tcolorbox provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part. The package tcolorbox can be used for the setting of \LaTeX{} examples where one part of the box displays the source code and the other part shows the output. Another common use case is the setting of theorems. The package supports saving and reuse of source code and text parts.

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1 Introduction

The package originates from the first edition of my book «\LaTeX{} – Einführung in das Textsatzsystem» [21] in about 2006. For the \LaTeX{} examples and tutorials given there, I wanted to have accentuated and colored boxes to display source code and compiled text in combination. Since, in my opinion, this type of boxes is also quite useful to highlight definitions and theorems, I applied them for my lecture notes in mathematics [18–20] as well. With this package, you are invited to apply these boxes for similar projects.

Starting with version 2.00, for all internal calculations \varepsilon\TeX{} [2] expressions are used in replacement of the package \texttt{calc}. The breaking news for version 2.00 is the support for breakable boxes. This new feature allows new applications of the package without affecting the core package too much if you do not need boxes to break automatically. With version 2.20, the often requested ‘side by side’ mode for listings has been added. With version 3.00, boxed titles are introduced together with improved customization options for overlays, underlays, finishes, and own code extensions.

Since the first public release in 2011, I received a lot of feedback from all over the world. I want to thank all who wrote me for supporting this package by sending bug reports and ideas for new or better features.

1.1 Installation

Typically, \texttt{tcolorbox} will be installed as part of a major \LaTeX{} distribution and there is nothing special to do for a user.

If you intend to make a local installation \textit{by hand}, see the README file of the \texttt{tcolorbox} package for some hints. The short story is: you have to install not only \texttt{tcolorbox.sty}, but also all \texttt{*.code.tex} files in the local \texttt{texmf} tree.

1.2 Loading the Package

The base package \texttt{tcolorbox} loads the packages \texttt{pgf} [22], \texttt{verbatim} [17], \texttt{etoolbox} [7], and \texttt{environ} [16]. \texttt{tcolorbox} itself is loaded in the usual manner in the preamble:

\begin{verbatim}
\usepackage{tcolorbox}
\end{verbatim}

The package takes option keys in the key-value syntax. Alternatively, you may use these keys later in the preamble with \texttt{\tcbuselibrary*P.9} (see there). For example, the key to typeset listings is:

\begin{verbatim}
\usepackage[listings]{tcolorbox}
\end{verbatim}
1.3 Libraries

The base package `tcolorbox` is extendable by program libraries. This is done by using option keys while loading the package or inside the preamble by applying the following macro with the same set of keys.

\tcbuselibrary{(key list)}

Loads the libraries given by the (key list).

\tcbuselibrary{listings, theorems}

The following keys are used inside \tcbuselibrary respectively \usepackage without the key tree path /tcb/library/.

/tcb/library/skins

Loads the package tikz [22] and provides additional styles (skins) for the appearance of the colored boxes; see Section 10 from page 151.

/tcb/library/vignette

Provides code for more ornamental; see Section 14 from page 274.

/tcb/library/raster

Provides additional macros and options for typesetting multiple boxes arranged in a kind of raster; see Section 15 from page 286.

/tcb/library/listings

Loads the package listings [6] and provides additional macros for typesetting listings which are described in Section 16 from page 308.

/tcb/library/listingsutf8

Loads the packages listings [6] and listingsutf8 [11] for UTF-8 support. This is a variant of the library listings and is described in Section 16 from page 308.

/tcb/library/minted

Loads the package minted [12] to typeset listings with the Pygments [14] tool, also see Section 16 on page 308.

/tcb/library/theorems

Provides additional macros for typesetting theorems which are described in Section 17 from page 349.

/tcb/library/breakable

Provides support for automatic box breaking from one page to another; see Section 18 on page 373.

/tcb/library/magazine

Provides support for storing broken box parts to be used later or in interchanged order, Section 19 on page 398.

/tcb/library/poster

Provides support for creating posters, Section 20 on page 408.

/tcb/library/fitting

Provides support for font size adaption of the box content to the box dimensions; see Section 21 from page 421.

/tcb/library/hooks

Extends several option keys to 'hookable' keys; see Section 22 from page 432.
/tcb/library/xparse

Provides document command production with xparse for tcolorbox; see Section 23 from page 443.

/tcb/library/external

Provides externalization support for stand-alone document snippets, see Section 24 on page 456.

/tcb/library/documentation

Provides additional macros for typesetting \LaTeX\ documentations which are described in Section 25 from page 468.

/tcb/library/many

Loads the libraries skins, breakable, raster, hooks, theorems, fitting, and xparse. Use this shortcut, if you want to use all features of tcolorbox with exception of typesetting listings and using the specialized documentation library.

/tcb/library/most

Loads all libraries except minted and documentation. Use this shortcut, if you want to use all features of tcolorbox with exception of using the minted package and using the specialized documentation library.

/tcb/library/all

Loads all libraries. Use this shortcut only, if you intend to use the documentation library.


/tcb/before \item P.80, /tcb/before skip \item P.82
/tcb/after \item P.80, /tcb/after skip \item P.82
3 Macros for Box Creation

\begin{tcolorbox}[(options)]
(environment content)
\end{tcolorbox}

This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts. The appearance of this box is controlled by numerous options. In the most simple case the source code

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

creates the following compiled text box:

\begin{center}
This is a \textbf{tcolorbox}.
\end{center}

The text content of the box can be divided in an upper and a lower part by the command \texttt{\textbackslash tcblower}. Visually, both parts are separated by a line. For example:

\begin{tcolorbox}
This is another \textbf{tcolorbox}.
\tcblower
Here, you see the lower part of the box.
\end{tcolorbox}

This code gives the following box:

\begin{center}
This is another \textbf{tcolorbox}.
\end{center}

Here, you see the lower part of the box.

The \texttt{(options)} control the appearance and several functions of the boxes, see Section 4 on page 18 for the complete list. A quick example is given here:

\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black,title=My nice heading]
This is another \textbf{tcolorbox}.
\tcblower
Here, you see the lower part of the box.
\end{tcolorbox}

\begin{center}
My nice heading
\end{center}

This is another \textbf{tcolorbox}.

Here, you see the lower part of the box.

\tcblower

Used inside \texttt{tcolorbox} to separate the upper box part from the optional lower box part. The upper and the lower part are treated as separate functional units. If you only want to draw a line, see \texttt{\textbackslash tcbline}\textsuperscript{p.212}. 

12
\texttt{\textbackslash tcbset\{\textit{options}\}}

Sets options for every following \texttt{tcolorbox} \footnote{P.12} inside the current \TeX{} group. By default, this does not apply to nested boxes, see Section 4.16 on page 93.

For example, the colors of the boxes may be defined for the whole document by this:

\begin{verbatim}
\tcbset{colback=red!5!white, colframe=red!75!black}
\end{verbatim}

\texttt{\textbackslash tcbsetforeverylayer\{\textit{options}\}}

Sets options for every following \texttt{tcolorbox} \footnote{P.12} inside the current \TeX{} group. In contrast to \texttt{\textbackslash tcbset}, this does also apply to nested boxes, see Section 4.16 on page 93. Technically, the \texttt{\{\textit{options\}} are appended to the default values for every \texttt{tcolorbox} which are applied by \texttt{/tcb\textbackslash reset} \footnote{P.108}.

You should not use this macro, if you are not completely sure that you want to have the \texttt{\{\textit{options\}} also for boxes in boxes (in boxes in boxes ...).

\begin{verbatim}
\tcbset{colback=green!10!white}
\tcbsetforeverylayer{colframe=red!75!black}

\begin{tcolorbox}[title=All options for this box]
This is a tcolorbox.\par\medskip
\begin{tcolorbox}[title=Nested box]
Note that this nested box has a red frame but no green background.
\end{tcolorbox}
\end{tcolorbox}
\end{verbatim}

\begin{center}
\begin{tcolorbox}
\begin{verbatim}
\tcbset{colback=green!10!white}
\tcbsetforeverylayer{colframe=red!75!black}

\begin{tcolorbox}[title=All options for this box]
This is a tcolorbox.\par\medskip
\begin{tcolorbox}[title=Nested box]
Note that this nested box has a red frame but no green background.
\end{tcolorbox}
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}
\end{center}

Options given with \texttt{\textbackslash tcbsetforeverylayer} survive a \texttt{\textbackslash reset}.
\texttt{tcolorbox} \{(options)\} \{\textit{box content}\}

Creates a colored box which is fitted to the width of the given \textit{box content}. In principle, most \textit{options} for a \texttt{tcolorbox} \cite{P.12} can be used for \texttt{tcolorbox} with some restrictions. A \texttt{tcolorbox} cannot have a lower part and cannot be broken.

\begin{tcolorbox}[colframe=blue!50!black,colback=white,colupper=red!50!black, fonttitle=\bfseries,nobeforeafter,center title]

Text \texttt{tcolorbox}[tcolorbox raise base]\{Hello World\}\texttt{hfll}
% \texttt{tcolorbox}[left=0mm,right=0mm,top=0mm,bottom=0mm,boxsep=0mm, toptitle=0.5mm,botomtitle=0.5mm,title=My table]{% \texttt{arrayrulecolor}{blue!50!black}\texttt{\renewcommand}{\arraystretch}{1.2}\% \texttt{\begin{tabular}{r|c|l}}
One & Two & Three \\
Men & Mice & Lions \\
Upper & Middle & Lower
\end{tabular}}\texttt{hfll}
% \texttt{tcolorbox}[colback=blue!85!black, left=0mm,right=0mm,top=0mm,bottom=0mm,boxsep=1mm,arc=0mm,boxrule=0.5pt, title=My picture]{% \texttt{\includegraphics}{[width=5cm]{Basilica_5.png}}

\end{tcolorbox}

\begin{tcolorbox}
Hello\ World!
\end{tcolorbox}

\begin{tcolorbox}
Hello\ World!
\end{tcolorbox}

\begin{tcolorbox}
Hello\ World!
\end{tcolorbox}
See Section 23.2 on page 445 and Section 23.3 on page 448 for more elaborate methods to create new environments and commands.

\newtcolorbox{(init options)}{(name)}{(number)}{(default)}{(options)}

Creates a new environment \(\text{name}\) based on \texttt{tcolorbox}\textsuperscript{\textit{P.12}}. Basically, \texttt{newtcolorbox}
operates like \texttt{newenvironment}. This means, the new environment \(\text{name}\) optionally takes \(\text{number}\) arguments, where \(\text{default}\) is the default value for the optional first argument. The \(\text{options}\) are given to the underlying \texttt{tcolorbox}. Note that /tcb/savedelimiter\textsuperscript{\textit{P.26}} is set to the given \(\text{name}\) automatically. The \(\text{init options}\) allow setting up automatic numbering, see Section 5 from page 110.

\begin{array}{ll}
\text{This is my own box.} & \text{This is my own box.} \\
\text{This is my own box with a mandatory title.} & \text{Hello there} \\
\text{This is my own box with a mandatory title and options.} & \text{Hello there} \\
\end{array}

\textbf{Definition in the preamble:}

\newtcolorbox[auto counter,number within=section]{pabox}{2}{}%\%
colback=red!5!white,colframe=red!75!black,fonttitle=\textbf{series}
title=Examp.\thetcbcounter,\texttt{tcbcounter: #2,#1}

\begin{array}{ll}
\text{This is my own box with a mandatory numbered title and options.} & \text{Examp. 3.1: Hello there} \\
\end{array}

\renewtcolorbox{(init options)}{(name)}{(number)}{(default)}{(options)}

Operates like \texttt{newtcolorbox}, but based on \texttt{renewenvironment} instead of \texttt{newenvironment}. An existing environment is redefined.
\newtcbox[\{init options\}]{\{\(name\)}\[\{\(number\)}\[\{\(default\)}\{\(options\)}

 Creates a new macro \(\{name\}\) based on \texttt{\tcbox\footnote{\texttt{P.14}}}. Basically, \texttt{\newtcbox} operates like \texttt{\newcommand}. The new macro \(\{name\}\) optionally takes \(\{number\}+1\) arguments, where \(\{default\}\) is the default value for the optional first argument. The \(\{options\}\) are given to the underlying \texttt{\tcbox}. The \(\{init options\}\) allow setting up automatic numbering, see Section 5 from page 110.

\begin{itemize}
\item \texttt{\newtcbox[\{colback=red!5!white,}
\item \texttt{colframe=red!75!black}\{This is my own box.\}}
\item \texttt{\mybox[\{colback=red!5!white,}
\item \texttt{colframe=red!75!black,fonttitle=\texttt{\textbfseries},}
\item \texttt{title=\#1}\{This is my own box.\}}
\item \texttt{\mybox[\{colback=yellow\}{Hello there}\%}
\item \texttt{\(\{\text{This is my own box.}\}}
\end{itemize}

\textbf{Definition in the preamble:}

\begin{itemize}
\item \texttt{\renewtcbox[\{init options\}]{\{\(name\)}\[\{\(number\)}\[\{\(default\)}\{\(options\)}
\item Operates like \texttt{\newtcbox}, but based on \texttt{\renewcommand} instead of \texttt{\newcommand}. An existing macro is redefined.
\end{itemize}
An existing environment `<name>` is redefined to be boxed inside a `tcolorbox` with the given `<options>`.

\begin{tcolorboxenvironment}{myitemize}{blanker, before skip=6pt, after skip=6pt, borderline west={3mm}{0pt}{red}}

Some text.
\begin{myitemize}
\item Alpha
\item Beta
\item Gamma
\end{myitemize}

More text.

See further examples in Section 17.4 on page 372.
4 Option Keys

For the \textit{options} in \texttt{tcolorbox} \textsuperscript{P.12} respectively \texttt{\textbraceleft{cbset}} \textsuperscript{P.13} the following \texttt{pgf} keys can be applied. The key tree path /tcb/ is not to be used inside these macros. It is easy to add your own style keys using the syntax for \texttt{pgf} keys, see \textsuperscript{[21, 22]} or the examples starting from page \textsuperscript{336}.

4.1 Title

\texttt{/tcb/title=⟨text⟩} \hspace{1cm} (no default, initially empty)

Creates a heading line with \textit{⟨text⟩} as content.

\texttt{\begin{tcolorbox}[title=My heading line]}
This is a \texttt{\textbf{tcolorbox}}.
\texttt{\end{tcolorbox}}

\texttt{/tcb/notitle} \hspace{1cm} (no value, initially set)

Removes the title line if set before.

\texttt{/tcb/adjusted title=⟨text⟩} \hspace{1cm} (style, no default, initially unset)

Creates a heading line with \textit{⟨text⟩} as content. The minimal height of this line is adjusted to fit the text given by /tcb/adjust text. This option makes sense for single line headings if boxes are set side by side with equal height. Note that it is very easy to trick this adjustment.

\texttt{\tcbset{colback=White,arc=0mm,width=(\linewidth-4pt)/4, equal height group=AT,before=,after=\hfill,fonttitle=\bfseries}}

The following titles are not adjusted:\
\texttt{\foreach \n in {xxx, ggg, AAA,"Ägypten}}\n\texttt{\begin{tcolorbox}[title=\n,colframe=red!75!black]}
Some content.\texttt{\end{tcolorbox}}
Now, we try again with adjusted titles:\
\texttt{\foreach \n in {xxx, ggg, AAA,"Ägypten}}\n\texttt{\begin{tcolorbox}[adjusted title=\n,colframe=blue!75!black]}
Some content.\texttt{\end{tcolorbox}}

The following titles are not adjusted:
\begin{tabular}{|c|c|c|c|}
\hline
xxx & ggg & AAA & Ägypten \\
\hline
Some content. & Some content. & Some content. & Some content. \\
\hline
\end{tabular}

Now, we try again with adjusted titles:
\begin{tabular}{|c|c|c|c|}
\hline
xxx & ggg & AAA & Ägypten \\
\hline
Some content. & Some content. & Some content. & Some content. \\
\hline
\end{tabular}

\texttt{/tcb/adjust text=⟨text⟩} \hspace{1cm} (no default, initially Äpgjy)

This sets the reference text for /tcb/adjusted title. If your texts never exceed 'Äpgjy' in depth and height you don’t need to care about this option.
/tcb/squeezed title=⟨text⟩  (style, no default, initially unset)

Creates a single heading line with ⟨text⟩ as content. If the ⟨text⟩ is longer than the available space, the text is squeezed to fit into the available space.

\begin{tcbitemize}[raster columns=3, raster equal height, colframe=red!75!black, colback=red!5!white, fonttitle=\bfseries]
\tcbitem[squeezed title={Short title}]
  First box
\tcbitem[squeezed title={This is a very very long title}]
  Second box
\tcbitem[squeezed title={This title is clearly too long for this application}]
  Third box
\end{tcbitemize}

/tcb/squeezed title*=⟨text⟩  (style, no default, initially unset)

This is a combination of /tcb/adjusted title^P.18 and /tcb/squeezed title.

\begin{tcbitemize}[raster columns=3, raster equal height, colframe=red!75!black, colback=red!5!white, fonttitle=\bfseries]
\tcbitem[squeezed title*=⟨Short title⟩]
  First box
\tcbitem[squeezed title*=⟨This is a very very long title⟩]
  Second box
\tcbitem[squeezed title*=⟨This title is clearly too long for this application⟩]
  Third box
\end{tcbitemize}

/tcb/titlebox=⟨mode⟩  (no default, initially visible)

Controls the treatment of the title part of the box. Feasible values for ⟨mode⟩ are:
- **visible**: usual type setting of the title box,
- **invisible**: empty space instead of the title contents.

\begin{tcolorbox}[title=My invisible title, titlebox=invisible]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.  

19
/tcb/detach title
Detaches the title from its normal position. The text of the title is stored into \tcbtitletext and the formatted title is available by \tcbtitle. The main application is to move the title from its usual place to another one.

\newtcolorbox{mybox}[2][]{colbacktitle=red!10!white, colback=blue!10!white, coltitle=red!70!black, title={#2},fonttitle={\bfseries,#1}}
\begin{mybox}{My title}
This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}[detach title, before upper={\tcbtitle}]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}[detach title, after upper={\par\hfill \tcbtitle}]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

My title
This is a \textbf{tcolorbox}.

My title: This is a \textbf{tcolorbox}.

/tcb/attach title
Attaches the title to its normal position. This option is used to reverse /tcb/detach title.

/tcb/attach title to upper=⟨text⟩
Attaches the title to the begin of the upper part of the box content. The optional ⟨text⟩ is set between the formatted title and the box content.

\newtcolorbox{mybox}[2][]{colbacktitle=red!10!white, colback=blue!10!white, coltitle=red!70!black, title={#2},fonttitle={\bfseries,#1}}
\begin{mybox}[attach title to upper={\ ---\ }]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}[attach title to upper, after title={:\ }]{My title}
This is a \textbf{tcolorbox}.
\end{mybox}

My title — This is a \textbf{tcolorbox}.

My title: This is a \textbf{tcolorbox}.

More title options are documented in Section 4.11 on page 64 and Section 10.2 on page 158.
4.2 Subtitle

Inside the box content, one or more subtitles can be added. In general, a subtitle is a further \texttt{tcolorbox} \footnote{P.12} which inherits some color and geometry options from the enclosing box. It may be customized just like any other \texttt{tcolorbox} \footnote{P.12}.

\begin{tcolorbox}
[title=My title, 
  colback=red!5!white, 
  colframe=red!75!black, 
  fonttitle=\bfseries]
  This is a \texttt{tcolorbox}.
  \tcbsubtitle\[before skip=\baselineskip\]
  \{My subtitle\}
  Further text.
\end{tcolorbox}

\texttt{My title}
This is a \texttt{tcolorbox}.

\texttt{My subtitle}
Further text.

\begin{tcolorbox}
[title=My title, 
  colback=red!5!white, 
  colframe=red!75!black, 
  colbacktitle=yellow!50!red, 
  coltitle=red!25!black, 
  fonttitle=\bfseries]
  This is a \texttt{tcolorbox}.
  \tcbsubtitle\[before skip=\baselineskip\]
  \{My subtitle\}
  Further text.
\end{tcolorbox}

\texttt{My title}
This is a \texttt{tcolorbox}.

\texttt{My subtitle}
Further text.

\texttt{Second subtitle}
Further text.
4.3 Upper Part

The text content of a \texttt{tcolorbox}\textsuperscript{P.12} may be parted into a mandatory \textit{upper part} and an optional \textit{lower part}. These parts are separated by \texttt{\tcblower}\textsuperscript{P.12}. If there is no \texttt{\tcblower}\textsuperscript{P.12} present, there is no \textit{lower part} and the \textit{upper part} forms the complete text content.

\texttt{\textcolor{red}{/tcb/upperbox=(mode)}} (no default, initially \texttt{visible})

Controls the treatment of the upper part of the box. If there is no lower part, this is the complete text content. Feasible values for \texttt{(mode)} are:

- \texttt{visible}: usual type setting of the upper part,
- \texttt{invisible}: empty space instead of the upper part contents.

\begin{tcolorbox}[upperbox=invisible,colback=white]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

This is the lower part.

\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

\begin{tcolorbox}
\texttt{\textcolor{red}{/tcb/visible}} (style, no value)

Shortcut for setting \texttt{/tcb/upperbox, /tcb/lowerbox}\textsuperscript{P.24}, and \texttt{/tcb/titlebox}\textsuperscript{P.19} to be \texttt{visible}.

\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

This is the lower part.

\begin{tcolorbox}
\texttt{\textcolor{red}{/tcb/invisible}} (style, no value)

Shortcut for setting \texttt{/tcb/upperbox, /tcb/lowerbox}\textsuperscript{P.24}, and \texttt{/tcb/titlebox}\textsuperscript{P.19} to be \texttt{invisible}.

\begin{tcolorbox}[invisible]
This is a \textbf{tcolorbox} (but invisible).
\end{tcolorbox}

This is the lower part.
/tcb/saveto\{file name\}

Saves the content of the box into a file for an optional later usage. This is the counterpart of /tcb/savelowerto\textsuperscript{P.24}, but is saves not only the upper part but the whole content. If a lower part is present, it is also saved including \tcblower\textsuperscript{P.12}.

\begin{tcolorbox}[invisible,saveto=\jobname_mysave1.tex,colback=white]
This is a \textbf{tcolorbox} which seems to be empty. The content is saved for later usage.
\end{tcolorbox}

Now, we load the saved text:
\input{\jobname_mysave1.tex}

\begin{tcolorbox}[saveto=\jobname_mysave2.tex]
This is a \textbf{tcolorbox}. \tcblower This is the lower part.
\end{tcolorbox}

Now, we load the saved text:
\begin{tcolorbox}[colframe=red,colback=red!10,coltitle=black,colbacktitle=red!20,sidebyside,title=Here we see the saved content including the lower part]
\input{\jobname_mysave2.tex}
\end{tcolorbox}

Now, we load the saved text:
\begin{tcolorbox}[colframe=red,colback=red!10,coltitle=black,colbacktitle=red!20,sidebyside,title=Here we see the saved content including the lower part]
\begin{tcolorbox}
This is a \textbf{tcolorbox}. This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}. This is the lower part.
4.4 Lower Part

/\texttt{tcb/lowerbox}=\langle mode \rangle \quad \text{(no default, initially visible)}

Controls the treatment of the lower part of the box. Feasible values for \langle mode \rangle are:

- **visible**: usual type setting of the lower part,
- **invisible**: empty space instead of the lower part contents,
- **ignored**: the lower part is not used (here).

The last two values are usually applied in connection with \texttt{savelowerto}.

\begin{tcolorbox}[lowerbox=\texttt{invisible},colback=white]
This is a \texttt{tcolorbox}.
\tcblower
This is the lower part (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[lowerbox=\texttt{ignored},colback=white]
This is a \texttt{tcolorbox}.
\tcblower
This is the lower part (but ignored).
\end{tcolorbox}

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/\texttt{tcb/savelowerto}=\langle file name \rangle \quad \text{(no default, initially empty)}

Saves the content of the lower part into a file for an optional later usage.

\begin{tcolorbox}[lowerbox=\texttt{invisible},savelowerto=\jobname\_bspsave.tex,colback=white]
This is a \texttt{tcolorbox}.
\tcblower
This is the lower part which may be quite complex: \[ f(x)=\frac{1+x^2}{1-x^2}. \]
\end{tcolorbox}

Now, we load the saved text:
\begin{verbatim}
\input{\jobname\_bspsave.tex}
\end{verbatim}

This is a \texttt{tcolorbox}.

Now, we load the saved text:

This is the lower part which may be quite complex: \( f(x) = \frac{1 + x^2}{1 - x^2}. \)
If set to true, the lower part is visually separated from the upper part. It depends on the chosen skin how the visualization of the separation is done.
/tcb/savedelimiter=(name) (no default, initially tcolorbox)
Used in connection with new environment definitions which extend tcolorbox and use or allow the option savelowerto. To catch the end of the new box environment ⟨name⟩ has to be the name of this environment. Additionally, the environment definition has to use \tcolorbox instead of \begin{tcolorbox} and \end{tcolorbox} instead of \end{tcolorbox}.

\newenvironment{mybox}[1]{{
\begin{tcolorbox}[savedelimiter=mybox, savelowerto=\jobname-bspsave2.tex,lowerbox=ignored, colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, title=#1]}% 
{\end{tcolorbox}}
\begin{mybox}{My Example}
Upper part.
\tcblower
Saved lower part!
\end{mybox}

Now, the saved part is used:
\begin{tcolorbox}[colback=green!5]
\input{\jobname-bspsave2.tex}
\end{tcolorbox}

My Example
Upper part.
Now, the saved part is used:
Saved lower part!

The savedelimiter is used implicitly with \newtcolorbox\textsuperscript{P.15} which allows a more convenient usage:

\newtcolorbox{mybox}[1]{% 
savelowerto=\jobname-bspsave2.tex,lowerbox=ignored, colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries, title=#1}% 
\begin{mybox}{My Example}
Upper part.
\tcblower
Saved lower part!
\end{mybox}

Now, the saved part is used:
\begin{tcolorbox}[colback=green!5]
\input{\jobname-bspsave2.tex}
\end{tcolorbox}

My Example
Upper part.
Now, the saved part is used:
Saved lower part!
4.5 Colors and Fonts

\texttt{/tcb/colframe=\langle color\rangle} 
(no default, initially \texttt{black!75!white})

Sets the frame \texttt{\langle color\rangle} of the box.

\begin{tcolorbox}[colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\texttt{/tcb/colback=\langle color\rangle} 
(no default, initially \texttt{black!5!white})

Sets the background \texttt{\langle color\rangle} of the box.

\begin{tcolorbox}[colback=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\texttt{/tcb/title filled=true|false} 
(default true, initially false)

Switches the drawing of the title background according to the given value. This option is set to true automatically by \texttt{/tcb/colbacktitle}, \texttt{/tcb/opacitybacktitle} \textsuperscript{P.51}, and \texttt{/tcb/title style} \textsuperscript{P.154}, and \texttt{/tcb/title code} \textsuperscript{P.142}.

\begin{tcolorbox}[title=My title,title filled]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[title=My title,title filled=false]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\texttt{/tcb/colbacktitle=\langle color\rangle} 
(no default, initially \texttt{black!50!white})

Sets the background \texttt{\langle color\rangle} of the title area of the box.

\begin{tcolorbox}[colbacktitle=red!50!white,title=My title, coltitle=black, fonttitle=\textbf{\textbfseries}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title

This is a \textbf{tcolorbox}.

My title
/tcb/colupper\{color\} (no default, initially black)
Sets the text \{color\} of the upper part.

```
\begin{tcolorbox}[colupper=red!75!black]
  This is a \textbf{tcolorbox}.
  \tcblower
  This is the lower part.
\end{tcolorbox}
```

/tcb/collower\{color\} (no default, initially black)
Sets the text \{color\} of the lower part.

```
\begin{tcolorbox}[collower=red!75!black]
  This is a \textbf{tcolorbox}.
  \tcblower
  This is the lower part.
\end{tcolorbox}
```

/tcb/coltext\{color\} (style, no default, initially black)
Sets the text \{color\} of the box. This is an abbreviation for setting colupper and collower to the same value.

```
\begin{tcolorbox}[coltext=red!75!black]
  This is a \textbf{tcolorbox}.
  \tcblower
  This is the lower part.
\end{tcolorbox}
```

/tcb/coltitle\{color\} (no default, initially white)
Sets the title text \{color\} of the box.

```
\begin{tcolorbox}[coltitle=red!75!black, colbacktitle=black!10!white, title=Test]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}
```
Sets \textit{text} before the content of the upper part (e.g. font settings).

```
\begin{tcolorbox}[fontupper=Hello!-\sffamily]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

Hello! This is a \textit{tcolorbox}.

Sets \textit{text} before the content of the lower part (e.g. font settings).

```
\begin{tcolorbox}[fontlower=\sffamily\bfseries\large,title=Hello]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a \textit{tcolorbox}.

More color options are provided by using skins documented in Section 10 from page 151.
4.6 Text Alignment

/tcb/halign=(alignment) (no default, initially justify)

If there is no lower part, halign determines the horizontal (alignment) of the text content. Otherwise, halign determines the horizontal (alignment) of the upper part of the box only. The feasible values for (alignment) are more or less identical to the corresponding /tikz/align settings, even if the implementation differs.

- **justify**: usual left and right justified type setting.
- **left**: left border justification in analogy to plain \text{T}_{\text{E}}X.
- **flush left**: left border justification with \texttt{raggedright} of \text{T}_{\text{E}}X.
- **right**: right border justification in analogy to plain \text{T}_{\text{E}}X.
- **flush right**: right border justification with \texttt{raggedleft} of \text{T}_{\text{E}}X.
- **center**: centering in analogy to plain \text{T}_{\text{E}}X.
- **flush center**: centering with \texttt{centering} of \text{T}_{\text{E}}X.

The differences between the flush and non-flush version are explained in detail in the \text{T}_{\text{kZ}} manual \cite{tikzmanual}. The short story is that the non-flush versions will often look more balanced but with more hyphenations.

```
\tcbset{colback=red!5!white,colframe=red!75!black,size=small,fonttitle=\bfseries,width=3.5cm,box align=top,nobeforeafter}
\begin{tcolorbox}[adjusted title=flush center,halign=flush center]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush left,halign=flush left]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush right,halign=flush right]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=center,halign=center]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=left,halign=left]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=right,halign upper=right]
This is a demonstration text for showing how line breaking works.
\end{tcolorbox}
```

 flush center

This is a demonstration text for showing how line breaking works.

 flush left

This is a demonstration text for showing how line breaking works.

 flush right

This is a demonstration text for showing how line breaking works.
halign lower determines the horizontal (alignment) of the lower part of the box. The feasible values for (alignment) are the same as for /tcb/halign.\footnote{P.30}

\begin{tcbraster}
\begin{tcolorbox}[adjusted title=flush center,halign lower=flush center]
Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush left,halign lower=flush left]
Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush right,halign lower=flush right]
Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=center,halign lower=center]
Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=left,halign lower=left]
Upper part. \tcblower Lower part.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=right,halign lower=right]
Upper part. \tcblower Lower part.
\end{tcolorbox}
\end{tcbraster}
`/tcb/halign title`\langle alignment\rangle (no default, initially `justify`)

`halign lower` determines the horizontal \langle alignment\rangle of the title of the box. The feasible values for \langle alignment\rangle are the same as for `/tcb/halign`\textsuperscript{P.30}.

\begin{tcbraster}[raster columns=3,fonttitle=\bfseries, colback=red!5!white,colframe=red!75!black]
\begin{tcolorbox}[adjusted title=flush center,halign title=flush center] This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush left,halign title=flush left] This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=flush right,halign title=flush right] This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=center,halign title=center] This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=left,halign title=left] This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=right,halign title=right] This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{tcbraster}

\begin{itemize}
\item `/tcb/flushleft upper` \hspace{1em} (style, no value)
\begin{itemize}
\item Shortcut for setting `/tcb/halign`\textsuperscript{P.30} to \textbf{flush left}.
\end{itemize}
\item `/tcb/center upper` \hspace{1em} (style, no value)
\begin{itemize}
\item Shortcut for setting `/tcb/halign`\textsuperscript{P.30} to \textbf{flush center}.
\end{itemize}
\item `/tcb/flushright upper` \hspace{1em} (style, no value)
\begin{itemize}
\item Shortcut for setting `/tcb/halign`\textsuperscript{P.30} to \textbf{flush right}.
\end{itemize}
\item `/tcb/flushleft lower` \hspace{1em} (style, no value)
\begin{itemize}
\item Shortcut for setting `/tcb/halign lower`\textsuperscript{P.31} to \textbf{flush left}.
\end{itemize}
\item `/tcb/center lower` \hspace{1em} (style, no value)
\begin{itemize}
\item Shortcut for setting `/tcb/halign lower`\textsuperscript{P.31} to \textbf{flush center}.
\end{itemize}
\item `/tcb/flushright lower` \hspace{1em} (style, no value)
\begin{itemize}
\item Shortcut for setting `/tcb/halign lower`\textsuperscript{P.31} to \textbf{flush right}.
\end{itemize}
\item `/tcb/flushleft title` \hspace{1em} (style, no value)
\begin{itemize}
\item Shortcut for setting `/tcb/halign title` to \textbf{flush left}.
\end{itemize}
\item `/tcb/center title` \hspace{1em} (style, no value)
\begin{itemize}
\itemShortcut for setting `/tcb/halign title` to \textbf{flush center}.
\end{itemize}
\item `/tcb/flushright title` \hspace{1em} (style, no value)
\begin{itemize}
\item Shortcut for setting `/tcb/halign title` to \textbf{flush right}.
\end{itemize}
\end{itemize}
The vertical alignment settings are only relevant for boxes which are larger than their natural height, see Section 4.10 on page 53.

\textbf{\verb|/tcb/valign|=(alignment)} \hspace{1cm} \text{(no default, initially top)}

If the height of a \texttt{tcolorbox} is not the natural height, \texttt{valign} determines the vertical \texttt{(alignment)} of the upper part. Feasible values are:

- \texttt{top}: Anchor text at top.
- \texttt{center}: Anchor text at center.
- \texttt{bottom}: Anchor text at bottom.
- \texttt{scale}: Scale text vertically to fit into the available space. This is brutal and may not look very good. Consider Section 21 on page 421 alternatively.
- \texttt{scale*}: Like \texttt{scale}, but scaling is bounded by \texttt{/tcb/valign scale limit}.

For a box with natural height, these settings are meaningless.

\begin{verbatim}
\set{width=(\linewidth-2mm)/4,before=,after=\hfill,
colframe=blue!75!black,colback=white,height=2cm}
\foreach \myalign in {top,center,bottom,scale}
{\begin{tcolorbox}[valign=\myalign]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}}
\end{verbatim}

\textbf{\verb|/tcb/valign upper|=(alignment)} \hspace{1cm} \text{(no default, initially top)}

Alias for \texttt{/tcb/valign}.

\textbf{\verb|/tcb/valign lower|=(alignment)} \hspace{1cm} \text{(no default, initially top)}

This key has the same meaning for the lower part as \texttt{valign} for the upper part, i.e., it determines the vertical \texttt{(alignment)} of the lower part with feasible values \texttt{top}, \texttt{center}, \texttt{bottom}, \texttt{scale}, and \texttt{scale*}.

\textbf{\verb|/tcb/valign scale limit|=(real number)} \hspace{1cm} \text{(no default, initially 1.1)}

Sets an upper scale limit for the \texttt{scale*} setting in \texttt{/tcb/valign} and \texttt{/tcb/valign lower}. Note that this value is not reset by \texttt{/tcb/reset} \textsuperscript{P.108}. So, changes also apply to embedded boxes.

Also see \texttt{/tcb/sidebyside align} \textsuperscript{P.119} for alignment settings when upper part and lower part are set side-by-side.
4.7 Geometry

4.7.1 Width

\texttt{\textbackslash tcb/width=⟨length⟩} (no default, initially \texttt{\textbackslash linewidth})

Sets the total width of the colored box to \texttt{(length)}. See also \texttt{\textbackslash tcb/height} \textsuperscript{P.53}.

\begin{verbatim}
\tcbset{colback=red!5!white, colframe=red!75!black}
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

This is a \texttt{tcolorbox}.

\texttt{\textbackslash tcb/text width=⟨length⟩} (style, no default)

Sets the text width of the upper part to \texttt{(length)}. See also \texttt{\textbackslash tcb/text height} \textsuperscript{P.54}.

\begin{verbatim}
\tcbset{colback=red!5!white, colframe=red!75!black}
\begin{tcolorbox}[text width=4cm]
This is a \textbf{tcolorbox} where the text has a width of 4cm.
\end{tcolorbox}
\end{verbatim}

This is a \texttt{tcolorbox} where the text has a width of 4cm.

\texttt{\textbackslash tcb/add to width=⟨length⟩} (style, no default)

Adds \texttt{(length)} to the current total width of the colored box.

\begin{verbatim}
\tcbset{width=4cm, colback=red!5!white, colframe=red!75!black}
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[add to width=1cm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

This is a \texttt{tcolorbox}.

This is a \texttt{tcolorbox}.

See Section 4.10 on page 53 for setting fixed height values.
4.7.2 Rules

\[ /tcb/toprule=⟨length⟩ \] (no default, initially 0.5mm)
Sets the line width of the top rule to \(⟨length⟩\).

\[
\textcolor{red}{\textbf{tcolorbox}} \begin{tcolorbox}[toprule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\]

\[ /tcb/bottomrule=⟨length⟩ \] (no default, initially 0.5mm)
Sets the line width of the bottom rule to \(⟨length⟩\).

\[
\textcolor{red}{\textbf{tcolorbox}} \begin{tcolorbox}[bottomrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\]

\[ /tcb/leftrule=⟨length⟩ \] (no default, initially 0.5mm)
Sets the line width of the left rule to \(⟨length⟩\).

\[
\textcolor{red}{\textbf{tcolorbox}} \begin{tcolorbox}[leftrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\]

\[ /tcb/rightrule=⟨length⟩ \] (no default, initially 0.5mm)
Sets the line width of the right rule to \(⟨length⟩\).

\[
\textcolor{red}{\textbf{tcolorbox}} \begin{tcolorbox}[rightrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\]
/tcb/titlerule=(length)  
(no default, initially 0.5mm) 
Sets the line width of the rule below the title to \(\langle\text{length}\rangle\).

\begin{tcolorbox}[titlerule=3mm,title=This is the title] 
This is a \textbf{tcolorbox}. 
\end{tcolorbox}

\begin{tcolorbox}[titlerule=3mm,title=This is the title] 
This is a \textbf{tcolorbox}. 
\end{tcolorbox}

/tcb/boxrule=(length)  
(style, no default, initially 0.5mm) 
Sets all rules of the frame to \(\langle\text{length}\rangle\), i.e. \texttt{/tcb/toprule}, \texttt{/tcb/bottomrule}, \texttt{/tcb/leftrule}, \texttt{/tcb/rightrule}, and \texttt{/tcb/titlerule}.

\begin{tcolorbox}[boxrule=3mm] 
This is a \textbf{tcolorbox}. 
\end{tcolorbox}

\begin{tcolorbox}[boxrule=3mm] 
This is a \textbf{tcolorbox}. 
\end{tcolorbox}

More options for drawing a \texttt{/tcb/borderline} are provided by using skins documented in Section 10 from page 151.

4.7.3 Arcs

/tcb/arc=(length)  
(no default, initially 1mm) 
Sets the inner radius of the four frame arcs to \(\langle\text{length}\rangle\).

\begin{tcolorbox}[arc=0mm] 
This is a \textbf{tcolorbox}. 
\end{tcolorbox}

\begin{tcolorbox}[arc=0mm] 
This is a \textbf{tcolorbox}. 
\end{tcolorbox}

\begin{tcolorbox}[arc=3mm] 
This is a \textbf{tcolorbox}. 
\end{tcolorbox}

\begin{tcolorbox}[arc=3mm] 
This is a \textbf{tcolorbox}. 
\end{tcolorbox}
/tcb/circular arc  

Sets /tcb/arc *P.36* to match the half of the inner width of the colored box. If width and height of the box are identical, this gives a circle.

If the height of the box is smaller than the width, the result will look quite ugly.

\begin{tcolorbox}[width=3cm,  
  colback=red!5!white,  
  colframe=red!75!black,  
  halign=center,valign=center,  
  square,circular arc]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/bean arc  

Sets /tcb/arc *P.36* to match the smaller value of the half of the inner width and of the inner height of the colored box.

This only works for a fixed /tcb/height *P.53*. Also, /tcb/bean arc must be used after width and height are set by option keys.

\tcbset{size=fbox,boxrule=0.5mm,  
  colback=red!5!white,  
  colframe=red!75!black,  
  halign=center,valign=center}

\begin{tcolorbox}[width=3cm,height=2cm,bean arc]  
  Box A
\end{tcolorbox}

\begin{tcolorbox}[width=2cm,height=3cm,bean arc]  
  Box B
\end{tcolorbox}

/tcb/octogon arc  

Sets /tcb/arc *P.36* to match \(\frac{1}{2+\sqrt{2}}\) of the inner width of the colored box. If width and height of the box are identical, the interior is a regular octogon.

\begin{tcolorbox}[enhanced,  
  size=minimal,auto outer arc,  
  width=2.1cm,octogon arc,  
  colback=red,colframe=white,colupper=white,  
  fontupper=\fontsize{7mm}{7mm}\selectfont\bfseries\sffamily,  
  halign=center,valign=center,  
  square,arc is angular,  
  borderline={0.2mm}{-1mm}{red} ]
  STOP
\end{tcolorbox}
/tcb/arc is angular\hfill (no value, initially unset)

Using this option applies a patch which straightens the corners arcs of the boxes. The little arcs are replaced by little straight lines.

This patch is considered as an experimental feature. It changes some of the original \LaTeX{} code. This change may break with future updates of \LaTeX{}.

\begin{tcolorbox}[arc is angular]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[arc is curved]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
\[\text{This is a tcolorbox.}\]
\end{tcolorbox}

\begin{tcolorbox}
\[\text{This is a tcolorbox.}\]
\end{tcolorbox}

/tcb/arc is curved\hfill (no value, initially set)

This option resets the patch from \texttt{/tcb/arc is angular}. The original \LaTeX{} code is activated.

\begin{tcolorbox}[arc=4mm,outer arc=1mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/\texttt{tcb/auto outer arc}\hfill (no value, initially set)

Sets the outer radius of the four frame arcs automatically in dependency of the inner radius given by /\texttt{tcb/arc}^{-P.36}.

\begin{tcolorbox}
\[\text{This is a tcolorbox.}\]
\end{tcolorbox}
4.7.4 Spacing

/tcb/boxsep=⟨length⟩
(no default, initially 1mm)
Sets a common padding of ⟨length⟩ between the text content and the frame of the box. This value is added to the key values of left, right, top, bottom, and middle at the appropriate places.

\tcbset{colback=red!5!white,colframe=red!75!black,width=(\linewidth-4mm)/2,
  before=,after=\hfill}
\begin{tcolorbox}[boxsep=5mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[boxsep=5mm,draft]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

/tcb/left=⟨length⟩
(style, no default, initially 4mm)
Sets the left space between all text parts and frame (additional to boxsep). This is an abbreviation for setting lefttitle, leftupper, and leftlower to the same value.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[left=0mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[left*=0mm,
  enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is some text.

\tcbset{colback=red!5!white,colframe=red!75!black}
This is some text.
\begin{tcolorbox}[grow to left by=5mm,left*=0mm,
  enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is some text.
/tcb/lefttitle=(length)  (no default, initially 4mm)
Sets the left space between title text and frame (additional to boxsep).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[lefttitle=3cm,title=My Title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My Title
This is a tcolorbox.

/tcb/leftupper=(length)  (no default, initially 4mm)
Sets the left space between upper text and frame (additional to boxsep).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[leftupper=3cm,title=My Title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My Title
This is a tcolorbox.

/tcb/leftlower=(length)  (no default, initially 4mm)
Sets the left space between lower text and frame (additional to boxsep).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[leftlower=3cm]
\textbf{This is a tcolorbox.}
\tcblower
This is the lower part.
\end{tcolorbox}

This is a tcolorbox.
This is the lower part.

/tcb/right=(length)  (style, no default, initially 4mm)
Sets the right space between all text parts and frame (additional to boxsep). This is an abbreviation for setting righttitle, rightupper, and rightlower to the same value.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[width=5cm,right=2cm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a tcolorbox.
Sets \texttt{/tcb/right} such that \texttt{(length)} is the distance between the right bounding box and the text parts.

\begin{tcolorbox} \[\text{This is a \textbf{tcolorbox}.}\] \end{tcolorbox}

Sets the right space between title text and frame (additional to \texttt{boxsep}).

\begin{tcolorbox} \[\text{My very long title text} \] \text{This is a \textbf{tcolorbox} with standard upper box dimensions.} \end{tcolorbox}

Sets the right space between upper text and frame (additional to \texttt{boxsep}).

\begin{tcolorbox} \[\text{My very long title text} \] \text{This is a \textbf{tcolorbox} with compressed upper box dimensions.} \end{tcolorbox}
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[width=5cm,rightlower=2cm]
This is a \textbf{tcolorbox} with standard upper box dimensions.
\tcblower
This is the lower part with large space at right.
\end{tcolorbox}

This is a \textbf{tcolorbox} with standard upper box dimensions.
This is the lower part with large space at right.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[top=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
This is the lower part.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[toptitle=3mm,title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.
/tcb/bottom=⟨length⟩ (no default, initially 2mm)
Sets the bottom space between text and frame (additional to boxsep).

\begin{tcolorbox}
\textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tcb/bottomtitle=⟨length⟩ (no default, initially 0mm)
Sets the bottom space between title and frame (additional to boxsep).

\begin{tcolorbox}[bottomtitle=3mm,title=My title]
\textbf{tcolorbox}.
\end{tcolorbox}

/tcb/middle=⟨length⟩ (no default, initially 2mm)
Sets the space between upper and lower text to the separation line (additional to boxsep).

\begin{tcolorbox}[middle=0mm,boxsep=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
4.7.5 Size Shortcuts

\( /tcb/size=\langle\text{name}\rangle \)

(no default, initially normal)
Sets all geometry keys with exception of \( /tcb/width \)\(^{P.34}\) to predefined length values. For \( \langle\text{name}\rangle \), the following values are feasible:

- **normal**: normal sized boxes e.g. of width \textwidth.
- **title**: title line sized boxes.
- **small**: small boxes e.g. for keyword highlighting.
- **fbox**: identical to the standard \fbox.
- **tight**: no padding space at all.
- **minimal**: no padding space, no box rules.

\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black}
\foreach \s in {normal,title,small,fbox,tight,minimal} {
  \tcbox[size=\s,on line]{\s}
}
\foreach \s in {normal,title,small,fbox,tight,minimal} {
  \tcbox[size=\s,on line,title=Test]{\s}
}
\foreach \s in {normal,title,small,fbox,tight,minimal} {
  \begin{tcolorbox}[size=\s,on line,title=Test,width=2.2cm]
    \s \tcblower lower\end{tcolorbox}
}
\end{verbatim}

\begin{table}
\centering
\begin{tabular}{|l|c|c|c|c|c|c|}
\hline
  & normal & title & small & fbox & tight & minimal \\
\hline
boxrule & 0.5mm & 0.4mm & 0.3mm & 0.4pt & 0.4pt & 0.0pt \\
boxsep & 1.0mm & 1.0mm & 1.0mm & 0.0pt & 0.0pt & 0.0pt \\
left & 4.0mm & 2.0mm & 1.0mm & 0.0pt & 0.0pt & 0.0pt \\
right & 4.0mm & 2.0mm & 1.0mm & 0.0pt & 0.0pt & 0.0pt \\
top & 2.0mm & 0.25mm & 0.0mm & 0.0pt & 0.0pt & 0.0pt \\
bottom & 2.0mm & 0.25mm & 0.0mm & 0.0pt & 0.0pt & 0.0pt \\
toptitle & 0.0mm & 0.0mm & 0.0mm & 0.0pt & 0.0pt & 0.0pt \\
bottomtitle & 0.0mm & 0.0mm & 0.0mm & 0.0pt & 0.0pt & 0.0pt \\
middle & 2.0mm & 0.75mm & 0.5mm & 1.0pt & 0.2pt & 0.0pt \\
arc & 1.0mm & 0.75mm & 0.5mm & 1.0pt & 0.0pt & 0.0pt \\
outer arc & auto & auto & auto & auto & 0.0pt & 0.0pt \\
\hline
\end{tabular}
\end{table}
Sets the text width of the upper part to the current line width plus an optional \( \langle \text{length} \rangle \). This is achieved by changing the keys \( /\text{tcb/width} \), \( /\text{tcb/enlarge left} \), and \( /\text{tcb/enlarge right} \) appropriately. The resulting box is overlapping into the left and right margin of the page. Note that this style option has to be given \textit{after} all other geometry keys! Also see \( /\text{tcb/grow sidewards} \) and \( /\text{tcb/spread sidewards} \) appropriately. The resulting box is overlapping into the left and right margin of the page. Note that this style option has to be given \textit{after} all other geometry keys! Also see \( /\text{tcb/grow sidewards} \) and \( /\text{tcb/spread sidewards} \) appropriately.

\begin{tcolorbox}
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[oversize,title=Oversized box]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[title=Normal box]
\lipsum[2]
\end{tcolorbox}

\textit{Normal text for comparison:}

\begin{tcolorbox}
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[title=Normal box]
\lipsum[2]
\end{tcolorbox}

\textit{Normal text for comparison:}

\textit{Oversized box}


\textit{Normal box}

4.7.6 Toggle Left and Right

/tcb/toggle left and right=(toggle preset)\hspace{1cm} (default evenpage, initially none)

According to the \texttt{(toggle preset)}, the left and the right settings of the \texttt{tcolorbox} are switched or not. Feasible values are:

- **none**: no switching.
- **forced**: the values of the left and right rules, spaces, and corners are switched.
- **evenpage**: if the page is an even page, the values of the left and right rules, spaces, and corners are switched. This value also sets \texttt{/tcb/check odd page} to true.

Horizontal bounding box enlargements are not toggled by this option. They can be toggled independently by \texttt{/tcb/toggle enlargement} \cite{P.103}. For example, \texttt{/tcb/oversize} \cite{P.45} changes the bounding box.

\begin{tcolorbox}
\begin{tcbclipframe}
\tcbifoddpage{\coordinate (X) at ([xshift=-5mm]frame.east);}
\end{tcbclipframe}
\lipsum[1-6]
\end{tcolorbox}

This example switches a 1cm thick rule from the left to the right side depending on the page number. Thereby, the rule is always on the outer side of the double-sided paper. Additionally, a ball is drawn on the outer side with help of an overlay.


Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellen-


4.8 Corners

The four corners of any \texttt{tcolorbox} can be set individually as \texttt{/tcb/sharp corners} or as \texttt{/tcb/rounded corners} \textsuperscript{p.49}. These settings are also reflected in the behavior of \texttt{/tcb/borderline} \textsuperscript{p.180} and \texttt{/tcb/shadow} \textsuperscript{p.191} as one would expect.

By default, all four corners are \textit{rounded}. So, only the \texttt{/tcb/sharp corners} option will be necessary for most use cases. The \texttt{/tcb/rounded corners} \textsuperscript{p.49} option can be used to revert a \texttt{/tcb/sharp corners} setting.

\texttt{/tcb/sharp corners=(position)} \hspace{1cm} (default all, initially unset)

The \texttt{(position)} denotes one or more of the four box corners to be set as sharp corners. The not assigned corners will retain their mode. Feasible values for \texttt{(position)} are:

- \texttt{northwest}
- \texttt{northeast}
- \texttt{southwest}
- \texttt{southeast}
- \texttt{north}
- \texttt{south}
- \texttt{east}
- \texttt{west}
- \texttt{downhill}
- \texttt{uphill}
- \texttt{all}

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharp corners=northwest ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharp corners ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
The \texttt{/tcb/rounded corners} can be used to revert a \texttt{/tcb/sharp corners} setting. The \texttt{(position)} denotes one or more of the four box corners to be set as \textit{rounded} corners. The not assigned corners will retain their mode. Feasible values for \texttt{(position)} are\footnote{The graphical examples assume that the boxes were set to have sharp corners before.}:

- \texttt{northwest}
- \texttt{northeast}
- \texttt{southwest}
- \texttt{southeast}
- \texttt{north}
- \texttt{south}
- \texttt{east}
- \texttt{west}
- \texttt{downhill}
- \texttt{uphill}
- \texttt{all}

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharp corners, rounded corners=northwest ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/sharpish corners} (style, no value)
Shortcut for setting \texttt{/tcb/arc} and \texttt{/tcb/outer arc} to 0pt. With this setting, rounded corners will appear as quasi-sharp, but e.g. the shadow will be somewhat rounder than the shadow of really sharp corners.

\begin{tcolorbox}[colback=red!5!white, colframe=red!75!black, sharpish corners ]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Corners are still of type \textit{rounded} with this option, but appear \textit{sharp}. To switch back to rounded corners, one has to adapt \texttt{/tcb/arc} and \texttt{/tcb/outer arc}.
The following examples will show the differences between /tcb/rounded corners \(^*\text{P.49}\), /tcb/sharpish corners \(^*\text{P.49}\), and /tcb/sharp corners \(^*\text{P.48}\). The later two give the same core box, but /tcb/borderline \(^*\text{P.180}\) and /tcb/shadow \(^*\text{P.191}\) settings are slightly different. The following examples use /tcb/drop fuzzy shadow \(^*\text{P.185}\).
### 4.9 Transparency

Transparency effects are likely to be used in conjunction with *jigsaw* skin variants, see Section 10.11 on page 204.

\[\text{/tcb/opacityframe}=(\text{fraction})\]

Sets the frame opacity of the box to the given \((\text{fraction})\).

\[
\begin{tcolorbox}[opacityframe=0.25, colframe=red]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\]

\[\text{/tcb/opacityback}=(\text{fraction})\]

Sets the background opacity of the box to the given \((\text{fraction})\).

\[
\begin{tcolorbox}[standard jigsaw, colframe=red, opacityback=0.5]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\]

\[\text{/tcb/opacitybacktitle}=(\text{fraction})\]

Sets the title background opacity of the box to the given \((\text{fraction})\).

\[
\begin{tcolorbox}[standard jigsaw, colframe=red, opacitybacktitle=0.5, title filled, title=This is a title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\]

\[\text{/tcb/opacityfill}=(\text{fraction})\]

Sets the fill opacity for frame, interior and optionally the title background to the given \((\text{fraction})\).

\[
\begin{tcolorbox}[standard jigsaw, colframe=red, opacityfill=0.7, title=This is a title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\]
/tcb/opacityupper\equal{(fraction)}  (no default, initially 1.0)
Sets the text opacity of the upper box part to the given \(\text{(fraction)}\).

\begin{tcolorbox}
\[\text{enhanced,opacityupper=0.5,}
\text{interior style={pattern=checkerboard light \& gray}}\]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

/tcb/opacitylower\equal{(fraction)}  (no default, initially 1.0)
Sets the text opacity of the lower box part to the given \(\text{(fraction)}\).

\begin{tcolorbox}
\[\text{enhanced,opacitylower=0.5,}
\text{interior style={pattern=checkerboard light \& gray}}\]
This is a \textbf{tcolorbox}.
\textbf{tcllower}
This is the lower part.
\end{tcolorbox}

/tcb/opacitytext\equal{(fraction)}  (no default, initially 1.0)
Sets the text opacity of the upper and the lower box part to the given \(\text{(fraction)}\).

\begin{tcolorbox}
\[\text{enhanced,opacitytext=0.5,}
\text{interior style={pattern=checkerboard light \& gray}}\]
This is a \textbf{tcolorbox}.
\textbf{tcllower}
This is the lower part.
\end{tcolorbox}

/tcb/opacitytitle\equal{(fraction)}  (no default, initially 1.0)
Sets the text opacity of the box title to the given \(\text{(fraction)}\).

\begin{tcolorbox}
\[\text{enhanced,opacitytitle=0.7,}
\text{coltitle=black,}
\text{fonttitle=\textbf{bfseries},title=This is a title,}
\text{title style={pattern=checkerboard light \& gray}}\]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
\[\text{enhanced jigsaw,fonttitle=\textbf{bfseries},title=This is a title,}
\text{opacityframe=0.5,opacityback=0.25,opacitybacktitle=0.25,opacitytext=0.8,}
\text{colback=red!5!white,colframe=red!75!black,colbacktitle=yellow!20!red}\]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
4.10 Height Control

In a typical usage scenario, the height of a \texttt{tcolorbox} is computed automatically to fit the content. Nevertheless, the height can be set to a fixed value or to fit commonly for several boxes, e.g. if boxes are set side by side.

The height control keys are only applicable to unbreakable boxes. If a box is set to be \texttt{/tcb/breakable \textsuperscript{P.375}}, the height is always computed according to the \textit{natural height}.

\texttt{/tcb/natural height} \hfill (no value, initially set)

Sets the total height of the colored box to its natural height depending on the box content.

\texttt{/tcb/height=\langle length\rangle} \hfill (no default)

Sets the total height of the colored box to \langle length\rangle independent of the box content. \langle length\rangle is the minimum height of the box, if \texttt{/tcb/height plus} is larger than zero.

\begin{verbatim}
\tcset{width=(\linewidth-2mm)/3,before=,after=\hfill, colframe=blue!75!black,colback=white}
\begin{tcolorbox}[height=1cm,valign=center]
This box has a height of 1cm.
\end{tcolorbox}
\begin{tcolorbox}[height=2cm,valign=center]
This box has a height of 2cm.
\end{tcolorbox}
\begin{tcolorbox}[height=3cm,split=0.5,valign=center,valign lower=center]
This box has a height of 3cm.
\tcblower
Lower part.
\end{tcolorbox}
\end{verbatim}

\texttt{/tcb/height plus=\langle length\rangle} \hfill (no default, initially \texttt{0pt})

The box may extend a given fixed \texttt{/tcb/height} up to the given \langle length\rangle.
/tcb/height from\(=\langle \text{min} \rangle \) to \(\langle \text{max} \rangle \) (style, no default)
Sets the box height to a dimension between \(\langle \text{min} \rangle \) and \(\langle \text{max} \rangle \).

\%
\usepackage{lipsum}
\newtcolorbox{mybox}{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm, bottom=1mm,right=1mm,boxsep=0mm,width=4.5cm,nobeforeafter, height from=2cm to 8cm}
\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}
This is a tcolorbox. This is a tcolorbox. This is a tcolorbox.
\end{mybox}
\begin{mybox}
\lipsum[2]
\end{mybox}
\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}
This is a tcolorbox. This is a tcolorbox.
\end{mybox}
\begin{mybox}
This is a tcolorbox. This is a tcolorbox.
\end{mybox}
\begin{mybox}
\textbf{This is a tcolorbox} where the text area has a height of 2cm.
\end{mybox}

/tcb/text height\(=\langle \text{length} \rangle \) (style, no default)
Sets the text height to \(\langle \text{length} \rangle \). This is the length from the top of the upper part to the bottom of the optional lower part. See also /tcb/text width\(^\text{P.34}\).

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[text height=2cm]
This is a \textbf{tcolorbox} where the text area has a height of 2cm.
\end{tcolorbox}

\begin{tcolorbox}
\textbf{This is a tcolorbox} where the text area has a height of 2cm.
\end{tcolorbox}
/tcb/add to height={\textit{length}} \hspace{1cm} (style, no default)

Adds \textit{length} to the current height of the colored box. /tcb/height \hspace{1cm} \textsuperscript{P.53} has to be set before this key is used! If this option is used several times, then the /tcb/height \hspace{1cm} \textsuperscript{P.53} is also increased several times.

\begin{tcolorbox}
\tcbset{height=2cm, \\
valign=center, width=\((\textwidth-2mm)/2, \\
before=,after=\text{\hfill}, colframe=blue!75!black, colback=white}
\end{tcolorbox}

\begin{tcolorbox}
This box has a height of 2cm.
\end{tcolorbox}

\begin{tcolorbox}[add to height=1cm]
This box has a height of 3cm.
\end{tcolorbox}

\begin{tcolorbox}
This box has a height of 2cm.
\end{tcolorbox}

\begin{tcolorbox}
This box has a height of 3cm.
\end{tcolorbox}

/tcb/add to natural height={\textit{length}} \hspace{1cm} (style, no default)

The application of this option generates a box with natural height plus the given \textit{length}. If this option is used several times, then the last setting of \textit{length} wins. The resulting box is not considered a fixed height box and the implementation is quite different to /tcb/add to height.

\begin{tcolorbox}
\tcbset{valign=center, width=\((\textwidth-2mm)/2, \\
before=,after=\text{\hfill}, colframe=blue!75!black, colback=white}
\end{tcolorbox}

\begin{tcolorbox}
This box has natural height.
\end{tcolorbox}

\begin{tcolorbox}[add to natural height=1cm]
This box has natural height plus 1 cm.
\end{tcolorbox}

\begin{tcolorbox}
This box has natural height.
\end{tcolorbox}

\begin{tcolorbox}
This box has natural height plus 1 cm.
\end{tcolorbox}
If set to `true`, the height of the `tcolorbox` is set to the rest of the available vertical space of the current page. If set to `maximum`, the page is compressed as much as possible. Note that the `tcolorbox` is always set as its own paragraph using this option. Also see `/tcb/text fill` \(^{P.69}\).

**Note that the library \[\text{\texttt{breakable}}\] has to be loaded to use this key!**

This height control key is only applicable to unbreakable boxes, but it uses code from the library \[\text{\texttt{breakable}}\]. The counterpart for breakable boxes is `/tcb/height fixed` \(^{P.380}\).

This option can and should not be used for boxes in boxes, but it can be used for boxes inside a `tcbraster` \(^{P.288}\).

\begin{tcolorbox}
\[\text{\texttt{height fill,}}\]
\end{tcolorbox}

```latex
% usepackage{lipsum}
% tcbuselibrary{breakable}
\begin{tcolorbox}[height fill, 
  colback=red!5!white,colframe=red!75!black,fonttitle=bfseries, 
  title=Box which fills the rest of the page]
\lipsum[1]
\end{tcolorbox}
```

**Box which fills the rest of the page**

If this option is used for a `tcolorbox` which is embedded inside another (outer) `tcolorbox` and if this outer `tcolorbox` has a fixed height, then the given \textit{fraction} of the available text height of the outer `tcolorbox` is used as `/tcb/height`\footnote{P.53} for the current `tcolorbox`. Otherwise, `/tcb/natural height`\footnote{P.53} is applied for the current `tcolorbox`.

```latex
\tcbset{colframe=blue!75!black,colback=white,fonttitle=\bfseries}
\begin{tcolorbox}[title=Outer box with fixed height 4cm,height=4cm]
\begin{tcolorbox}[title=Inner box,nobeforeafter,inherit height]
This inner box matches the available space.
\end{tcolorbox}
\end{tcolorbox}
\begin{tcolorbox}[title=Outer box with natural height]
\begin{tcolorbox}[title=Inner box,nobeforeafter,inherit height]
This inner box has its natural height.
\end{tcolorbox}
\end{tcolorbox}
\begin{tcolorbox}[title=Outer box with fixed height 5cm,height=5cm]
\begin{tcolorbox}[title=Inner box,nobeforeafter,inherit height]
\begin{tcolorbox}[colframe=red,beforeafter skip=0pt,inherit height=0.6]
Deeply nested box using 60 percent of the available space.
\end{tcolorbox}
\begin{tcolorbox}[colframe=red,beforeafter skip=0pt,inherit height=0.4]
Deeply nested box using 40 percent of the available space.
\end{tcolorbox}
\end{tcolorbox}
\end{tcolorbox}
```

\begin{enumerate}
\item Outer box with fixed height 4cm
\begin{itemize}
\item Inner box
\begin{itemize}
\item This inner box matches the available space.
\end{itemize}
\end{itemize}
\item Outer box with natural height
\begin{itemize}
\item Inner box
\begin{itemize}
\item This inner box has its natural height.
\end{itemize}
\end{itemize}
\item Outer box with fixed height 5cm
\begin{itemize}
\item Inner box
\begin{itemize}
\item Deeply nested box using 60 percent of the available space.
\item Deeply nested box using 40 percent of the available space.
\end{itemize}
\end{itemize}
\end{enumerate}
Sets `/tcb/height` \(^{53}\) to match the width of the colored box.

\begin{tcolorbox}[width=3cm, colback=red!5!white, colframe=red!75!black, halign=center, valign=center, square] This is a \textbf{tcolorbox}. \end{tcolorbox}

This is a \textbf{tcolorbox}.

/\texttt{tcb/space}=⟨fraction⟩ \hspace{1cm} (no default, initially 0)

If the height of a \texttt{tcolorbox} is not the natural height, the space difference between the forced and the natural size is distributed between the upper and the lower part of the box. This space could also be negative. ⟨\textit{fraction}⟩ with a value between 0 and 1 is the amount of space which is added to the upper part, the rest is added to the lower part. If there is no lower part, then all of the space is added to the upper part always.

\begin{tcolorbox}[space=0.2] This is the upper part. \tcblower This is the lower part. \end{tcolorbox}

This is the upper part. This is the lower part.

This is the upper part. This is the lower part.

This is the upper part. This is the lower part.

/\texttt{tcb/space to upper} \hspace{1cm} (style)

This is an abbreviation for \texttt{space=1}, i.e. all extra space is added to the upper part.

/\texttt{tcb/space to lower} \hspace{1cm} (style, initially set)

This is an abbreviation for \texttt{space=0}, i.e. all extra space is added to the lower part (if there is any).
/tcb/space to both

This is an abbreviation for space=0.5, i.e. the extra space equally distributed between the upper and the lower part.

\begin{tcolorbox}[width=(\linewidth-2mm)/3,before=,after=,height=3cm]
\foreach \myspace in {space to upper,space to both,space to lower}
{\begin{tcolorbox}[\myspace]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}}
\end{tcolorbox}

\begin{tcolorbox}
This is my box of height 3cm. The space is filled with a picture:
\includegraphics[width=\linewidth,height=\myspace]{goldshade.png}
This is some other text.
\end{tcolorbox}

/tcb/space to\space to\space to\space to\texttt{(macro)}

(no default, initially unset)

If the height of a tcolorbox is not the natural height, the space difference between the forced and the natural size is saved into the given local \texttt{⟨macro⟩}. This \texttt{⟨macro⟩} can and should be used inside the box content to add content which is vertically sized to match \texttt{⟨macro⟩}.

- The actual length saved into \texttt{⟨macro⟩} is adapted dynamically during several compilations – at least two, but maybe more.
- Due to the adaption algorithm, objects can be sized with \texttt{⟨macro⟩} plus any offset length.
- Never ever use \texttt{⟨macro⟩} multiplied with a factor. The only exception to this rule is that the space can be split into parts which sum to \texttt{⟨macro⟩}.
- Never use this in combination with /tcb/fit \textsuperscript{P.423}.

\begin{tcolorbox}[colframe=blue!75!black,colback=white,height=3cm,space to=\myspace]
This is my box of height 3cm. The space is filled with a picture:\\[2mm]\includegraphics[width=\linewidth,height=\myspace]{goldshade.png}\\[1mm]
This is some other text.
\end{tcolorbox}
If the height of a `tcolorbox` is not the natural height, the `(fraction)` with a value between 0 and 1 determines the positioning of the segmentation between the upper and the lower part. Here, 0 stands for top and 1 for bottom. Note that the box is split regardless of the actual dimensions of the text parts!
Boxes which are members of an equal height group will all get the same height, i.e. the maximum of all their natural heights. The \textit{id} serves to distinguish between different height groups. Note that you have to compile twice to see changes and that height groups are global definitions.

\makeatletter
\c@pgf@counta=7 \relax\c@pgf@countb=0 \relax
\begin{tcolorbox}
\begin{tabular}{|c|c|c|}
\hline
\textbf{One} & \textbf{Two} & \textbf{Three} \\
\hline
My smallest box. & This box is also small. & This box contains a lot of text just to fill the space with word flowing and flowing and flowing until the box is filled with all of it. \\
& But with a lower part. & \\
& & \int_0^1 x^2 = \frac{1}{3}. \\
\hline
\end{tabular}
\end{tcolorbox}

See Section 15 on page 286 for more equal height options.
Plants a \langle length \rangle into the equal height group with the given \langle id \rangle. This ensures that the height will not drop below \langle length \rangle. Note that you cannot reduce a computed height value by using this key with a small value. The difference to applying \texttt{/tcb/height}\textsuperscript{*P.55} directly is that the boxes are never too small for their content.

\begin{tcolorbox}
My first box. All boxes will get 3.5cm times 3.5cm if the content height is not too large.
\end{tcolorbox}

\begin{tcolorbox}
My second box.
\end{tcolorbox}

\textbf{Mixed} with a listing.

\begin{tcolorbox} [title={Fourth box}]
My final box.
\end{tcolorbox}

\begin{tcbitemize} [raster equal height, colframe=blue!75!black, colback=white, raster every box/.style={minimum for current equal height group=2cm}]
\tcbitem A
\tcbitem B
\end{tcbitemize}

\begin{tcblisting}{}
\textbf{Mixed} with a listing.
\end{tcblisting}
/tcb/use height from group=⟨id⟩ (style, default current group)

Sets the current box to a fixed /tcb/height\textsuperscript{P.53} which is copied from an equal height group with the given ⟨id⟩. If this height is not available during the current compilation, no fixed height setting is used. If ⟨id⟩ is omitted, the current equal height group is used which has to be set before by /tcb/equal height group\textsuperscript{P.61}.

Note that the natural height of the current box is not considered for computation of the group height. The main application for /tcb/use height from group is that the height can be adapted further by /tcb/add to height\textsuperscript{P.55}.

\begin{tcolorbox}
[use height from group=C,add to height=-2cm,
colframe=blue!75!black,colback=white]
Height from group 'C' of the previous example, but reduced by 2cm.
\end{tcolorbox}

\begin{tcbraster}
\begin{tcolorbox}First line\second line\The height of this box rules.\end{tcolorbox}
\begin{tcolorbox}[use height from group]Test\end{tcolorbox}
\begin{tcolorbox}[use height from group]First line\second line\end{tcolorbox}
\begin{tcolorbox}The height of this box rules.\end{tcolorbox}
\end{tcbraster}

\% \tcbuselibrary{raster}
Every line is inside an equal height group:
\begin{tcbraster}[raster equal height=rows,
title=Box \thetcbbrasternum,enhanced,size=small,colframe=red!50!black,colback=red!10!white]
\begin{tcolorbox}First line\second line\The height of this box rules.\end{tcolorbox}
\begin{tcolorbox}[use height from group]Test\end{tcolorbox}
\begin{tcolorbox}[use height from group]First line\second line\end{tcolorbox}
\begin{tcolorbox}The height of this box rules.\end{tcolorbox}
\end{tcbraster}

\tcbheightfromgroup{⟨macro⟩}{⟨id⟩}

Saves the height from an equal height group with the given ⟨id⟩ to a ⟨macro⟩. If this height is not available during the current compilation, ⟨macro⟩ is set to 0pt.
4.11 Box Content Additions

The following options introduce some arbitrary \(<code>\) to the content of a \texttt{tcolorbox}. These additions can be given at the beginning or at the ending of the title, the upper part, or the lower part.

\texttt{/tcb/before title=\(<code>\)} (no default, initially unset)

The given \(<code>\) is placed \textit{after} the color and font settings and \textit{before} the content of the title.

```latex
\begin{tcolorbox}
\texttt{before title=\{\textcolor{yellow}{\large Important}:-\},}
\texttt{colback=red!5!white,colframe=red!75!black,fonttitle=\textbf{}}
\begin{tcolorbox}[title=My title] This is a \textbf{tcolorbox}. \end{tcolorbox}
\end{tcolorbox}
```

**Important:** My title

This is a \textbf{tcolorbox}.

\texttt{/tcb/after title=\(<code>\)} (no default, initially unset)

The given \(<code>\) is placed \textit{after} the content of the title.

```latex
\begin{tcolorbox}
\texttt{after title=\{\textcolor{Navy}{\hfill\textbf{approved}}\},}
\texttt{colback=red!5!white,colframe=red!75!black,fonttitle=\textbf{}}
\begin{tcolorbox}[title=My title] This is a \textbf{tcolorbox}. \end{tcolorbox}
\end{tcolorbox}
```

My title

This is a \textbf{tcolorbox}. 
The given \texttt{code} is placed after the color and font settings and before the content of the upper part. The \texttt{code} is appended by a final \texttt{\ignorespaces}.

```
\tcbset{before upper={\textit{The story:}\par},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

My title

The story:
This is a tcolorbox.

```
\begin{tcolorbox}[size=small,tile,
colback=yellow!20,colbacktitle=yellow!70!black,
title=My table,hbox,center,center title,
before upper*=\begin{tabular}{cc}
\end{tabular},
]\multicolumn{2}{cc}{Title} \\
one & two \\
three & four \end{tcolorbox}
```

My table

<table>
<thead>
<tr>
<th>Title</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>one</td>
<td>two</td>
</tr>
<tr>
<td>three</td>
<td>four</td>
</tr>
</tbody>
</table>
The given `\langle code \rangle` is placed after the content of the upper part. The `\langle code \rangle` is prepended by a leading \unskip.

```
\tcbset{after upper={\par\hfill\textit{Read more next week}},
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

My title

This is a tcolorbox.  

```
\begin{tcolorbox}[before upper=\flqq,after upper=\frqq,\par\hfill\textit{Read more next week},
  colback=red!5!white,colframe=red!75!black]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

«This is a tcolorbox.»

From version 3.80 to 3.94, this option prepended an \unskip to the given `\langle code \rangle`.  
From version 3.95 to 4.15, this option was deprecated.  
From version 4.20, this option is re-established with changed semantic (no \unskip!)
The \texttt{/tcb/before lower} command (no default, initially empty) places the given \texttt{⟨code⟩} after the color and font settings and before the content of the lower part. The \texttt{⟨code⟩} is appended by a final \texttt{\ignorespaces}. The \texttt{/tcb/before lower*} command (no default, initially unset) places the given \texttt{⟨code⟩} after the color and font settings and before the content of the lower part. In contrast to \texttt{/tcb/before lower}, no \texttt{\ignorespaces} is appended. Use this for situations where \texttt{\ignorespaces} is not needed or causes harm.

\begin{tcolorbox}[size=small,bicolor,sidebyside,center lower, colback=yellow!30,colbacklower=yellow!20,colframe=yellow!80!black, before lower*=\begin{tabular}{cc}, after lower*=\end{tabular},]
My table
\begin{tcblower}
\multicolumn{2}{c}{Title}\\
one & two \\
three & four\\
\end{tcblower}
\end{tcolorbox}
The given \langle code \rangle is placed after the content of the lower part. The \langle code \rangle is prepended by a leading \unskip.

\begin{tcolorbox}[after lower=\textit{This is the end.}, colback=red!5!white,colframe=red!75!black]
\textbf{This is a tcolorbox.}
\texttt{\textbf{This is the lower part.}}
\end{tcolorbox}

This is a \textbf{tcolorbox}.

This is the lower part. \textit{This is the end.}

The given \langle code \rangle is placed after the content of the lower part. In contrast to /tcb/after upper\textsuperscript{P.66}, no \unskip is prepended. Use this for situations where \unskip is not needed or causes harm.

\begin{tcolorbox}[before lower=$,after lower=$, colback=red!5!white,colframe=red!75!black]
\textbf{This is a tcolorbox.}
\texttt{\textbf{This is the lower part.}}
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\sin^2(x) + \cos^2(x) = 1.

From version 3.80 to 3.94, this option prepended an \unskip to the given \langle code \rangle.
From version 3.95 to 4.15, this option was deprecated.
From version 4.20, this option is re-established with changed semantic (no \unskip!)
If /tcb/text fill is used, one cannot have a lower part and the box is unbreakable.

/tcb/text fill

This style sets /tcb/before upper \textsuperscript{P.65} and /tcb/after upper \textsuperscript{P.66} to embed the upper part with a minipage. If a fixed height was applied e.g. by /tcb/height \textsuperscript{P.53} or /tcb/height fill \textsuperscript{P.56}, this minipage gets a matching height. This allows to use vertical glue macros like \vfill to act like expected. If the box has no fixed height, setting /tcb/text fill has no other effect as making the box unbreakable.

\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,height=8cm,text fill,title=My filled box]
This is a \textbf{tcolorbox}.
\par\vfill
\begin{center}
My middle text.
\end{center}
\par\vfill
This is the end of my box.
\end{tcolorbox}

My filled box

This is a tcolorbox.

My middle text.

This is the end of my box.
If `/tcb/tabularx` or `/tcb/tabularx*` are used, one cannot have a lower part.

`/tcb/tabularx=(preamble)`  
This style sets `/tcb/before upper`¹⁻⁶５ and `/tcb/after upper`¹⁻⁶⁶ and several geometry keys to support a `tabularx` with the given *(preamble)*. The packages `tabularx` [⁴], `array`, and `colortbl` have to be loaded separately.

```latex
\usepackage{array,tabularx}
\usepackage{colortbl} - or - \usepackage[table]{xcolor}
\tcbset{enhanced,fonttitle=\bfseries\large,fontupper=\normalsize\sffamily,
colback=yellow!10!white,colframe=red!50!black,colbacktitle=Salmon!30!white,
coltitle=black,center title}
\begin{tcolorbox}[tabularx={X||Y|Y|Y|Y||Y},title=My table]
\hline
\textbf{Group} & One & Two & Three & Four & \textbf{Sum} \\
\hline
\textbf{Red} & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
\textbf{Green} & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
\textbf{Blue} & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
\textbf{Sum} & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\hline
\end{tcolorbox}
```

```
My table
\hline
\textbf{Group} & One & Two & Three & Four & \textbf{Sum} \\
\hline
\textbf{Red} & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
\textbf{Green} & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
\textbf{Blue} & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
\textbf{Sum} & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\hline
\end{tcolorbox}
```

`/tcb/tabularx*={(code)}*(preamble)}`  
This is a variant of `/tcb/tabularx` which adds some *(code)* before the table starts.

```latex
% \usepackage{array,tabularx}
% \usepackage{colortbl} - or - \usepackage[table]{xcolor}
\tcbset{enhanced,fonttitle=\bfseries\large,fontupper=\normalsize\sffamily,
colback=yellow!10!white,colframe=red!50!black,colbacktitle=Salmon!30!white,
coltitle=black,center title}
\begin{tcolorbox}[tabularx*={\arrayrulewidth0.5mm}{X|X|X},title=My table]
One & Two & Three \hline
1000.00 & 2000.00 & 3000.00 \\
2000.00 & 3000.00 & 4000.00 \\
\end{tcolorbox}
```

```
\begin{tcolorbox}[tabularx*={\arrayrulewidth0.5mm}{X|X|X},title=My table]
One & Two & Three \hline
1000.00 & 2000.00 & 3000.00 \\
2000.00 & 3000.00 & 4000.00 \\
\end{tcolorbox}
```

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/tcb/tikz_upper = \texttt{(options)} \\
This style adds a centered \texttt{tikzpicture} environment to the start and end of the upper part. The \texttt{(options)} may be given as TikZ picture options.

\begin{tcolorbox}
\begin{tikzpicture}
\node (name) at (0,0) {\textbf{tikzname}};
\fill[yellow,draw=yellow!75!red] (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tikzpicture}
\end{tcolorbox}

/tcb/tikz_lower = \texttt{(options)} \\
This style adds a centered \texttt{tikzpicture} environment to the start and end of the lower part. The \texttt{(options)} may be given as TikZ picture options.

\begin{tcblisting}
\begin{tikzpicture}
\node (name) at (0,0) {\textbf{tikzname}};
\fill[yellow,draw=yellow!75!red] (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tikzpicture}
\end{tcblisting}
/tcb/tikznodule \{options\} \textision{style}
This style places the upper part content into a centered Ti\kZ node. The \{options\} may be
given as Ti\kZ node options. This style is especially useful for boxes with multiline texts
which are fitted to the text width.

\begin{tcolorbox}[enhanced,center,ignore nodbreak,fontupper=\Large\bfseries,colframe=red!50!black,colback=red!10!white,drop fuzzy shadow=yellow,tikznodule upper,\#1]
\headline{Important\\Important Headline}
\end{tcolorbox}

/tcb/tikznodule lower \{options\} \textision{style}
This style places the lower part content into a centered Ti\kZ node. The \{options\} may be
given as Ti\kZ node options.

\begin{tcolorbox}[bicolor,colback=LightBlue!50!white,colbacklower=white,colframe=black,tikznodule lower={inner sep=2pt,draw=red,fill=yellow}]
Upper part.
\tcblower
Lower part.
\end{tcolorbox}

/tcb/tikznodule \{options\} \textision{style}
Shortcut for setting /tcb/tikznodule upper and /tcb/tikznodule lower the same time.

/tcb/varwidth upper \{length\} \textision{style, default /tcb/width*P.34}
This style places the upper part content into a \textit{varwidth} environment. This style needs
the \textit{varwidth} package \cite{1} to be loaded manually. The resulting box has a maximal width
of \{length\}. This option is only senseful for a \textit{tcolorbox} \cite{14}.

\begin{tcolorbox}[colframe=red!50!black, colback=red!10!white, varwidth upper]
\varbox{Short text.}
\varbox{This box contains is a longer text which is broken.}
\end{tcolorbox}
4.12 Overlays

With an overlay, arbitrary (graphical code) can be added to a tcolorbox. This code is executed after the frame and interior are drawn and before the text content is drawn. Therefore, you can decorate the tcolorbox with your own extensions. Common special cases are watermarks which are implemented using overlays. See Subsection 10.3 from page 168 if you want to add watermarks.

If you use the core package only, the (graphical code) has to be pgf code and there is not much assistance for positioning. Therefore, the usage of the /tcb/enhanced mode from the library skins is recommended which allows tikz code and gives access to /tcb/geometry nodes for positioning.

/tcb/overlay=(graphical code) (no default, initially unset)

Adds (graphical code) to the box drawing process. This (graphical code) is drawn after the frame and interior and before the text content.

% \tcbuselibrary{skins} % preamble
\tcbset{frogbox/.style={enhanced,colback=green!10,colframe=green!65!black,
enlarge top by=5.5mm,
overlay={\foreach \x in {2cm,3.5cm} {
\begin{scope}[shift={([xshift=\x]frame.north west)}]
\path[draw=green!65!black,fill=green!10,line width=1mm] (0,0) arc (0:180:5mm);
\path[fill=black] (-0.2,0) arc (0:180:1mm);
\end{scope}}}}}

\begin{tcolorbox}[frogbox,title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

% \usetikzlibrary{patterns} % preamble
% \tcbuselibrary{skins} % preamble
\tcbset{ribbonbox/.style={enhanced,colback=red!5!white,colframe=red!75!black,
fonttitle=\bfseries,
overlay={\path[fill=blue!75!white,draw=blue,double=white!85!blue,
preaction={opacity=0.6,fill=blue!75!white},
line width=0.1mm,double distance=0.2mm,
pattern=fivepointed stars,pattern color=white!75!blue]
([xshift=-0.2mm,yshift=-1.02cm]frame.north east)
-- ++(-1,1) -- ++(-0.5,0) -- ++(1.5,-1.5) -- cycle;}}}

\begin{tcolorbox}[ribbonbox,title=My title]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
/tcb/no overlay  (style, no default, initially set)

Removes the overlay if set before.

/tcb/overlay broken=(graphical code)  (no default, initially unset)

If the box is set to be /tcb/breakable  P.375 and is broken actually, then the (graphical code) is added to the box drawing process. /tcb/overlay  P.73 overwrites this key.

/tcb/overlay unbroken=(graphical code)  (no default, initially unset)

If the box is set to be /tcb/breakable  P.375 but is not broken actually or if the box is set to be /tcb/unbreakable  P.376, then the (graphical code) is added to the box drawing process. /tcb/overlay  P.73 overwrites this key.

/tcb/overlay first=(graphical code)  (no default, initially unset)

If the box is set to be /tcb/breakable  P.375 and is broken actually, then the (graphical code) is added to the box drawing process for the first part of the break sequence. /tcb/overlay  P.73 overwrites this key.

/tcb/overlay middle=(graphical code)  (no default, initially unset)

If the box is set to be /tcb/breakable  P.375 and is broken actually, then the (graphical code) is added to the box drawing process for the middle parts (if any) of the break sequence. /tcb/overlay  P.73 overwrites this key.

/tcb/overlay last=(graphical code)  (no default, initially unset)

If the box is set to be /tcb/breakable  P.375 and is broken actually, then the (graphical code) is added to the box drawing process for the last part of the break sequence. /tcb/overlay  P.73 overwrites this key.

/tcb/overlay unbroken and first=(graphical code)  (no default, initially unset)

This is an optimized abbreviation for setting /tcb/overlay unbroken and /tcb/overlay first together. /tcb/overlay  P.73 overwrites this key.

/tcb/overlay middle and last=(graphical code)  (no default, initially unset)

This is an optimized abbreviation for setting /tcb/overlay middle and /tcb/overlay last together. /tcb/overlay  P.73 overwrites this key.

/tcb/overlay unbroken and last=(graphical code)  (no default, initially unset)

This is an optimized abbreviation for setting /tcb/overlay unbroken and /tcb/overlay last together. /tcb/overlay  P.73 overwrites this key.

/tcb/overlay first and middle=(graphical code)  (no default, initially unset)

This is an optimized abbreviation for setting /tcb/overlay first and /tcb/overlay middle together. /tcb/overlay  P.73 overwrites this key.

This example demonstrates the application of break sequence specific overlay options. Here, we define an environment myexample based on tcolorbox where the visible drawing is done totally by overlay keys.

Here, the first application of myexample produces an unbroken tcolorbox. The frame is drawn by the code given with /tcb/overlay unbroken.

The second application of myexample is broken into several parts which are drawn by the codes given with /tcb/overlay first, /tcb/overlay middle, and /tcb/overlay last.

% Preamble:
%\usepackage{tikz,lipsum}
%\tcbuselibrary{skins,breakable}
%\newcounter{example}
\colorlet{colexam}{red!75!black}
\newtcolorbox[use counter=example]{myexample}{%
Example 1

Example 2


Suspendisse vitae elit. Aliquam arcu neque, ornare in, ullamcorper quis, commodo eu, libero. Fusce sagittis erat at erat tristique mollis. Maecenas sapien libero, molestie et, lobortis in, 76


4.13 Floating Objects

\texttt{/tcb/floatplacement=⟨values⟩} \hspace{1cm} (no default, initially htb)
Sets \{values\} as default values for the usage of \texttt{/tcb/float} and \texttt{/tcb/float*}. Feasible are the usual parameters for floating objects.

\begin{tcolorbox}[floatplacement=t,float,
title=Floating box from \texttt{|floatplacement|},
watermark text={I am floating}]
This floating box is placed at the top of a page.
\end{tcolorbox}

\texttt{/tcb/float=⟨values⟩} \hspace{1cm} (default from \texttt{floatplacement})
Turns the box to a floating object where \{values\} are the usual parameters for such floating objects. If they are not used, the placement uses the default values given by \texttt{floatplacement}.

\begin{tcolorbox}[float, title=Floating box from \texttt{|float|},
enhanced,watermark text={I'm also floating}]
This box floats to a feasible place automatically. You do not have to use a numbering for this floating object.
\end{tcolorbox}

\texttt{/tcb/float*=⟨values⟩} \hspace{1cm} (default from \texttt{floatplacement})
Identical to \texttt{/tcb/float}, but for wide boxes spanning the whole page width of two column documents or in conjunction with the packages \texttt{multicol} or \texttt{paracol}. Note that you have to set \texttt{width=\textwidth} additionally, if the box should span the whole page width in these cases!

\begin{tcolorbox}[float*=b, title=Floating box from \texttt{|float*|},\textwidth=\textwidth, enhanced,watermark text={I'm also floating}]
In this single column document, you will see no difference to \texttt{|float|}.
\end{tcolorbox}

\texttt{/tcb/nofloat} \hspace{1cm} (style, initially set)
Turns the floating behavior off.

\begin{tcolorbox}[float*, title=Floating box from \texttt{|float*|}]
In this single column document, you will see no difference to \texttt{float}.
\end{tcolorbox}
For floating objects, the /tcb/before \textsuperscript{P.80} and /tcb/after \textsuperscript{P.80} settings are ignored. Instead, the given \textit{code} is inserted before a floating box. If the box is /tcb/breakable \textsuperscript{P.375}, the given \textit{code} is inserted before every part of the break sequence. The most common use case is \texttt{every float=\centering}.

\begin{tcbbox}[float=htb,title={Floating box},every float=\centering, colback=blue!50!black,colframe=blue!50!white,colbacktitle=blue!10!white, coltitle=black,center title]
\includegraphics[height=6cm]{lichtspiel.jpg}
\end{tcbbox}
4.14 Embedding into the Surroundings

Typically, but not necessarily, a \texttt{tcolorbox} is put inside a separate paragraph and has some vertical space before and after it. This behavior is controlled by the keys \texttt{before} and \texttt{after}.

\texttt{/tcb/before=⟨code⟩} (no default, initially see \texttt{/tcb/autoparskip})

Sets the \texttt{⟨code⟩} which is executed before the colored box. It is not used for floating boxes. Also, it is not used, if the box follows a heading immediately and \texttt{/tcb/ignore nobreak} \textsuperscript{P.83} is set to \texttt{false}.

\texttt{/tcb/after=⟨code⟩} (no default, initially see \texttt{/tcb/autoparskip})

Sets the \texttt{⟨code⟩} which is executed after the colored box. It is not used for floating boxes.

\texttt{/tcb/parskip} (style, no value)

Sets the keys \texttt{before} and \texttt{after} to values which are recommended, if the package \texttt{parskip} is used and there is no better idea for \texttt{before} and \texttt{after}. This is similar to:

```latex
\tcbset{parskip/.style={before={\par\pagebreak[0]\parindent=0pt}, after={\par}}}
```

\texttt{/tcb/noparskip} (style, no value)

Sets the keys \texttt{before} and \texttt{after} to values which are recommended, if the package \texttt{parskip} is \texttt{not} used and there is no better idea for \texttt{before} and \texttt{after}. This is similar to:

```latex
\tcbset{noparskip/.style={before={\par\pagebreak[0]\smallskip\parindent=0pt}, after={\par\smallskip}}}
```

\texttt{/tcb/autoparskip} (style, no value, initially set)

Tries to detect the usage of the package \texttt{parskip} and sets the keys \texttt{before} and \texttt{after} accordingly. Actually, the following is done:

- If the length of \texttt{\parskip} is greater than \texttt{0pt} at the beginning of the document, \texttt{/tcb/parskip} is executed. Here, the usage of package \texttt{parskip} is assumed.
- Otherwise, if the length of \texttt{\parskip} is not greater than \texttt{0pt} at the beginning of the document, \texttt{/tcb/noparskip} is executed. Here, the absence of package \texttt{parskip} is assumed.

\texttt{autoparskip} is the default for the package \texttt{tcolorbox}, if \texttt{before} or \texttt{after} are not changed otherwise.

\texttt{/tcb/nobeforeafter} (style, no value)

Abbreviation for clearing the keys \texttt{before} and \texttt{after}. The colored box is not put into a paragraph and there is no space before or after the box.

\texttt{/tcb/forces nobeforeafter} (style, no value)

Forces the setting of \texttt{/tcb/nobeforeafter} even if \texttt{/tcb/before} and \texttt{/tcb/after} are set to other values later. Do not use this option globally unless you \texttt{really} know what you do. Note that embedded boxes do not inherit this forced clearance.
\[\text{/tcb/baseline=\langle length\rangle}\]
(no default, initially 0pt)
Used to set the \texttt{\pgfsetbaseline} value of the resulting \texttt{tcolorbox}.

\begin{verbatim}
\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
Some text \dotfill
\begin{tcolorbox}[baseline=3mm]
One line.
\end{tcolorbox}
\begin{tcolorbox}[baseline=3mm]
First line.\ Second line.
\end{tcolorbox}
\end{verbatim}

\[\text{/tcb/box align=\langle alignment\rangle}\]
(style, no default, initially bottom)
Used to set the \texttt{/tcb/baseline} value of the resulting \texttt{tcolorbox}. Feasible values for \texttt{\langle alignment\rangle} are:

- \texttt{bottom}: alignment with the box bottom,
- \texttt{top}: alignment with the box top,
- \texttt{center}: alignment with the box center,
- \texttt{base}: alignment with the box content base. This option is not applicable for a \texttt{tcolorbox} but for a \texttt{tcbox} only. It is an alias for \texttt{/tcb/tcbox raise base}.

\begin{verbatim}
\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
Some text \dotfill
\begin{tcolorbox}[box align=bottom]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=bottom]
First line.\ Second line.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
\tcbset{colframe=red!50!white,width=4cm,nobeforeafter}
Some text \dotfill
\begin{tcolorbox}[box align=top]
One line.
\end{tcolorbox}
\begin{tcolorbox}[box align=top]
First line.\ Second line.
\end{tcolorbox}
\end{verbatim}
\texttt{\textbackslash tcbset\{colframe=red!50!white,width=4cm,nobeforeafter\}}
Some text\textbackslash dotfill
\begin{tcolorbox}\{box align=center\}
One line.
\end{tcolorbox}
\begin{tcolorbox}\{box align=center\}
First line.\textbackslash Second line.
\end{tcolorbox}

Some text \dotfill
\begin{tcolorbox}\{box align=center\}
One line.
\end{tcolorbox}
First line.
Second line.

\begin{tcolorbox}\{box align=base\}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Some text.
\begin{tcolorbox}\{box align=base, size=fbox\}
Another line
\end{tcolorbox}

Some text \dotfill
\begin{tcolorbox}\{box align=base\}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
Second box.
\end{tcolorbox}

/tcb/before skip=(glue) \hfill (style, no default)
Inserts some vertical space of the given \texttt{(glue)} before the colored box. This style sets \texttt{/tcb/before} $^\text{P.80}$.

\begin{tcolorbox}[before skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Some text.

/tcb/after skip=(glue) \hfill (style, no default)
Inserts some vertical space of the given \texttt{(glue)} after the colored box. This style sets \texttt{/tcb/after} $^\text{P.80}$.

\begin{tcolorbox}[after skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Some text.

/tcb/beforeafter skip=(glue) \hfill (style, no default)
Inserts some vertical space of the given \texttt{(glue)} before and after the colored box. This style sets \texttt{/tcb/before} $^\text{P.80}$ and \texttt{/tcb/after} $^\text{P.80}$.

\begin{tcolorbox}[beforeafter skip=0pt, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

This is a \textbf{tcolorbox}.

This is a \textbf{tcolorbox}.

Second box.
/tcb/left skip\=(length) (style, no default, initially 0mm)

Inserts some horizontal space of the given \langle length \rangle before the colored box. This style sets /tcb/grow to left by \(^{+}\text{P.86}\) with the negated \langle length \rangle, i.e. the bounding box and box width are changed.

\begin{tcolorbox} [left skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a tcolorbox.

/tcb/right skip\=(length) (style, no default, initially 0mm)

Inserts some horizontal space of the given \langle length \rangle after the colored box. This style sets /tcb/grow to right by \(^{+}\text{P.86}\) with the negated \langle length \rangle, i.e. the bounding box and box width are changed.

\begin{tcolorbox} [right skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a tcolorbox.

/tcb/leftright skip\=(length) (style, no default)

Inserts some horizontal space of the given \langle length \rangle before and after the colored box. This style changes the bounding box and the box width.

\begin{tcolorbox} [leftright skip=1cm, colframe=red!50!white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a tcolorbox.

/tcb/ignore nobreak=true|false (default true, initially false)

After a heading, \LaTeX{} tries to avoid a break by setting a nobreak boolean value. Starting from version 3.33, the /tcb/before \(^{+}\text{P.80}\) respectively /tcb/before skip \(^{+}\text{P.82}\) settings are not used after a heading if /tcb/ignore nobreak is set to false. For an unbreakable box, /tcb/before nobreak is used instead. Further, a /tcb/breakable \(^{+}\text{P.375}\) box will also try to avoid a break between a heading and a directly following first part of a break sequence. Set /tcb/ignore nobreak to true, if nobreak should be ignored as prior to version 3.33. Also, such a setting may be used locally to enforce the /tcb/before \(^{+}\text{P.80}\) setting.

/tcb/before nobreak\=(code) (no default, initially \noindent)

Sets the \langle code \rangle which is executed before the colored box if it is unbreakable, if /tcb/ignore nobreak is not set, and if the box follows a heading.

/tcb/parfillskip restore=true|false (default true, initially true)

If this option is set to be true, the minimum value of \parfillskip is tested at specific spots, if it is greater than 0pt. If so, \parfillskip is restored to \@flushglue which happens to be the default value.

These tests are executed for /tcb/parskip \(^{+}\text{P.80}\), /tcb/noparskip \(^{+}\text{P.80}\), /tcb/after skip \(^{+}\text{P.82}\), /tcb/breakable \(^{+}\text{P.375}\), and tcbraster \(^{+}\text{P.288}\).

This option was created to automatically avoid overfull box warnings with \parfillskip changing packages.
4.15 Bounding Box

Normally, every \texttt{tcolorbox} has a bounding box which fits exactly to the dimensions of the outer frame. Therefore, \LaTeX{} reserves exactly the space needed for the box. This behavior can be changed by enlarging (or shrinking) the bounding box. If the bounding box is enlarged, the \texttt{tcolorbox} will get some clearance around it. If the bounding box is shrunk, i.e. enlarged with negative values, the \texttt{tcolorbox} will overlap to other parts of the page. For example, the \texttt{tcolorbox} could be stretched into the page margin.

The following examples use \texttt{/tcb/show bounding box} to display the actual bounding box. For this, the library \texttt{skins} has to be included and \texttt{/tcb/enhanced} has to be set.

4.15.1 Shifting Bounding Box Borders

\texttt{/tcb/enlarge top initially by=⟨length⟩} (no default, initially 0mm)

Enlarges the bounding box distance to the top of the box by \texttt{⟨length⟩}. If the box is \textit{breakable}, only the first box of the break sequence gets enlarged. \texttt{/tcb/enlarge top by} overwrites this key.

\begin{verbatim}
\tcset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[enlarge top initially by=-5mm]
 This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enlarge top initially by=5mm,enhanced,show bounding box]
 This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\begin{tcolorbox}
 This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
 This is a \textbf{tcolorbox}.
\end{tcolorbox}

\texttt{/tcb/enlarge bottom finally by=⟨length⟩} (no default, initially 0mm)

Enlarges the bounding box distance to the bottom of the box by \texttt{⟨length⟩}. If the box is \textit{breakable}, only the last box of the break sequence gets enlarged. \texttt{/tcb/enlarge bottom by} overwrites this key.

\begin{verbatim}
\tcset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[enlarge bottom finally by=5mm]
 This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[enlarge bottom finally by=-5mm,enhanced,show bounding box]
 This is a \textbf{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

This is a \textbf{tcolorbox}.

This is a \textbf{tcolorbox}.
/tcb/enlarge top at break by={length} \hspace{1cm} \text{(no default, initially 0mm)}
Enlarges the bounding box distance to the top of the box by \textit{⟨length⟩}, if the box is
\text{/tcb/breakable}\textsuperscript{\textit{+P.375}}. In this case, it is applied to \textit{middle} and \textit{last} parts in a break sequence. \text{/tcb/enlarge top} by overwrites this key.

/tcb/enlarge bottom at break by={length} \hspace{1cm} \text{(no default, initially 0mm)}
Enlarges the bounding box distance to the bottom of the box by \textit{⟨length⟩}, if the box is
\text{/tcb/breakable}\textsuperscript{\textit{+P.375}}. In this case, it is applied to \textit{first} and \textit{middle} parts in a break sequence. \text{/tcb/enlarge bottom at break by} overwrites this key.

/tcb/enlarge top by={length} \hspace{1cm} \text{(no default, initially 0mm)}
Enlarges the bounding box distance to the top of the box by \textit{⟨length⟩}. \text{/tcb/enlarge top initially by}\textsuperscript{\textit{+P.84}} and \text{/tcb/enlarge top at break by} are set to \textit{⟨length⟩}.

/tcb/enlarge bottom by={length} \hspace{1cm} \text{(no default, initially 0mm)}
Enlarges the bounding box distance to the bottom of the box by \textit{⟨length⟩}. \text{/tcb/enlarge bottom finally by}\textsuperscript{\textit{+P.84}} and \text{/tcb/enlarge bottom at break by} are set to \textit{⟨length⟩}.

/tcb/enlarge left by={length} \hspace{1cm} \text{(no default, initially 0mm)}
Enlarges the bounding box distance to the left side of the box by \textit{⟨length⟩}.

/tcb/enlarge right by={length} \hspace{1cm} \text{(no default, initially 0mm)}
Enlarges the bounding box distance to the right side of the box by \textit{⟨length⟩}.
/tcb/\texttt{enlarge by}(\texttt{length}) \hspace{1cm} \text{(no default, initially 0\texttt{mm})}
Enlarges the bounding box distance to all sides of the box by \texttt{(length)}.

\begin{tcolorbox}[colframe=blue!75!black,colback=white,width=5cm,nobeforeafter]
\begin{tcboxblend}
This is a \texttt{tcolorbox}.
\end{tcboxblend}
\end{tcolorbox}

\begin{tcolorbox}[enlarge by=5mm,enhanced,show bounding box]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

This is a \texttt{tcolorbox}.

/\texttt{tcb/grow to left by}(\texttt{length}) \hspace{1cm} \text{(no default, initially 0\texttt{mm})}
Enlarges the current box width by \texttt{(length)} and enlarges (shrinks) the bounding box distance
to the left side of the box by \texttt{−(length)}. Also see /tcb/\texttt{left skip}.\textsuperscript{P.83}

\begin{tcolorbox}[colframe=blue!75!black,colback=white]
\begin{tcboxblend}
This is a \texttt{tcolorbox}.
\end{tcboxblend}
\end{tcolorbox}

\begin{tcolorbox}[width=5cm,grow to left by=2cm,enhanced,show bounding box]
This is a \texttt{tcolorbox} with a width of 7cm.
\end{tcolorbox}

This is a \texttt{tcolorbox} with a width of 7cm.

\begin{tcolorbox}[grow to right by=2cm,enhanced,show bounding box]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

This is a \texttt{tcolorbox}.

/\texttt{tcb/grow to right by}(\texttt{length}) \hspace{1cm} \text{(no default, initially 0\texttt{mm})}
Enlarges the current box width by \texttt{(length)} and enlarges (shrinks) the bounding box distance
to the right side of the box by \texttt{−(length)}. Also see /tcb/\texttt{right skip}.\textsuperscript{P.83}

\begin{tcolorbox}[colframe=blue!75!black,colback=white]
\begin{tcboxblend}
This is a \texttt{tcolorbox}.
\end{tcboxblend}
\end{tcolorbox}

\begin{tcolorbox}[grow to right by=2cm,enhanced,show bounding box]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[grow to right by=2cm,grow to left by=1cm,enhanced,show bounding box]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

This is a \texttt{tcolorbox}.
4.15.2 Box Alignment

\textbf{tcb/grow sidewards by}=(length) (no default, initially 0mm)

Shortcut for setting \texttt{/tcb/grow to left} by \texttt{\textcup P.86} and \texttt{/tcb/grow to right} by \texttt{\textcup P.86} to (length). Also see \texttt{/tcb/oversize \textcup P.45} and \texttt{/tcb/spread sidewards \textcup P.90}.

\begin{tcolorbox}[grow sidewards by=2cm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\section*{4.15.2.1 Box Alignment}

\textbf{tcb/flush left} (style, no value)

Enlarges the bounding box to the right side to fill the line completely.

\begin{tcolorbox}[flush left,width=5cm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\textbf{tcb/flush right} (style, no value)

Enlarges the bounding box to the left side to fill the line completely.

\begin{tcolorbox}[flush right,width=5cm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\textbf{tcb/center} (style, no value)

Enlarges the bounding box equally to both sides to fill the line completely.

\begin{tcolorbox}[center,width=5cm,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}. 87
4.15.3 Toggle Enlargements

\texttt{/tcb/toggle enlargement=(toggle preset)} (default \texttt{evenpage}, initially \texttt{none})

According to the \texttt{(toggle preset)}, the left and the right enlargements of the bounding box are switched or not. Feasible values are:

- \texttt{none}: no switching.
- \texttt{forced}: the values of the left and right enlargement are switched.
- \texttt{evenpage}: if the page is an even page, the values of the left and right enlargement are switched. This value also sets \texttt{/tcb/check odd page} \texttt{true}.

See \texttt{/tcb/toggle left and right} \textsc{P.46} to toggle geometry settings.

\begin{tcolorbox}[toggle enlargement=none,enhanced,show bounding box]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[toggle enlargement=forced]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[toggle enlargement=evenpage]
This page is an \texttt{tcbifoddpage}{}{odd}{even} page. Therefore, the left and right enlargements \texttt{are not}{are} toggled.
\end{tcolorbox}

This is a \texttt{tcolorbox}.

This page is an \texttt{tcbifoddpage}{}{odd}{even} page. Therefore, the left and right enlargements are toggled.
4.15.4 Spread Box to Page Borders

The following border options are *not* applicable to nested boxes, boxes inside tables, etc. For boxes inside lists, the options *may* work, but not necessarily. Also, boxes should be set with `\noindent` and full width.

/tcb/spread inwards=⟨length⟩ (default 0pt, initially unset)
Enlarges the current box width to match the inner page border (left-handed side for one-sided documents). If the optional ⟨length⟩ is greater than 0pt, the box grows over the border, if ⟨length⟩ is lower than 0pt, there is a margin between box and page border.

```
\begin{tcolorbox}[enhanced,spread inwards,  
  colframe=blue!75!black,colback=white,show bounding box]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}
```

This is a tcolorbox.

/tcb/spread outwards=⟨length⟩ (default 0pt, initially unset)
Enlarges the current box width to match the outer page border (right-handed side for one-sided documents). If the optional ⟨length⟩ is greater than 0pt, the box grows over the border, if ⟨length⟩ is lower than 0pt, there is a margin between box and page border.

```
\begin{tcolorbox}[enhanced,spread outwards,  
  colframe=blue!75!black,colback=white,show bounding box]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}
```

This is a tcolorbox.

/tcb/move upwards=⟨length⟩ (default 0pt, initially unset)
Starts a new page with the box at the very top page border. If the optional ⟨length⟩ is greater than 0pt, the box moves over the border, if ⟨length⟩ is lower than 0pt, there is a margin between box and page border.

/tcb/move upwards*=⟨length⟩ (default 0pt, initially unset)
Identical to `/tcb/move upwards`, but without starting a new page.

/tcb/fill downwards=⟨length⟩ (default 0pt, initially unset)
Enlarges the height of the box until the very bottom page border. The library `\breakable` has to be loaded, and `/tcb/height fill` is set automatically. If the optional ⟨length⟩ is greater than 0pt, the box moves over the border, if ⟨length⟩ is lower than 0pt, there is a margin between box and page border.

```
\begin{tcolorbox}[enhanced,fill downwards,  
  colframe=blue!75!black,colback=white,show bounding box]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}
```

This is a tcolorbox.
This is an example for 'spread upwards'.

\begin{tcolorbox}[enhanced,spread upwards,sharp corners=north,height=3cm,  
colframe=blue!75!black,interior style={top color=blue!50,bottom color=white}]
This is an example for 'spread upwards'.
\end{tcolorbox}

This is an example for 'spread downwards'.

\begin{tcolorbox}[enhanced,spread downwards,sharp corners=south,  
colframe=red!75!black,interior style={top color=white,bottom color=red!50}]
This is an example for 'spread downwards'.
\end{tcolorbox}
4.15.5 Box Extrusion

The following keys should not be used with breakable boxes or boxes with a lower part.

/tcb/shrink tight (style, no value, initially unset)
The total colored box is shrunk to the dimensions of the upper part. There should be no lower part and no title. This style sets the /tcb/boxsep to 0pt and other geometry keys to fitting values. This option is likely to be used with the following extrusion keys.

```
\tcbset{colframe=blue!75!black,colback=white,arc=0mm,boxrule=0.4pt, nobeforeafter,tcbox raise base,shrink tight}
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}

Lorem \tcbox{ipsum} dolor sit amet, consectetuer adipiscing elit.
```

U 2014-09-19 /tcb/extrude left by=(length) (style, no default, initially unset)
The (upper part of the) colored box is extruded by the given \textit{(length)} to the left side. The inner width and the bounding box is kept unchanged and the operation is additive!

```
\tcbset{enhanced,colframe=red,colback=yellow!25!white, frame style={opacity=0.25},interior style={opacity=0.5}, nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}
Lorem \tcbox[ipsum] dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis.
```

U 2014-09-19 /tcb/extrude right by=(length) (style, no default, initially unset)
The (upper part of the) colored box is extruded by the given \textit{(length)} to the right side. The inner width and the bounding box is kept unchanged and the operation is additive!

```
\tcbset{enhanced,colframe=red,colback=yellow!25!white, frame style={opacity=0.25},interior style={opacity=0.5}, nobeforeafter,tcbox raise base,shrink tight,extrude by=2mm}
Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis.
```

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The (upper part of the) colored box is extruded by the given \( \langle \text{length} \rangle \) to the top side. The inner width and the bounding box is kept unchanged and the operation is additive!

\[
\text{tcbox}[\text{enhanced}, \text{colframe=red, colback=yellow!25!white, frame style={opacity=0.25}, interior style={opacity=0.5}, nobeforeafter, tcbbox raise base, shrink tight, extrude by=2mm}]
\]

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \textbf{Curabitur} dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.

The (upper part of the) colored box is extruded by the given \( \langle \text{length} \rangle \) to the bottom side. The inner width and the bounding box is kept unchanged and the operation is additive!

\[
\text{tcbox}[\text{enhanced}, \text{colframe=red, colback=yellow!25!white, frame style={opacity=0.25}, interior style={opacity=0.5}, nobeforeafter, tcbbox raise base, shrink tight, extrude by=2mm}]
\]

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \textbf{Curabitur} dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna.

The (upper part of the) colored box is extruded by the given \( \langle \text{length} \rangle \) to all sides. The inner width and the bounding box is kept unchanged and the operation is additive!

\[
\text{tcbox}[\text{enhanced}, \text{colframe=red, colback=yellow!25!white, frame style={opacity=0.25}, interior style={opacity=0.5}, nobeforeafter, tcbbox raise base, shrink tight, extrude by=2mm}]
\]

4.16 Layered Boxes and Every Box Settings

A \texttt{tcolorbox} may contain another \texttt{tcolorbox} and so on. The package takes track of the nesting level using a counter \texttt{tcblayer}. Counter values may be used for doing some fancy things, but you should never change the counter value yourself.

The package takes special care for the first four layers or nesting levels, called managed layers. Here, footnote texts are administrated to find their intended place and specific layer dependent options may be set by changing \texttt{/tcb/every box on layer n}\textsuperscript{P.94}. If needed, the number of managed layers can be increased by setting \texttt{\textbackslash tcbsetmanagedlayers}\textsuperscript{P.94} to a higher value than 4.

The following styles have a considerable influence on how layered boxes are processed. Note especially that nested boxes are getting a \texttt{/tcb/reset}\textsuperscript{P.108} by default. You can change this, but be prepared for suprises if you do.

If the defaults are \texttt{not changed}, a \texttt{tcolorbox} gets its options in the following order. Following options overwrite preceding options.

1. On package load, all options are set to default values.
2. Every \texttt{\textbackslash tcbset}\textsuperscript{P.13} command adds or changes options for the following boxes inside the current \TeX group.
3. While entering a \texttt{tcolorbox}, a \texttt{/tcb/every box on layer n}\textsuperscript{P.94} or \texttt{/tcb/every box on higher layers}\textsuperscript{P.94} option list is applied. With default settings this means:
   - For layer 1 (lowest layer), the \texttt{/tcb/every box} option list is applied. Not overwritten options given by a preceding \texttt{\textbackslash tcbset}\textsuperscript{P.13} survive.
   - For layer 2 and above (nested boxes), a \texttt{/tcb/reset}\textsuperscript{P.108} followed by \texttt{/tcb/every box} option list is applied. Every resettable options given by a preceding \texttt{\textbackslash tcbset}\textsuperscript{P.13} and by the surrounding box(es) are reset.
4. The \texttt{⟨options⟩} given to the \texttt{tcolorbox} are applied. Or, if the box was generated by \texttt{\newtcolorbox}\textsuperscript{P.15} or friends, the \texttt{⟨options⟩} given there are applied.
5. If the box was generated by \texttt{\newtcolorbox}\textsuperscript{P.15} or friends, some automated options are applied.

\texttt{/tcb/every box} \hspace{1cm} (style)

By default, this style is empty.

\begin{Verbatim}
% default setting:
\textbackslash tcbset\{every box/.style={}}\end{Verbatim}

It may be changed by redefining this style.

\begin{Verbatim}
% setting all boxes to be enhanced:
\textbackslash tcbset\{every box/.style={enhanced}}\end{Verbatim}

The alternative for setting something for every box (on every layer) is

\begin{Verbatim}
% setting all boxes to be enhanced:
\textbackslash tcbsetforeverylayer\{enhanced}\end{Verbatim}
/tcb/every box on layer \( n \) (style)
Here, \( n \) has to be replaced by a number ranging from 1 to the highest managed layer number (4 by default).

```
% default settings:
\tcbset{
  every box on layer 1/.style={every box},
  every box on layer 2/.style={reset,every box},
  every box on layer 3/.style={reset,every box},
  every box on layer 4/.style={reset,every box},
}
```

/tcb/every box on higher layers (style)
Higher layers are layers above the highest managed layer number (4 by default).

```
\tcbset{every box on higher layers/.style={reset,every box}}
```

/\texttt{tcbsetmanagedlayers}\{⟨number⟩\}
Replaces the highest managed layer number by \( ⟨number⟩ \) where 4 is the default. This macro can only be used inside the preamble. Using a \( ⟨number⟩ \) lower than 4 typically makes no sense, but is not forbidden.

```
% \usepackage{lipsum}
% \tcbuselibrary{skins,breakable}
\tcbset{colframe=red!75!black,fonttitle=\bfseries,
colback=red!5!white,
every box/.style={enhanced,watermark text=\the\tcblayer,
  before=\par\smallskip,after=\par\smallskip},
every box on layer 2/.style={reset,every box,colback=yellow!10!white,
  drop fuzzy shadow}}
\begin{tcolorbox}[enhanced jigsaw,breakable,title=Layer 1 Box]
Here comes a footnote\footnote{Footnote from layer 1 box}.
\lipsum[2]
\begin{tcolorbox}[title=Layer 2 Box]
abc\footnote{The footnote of abc}
\end{tcolorbox}
\begin{tcolorbox}[title=Another Box,ams equation]
\tcbhighmath\{\sum\limits_{n=1}^{\infty} \frac{1}{n}\} = \infty.
\end{tcolorbox}
\begin{tcolorbox}[title=Yet Another Box]
My text.  
\tcboxfit[height=2cm]{\lipsum[1]}\footnote{A lipsum text}. \lipsum[3]
\begin{tcolorbox}[title=Layer 4,colframe=blue,colback=white]
Layer 4\footnote{Layer 4 footnote}
\end{tcolorbox}
The End\footnote{Last footnote}.
\end{tcolorbox}
\end{tcolorbox}
```

Layer 1 Box
Here comes a footnote\(^6\). Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras

Layer 2 Box

abc

*The footnote of abc*

Another Box

\[
\sum_{n=1}^{\infty} \frac{1}{n} = \infty.
\]

Some text.

Yet Another Box


Layer 4

Layer 4

*Layer 4 footnote*

The End.

*Footnote from layer 1 box*

my text.


Layer 4

Layer 4

*Layer 4 footnote*

The End.

*Footnote from layer 1 box*

*a*Footnote from some text
4.17 Capture Mode

\texttt{/tcb/capture=\langle mode \rangle} \hspace{1cm} \text{(no default, initially minipage)}

The capture \langle mode \rangle defines how the box content is processed.

Feasible values for \langle mode \rangle are:

- **minipage:**
  This is the default \langle mode \rangle for \texttt{tcolorbox} \textsuperscript{P.12}. The content may have an upper and a lower part. Optionally, the box can be \texttt{/tcb/breakable} \textsuperscript{P.375}. The box content is put into a minipage or into something similar to a minipage.

- **hbox:**
  This is the default \langle mode \rangle for \texttt{tcbox} \textsuperscript{P.14}. The content cannot have a lower part and cannot be broken. The colored box is sized according to the dimensions of the content. A shortcut to set this mode is \texttt{/tcb/hbox}.

- **fitbox:** (needs the \texttt{fitting} library)
  This is the default \langle mode \rangle for \texttt{tcboxfit} \textsuperscript{P.421}. The content cannot have a lower part and cannot be broken. The content is sized according to the dimensions of the colored box. A shortcut to set this mode is \texttt{/tcb/fit} \textsuperscript{P.423}.

\begin{verbatim}
\tcbset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[capture=minipage]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[capture=hbox]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[capture=fitbox,height=9mm]% needs the 'fitting' library
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}

\textbf{/tcb/hbox} \hspace{1cm} \text{(style, no default)}

Shortcut for \texttt{capture=hbox}.

\begin{verbatim}
\tcbset{colframe=blue!75!black,colback=white}
\begin{tcolorbox}[hbox]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}

\textbf{/tcb/minipage} \hspace{1cm} \text{(style, no default)}

Shortcut for \texttt{capture=minipage}.
4.18 Text Characteristics

The text inside a tcolorbox is formatted using a \TeX\ minipage if the box is unbreakable. If breakable, the box tries a mimicry of a minipage. In a minipage or parbox, paragraphs are formatted slightly different as the main text. If the key value is set to false, the normal main text behavior is restored. In some situations, this has some unwanted side effects. It is recommended that you use this experimental setting only where you really want to have this feature.

```latex
% \usepackage{lipsum} % preamble
\tcbset{width=(\textwidth-2mm)/2,nobeforeafter,arc=1mm, colframe=blue!75!black,colback=white,fonttitle=\bfseries,fontupper=\small, left=2mm,right=2mm,top=1mm,bottom=1mm,equal height group=parbox}
\begin{tcolorbox}[parbox,adjusted title={parbox=true (normal)}]
\lipsum[1-2]
\end{tcolorbox}
\hfill
\begin{tcolorbox}[parbox=false,adjusted title={parbox=false}]
\lipsum[1-2]
\end{tcolorbox}
```

**parbox=true (normal)**

Lorem ipsum dolor sit amet, consectetur adipisci
ing elit. Ut purus elit, vestibulum ut, place
rat ac, adipiscing vitae, felis. Curabitur dictum
gravida mauris. Nam arcu libero, nonummy eget,
consectetuer id, vulputate a, magna. Donec vehi
cula augue eu neque. Pellentesque habitant morbi tristique
senectus et netus et malesuada fames ac turpis egestas. Male
ris ut leo. Cras viverra metus rhoncus sem. Nulla et
lectus vestibulum urna fringilla ultrices. Phasellus eu
tellus sit amet tortor gravida placerat. Integer sapien est,
iaculis in, pretium quis, viverra ac, nunc. Praesent eget
sem vel leo ultrices bibendum. Aenean faucibus. Morbi do
lor nulla, malesuada eu, pulvinar at, mollis ac, nulla.
Curabitur auctor semper nulla. Donec varius orci eget
risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam.
Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales,
sollicitudin vel, wisi. Morbi auctor lorem non
justo. Nam lacus libero, pretium at, lobortis
vitae, ultricies et, tellus. Donec aliquet, tor
tor sed accumsan bibendum, erat ligula ali
quet magna, vitae ornare odio metus a mi.
Morbi ac orci et nisl hendrerit mollis. Sus
pendisse ut massa. Cras nec ante. Pellentesque
a nulla. Cum sociis natoque penatibus et mag
nis dis parturient montes, nascetur ridiculus
mus. Aliquam tincidunt urna. Nulla ullam
corper vestibulum turpis. Pellentesque cursus
luctus mauris.

**parbox=false**

Lorem ipsum dolor sit amet, consectetur adipisc
ing elit. Ut purus elit, vestibulum ut, place
rat ac, adipiscing vitae, felis. Curabitur dictum
gravida mauris. Nam arcu libero, nonummy eget,
consectetuer id, vulputate a, magna. Donec vehi
cula augue eu neque. Pellentesque habitant morbi tristique
senectus et netus et malesuada fames ac turpis egestas. Male
ris ut leo. Cras viverra metus rhoncus sem. Nulla et
lectus vestibulum urna fringilla ultrices. Phasellus eu
tellus sit amet tortor gravida placerat. Integer sapien est,
iaculis in, pretium quis, viverra ac, nunc. Praesent eget
sem vel leo ultrices bibendum. Aenean faucibus. Morbi do
lor nulla, malesuada eu, pulvinar at, mollis ac, null
a. Curabitur auctor semper nulla. Donec varius orci eget
risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam.
Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales,
sollicitudin vel, wisi. Morbi auctor lorem non
justo. Nam lacus libero, pretium at, lobortis
vitae, ultricies et, tellus. Donec aliquet, tor
tor sed accumsan bibendum, erat ligula ali
quet magna, vitae ornare odio metus a mi.
Morbi ac orci et nisl hendrerit mollis. Sus
pendisse ut massa. Cras nec ante. Pellentesque
a nulla. Cum sociis natoque penatibus et mag
nis dis parturient montes, nascetur ridiculus
mus. Aliquam tincidunt urna. Nulla ullam
corper vestibulum turpis. Pellentesque cursus
luctus mauris.
Long words at the beginning of paragraphs in very narrow boxes will not be hyphenated using `pdflatex`. This problem is circumvented by applying the `hyphenationfix` option.

```
\tcbset{colframe=blue!75!black, fontupper=\normalsize, colback=blue!5!white, width=4cm}
\begin{tcolorbox}
Rechnungsadjunktentochter. Statthalttereikonzipist. \par
Statthalttereikonzipist. 
\end{tcolorbox}
\begin{tcolorbox}[hyphenationfix]
Rechnungsadjunktentochter. Statthalttereikonzipist. \par
Statthalttereikonzipist. 
\end{tcolorbox}
```

!parbox=false and `hyphenationfix` should not be used together. They are targeting different box types and they do not blend very well.

4.19 Files

`/tcb/tempfile=⟨file name⟩` (no default, initially \jobname.tcbtemp)
Sets ⟨file name⟩ as name for the temporary file which is used inside `tcbwritetemp` and \tcbusetemp implicitly.

4.20 \tcbox Specials

The following options are applicable for `\tcbox` and `\tcboxmath` only.

`/tcb/tcbox raise=⟨length⟩` (no default, initially 0pt)
Raises the `\tcbox` by the given ⟨length⟩.

```
\tcbset{colframe=blue!50!black,colback=white,colupper=red!50!black, fonttitle=\bfseries,nobeforeafter,center title}
\tcbset{colframe=blue!75!black,colback=white,colupper=red!50!black, fontupper=\normalsize}
Test\dotfill\tcbox[tcbox raise base]{Hello World 1}\dotfill\tcbox[tcbox raise=5mm]{Hello World 2}\dotfill\tcbox[tcbox raise base]{Hello World 3}\dotfill
```

`/tcb/tcbox raise base` (style, no value, initially unset)
Raises the `\tcbox` such that the base of its content matches the base of the environmental line; see example above.

`/tcb/on line` (style, no value, initially unset)
Combines `/tcb/tcbox raise base` with `/tcb/nobeforeafter`. The resulting box behaves analogue to `\fbox`.  

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Controls how \tcbox \(^{\text{P.14}}\) respects a \tcbox width \(^{\text{P.34}}\) setting. Feasible values for \((\text{mode})\) are:

- **auto** (initial setting): ignore \tcbox width \(^{\text{P.34}}\) and set box width according to its content.
- **auto limited**: Set box width according to its content, if it is smaller than \tcbox width \(^{\text{P.34}}\). Otherwise, the content is set like in a tcolorbox \(^{\text{P.12}}\) with line breaks.
- **forced center**: Set box width according to \tcbox width \(^{\text{P.34}}\). The content is centered and may overlap the box borders.
- **forced left**: Set box width according to \tcbox width \(^{\text{P.34}}\). The content is left aligned and may overlap the box borders.
- **forced right**: Set box width according to \tcbox width \(^{\text{P.34}}\). The content is right aligned and may overlap the box borders.
- **minimum center**: Set box width according to \tcbox width \(^{\text{P.34}}\), if the content fits into. The content is centered and the box width may grow beyond \tcbox width \(^{\text{P.34}}\).
- **minimum left**: Set box width according to \tcbox width \(^{\text{P.34}}\), if the content fits into. The content is left aligned and the box width may grow beyond \tcbox width \(^{\text{P.34}}\).
- **minimum right**: Set box width according to \tcbox width \(^{\text{P.34}}\), if the content fits into. The content is right aligned and the box width may grow beyond \tcbox width \(^{\text{P.34}}\).
4.21 Counters, Labels, and References

\tcb/phantom\{code\} (no default, initially unset)

The \{code\} is put in a box at the upper left corner of the \texttt{tcolorbox}. If the \texttt{tcolorbox} is breakable, the \{code\} is executed for the first box of the break sequence only. If there already was some phantom code given, the new \{code\} is appended.

The \{code\} is intended to be used for counter stepping, labelling, and related operations which do not produce visible text.

- The \{code\} is executed before the title and box content, i.e. counter values are ensured to be increased before usage.
- Labels are ensured to reference the correct page number.
- The \{code\} is executed only once even during fitting operations for title and box content.
- In combination with the \texttt{hyperref} package, the hyper anchor is set to the upper left corner of the \texttt{tcolorbox}, i.e. links inside the pdf document will jump to the box pleasantly.
- Since the \{code\} is executed inside a \TeX{} group, only global operations can survive this group.

Examples for the \texttt{phantom} usage are given in Section 16.9 from page 343, e.g. Example 16.1 on page 344.

\tcb/nophantom (no value, initially set)

Removes the phantom code if set before.

\tcb/label\{marker\} (no default, initially unset)

The \{marker\} is set as label text for a reference with the \texttt{\ref} macro. Typically, this option is used for numbered boxes, see Subsection 5.1 from page 110, e.g. \texttt{/tcb/new/auto counter}.\footnote{P.110.}

\tcb/phantomlabel\{marker\} (no default, initially unset)

Equivalent to \texttt{/tcb/label} for an \texttt{unnumbered} box. A \texttt{\phantomsection} from the package \texttt{hyperref} \cite{15} is used to set a correct hyperlink target. This is not needed for a numbered box.

\tcb/label\{type\} (no default, initially unset)

This option key can be used only in conjunction with the \texttt{cleveref} package \cite{5} which has to be loaded separately. \{type\} has to be a cross-reference type known to \texttt{cleveref} like \texttt{theorem}, \texttt{algorithm}, \texttt{result}, etc. References made with \texttt{cleveref} will use this type. Note that using \texttt{label\{type\}} will result in compilation errors, if \texttt{cleveref} is not loaded. For an example, see Theorem 17.3.5 on page 369.

\tcb/no label\{type\} (no value, initially set)

Removes a \texttt{/tcb/label\{type\}}, if set before.

\tcb/step\{counter\} (no default, initially unset)

Shortcut for \texttt{phantom}\{\texttt{\refstepcounter\{#1\}}\}. The given \{counter\} is increased and ready for labelling. This option is not needed when using the convenient automated numbering introduced with version 2.40, see Subsection 5.1 from page 110.

\tcb/step and label\{\{counter\}\}\{\{marker\}\} (no default, initially unset)

Shortcut for using \texttt{/tcb/step} and \texttt{/tcb/label}. This option is not needed when using the convenient automated numbering introduced with version 2.40, see Subsection 5.1 from page 110.
If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 117 is used, this key describes the \langle text \rangle for an entry into the generated list, e.g.

\list entry={\protect\numberline{\thetcbcounter}My beautiful Example}

See Section 16.9 from page 343 for a complete example.

\textbf{/tcb/list\ space text}=(text) \quad \text{(style, no default)}

This is a shortcut for setting \texttt{/tcb/list entry} to \protect\numberline{\thetcbcounter}(text). So, the following settings are identical:

\begin{quote}
list text={My beautiful Example},
list entry={\protect\numberline{\thetcbcounter}My beautiful Example}
\end{quote}

See Section 16.9 from page 343 for a complete example.

\textbf{/tcb/add to list}={\langle list \rangle}{\langle type \rangle} \quad \text{(no default, initially unset)}

If the «list of tcolorbox(es)» feature described in Subsection 5.2 from page 117 is used, list entries are generated automatically. With this key, you can enforce an entry to the given \langle list \rangle with the given \langle type \rangle. This issues:

\begin{quote}
\texttt{$\addcontentsline{\langle list\rangle}{\langle type\rangle}{\langle entry\ space\ text\rangle}$}
\end{quote}

\textbf{/tcb/nameref}=(text) \quad \text{(no default, initially unset)}

If the \texttt{nameref} package is loaded, the given \langle text \rangle is used for corresponding \texttt{\nameref} macros. Typically, the \langle text \rangle will be chosen to be identical or nearly identical to the one for \texttt{/tcb/title} \textsuperscript{P.18}.

\begin{quote}
\texttt{Definition \ in \ the \ preamble:}
\end{quote}

\begin{verbatim}
\newtcolorbox[auto counter,number within=section]{pabox}[2][]{%
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
title=Examp.-\thetcbcounter: #2,#1}
\end{verbatim}

\begin{quote}
\texttt{\begin{pabox}[label={mynamelabel},nameref={Title or anything else}]{Title text}
This is a tcolorbox.
\end{pabox}
This box is automatically numbered with \texttt{\ref{mynamelabel}} on page \texttt{\pageref{mynamelabel}}.
The box is titled '\texttt{\nameref{mynamelabel}}'.
\end{pabox}}
\end{quote}

\textbf{Examp. 4.1: Title text}

This is a tcolorbox.

This box is automatically numbered with 4.1 on page 101.
The box is titled 'Title or anything else'.

! \texttt{/tcb/nameref} is used automatically inside \texttt{\newtcbtheorem} \textsuperscript{P.349}.
A \texttt{hypertarget} from the package \texttt{hyperref} \cite{hyperref} is used to create an internal link of an anchor \texttt{〈marker〉}. This \texttt{〈marker〉} can be referenced by \texttt{\hyperlink} or \texttt{/tcb/hyperlink} \textsuperscript{P.202}.

\begin{tcolorbox}
\begin{Verbatim}
\usepackage{hyperref}
\begin{tcolorbox}[enhanced, 
colback=red!10, colframe=red!50!black, 
hypertarget=hypertwinA, 
hyperlink=hypertwinB, 
title=Box A]
Click me to jump to Box B.
\end{tcolorbox}
\end{Verbatim}
\end{tcolorbox}

Sets a PDF bookmark with the given \texttt{〈text〉}, if the package \texttt{bookmark} \cite{bookmark} is loaded. This bookmark is set with an automated destination (the current box) and is set one level below the current bookmark level.

\begin{tcolorbox}
\begin{Verbatim}
\usepackage{bookmark}
\begin{tcolorbox}[colback=blue!10, colframe=blue!50!black, 
bookmark=Example for using a bookmark, 
title=Example for using a bookmark]
Open the bookmark view of the previewer to see the bookmark.
\end{tcolorbox}
\end{Verbatim}
\end{tcolorbox}

Identical to \texttt{/tcb/bookmark}, but additional \texttt{〈options〉} from the package \texttt{bookmark} \cite{bookmark} can be given.

\begin{tcolorbox}
\begin{Verbatim}
\usepackage{bookmark}
\begin{tcolorbox}[colback=red!10, colframe=red!50!black, 
bookmark*=\{color=red, italic, bold\} 
\{Another bookmark example\}, 
title=Red and bold bookmark]
Open the bookmark view of the previewer to see the bookmark.
\end{tcolorbox}
\end{Verbatim}
\end{tcolorbox}

Adds an index \texttt{〈entry〉} for the box. This is a shortcut for setting \texttt{\index{〈entry〉}} to \texttt{/tcb/phantom}\textsuperscript{P.100}.

\begin{tcolorbox}
\begin{Verbatim}
\texttt{/tcb/index=〈entry〉}
\end{Verbatim}
\end{tcolorbox}

\begin{tcolorbox}
\begin{Verbatim}
\texttt{/tcb/index*=〈name〉{〈entry〉}}
\end{Verbatim}
\end{tcolorbox}

Adds an \texttt{〈entry〉} to an index with a specific \texttt{〈name〉}. This is a shortcut for setting \texttt{\index[〈name〉]{〈entry〉}} to \texttt{/tcb/phantom}\textsuperscript{P.100}. An index extension package like \texttt{imakeidx} has to be loaded to use this option key.
4.22 Even and Odd Pages

Also see /tcb/toggle left and right \textsuperscript{P.46} and /tcb/toggle enlargement \textsuperscript{P.88} for further even/odd options.

\verb|/tcb/check odd page=true|false \hspace{1cm} \textbf{(default true, initially false)}

If set to \texttt{true}, a precise even/odd page testing for the current box is applied. This is done by using labels. If a box moves to another page, the document has to be compiled twice for the correct settings. If set to \texttt{false}, even/odd page tests may give wrong results for the first box of a page.

\verb|/tcb/toggle left and right\textsuperscript{P.46}| /tcb/toggle enlargement \textsuperscript{P.88}, and /tcb/if odd page\textsuperscript{P.108} automatically set check odd page, but for \texttt{\textbackslash tcb\textbackslash if oddpage} \textsuperscript{P.105} this option has to be set explicitly.

\verb|/tcb/if odd page={⟨odd options⟩}{⟨even options⟩}\hspace{1cm} \textbf{(style, no default)}|

If the current box is on an odd page, the \texttt{⟨odd options⟩} are applied. On an even page, the \texttt{⟨even options⟩} are applied. /tcb/check odd page is automatically set for precise even/odd page testing.

\begin{tcolorbox}[if odd page={colback=yellow!50}{colback=red!50}]
\begin{verbatim}
This box is colored in yellow on an odd page
and is colored in red on an even page.
\end{verbatim}
\end{tcolorbox}

This box is colored in yellow on an odd page and is colored in red on an even page.

\verb|If a box is /tcb/breakable\textsuperscript{P.375}| using /tcb/if odd page only acts upon the first box. If the setting should be repeated for every partial box of the break sequence, the option should be packed into /tcb/extras \textsuperscript{P.381}. In this case, /tcb/check odd page has to be set explicitly! Also see /tcb/if odd page\textsuperscript{P.104}.

\verb|/tcb/if odd page or oneside={⟨odd options⟩}{⟨even options⟩}\hspace{1cm} \textbf{(style, no default)}|

For onesided documents, the \texttt{⟨odd options⟩} are applied always. For twosided documents, this style is identical to /tcb/if odd page.
For breakable boxes, if the current partial box is on an odd page, the \textit{odd options} are applied. On an even page, the \textit{even options} are applied. \texttt{/tcb/check odd page}^{\text{\textsuperscript{P.103}}} is automatically set for precise even/odd page testing.

In contrast to \texttt{/tcb/if odd page}^{\text{\textsuperscript{P.103}}}, \texttt{/tcb/if odd page*} is used on every partial box of a break sequences and not only on the first box. Another difference is that \texttt{/tcb/if odd page*} is applied quite late during option processing, while \texttt{/tcb/if odd page}^{\text{\textsuperscript{P.103}}} is applied immediately.

\texttt{/tcb/if odd page*} is implemented as \texttt{/tcb/if odd page}^{\text{\textsuperscript{P.103}}} packed into \texttt{/tcb/extras}^{\text{\textsuperscript{P.381}}}.

\begin{tcolorbox}
\texttt{\begin{tcbox}[breakable,if odd page*={colback=yellow!50}{colback=red!50}]
This breakable box is colored in yellow on an odd page
and is colored in red on an even page. For every partial box, the
test is repeated, i.e. this would give a yellow, red, yellow, red, \ldots sequence for a long content.
\end{tcbox}}
\end{tcolorbox}

This breakable box is colored in yellow on an odd page and is colored in red on an even page. For every partial box, the test is repeated, i.e. this would give a yellow, red, yellow, red, \ldots sequence for a long content.

For onesided documents, the \textit{odd options} are applied always. For twosided documents, this style is identical to \texttt{/tcb/if odd page*}.
\textbf{If the current box is on an odd page, the (odd code) is executed. On an even page, the (even code) is executed. For precise even/odd page testing, the /tcb/check odd page has to be set manually inside the box options. The macro \texttt{tcbifoddpage} can be used inside underlay, overlay, or watermark code to test if the box is on an odd page. This will work also for boxes in a break sequence. The macro can also be used inside the box \textbf{content text}. For unbreakable boxes, the correct page test is applied. But for /tcb/breakable boxes, \texttt{tcbifoddpage} will always give the result for the page of the first box inside the box \textbf{content text}. If needed, the methods from the packages \texttt{changepage} or \texttt{ifoddpage} could be used here.}

\begin{tcolorbox}[enhanced,check odd page, title={Example for a box on an \texttt{tcbifoddpage} (odd) (even) page}, watermark text={\texttt{tcbifoddpage}(Odd)(Even) page!}]
\lipsum[1]
\end{tcolorbox}

\textbf{Example for a box on an odd page}


\textbf{For onesided documents, the (odd code) is executed always. For twosided documents, this macro is identical to \texttt{tcbifoddpage}.}
This is a unique identifier (arabic number) for a tcolorbox. It is locally defined inside boxes and has no meaning outside. It is used for precise even/odd page testing, but may also be valuable for elaborate user code.

\begin{tcolorbox}[colback=yellow!5,title=Box \texttt{\textbackslash\texttt{thetcolorboxnumber}}]
This box is \texttt{\textbackslash\texttt{thetcolorboxnumber}}.
\tcbox[on line,size=fbox]{This box is \texttt{\textbackslash\texttt{thetcolorboxnumber}} and
\tcbox[on line,size=fbox]{this box is \texttt{\textbackslash\texttt{thetcolorboxnumber}}}.
This box is \texttt{\textbackslash\texttt{thetcolorboxnumber}}.
\end{tcolorbox}

<table>
<thead>
<tr>
<th>Box 1135</th>
</tr>
</thead>
<tbody>
<tr>
<td>This box is 1135. This box is 1136 and this box is 1137. This box is 1135.</td>
</tr>
</tbody>
</table>

This macro contains the expanded arabic page number of the current tcolorbox. It is locally defined inside boxes and has no meaning outside. It is precise only, if /tcb/check odd page was set.

\begin{tcolorbox}[colback=yellow!5,check odd page,\texttt{title=Box on page \textbackslash\texttt{thetcolorboxpage}}]
This box is located on page \texttt{\textbackslash\texttt{thetcolorboxpage}}.
\end{tcolorbox}

<table>
<thead>
<tr>
<th>Box on page 106</th>
</tr>
</thead>
<tbody>
<tr>
<td>This box is located on page 106.</td>
</tr>
</tbody>
</table>
4.23 Externalization

See Section 24 on page 456 for the \texttt{external} library of \texttt{tcolorbox}.

If the \textit{externalization} library of the \texttt{tikz} package is used and \texttt{/tcb/graphical environment} is set to \texttt{tikzpicture}, a \texttt{tcolorbox} could trigger the externalization process which will arise a compilation error.

To avoid this, there are two possible strategies:

- Ensure, that \texttt{\tikzexternaldisable} is set before a \texttt{tcolorbox} is used. If you typically use the pattern \texttt{\tikzexternenable some picture \tikzexternaldisable}, there is nothing to care about.

- If \textit{externalization} is enabled globally, use \texttt{/tcb/shield externalize} to shield any \texttt{tcolorbox}. The preamble code could look like this:

\begin{verbatim}
\usetikzlibrary{external}
\tikzexternalize
\tcbset{shield externalize}
\end{verbatim}

\texttt{/tcb/shield externalize=true|false} (default \texttt{true}, initially \texttt{false})

If set to \texttt{true}, the drawing part of the \texttt{tcolorbox} is not being externalized which is a good thing at the current state of art. Nevertheless, if the \texttt{tcolorbox} contains a \texttt{tikzpicture}, this picture is still externalized. Pictures drawn with help of \texttt{/tcb/tikz upper} or alike are not externalized.

If a \texttt{tcolorbox} is used inside a node of an encircling \texttt{tikzpicture} which is externalized, do \textbf{not} use \texttt{\tikzexternaldisable} in front of the \texttt{tcolorbox}. \texttt{/tcb/shield externalize} is deactivated automatically inside a \texttt{tikzpicture}.

\texttt{/tcb/external=(file name)} (no default, initially unset)

Convenience option which calls \texttt{\tikzsetnextfilename{(file name)}}. Typically, it may be used inside the option list of a \texttt{tcolorbox} to set the externalization \texttt{(file name)} for the first \texttt{tikzpicture} which is discovered inside the box content. The package \texttt{tikz} or the library \texttt{skins} has to be loaded to use this option. Additionally, \texttt{\usetikzlibrary{external}} has to be used.

\texttt{/tcb/remake=true|false} (default \texttt{true}, initially \texttt{false})

Convenience option which calls \texttt{/tikz/external/remake next}. Typically, it may be used inside the option list of a \texttt{tcolorbox} to force the remake of the first \texttt{tikzpicture} which is discovered inside the box content. The package \texttt{tikz} or the library \texttt{skins} has to be loaded to use this option. Additionally, \texttt{\usetikzlibrary{external}} has to be used.
4.24 Miscellaneous

/tcb/reset (no value, initially set)
Sets (nearly) all \texttt{tcolorbox} settings (including loaded libraries) back to their default values plus any settings given by \texttt{/tcbsetforeverylayer}$^\text{P.13}$, \texttt{/tcb/savedelimiter}$^\text{P.26}$ and \texttt{/tcb/capture}$^\text{P.96}$ keep their values. Also, all raster values (see Section 15 on page 286) are not resetted.
This option is useful for boxes in boxes where the inner box should not inherit the settings of the outer box. Note that for boxes inside boxes the \texttt{reset} is done automatically, if the standard settings of the package are used (v2.40 and above), see Section 4.16 from page 93.

/tcb/code=$\langle$\texttt{code}$\rangle$ (no default, initially unset)
The given $\langle$\texttt{code}$\rangle$ is executed immediately. This option is useful to place some arbitrary code into an option list.

\begin{tcolorbox}[\texttt{colback=red!5!white,}\texttt{colframe=red!75!black,}\	\texttt{code={Useless at this spot but functional.}},\texttt{fonttitle=\bfseries}]\begin{tcolorbox}\texttt{[code={\newcommand{\mycommand}{\textit{working}},\texttt{title=My \mycommand\ title}]\This is a \texttt{tcolorbox}.\end{tcolorbox}}\end{tcolorbox}

Useless at this spot but functional.

\textbf{My working title}

This is a \texttt{tcolorbox}. 108
Annihilates the current `tcolorbox` as far as possible. Basically, this comments out the whole `tcolorbox` by using a key. If the option list of the current `tcolorbox` contains arbitrary code with global impact (like counter settings), these actions are not undone automatically. Nevertheless, the effects of `/tcb/phantom`\textsuperscript{P.100}, `/tcb/step`\textsuperscript{P.100}, `/tcb/new/auto counter`\textsuperscript{P.110}, etc., are removed by `/tcb/void`.

```
\begin{tcolorbox}
  title=This box is completely removed by the following key,\newpage
  \textbf{void}
\end{tcolorbox}

This is a \textbf{tcolorbox}.
```

This option key cannot be applied for every situation. For example, if several box environments with the same environment name are nested, for the outer environment `/tcb/void` cannot be used, since the end of the inner environment will be misinterpreted as end of the outer environment.

The contents of the current `tcolorbox` are processed including counter settings, but the box is just not drawn. Therefore, `/tcb/nirvana` is less radical than `/tcb/void` and several box environments can be nested without problems.

```
\begin{tcolorbox}
  title=This box is completely removed by the following key,\newpage
  \textbf{nirvana}
\end{tcolorbox}

\begin{tcolorbox}
  Nested Box
\end{tcolorbox}
```

\begin{tcolorbox}[]
\end{tcolorbox}
The initialization options are only applicable for the generation of new environments and commands based on `tcolorbox` and friends. Particularly, they can be used for

- \texttt{\newtcolorbox}\textsuperscript{P.15},
- \texttt{\newtcbox}\textsuperscript{P.16},
- \texttt{\newtcblisting}\textsuperscript{P.312},
- \texttt{\newtcbinputlisting}\textsuperscript{P.314},
- \texttt{\newtcbtheorem}\textsuperscript{P.349}, and
- \texttt{\newtcbfit}\textsuperscript{P.422}.

Typically, these options may generate counters and alike. It is strongly recommended that you use initialization options inside the preamble only. Otherwise, you may get trouble when using \LaTeX\’s `\include` features.

5.1 Numbered Boxes

Counters assigned using the initialization options are administrated automatically. Especially, they are increased for each new box. Independent from the real counter name, the counter value can be referenced by \texttt{\thetcbcounter}, e.g. inside the title of the box. The real counter name is stored inside \texttt{\tcbcounter}.

\texttt{/tcb/new/auto counter} (no value, initially unset)

Creates a new counter automatically. With \texttt{/tcb/new/number format}\textsuperscript{P.112} and \texttt{/tcb/new/number within}\textsuperscript{P.112}, the appearance and behavior of the counter can be changed. The counter value is referenced by \texttt{\thetcbcounter}.

\begin{verbatim}
\newtcolorbox[auto counter,number within=section]{pabox}{2}[2]{%
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
title=Examp.-\thetcbcounter: #2,#1}
\begin{pabox}[label={myautocounter}]{Title with number}
This box is automatically numbered with \ref{myautocounter} on page \pageref{myautocounter}. Inside the box, the \thetcbcounter can also be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{tcb@cnt@pabox}.
\end{pabox}
\end{verbatim}

\begin{verbatim}
\begin{pabox}[label={myautocounter}]{Title with number}
This box is automatically numbered with 5.1 on page 110. Inside the box, the 5.1 can also be referenced by \thetcbcounter. The real counter name is \texttt{tcb@cnt@pabox}.
\end{pabox}
\end{verbatim}
Here, a counter from another \texttt{tcolorbox} is reused. Note that the settings for
\texttt{/tcb/new/number format} and \texttt{/tcb/new/number within} are inherited and
cannot be changed. The counter value is referenced by \texttt{\thetcbcounter}.

\begin{tcolorbox}[use counter from=pabox,]{mybox}[2][]{
  \textcolor{blue!5!white}{colback=blue!5!white},\textcolor{blue!75!black}{colframe=blue!75!black},fonttitle=\textbf{
  \texttt{tcbcounter: #2,#1}}\}
  \begin{mybox}[label={myusecounterfrom}]{Title with continued number}
  This box is automatically numbered with \texttt{\ref{myusecounterfrom}} on page
  \texttt{\pageref{myusecounterfrom}}. Inside the box, the \texttt{\thetcbcounter} can
  also be referenced by \texttt{\thetcbcounter}. \end{mybox}
\end{tcolorbox}

Some Box 5.2: Title with continued number

This box is automatically numbered with 5.2 on page 111. Inside the box, the 5.2 can also
be referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{tcb@cnt@pabox}.

Here, an ordinary existing \LaTeX{} \texttt{counter} is used for numbering. With
\texttt{/tcb/new/number format} and \texttt{/tcb/new/number within}, the appearance and behavior of the
counter can be changed. The counter value is referenced by \texttt{\thetcbcounter}.

\begin{tcolorbox}[use counter=myexample,]{mybox}[2][]{
  \textcolor{green!5!white}{colback=green!5!white},\textcolor{green!55!black}{colframe=green!55!black},fonttitle=\textbf{
  \texttt{tcbcounter: #2,#1}}\}
  \begin{mybox}[label={myusecounter}]{Title with \LaTeX{} number}
  This box is automatically numbered with \texttt{\ref{myusecounter}} on page
  \texttt{\pageref{myusecounter}}. Inside the box, the \texttt{\thetcbcounter} can
  also be referenced by \texttt{\thetcbcounter}. \end{mybox}
\end{tcolorbox}

Some Box A: Title with \LaTeX{} number

This box is automatically numbered with A on page 111. Inside the box, the A can also be
referenced by \texttt{\thetcbcounter}. The real counter name is \texttt{myexample}.

An existing \LaTeX{} \texttt{counter} is used for numbering. In contrast to \texttt{/tcb/new/use counter},
the options \texttt{/tcb/new/number format} and \texttt{/tcb/new/number within} are
ignored. Use this for counters which are already configured outside the \texttt{tcolorbox} package,
e.g. the standard \texttt{figure} counter.

The created boxes are not numbered. This is the default. The option may be used to
overrule a previous option.
\textit{tcb/new/number within}=(counter) \hspace{1cm} \text{(no default, initially unset)}

The automatic counter is set to zero, if \textit{(counter)} is increased. Additionally, during output, the value of \textit{(counter)} is prepended to the value of the automatic counter.

To prepend the automatic counter with the chapter number and to reset it with every new chapter, use:

\begin{verbatim}
number within=chapter
\end{verbatim}

See \textit{/tcb/new/use counter}\cite{P.111} for a complete example.

\textit{tcb/new/number format}=(format macro) \hspace{1cm} \text{(no default, initially \texttt{arabic})}

Declares the format of the automatic counter. The \textit{(format macro)} can be any valid \LaTeX{} number formatting macro like \texttt{arabic}, \texttt{roman}, etc.

To display the counter value in large roman numbers, use:

\begin{verbatim}
number format=\Roman
\end{verbatim}

See \textit{/tcb/new/auto counter}\cite{P.110} for a complete example.

\textit{tcb/new/number freestyle}=(code) \hspace{1cm} \text{(no default, initially unset)}

Allows advanced control over the complete number format. This option overrules the format given by \textit{/tcb/new/number within} and \textit{/tcb/new/number format}. Nevertheless, you can combine it with \textit{/tcb/new/number within} to get the desired reset property.

The \textit{(code)} is some formatting code which should contain \texttt{tcbcounter} to reference the automated counter. Since this \textit{(code)} is expanded, you have to secure each macro with \texttt{noexpand} with exception of \texttt{tcbcounter}.

Definition in the preamble:

\begin{verbatim}
\newtcolorbox[auto counter,number within=section,
  number freestyle={(Q/noexpand\thesection/noexpand\Alph{tcbcounter})},
  colback=yellow!15!white,colframe=blue!75!black,fonttitle=\bfseries,
  title=Question~\thetcbcounter{}: #2,#1]{phbox}[2][2]{%
%colback=yellow!15!white,colframe=blue!75!black,fonttitle=\bfseries,
title=Question~\thetcbcounter{}: #2,#1}
\end{verbatim}

\textbf{Question (Q/5/A): Title with freestyle number}

This box is automatically numbered with \texttt{(Q/5/A)} on page 112. Inside the box, the \texttt{(Q/5/A)} can also be referenced by \texttt{\thetcbcounter{}}.

\textbf{The real counter name is \texttt{tcb@cnt@phbox}.}
The following options `/tcb/new/crefname` and `/tcb/new/Crefname` need to be set inside the preamble.

```
\usepackage{cleveref}
\newtcolorbox[auto counter,number within=section, 
crefname={bluebox}{blueboxes},
]{mybluebox}[2][colback=blue!5!white,colframe=blue!75!black,fonttitle=\bfseries, 
title=Bluebox \thetcbcounter: #2,#1]
```

```
% \usepackage{varioref}
% \usepackage{cleveref}
\begin{mybluebox}[label={myreference}]{My title}
This is an example.
\end{mybluebox}
```

With `varioref`:

```
Bluebox 5.1, bluebox 5.1.
Page 113, page 113.
Bluebox, bluebox.
5.1, 113.
```

With `cleveref`:

```
\Cref{myreference}, \ cref{myreference}.
\Cpageref{myreference}, \cpageref{myreference}.
\nameCref{myreference}, \namecref{myreference}.
\labelcref{myreference}, \labelcpageref{myreference}.
```

```
\Vref{myreference}, \vref{myreference}.
\Vref*{myreference}, \vref*{myreference}.
```

Bluebox 5.1: My title

This is an example.
/tcb/new/blend into⟨name⟩(style, no default, initially unset)

Used to comfortably blend into an existing schema of naming and numbering for some selected cases. For example, a tcolorbox can be used to display and entitle an image pretending to be a standard figure environment. Here, /tcb/title \text{"P.18}" is used instead of the standard \caption and /tcb/list text \text{"P.101}" can be used instead of the optional parameter of the standard \caption.

Feasible values for ⟨name⟩ are:

- figures: blend into the standard figure environment.
- tables: blend into the standard table environment.
- listings: blend into the standard lstlisting environment of the package listings [6].

Note that blend into=listings can only be used in the document content or, preferably, inside a \AtBeginDocument clause! Using it without \AtBeginDocument inside the preamble does not work since the listings packages initializes its counter also inside \AtBeginDocument.

\begin{figure}[htb]
\centering\includegraphics[height=4cm]{lichtspiel.jpg}
\caption{A standard figure}
\end{figure}

\newtcolorbox[blend into=figures]{myfigure}[2][]{float=htb,capture=hbox, title={#2},every float=\centering,#1}

\begin{myfigure}{A tcolorbox figure}
\includegraphics[height=4cm]{lichtspiel.jpg}
\end{myfigure}

Figure 1: A standard figure

Figure 2: A tcolorbox figure
/tcb/blend before title\=(value) \hspace{1em} \text{(no default, initially colon)}

This option formats the title output of /tcb/new/blend into \textsuperscript{P.114}. Note that this is a common \texttt{tcolorbox} option which should be set globally or in the normal option part of \texttt{\newtcolorbox} \textsuperscript{P.15}.

Feasible values for \texttt{\langle value \rangle} are:

- \texttt{colon}: use name/number plus colon.
- \texttt{dash}: use name/number plus dash.
- \texttt{colon hang}: use name/number plus colon with hanging indent.
- \texttt{dash hang}: use name/number plus dash with hanging indent.

```latex
\newtcolorbox[blend into=figures]{myfigure}[2]{float=htb,capture=hbox,
  blend before title=dash hang,title={#2},every float=\centering,#1}

\begin{myfigure}{A tcolorbox figure with quite a long title}
  \includegraphics[height=5cm]{lichtspiel.jpg}
\end{myfigure}
```

Figure 3 – A tcolorbox figure with quite a long title
This option formats the title output of \tcb/new/blend into \textsuperscript{P.114}. The \texttt{code} takes one parameter, the name/number. Use this, if \tcb/blend before title \textsuperscript{P.115} is not flexible enough.

\begin{myfigure}{A tcolorbox figure}
\includegraphics[height=6cm]{lichtspiel.jpg}
\end{myfigure}
5.2 Lists of \texttt{tcolorbox}

For figures and tables, \LaTeX{} provides the \texttt{listoffigures} and \texttt{listoftables} commands to create lists of these numbered entities. Also, a \texttt{tcolorbox} can be part of such a kind of list.

1. Assign a list \langle name \rangle by the \texttt{initialization} option \texttt{/tcb/new/list inside}.

2. Optionally, a new \langle type \rangle for list entries may be assigned by the \texttt{initialization} option \texttt{/tcb/new/list type}.

3. List entries are generated automatically within each new \texttt{tcolorbox} using the above initialization.
   - If \texttt{/tcb/list entry \textasciitilde P.101} is set, the entry is generated with it.
   - Otherwise, if \texttt{/tcb/title \textasciitilde P.18} is set, the entry is generated with it.
   - Otherwise, the entry is generated with the current number and the environment name.

4. The generated list is displayed by \texttt{\tcblistof{}}.

\begin{verbatim}
/tcb/new/list inside=(name) \hspace{1cm} \text{ (no default, initially unset) }
\end{verbatim}

Assigns a list or contents file to the generated \texttt{tcolorbox}es. Entries to this list are saved to a file which gets the \langle name \rangle as file name extension. The list is referenced by this name in \texttt{\tcblistof{}}. For example:

\begin{verbatim}
list inside=exam
\end{verbatim}

See Section 16.9 from page 343 for a complete example.

\begin{verbatim}
/tcb/new/list type=(type) \hspace{1cm} \text{ (no default, initially tcolorbox) }
\end{verbatim}

Optionally, some \langle type \rangle can be assigned to the list entries. For a new \langle type \rangle, a macro \texttt{\l@\langle type \rangle} has to exist which controls the format of the list entry. The default type is defined by

\begin{verbatim}
\newcommand*{\l@tcolorbox}{\@dottedtocline{1}{1.5em}{2.3em}}
\end{verbatim}

This is identical to the \texttt{\l@section} setting of \LaTeX{}. \texttt{\l@tcolorbox} can be redefined or a new \langle type \rangle can be assigned.

\begin{verbatim}
\tcblistof{\langle macro \rangle}{\langle name \rangle}{\langle title text \rangle}
\end{verbatim}

Displays the generated list of \texttt{tcolorbox}es with the given \langle name \rangle. The heading is generated by \langle macro \rangle\{\langle title text \rangle\} where \texttt{\section} is the default setting for \langle macro \rangle.

To display the list inside a subsection, use for example:

\begin{verbatim}
\tcblistof{\subsection}{exam}{List of Exercises}
\end{verbatim}

The result of the example is found as Subsection 16.10 on page 346.

\begin{verbatim}
\textit{The core of the list is generated by \texttt{\thestarttoc{\langle name \rangle}}} which can be wrapped into an own macro.}
\end{verbatim}
6 Side by Side

A side by side box is a special \texttt{tcolorbox} where the upper and lower part of the box are set side by side. All boxes of this kind are unbreakable.

Further side by side options for code examples are \texttt{/tcb/listing side text}, \texttt{/tcb/text side listing}, \texttt{/tcb/listing outside text}, and \texttt{/tcb/text outside listing}.

6.1 Basic Settings

\texttt{/tcb/sidebyside=true|false} \hspace{2cm} (default true, initially false)

Normally, the upper part and the lower part of the box have their positions as their names suggest. If \texttt{sidebyside} is set to \texttt{true}, the upper part is drawn left-handed and the lower part is drawn right-handed. Both parts are drawn together with the geometry settings of the upper part but the space is divided horizontally according to the following options. Colors, fonts, and box content additions are used individually. The resulting box is unbreakable.

\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title,sidebyside]
This is the upper (left-handed) part.
\tcblower
This is the lower (right-handed) part.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
% \usepackage{lipsum}
% \usepackage{tcolorbox}
\begin{tcolorbox}[bicolor,sidebyside,righthand width=3cm, sharp corners,boxrule=.4pt,colback=green!5,colbacklower=green!50!black!50]
\lipsum[2]
\tcblower
\includegraphics[width=\linewidth]{goldshade}%
\end{tcolorbox}
\end{verbatim}

Sets the vertical `{alignment}` for the left-handed and right-handed part.
Feasible values for `{alignment}` are:

- **center**: identical to `minipage` option `c`.
- **top**: identical to `minipage` option `t` (aligns the top lines of the left-handed and right-handed side according to their baselines).
- **bottom**: identical to `minipage` option `b` (aligns the bottom lines of the left-handed and right-handed side according to their baselines).
- **center seam**: aligns the center of the left-handed and right-handed side.
- **top seam**: aligns the very top seam of the left-handed and right-handed side.
- **bottom seam**: aligns the very bottom seam of the left-handed and right-handed side.

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,nobeforeafter,
        left=2mm,right=2mm,sidebyside,sidebyside gap=6mm,width=(\linewidth-2mm)/3}
\begin{tcolorbox}[adjusted title=center,sidebyside align=center]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=top,sidebyside align=top]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=bottom,sidebyside align=bottom]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}
```

center, top, and bottom are identical to the known corresponding `minipage` options. While this is the preferred approach for text content, the result for boxed content like tables or images may not be as expected.
For such content, one may use center seam, top seam, and bottom seam. For example, top seam aligns the very top seam of the left-handed and right-handed side.
center seam
This is my description text for the pictures displayed on the right-handed side.

*center seam* 

<table>
<thead>
<tr>
<th><img src="goldshade" alt="Goldshade" /></th>
<th><img src="blueshade" alt="Blueshade" /></th>
</tr>
</thead>
</table>

top seam
This is my description text for the pictures displayed on the right-handed side.

*top seam* 

<table>
<thead>
<tr>
<th><img src="goldshade" alt="Goldshade" /></th>
<th><img src="blueshade" alt="Blueshade" /></th>
</tr>
</thead>
</table>

bottom seam
This is my description text for the pictures displayed on the right-handed side.

*bottom seam* 

| ![Goldshade](goldshade) | ![Blueshade](blueshade) |
/tcb/sidebyside gap=(length) \hspace{10mm} \text{(no default, initially 10mm)}

Sets the horizontal distance between the left-handed and right-handed part to ⟨length⟩.

\begin{tcolorbox}
[adjusted title=Wide gap, sidebyside gap=30mm]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox} 

\begin{tcolorbox}
[adjusted title=Narrow gap, sidebyside gap=1mm]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox} 

/tcb/lefthand width=(length) \hspace{10mm} \text{(no default, initially unset)}

Sets the width of the left-handed part to the given ⟨length⟩.

\begin{tcolorbox}
[title=My title, sidebyside, lefthand width=3cm]
This is the upper (left-handed) part.
\tcblower
This is the lower (right-handed) part.
\end{tcolorbox} 

/tcb/righthand width=(length) \hspace{10mm} \text{(no default, initially unset)}

Sets the width of the right-handed part to the given ⟨length⟩.

\begin{tcolorbox}
[title=My title, sidebyside, righthand width=3cm]
This is the upper (left-handed) part.
\tcblower
This is the lower (right-handed) part.
\end{tcolorbox} 

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\textcolor{red!5!white}{\textbf{My title}}

This is the upper (\textit{left-handed}) part. This is the lower (\textit{right-handed}) part.

\textcolor{red!5!white}{\textbf{My title}}

This is the upper (\textit{left-handed}) part. This is the lower (\textit{right-handed}) part.
If one side of a side-by-side box should be adapted to the width of its content, this width has to be computed beforehand. The following example uses a savebox \mysavebox to store the picture to determine its width. A more convenient way to handle this task is to use the methods from Section 6.2 on page 124.

\begin{tikzpicture}
  \path[fill=red!20,draw=red!50!black]
  (0,0) node[below]{A} -- (3,1) node[above]{B}
  -- (1,4) node[above]{C} -- cycle;
\end{tikzpicture}

6.2 Advanced Settings from the \texttt{\textcopyright{lib}xparse} Library

All following macros and options need the \texttt{\textcopyright{lib}xparse} library to be loaded, see Section 23 on page 443.

\tcbsidebyside[\langle options\rangle]{\langle left-handed content\rangle}{\langle right-handed content\rangle}

Creates a colored box using more or less arbitrary \langle options\rangle for a \texttt{tcolorbox}\textsuperscript{P.12}. The /\texttt{tcb/sidebyside}\textsuperscript{P.118} option is set to \texttt{true} and the (left-handed content) and (right-handed content) is filled into the box appropriately. The resulting box is unbreakable. \texttt{\textcopyright{lib}csidebyside} is not only a shortcut for using a normal \texttt{tcolorbox}\textsuperscript{P.12} with /\texttt{tcb/sidebyside}\textsuperscript{P.118}, but allows setting further options like /\texttt{tcb/sidebyside adapt}\textsuperscript{P.125} and /\texttt{tcb/sidebyside switch}\textsuperscript{P.127}.

\% \texttt{\textcopyright{lib}cuselibrary skulls,\textcopyright{lib}xparse}
\% \texttt{\textcopyright{lib}usepackage lipsum}
\tcbsidebyside[title=The Triangle, sidebyside adapt=left, bicolor, colback=white, colbacklower=yellow!10, fonttitle=\textbf{\texttt{sc}}, center title, drop lifted shadow, ]{%
\begin{tikzpicture}
(0,0) node[below]{A} -- (3,1) node[right]{B} -- (1,4) node[above]{C} -- cycle;
\end{tikzpicture}%
}{%
\lipsum[1]
}\}

The Triangle

The option allows the left-handed and/or right-handed side to determine the dimensions of the box. This option is only valid inside `\tcbsidebyside` \(^{P.124}\).

Feasible values for `\textlangle\textit{side(s)}\rangle` are:

- **none**: no measurement of left-handed and right-handed side.
- **left**: the actual width of the left-handed content is used to set `\tcb/lefthand width` \(^{P.121}\).
- **right**: the actual width of the right-handed content is used to set `\tcb/righthand width` \(^{P.121}\).
- **both**: the actual width of the left-handed and right-handed content is used to set `\tcb/lefthand width` \(^{P.121}\), `\tcb/righthand width` \(^{P.121}\), and the overall `\tcb/width` \(^{P.34}\).

\begin{verbatim}
\% \tcbusepackage{skins,xparse}
\tcbsidebyside[sidebyside adapt=left, title=Very important table, beamer,colframe=blue!50!black,colback=blue!10, lower separated=false,sidebyside gap=5mm ]{%
\begin{tabular}{|l|c|r|}
\hline
left & center & right \\
\hline
A & B & C \\
D & E & F \\
\hline
\end{tabular}
}%
\end{verbatim}

This table contains the most important figures for all future actions. You may notice that B follows A, C follows B, and so on.

\begin{verbatim}
\% \tcbusepackage{skins,xparse}
\tcbsidebyside[sidebyside adapt=right, blanker,sidebyside gap=5mm ]{%
\lipsum[2]
}%
\end{verbatim}


\begin{verbatim}
\path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tikzpicture}
\end{verbatim}

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% \R{\texttt{tcbuselibrary\{skins,\texttt{aparse}\}}} \n% \R{\texttt{tcbsidebyside\{sidebyside\ adapt=both, \n\hspace{1em} enhanced,center, \n\hspace{1em} title=Both sides adapted, \n\hspace{1em} attach boxed title to top center={yshift=-2mm}, \n\hspace{1em} coltitle=black,boxed title style={colback=red!25}, \n\hspace{1em} segmentation style=solid,colback=red!5,colframe=red!50} \n\}% \begin{tabular}{|l|c|r|} \hline \left & \center & \right \hline A & B & C \hline D & E & F \hline \end{tabular} \n% \begin{tikzpicture} \path[\texttt{fill=yellow,draw=yellow!75!red}] (0,0) circle (1cm); \fill[\texttt{red}] (45:5mm) circle (1mm); \fill[\texttt{red}] (135:5mm) circle (1mm); \draw[\texttt{line width=1mm,red}] (215:5mm) arc (215:325:5mm); \end{tikzpicture} \n% \begin{tabular}{|l|c|r|} \hline left & center & right \hline A & B & C \hline D & E & F \hline \end{tabular} \n% \begin{tikzpicture} \path[\texttt{fill=yellow,draw=yellow!75!red}] (0,0) circle (1cm); \fill[\texttt{red}] (45:5mm) circle (1mm); \fill[\texttt{red}] (135:5mm) circle (1mm); \draw[\texttt{line width=1mm,red}] (215:5mm) arc (215:325:5mm); \end{tikzpicture}
\texttt{/tcb/sidebyside switch=true|false} (default \texttt{true}, initially \texttt{false})

If set to \texttt{true}, the \texttt{(left-handed content)} and \texttt{(right-handed content)} of \texttt{\tcb/sidebyside}\textsuperscript{P.124} are switched. Obviously, this option is only valid inside \texttt{\tcb/sidebyside}\textsuperscript{P.124}.

The side switching can be made even/odd page sensitive, if used inside \texttt{/tcb/if odd page}\textsuperscript{P.103}.

\begin{verbatim}
% \tcbuselibrary{skins,xparse}
\tcbusepackage{Left}{Right}
\tcbusepackage{if odd page}{Left}{Right}
\tcbusepackage{title=Very important table, if odd page={sidebyside switch,sidebyside adapt=right,flushright title}}%
\tcbusepackage{beamer,colframe=blue!50!black,colback=blue!10, lower separated=false,sidebyside gap=5mm}
\begin{tabular}{|l|c|r|}
\hline
\texttt{left} & \texttt{center} & \texttt{right} \\
\hline
A & B & C \\
D & E & F \\
\hline
\end{tabular}
\end{verbatim}

This table contains the most important figures for all future actions. You may notice that B follows A, C follows B, and so on.
7 Saving and Loading of Verbatim Texts

The following macros are slightly modified versions of the original macros from the known packages `moreverb` and `verbatim`. They are used implicitly inside of a `tcolorbox` environment, but they can be used outside also.

\begin{tcbverbatimwrite}{⟨file name⟩}
⟨environment content⟩
\end{tcbverbatimwrite}

Saves the ⟨environment content⟩ to a file named by ⟨file name⟩. TeX macros inside the environment are not expanded.

\begin{tcbverbatimwrite}{\jobname_verbexp.tex}
This text is saved \textit{as is}.
\end{tcbverbatimwrite}

Now, we are using the file: 
\input{\jobname_verbexp.tex}

This environment may be used inside an own environment. Note, that inside the environment definition \texttt{tcbverbatimwrite} has to be used instead of \texttt{begin{tcbverbatimwrite}} and \texttt{end{tcbverbatimwrite}} instead of \texttt{end{tcbverbatimwrite}}.

\begin{myverbatim}
This is the text which is saved by my own environment.
\end{myverbatim}

Now, we are using the file: 
\input{\jobname_myverb.tex}

\begin{tcbwritetemp}
⟨environment content⟩
\end{tcbwritetemp}

Has the same function as `tcbverbatimwrite`, but uses the key value of \texttt{tempfile} for the file name.

\begin{tcbwritetemp}
This text is saved \textit{as is}.
\end{tcbwritetemp}

Now, we are using the file: 
\input{\jobname_myverb.tex}

\tcbusetemp

Loads the current temporary file which was saved by `tcbwritetemp`. 

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If this option is set to be true, the percent sign % is silently ignored for\texttt{tcbverbatimwrite} \(^{P.128}\) and all macros and environments which are built using\texttt{tcbverbatimwrite} \(^{P.128}\), e.g.\texttt{tcbwritetemp} \(^{P.128}\),\texttt{tcblisting} \(^{P.309}\), or\texttt{dispExample} \(^{P.473}\).

This option may be useful for creating some special effects, but mainly it is intended to be applied for documentation with DocStrip. The creation of this option was motivated by Yudai Nakata. Note that this option is not getting reset by /\texttt{tcb/reset} \(^{P.108}\).

Note that every percent sign is removed, also escaped ones.
8 Recording

The package provides some macros and options to take records during compilation. This is done by \LaTeX file operations to save some data to a file for later usage. The main application scenario is depicted in Section 8.3 on the next page where information about example solutions is recorded and read again in Section 8.4 on page 134.

8.1 Macros

\texttt{\textbackslash tcbstartrecording[(\textit{file name})]}

Opens a file denoted by \textit{file name} for writing the records. The default file name is \texttt{\jobname.records}. See Section 8.3 on the next page for an example application.

\texttt{\textbackslash tcbrecord\{\textit{content}\}}

Records any \textit{content} to the record file. \texttt{\textbackslash tcbrecord} is implemented as \texttt{\immediate\write}. \texttt{\textbackslash tcbstartrecording} has to be called before; otherwise, \texttt{\textbackslash tcbrecord} is silently ignored.

\texttt{\textbackslash tcbstoprecording}

Closes the current record file which was opened by \texttt{\textbackslash tcbstartrecording} before.

\texttt{\textbackslash tcbinputrecords[(\textit{file name})]}

Opens a file denoted by \textit{file name} for reading the records via \texttt{\input}. The default file name is the name of the last used record file for saving. \texttt{\textbackslash tcbstoprecording} has to be called before.

8.2 Options

\texttt{\textbackslash tcb/record=\{\textit{content}\}} (style, no default)

Records any \textit{content} to the record file, see \texttt{\textbackslash tcbrecord}. This key can be used several times to write several lines.

\texttt{\textbackslash tcb/no~recording}

Disables \texttt{\textbackslash tcbrecord} and \texttt{\textbackslash tcb/record} inside the current group.
8.3 Example: Exercises

The following application example creates exercises and their corresponding solutions. Each pair is generated inside a single `tcolorbox` where the solution is given below with `tcblower`. For every example, the solution part is saved by `/tcb/savelowerto` to a file. The saving is recorded using `/tcb/record` to a file. To enlighten the possibilities, the second exercise has no solution. Finally, the solutions are input in Section 8.4 on page 134.

**Definition in the preamble:**

```latex
\NewTColorBox{auto counter, number within=section}{exercise}{+!O{}}{%
  enhanced, colframe=green!20!black, colback=yellow!10!white, coltitle=green!40!black, fonttitle=\bfseries, underlay={\begin{tcbclipinterior}\shade[inner color=green!80!yellow,outer color=yellow!10!white] (interior.north west) circle (2cm); \draw[help lines,step=5mm,yellow!80!black,shift={(interior.north west)}] (interior.south west) grid (interior.north east); \end{tcbclipinterior}}, title={Exercise\thetcbcounter:}, label={exercise@\thetcbcounter}, attach title to upper=\quad, after upper={\par\hfill\textcolor{green!40!black}{\itshape Solution on page~\pageref{solution@\thetcbcounter}}}, lowerbox=ignored, savelowerto=solutions/exercise-\thetcbcounter.tex, record={\string\solution{\thetcbcounter}{solutions/exercise-\thetcbcounter.tex}}, #1}

\NewTotalTColorBox{\solution}{mm}{%
  enhanced, colframe=red!20!black, colback=yellow!10!white, coltitle=red!40!black, fonttitle=\bfseries, underlay={\begin{tcbclipinterior}\shade[inner color=red!50!yellow,outer color=yellow!10!white] (interior.north west) circle (2cm); \draw[help lines,step=5mm,yellow!80!black,shift={(interior.north west)}] (interior.south west) grid (interior.north east); \end{tcbclipinterior}}, title={Solution of Exercise\ref{exercise@#1} on page~\pageref{exercise@#1}:}, phantomlabel={solution@#1}, attach title to upper=\par, \input{#2}}

\tcbset{no solution/.style={no recording, after upper=}}
```

\begin{exercise}

Compute the derivative of the following function:

\begin{equation*}
f(x) = \sin((\sin x)^2)
\end{equation*}

\tcblower

The derivative is:

\begin{align*}
f'(x) &= \cos((\sin x)^2) 2 \sin x \cos x.
\end{align*}

\end{exercise}

\tcbstartrecording

\begin{example}

```
\begin{equation*}
f(x) = \sin((\sin x)^2)
\end{equation*}
```

The derivative is:

```
\begin{align*}
f'(x) &= \cos((\sin x)^2) 2 \sin x \cos x.
\end{align*}
```
```
\end{example}
```

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It holds:
\begin{equation*}
\frac{d}{dx}\left(\ln|x|\right) = \frac{1}{x}.
\end{equation*}

Compute the derivative of the following function:
\begin{equation*}
f(x)=(\sin(\sin x))^2
\end{equation*}
The derivative is:
\begin{align*}
f'(x) &= \left( (\sin(\sin x))^2 \right)' \\
&= 2\sin(\sin x)\cos(\sin x)\cos x.
\end{align*}

Compute the derivative of the following function:
\begin{equation*}
f(x)=\sqrt{x^3-6x^2+2x}
\end{equation*}
The derivative is:
\begin{align*}
f'(x) &= \left( \sqrt{x^3-6x^2+2x} \right)' \\
&= \frac{3x^2-12x+2}{2\sqrt{x^3-6x^2+2x}}.
\end{align*}

Compute the derivative of the following function:
\begin{equation*}
f(x)=\left(\frac{2+3x}{1-2x}\right)^3
\end{equation*}
The derivative is:
\begin{align*}
f'(x) &= \left( \left(\frac{2+3x}{1-2x}\right)^3 \right)' \\
&= 3 \left(\frac{2+3x}{1-2x}\right)^2 \frac{(1-2x)3-(2+3x)(-2)}{(1-2x)^2} \\
&= \frac{21(2+3x)^2}{(1-2x)^4}.
\end{align*}

Compute the derivative of the following function:
\begin{equation*}
f(x)=\frac{\cos x}{(\tan 2x)^2}
\end{equation*}
The derivative is:
\begin{align*}
f'(x) &= \left( \frac{\cos x}{(\tan 2x)^2} \right)' \\
&= \frac{\cos(2x) \left[ \sin x \sin 2x \cos 2x + 4\cos x(\sin 2x)^2 \right]}{(\sin 2x)^3}.
\end{align*}
Exercise 8.1: Compute the derivative of the following function:
\[ f(x) = \sin((\sin(x))^2) \]

Solution on page 134

Exercise 8.2: It holds:
\[ \frac{d}{dx} (\ln x) = \frac{1}{x} \]

Exercise 8.3: Compute the derivative of the following function:
\[ f(x) = (\sin(x))^2 \]

Solution on page 134

Exercise 8.4: Compute the derivative of the following function:
\[ f(x) = \sqrt{x^3 - 6x^2 + 2x} \]

Solution on page 134
Exercise 8.5: Compute the derivative of the following function:

\[ f(x) = \left( \frac{2 + 3x}{1 - 2x} \right)^3 \]

Solution on page 135

Exercise 8.6: Compute the derivative of the following function:

\[ f(x) = \frac{\cos x}{(\tan 2x)^2} \]

Solution on page 135

Exercise 8.7: Compute the derivative of the following function:

\[ f(x) = \cos((2x^2 + 3)^3) \]

Solution on page 135

Exercise 8.8: Compute the derivative of the following function:

\[ f(x) = (x^2 + 1)^{\sqrt{x^4 + 1}} \]

Solution on page 135

8.4 Example: Solutions

This concludes the example given in Section 8.3 on page 131. Now, the saved and recorded solutions are included.

Solution of Exercise 8.1 on page 133:
The derivative is:

\[ f'(x) = \left( \sin((\sin x)^2) \right)' = \cos((\sin x)^2)2 \sin x \cos x. \]

Solution of Exercise 8.3 on page 133:
The derivative is:

\[ f'(x) = \left( (\sin(\sin x))^2 \right)' = 2 \sin(\sin x) \cos(\sin x) \cdot \cos x. \]

Solution of Exercise 8.4 on page 133:
The derivative is:

\[ f'(x) = \left( \sqrt{x^3 - 6x^2 + 2x} \right)' = \frac{3x^2 - 12x + 2}{2\sqrt{x^3 - 6x^2 + 2x}}. \]

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Solution of Exercise 8.5 on page 134:
The derivative is:
\[ f'(x) = \left( \frac{2 + 3x}{1 - 2x} \right)' = 3 \left( \frac{2 + 3x}{1 - 2x} \right)^2 \frac{(1 - 2x)3 - (2 + 3x)(2)}{(1 - 2x)^2} = \frac{21(2 + 3x)^2}{(1 - 2x)^4}. \]

Solution of Exercise 8.6 on page 134:
The derivative is:
\[ f''(x) = \left( \frac{\cos x}{(\tan 2x)^2} \right)' = \left( \frac{\cos x (\cos 2x)^2}{(\sin 2x)^2} \right)' = \frac{(\sin 2x)^2 (\cos x (\cos 2x)^2)' - (\cos x (\cos 2x)^2) (\sin 2x)^2'}{(\sin 2x)^4} = \frac{\cos(2x) \sin x \sin 2x \cos 2x + 4 \cos x (\sin 2x)^2 + 4 \cos x (\cos 2x)^2}{(\sin 2x)^3}. \]

Solution of Exercise 8.7 on page 134:
The derivative is:
\[ f'(x) = \left( \cos (2x^2 + 3)^3 \right)' = -\sin (2x^2 + 3)^3 (2x^2 + 3)^2 4x = -12x (2x^2 + 3)^2 \sin ((2x^2 + 3)^3). \]

Solution of Exercise 8.8 on page 134:
The derivative is:
\[ f'(x) = \left( (x^2 + 1) \sqrt{x^4 + 1} \right)' = 2x \sqrt{x^4 + 1} + \frac{2x^3 (x^2 + 1)}{\sqrt{x^4 + 1}}. \]
9 Technical Overview and Customization

This section provides a technical overview of the skin concept of \texttt{tcolorbox}. For most applications of \texttt{tcolorbox}, one will not need to know the bells and whistles described herein. You may proceed to Section 10 on page 151 where the customization options for most users are documented.

The following explanations also cover options and settings from the \texttt{\colorbox{}} library, see Section 10 on page 151.

9.1 Skins and Drawing Engines

From a technical point of view, a \textit{skin} is a style definition for the appearance of a \texttt{tcolorbox}. The core package provides some additional option keys for skins but only two skins called \texttt{standard} \footnote{P.207} and \texttt{standard jigsaw} \footnote{P.208}. The \texttt{\colorbox{}} library adds several more skins. To change to a skin, only one option from the core package has to be set.

\begin{verbatim}
\tcbset{colback=Salmon!50!white,colframe=FireBrick!75!black,
width=(\linewidth-8mm)/2,before=,after=\hfill,equal height group=ske}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[skin=beamer,adjusted title=My title]
This is my content.
\end{tcolorbox}
\end{verbatim}

\begin{tcolorbox}
My title
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\end{tcolorbox}

\begin{tcolorbox}
My title
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\end{tcolorbox}

\begin{verbatim}
\tcb/skin=⟨name⟩
(\texttt{\colorbox{}})
Sets the current skin to \texttt{⟨name⟩}. This is a style definition which sets all the following keys, i.e. for many use cases there is nothing more to do.

\texttt{\colorset{⟨colback⟩,⟨colframe⟩,⟨width⟩,⟨before⟩,⟨after⟩,⟨equal height group⟩}}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[skin=beamer,adjusted title=My title]
This is my content.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
/tcb/skin first=⟨name⟩
(\texttt{\colorbox{}})
If the box is set to be \texttt{\colorbox{\colorbreakable}} \footnote{P.375} and \texttt{\colorbreakable} is broken actually, then the skin for the \texttt{first} part of the break sequence is set to \texttt{⟨name⟩}, see Subsection 18.8 on page 388. Typically, this key is set by a \texttt{/tcb/skin}.

/tcb/skin middle=⟨name⟩
(\texttt{\colorbox{}})
If the box is set to be \texttt{\colorbox{\colorbreakable}} \footnote{P.375} and \texttt{\colorbreakable} is broken actually, then the skin for the \texttt{middle} parts (if any) of the break sequence is set to \texttt{⟨name⟩}, see Subsection 18.8 on page 388. Typically, this key is set by a \texttt{/tcb/skin}.

/tcb/skin last=⟨name⟩
(\texttt{\colorbox{}})
If the box is set to be \texttt{\colorbox{\colorbreakable}} \footnote{P.375} and \texttt{\colorbreakable} is broken actually, then the skin for the \texttt{last} part of the break sequence is set to \texttt{⟨name⟩}, see Subsection 18.8 on page 388. Typically, this key is set by a \texttt{/tcb/skin}.
/tcb/graphical environment=(name) (no default, initially pgfpicture)

Sets the graphical environment for the tcolorbox to ⟨name⟩. Feasible values are pgfpicture and tikzpicture or environments which inherit from one of these two. This key is set by a /tcb/skin \textsuperscript{P.136} and may seldom be used directly.

The skin of a tcolorbox is drawn by up to four engines. Afterwards, the text content is drawn which is not part of a skin. The four steps are:

1. The frame of the box, drawn by /tcb/frame engine.

2. The interior of the box. The interior of a box with title is drawn differently from a box without title. /tcb/interior titled engine or /tcb/interior engine \textsuperscript{P.138} is used to draw the interior.

3. The segmentation (line) of the box, if there is a lower part; drawn by /tcb/segmentation engine \textsuperscript{P.138}.

4. The title area of the box, if there is a title and /tcb/title filled \textsuperscript{P.27} is set to true; drawn by /tcb/title engine \textsuperscript{P.138}.

/tcb/frame engine=(name) (no default, initially standard)

Sets the frame drawing engine for a box to ⟨name⟩. Typically, this key is set by a /tcb/skin \textsuperscript{P.136}. Feasible values for ⟨name⟩ are:

- standard: the original code from the core package,
- path: a tikz path which is controlled by /tcb/frame style \textsuperscript{P.151},
- pathjigsaw: a tikz path which is controlled by /tcb/frame style \textsuperscript{P.151},
- pathfirst: a tikz path which is controlled by /tcb/frame style \textsuperscript{P.151},
- pathfirstjigsaw: a tikz path which is controlled by /tcb/frame style \textsuperscript{P.151},
- pathmiddle: a tikz path which is controlled by /tcb/frame style \textsuperscript{P.151},
- pathmiddlejigsaw: a tikz path which is controlled by /tcb/frame style \textsuperscript{P.151},
- pathlast: a tikz path which is controlled by /tcb/frame style \textsuperscript{P.151},
- pathlastjigsaw: a tikz path which is controlled by /tcb/frame style \textsuperscript{P.151},
- freelance: deprecated.
- spartan: a quite spartan code.
- empty: draw nothing.

/tcb/interior engine=(name) (no default, initially standard)

Sets the interior drawing engine for a titled box to ⟨name⟩. Typically, this key is set by a /tcb/skin \textsuperscript{P.136}. Feasible values for ⟨name⟩ are:

- standard: the original code from the core package,
- path: a tikz path which is controlled by /tcb/interior style \textsuperscript{P.152},
- pathfirst: a tikz path which is controlled by /tcb/interior style \textsuperscript{P.152},
- pathmiddle: a tikz path which is controlled by /tcb/interior style \textsuperscript{P.152},
- pathlast: a tikz path which is controlled by /tcb/interior style \textsuperscript{P.152},
- freelance: deprecated.
- spartan: a quite spartan code.
- empty: draw nothing.
Sets the \textit{interior} drawing engine for an untitled box to \texttt{name}. Typically, this key is set by a \texttt{/tcb/skin\texttt{[\texttt{P.136]}}}. Feasible values for \texttt{name} are:

- \texttt{standard}: the original code from the core package,
- \texttt{path}: a \texttt{tikz} path which is controlled by \texttt{/tcb/interior style\texttt{[\texttt{P.152}]}}.
- \texttt{pathfirst}: a \texttt{tikz} path which is controlled by \texttt{/tcb/interior style\texttt{[\texttt{P.152}]}}.
- \texttt{pathmiddle}: a \texttt{tikz} path which is controlled by \texttt{/tcb/interior style\texttt{[\texttt{P.152}]}}.
- \texttt{pathlast}: a \texttt{tikz} path which is controlled by \texttt{/tcb/interior style\texttt{[\texttt{P.152}]}}.
- \texttt{freelance}: deprecated.
- \texttt{spartan}: a quite spartan code.
- \texttt{empty}: draw nothing.

Sets the \textit{segmentation} (line) drawing engine for a box to \texttt{name}. Typically, this key is set by a \texttt{/tcb/skin\texttt{[\texttt{P.136]}}}. Feasible values for \texttt{name} are:

- \texttt{standard}: the original code from the core package,
- \texttt{path}: a \texttt{tikz} path which is controlled by \texttt{/tcb/segmentation style\texttt{[\texttt{P.154}]}}.
- \texttt{freelance}: deprecated.
- \texttt{spartan}: a quite spartan code.
- \texttt{empty}: draw nothing.

Sets the \textit{title area} drawing engine for a titled box to \texttt{name}. Typically, this key is set by a \texttt{/tcb/skin\texttt{[\texttt{P.136]}}}. Feasible values for \texttt{name} are:

- \texttt{standard}: the original code from the core package,
- \texttt{path}: a \texttt{tikz} path which is controlled by \texttt{/tcb/title style\texttt{[\texttt{P.154}]}}.
- \texttt{pathfirst}: a \texttt{tikz} path which is controlled by \texttt{/tcb/title style\texttt{[\texttt{P.154}]}}.
- \texttt{pathmiddle}: a \texttt{tikz} path which is controlled by \texttt{/tcb/title style\texttt{[\texttt{P.154}]}}.
- \texttt{pathlast}: a \texttt{tikz} path which is controlled by \texttt{/tcb/title style\texttt{[\texttt{P.154}]}}.
- \texttt{freelance}: deprecated.
- \texttt{spartan}: a quite spartan code.
- \texttt{empty}: draw nothing.

After an engine is set to an initializing value, the resulting graphical code can be changed using code option keys, see Section 9.2 on page 140.
/tcb/geometry nodes=true|false (default true, initially false)

If set to true, up to four tikz nodes are defined for a tcolorbox which are named frame, interior, segmentation, and title. These nodes describe the boundaries of the equally named parts of a tcolorbox. They are used by most engines based on TikZ. Typically, this key is set automatically by a \tcbset\P.136.

\begin{tcolorbox}[adjusted title=The title]
  The upper part.\tcblower The lower part.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,adjusted title=The title, frame code={\path[draw=red,fill=red!25] (frame.south west) rectangle (frame.north east);}, interior titled code={\path[draw=blue,fill=blue!25] (interior.south west) rectangle (interior.north east);}, segmentation code={\path[draw=green,fill=green!25] (segmentation.south west) rectangle (segmentation.north east);}, title code={\path[draw=black,fill=brown!75!black] (title.south west) rectangle (title.north east);}]
  The upper part.\tcblower The lower part.
\end{tcolorbox}
9.2 Code Option Keys

The following code options are applicable for all skins. The used \textit{(graphical code)} can be any \texttt{pgf} code. For all skins with exception of \texttt{standard} \textsuperscript{P.207} and \texttt{standard jigsaw} \textsuperscript{P.208}, the \textit{(graphical code)} can also be any \texttt{TikZ} code.

\texttt{/tcb/frame code=}\texttt{(graphical code)} (code, default from \texttt{standard})

The given \textit{(graphical code)} is used for drawing the frame of the box.

\texttt{/tcb/frame empty} (style, no value)

This is a shortcut for setting \texttt{/tcb/frame code} to empty. This option removes the drawing of the frame. Alternatively, use \texttt{/tcb/frame hidden} \textsuperscript{P.132}.

\texttt{/tcb/interior titled code=}\texttt{(graphical code)} (code, default from \texttt{standard})

The given \textit{(graphical code)} is used for drawing the interior of the box, if the box comes with a title.

\texttt{/tcb/interior titled empty} (style, no value)

This is a shortcut for setting \texttt{/tcb/interior titled code} to empty. This option removes the drawing of the untitled interior. Alternatively, use \texttt{/tcb/interior hidden} \textsuperscript{P.133}.
/tcb/interior code=(graphical code) (code, default from standard)
The given (graphical code) is used for drawing the interior of the box, if the box is without a title.

\begin{tcolorbox}
\tcblset{colback=red!5!white,colframe=red!75!black}
\path[draw=red!5!white,line width=5mm,line cap=round]
  ([xshift=3mm,yshift=-3mm]interior.north west) --([xshift=-3mm,yshift=3mm]interior.south east)
  ([xshift=3mm,yshift=3mm]interior.south west) --([xshift=-3mm,yshift=-3mm]interior.north east);
\end{tcolorbox}

This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a tcolorbox.
This is the lower part.

/tcb/interior empty (style, no value)
This is a shortcut for setting /tcb/interior code to empty. This option removes the drawing of the interior. Alternatively, use /tcb/interior hidden\textsuperscript{P.153}.

/tcb/segmentation code=(graphical code) (code, default from standard)
The given (graphical code) is used for drawing the segmentation area of the box.

\begin{tcolorbox}
\tcblset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\path[top color=red!5!white, bottom color=red!5!white, middle color=blue]
  (segmentation.south west) rectangle (segmentation.north east);
\end{tcolorbox}

This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a tcolorbox.
This is the lower part.

/tcb/segmentation empty (style, no value)
This is a shortcut for setting /tcb/segmentation code to empty. This option removes the drawing of the segmentation line. Alternatively, use /tcb/segmentation hidden\textsuperscript{P.154}.

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The given \texttt{(graphical code)} is used for drawing the \textit{title} area of the box.

\begin{tcolorbox}[enhanced,title=My title,title code={
\path[draw=yellow,solid,decorate,line width=2mm,
  decoration={coil,aspect=0,segment length=10.1mm}]
  ([xshift=1mm]\textit{title}.west) -- ([xshift=-1mm]\textit{title}.east);}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

This is a \emph{tcolorbox}.

My title

This is the lower part.

\texttt{/tcb/title empty} \hspace{1em} (style, no value)

This is a shortcut for setting \texttt{/tcb/title code} to empty. This option removes the drawing of the title area. Alternatively, use \texttt{/tcb/title hidden} \textsuperscript{P.155}. 

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9.3 Subskins

A subskin is a new \texttt{/tcb/skin} based on an existing skin which is extended or changed.

\begin{itemize}
  \item Never use geometry settings or bounding box options inside a subskin definition! If one skin is replaced by another skin, the overall bounding box should stay constant. Especially, if a skin is used for a breakable box, unpredictable and unpleasant results could arise otherwise.
  \item If you want to change the geometry also, use an additional style. See the skin \texttt{beamer} and the style \texttt{/tcb/beamer} as pattern.
\end{itemize}

\texttt{\tcbsubskin\{\langle name\rangle\}\{\langle base skin\rangle\}\{\langle options\rangle\}}

Creates a new skin \langle name\rangle which inherits all properties of an existing \langle base skin\rangle plus the given \langle options\rangle. The new skin \langle name\rangle can be used as value for the keys \texttt{/tcb/skin}, \texttt{/tcb/skin first}, \texttt{/tcb/skin middle}, and \texttt{/tcb/skin last}. As \langle base skin\rangle, one can take \texttt{standard}, \texttt{empty}, \texttt{enhanced}, or any skin from the \texttt{skins} library, see Section 10 on page 151.

\begin{verbatim}
\tcbsubskin{mycross}{empty}{frame code={%
\draw[red,line width=5pt] (frame.south west)--(frame.north east);
\draw[red,line width=5pt] (frame.north west)--(frame.south east);
}, skin first=mycross, skin middle=mycross, skin last=mycross}
\begin{tcolorbox}[skin=mycross]
  This is my content.
\end{tcolorbox}
\end{verbatim}

\texttt{/tcb/skin first is subskin of\{\langle base skin\rangle\}\{\langle options\rangle\}} (no default, initially unset)

Creates a new unnamed skin which inherits all properties of an existing \langle base skin\rangle plus the given \langle options\rangle. This skin is set as \texttt{/tcb/skin first}. See a detailed example on page 246.

\texttt{/tcb/skin middle is subskin of\{\langle base skin\rangle\}\{\langle options\rangle\}} (no default, initially unset)

Creates a new unnamed skin which inherits all properties of an existing \langle base skin\rangle plus the given \langle options\rangle. This skin is set as \texttt{/tcb/skin middle}. See a detailed example on page 246.

\texttt{/tcb/skin last is subskin of\{\langle base skin\rangle\}\{\langle options\rangle\}} (no default, initially unset)

Creates a new unnamed skin which inherits all properties of an existing \langle base skin\rangle plus the given \langle options\rangle. This skin is set as \texttt{/tcb/skin last}. See a detailed example on page 246.
9.4 Drawing Scheme

Depending on the complexity of a \texttt{tcolorbox} definition, the resulting box is drawn in a more or less complex series of steps.

To document and demonstrate these drawing steps, we consider the following box definition:

```latex
\newtcolorbox{testbox}[1][][enhanced,title=Test Box, boxrule=1mm,tilterule=0.5mm,colframe=blue!50!black, interior style={top color=blue!20!green!50!white,bottom color=blue!20!yellow!50!white}, colbacktitle=blue!50!green!90!white,segmentation style={solid}, fonttitle=\textbf,drop fuzzy shadow,borderline={0.3mm}{0.35mm}{yellow!50!white}, underlay={\path[fill image opacity=0.15,fill image scale=0.9, fill stretch picture={\draw[blue,line width=2mm] circle (1);}] (interior.south west) rectangle (interior.north east);}, watermark text={Watermark},watermark color={green!20!white}, finish={\begin{tcbclipframe}
\path[bottom color=black,top color=black!50!white,opacity=0.1]
(frame.south west) -- (frame.south east) -- (frame.north east) -- cycle;
\path[top color=white,bottom color=black!50!white,opacity=0.1]
(frame.south west) -- (frame.north west) -- (frame.north east) -- cycle;
\end{tcbclipframe}},#1}
```

For this definition, we get the maximal number of drawing steps:

1. **shadow**

2. **frame**

- Section 10.6 on page 185.
- \texttt{/tcb/colframe} \textsuperscript{P.27}, \texttt{/tcb/opacityframe} \textsuperscript{P.51}
- \texttt{/tcb/frame code} \textsuperscript{P.140}
- \texttt{/tcb/frame style} \textsuperscript{P.151}

Lower part

- Section 10.9 on page 200

All together, the box is drawn:

```latex
\begin{testbox}
\lipsum[2]
\end{testbox}
```
9.5 Color Names

Color settings for a `tcolorbox` are saved into named colors which may be used inside a box, e.g. for an overlay. These color names are

- `tcbcolframe` set by `/tcb/colframe` (frame color)
- `tcbcolback` set by `/tcb/colback` (background color)
- `tcbcolbacktitle` set by `/tcb/colbacktitle` (background color of the title)
- `tcbcolbacklower` set by `/tcb/colbacklower` (skin dependend background color of the lower part; needs \texttt{skins} to be loaded)
- `tcbcolupper` set by `/tcb/colupper` (text color upper part)
- `tcbcollower` set by `/tcb/collower` (text color lower part)
- `tcbcoltitle` set by `/tcb/coltitle` (text color title)

\begin{tcolorbox}[title=Color names, colframe=blue!50!black, colback=blue!5, colbacktitle=blue!50, colupper=red!35!black]
\foreach \name in {tcbcolframe,tcbcolback,tcbcolbacktitle,tcbcolbacklower, tcbcolupper,tcbcollower,tcbcoltitle}
{\tikz\path[draw,fill=\name] (0,0) rectangle node[right=4mm,font=\ttfamily]{\name} (0.8,0.8);}
\end{tcolorbox}

\% \texttt{tcbuselibrary{skins}}
\begin{tcolorbox}[title=Color names, colframe=blue!50!black, colback=blue!5, colbacktitle=blue!50, colupper=red!35!black]
\foreach \name in {tcbcolframe,tcbcolback,tcbcolbacktitle,tcbcolbacklower, tcbcolupper,tcbcollower,tcbcoltitle}
{\tikz\path[draw,fill=\name] (0,0) rectangle node[right=4mm,font=\ttfamily]{\name} (0.8,0.8);}
\end{tcolorbox}
9.6 Useful Properties

The following macros describe certain properties which may be used for the drawing scheme, see Section 9.4 on page 144. Sometimes, they are even available inside the box content. All of them are considered to be read-only and should never be redefined by the user.

\texttt{\textbackslash tcbheightspace}

If the height of a tcolorbox is not the natural height, the space difference between the forced and the natural size is held by \texttt{\textbackslash tcbheightspace}. This macro is not usable inside the box content, but for skins or inside \texttt{/tcb/underlay} \textsuperscript{P.198}, \texttt{/tcb/overlay} \textsuperscript{P.73}, etc. If such a space information is needed inside the box content, see \texttt{/tcb/space to} \textsuperscript{P.59} instead.

\begin{tcolorbox}
\begin{verbatim}
\% \tcbsublibrary{skins}
\newtcolorbox{testbox}[2][]{enhanced,size=fbox,
  colframe=blue!75!black,colback=white,height=#2,
  underlay={\node[above,inner sep=3pt] at (interior.south){%
    \includegraphics[width=\tcbtextwidth,height=\tcbheightspace-3pt]{goldshade.png}};},
  #1}
\begin{testbox}{3cm}
  This is my box. The space is filled with a picture.
\end{testbox}
\begin{testbox}{2cm}
  This is my box. The space is filled with a picture.
\end{testbox}
\end{verbatim}
\end{tcolorbox}

\texttt{\textbackslash tcbtextwidth}

This property describes the box content width.

- If there also is a lower part, it describes the width of the upper part.
- For \texttt{/tcb/sidebyside} \textsuperscript{P.118} boxes, it describes the combined text width plus segmentation.
- This property can be used inside the box content text with exception of \texttt{/tcb/fit} \textsuperscript{P.423} boxes.
- \texttt{\textbackslash tcbtextwidth} can be used for all box types for skins or inside \texttt{/tcb/underlay} \textsuperscript{P.198}, \texttt{/tcb/overlay} \textsuperscript{P.73}, etc.

\begin{tcolorbox}
\begin{verbatim}
\begin{tcolorbox}[colframe=blue!75!black]
  Inside a box: \texttt{\textbackslash tcbtextwidth} (\texttt{\textasciitilde370.74823pt}).
\end{tcolorbox}
\end{verbatim}
\end{tcolorbox}
\texttt{tcbtextheight}

This property describes the designated box content height. If the box is larger than the natural height, the actual content will be smaller than \texttt{tcbtextheight}.

- For boxes with a fixed \texttt{/tcb/height} \cite{P.53}, this property can be used inside the box content text. For other boxes, it denotes 0pt inside the box content.
- \texttt{tcbtextheight} can be used for all box types for skins or inside \texttt{/tcb/underlay} \cite{P.198}, \texttt{/tcb/overlay} \cite{P.73}, etc.

\begin{tcbraster}[raster equal height,enhanced,watermark text=\texttt{tcbsegmentstate}]
\begin{tcolorbox}Upper part\end{tcolorbox}
\begin{tcolorbox}Upper part \tcblower Lower part\end{tcolorbox}
\end{tcbraster}

\texttt{tcbsegmentstate}

This macro contains 0, 1, or 2. It is set for every unbroken box and every broken partial box with the following meaning:

- 0: The current (partial) box contains only an upper part.
- 1: The current (partial) box contains an upper and a lower part. The segmentation node can be used for positioning.
- 2: The current (partial) box contains only a lower part. This can only be true for parts of breakable boxes.

Skins like \texttt{bicolor} \cite{P.222} use this property to paint the (partial) boxes.
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{skins}

This also loads the package \texttt{tikz} \cite{tikz}. Typically but not necessarily, the following skins use \texttt{tikz} instead of \texttt{pgf}.

10.1 Style Option Keys

The following style options are applicable for all skins which use engines of type \texttt{path}, \texttt{pathfirst}, \texttt{pathmiddle}, or \texttt{pathlast}. Especially, the skin \texttt{enhanced} \cite{enhanced} supports all of them and \texttt{standard} \cite{standard} none.

/\texttt{tcb/frame style}=\langle \texttt{tikz keys} \rangle \\
(\texttt{style, no default})

The \langle \texttt{tikz keys} \rangle are used inside the \texttt{tikz} path command for drawing the \texttt{frame} of the box. This option is available if the /\texttt{tcb/frame engine} \cite{frame engine} is set to \texttt{path}, \texttt{pathfirst}, \texttt{pathmiddle}, or \texttt{pathlast}. It is \texttt{not} available for \texttt{standard}.

/\texttt{tcb/frame style image}=\langle \texttt{file name} \rangle \\
(no default, initially unset)

Fills the frame with an external image referenced by \langle \texttt{file name} \rangle. For advanced features like blending of a picture with the background, use /\texttt{tcb/frame style} together with /\texttt{tikz/fill stretch image} \cite{fill stretch image}.
\tcb/frame style tile={⟨graphics options⟩}{⟨file name⟩}  (no default, initially unset)
Fills the frame with a tile pattern based on an external image referenced by ⟨file name⟩. The ⟨graphics options⟩ are given to the underlying \includegraphics command. For advanced features like blending of a picture with the background, use \tcb/frame style together with \tikz/fill tile image.P.151.

\begin{tcolorbox}[enhanced,title=My title, frame style tile={width=1cm}{pink_marble.png}]
This is a textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

\tcb/frame hidden  (style, no value)
This is a shortcut for frame style={draw=none,fill=none}. Depending on the skin, this option switches off the drawing of the frame. Alternatively, use \tcb/frame empty.P.140.

\begin{tcolorbox}[enhanced,title=My title, frame hidden]
This is a textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

\tcb/interior style=⟨tikz keys⟩  (style, no default)
The ⟨tikz keys⟩ are used inside the tikz path command for drawing the interior of the box. They are used for the titled and for the untitled version as well. This option is available if the /tcb/interior titled engine.P.137 or /tcb/interior engine.P.138 is set to path, pathfirst, pathmiddle, or pathlast. It is not available for standard.

\begin{tcolorbox}[enhanced,title=My title, interior style={left color=red!20!white, right color=yellow!50!white}]
This is a textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
/tcb/interior style image=⟨file name⟩
(no default, initially unset)
Fills the interior with an external image referenced by ⟨file name⟩. For advanced features like blending of a picture with the background, use /tcb/interior style^P.152 together with /tikz/fill stretch image^P.260.

\tcbset{colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,
interior style image=goldshade.png]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a tcolorbox.
This is the lower part.

/tcb/interior style tile=⟨graphics options⟩{⟨file name⟩}
(no default, initially unset)
Fills the interior with a tile pattern based on an external image referenced by ⟨file name⟩. The ⟨graphics options⟩ are given to the underlying \includegraphics command. For advanced features like blending of a picture with the background, use /tcb/interior style^P.152 together with /tikz/fill tile image^P.264.

\tcbset{colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,
interior style tile={width=2cm}{crinklepaper.png}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a tcolorbox.
This is the lower part.

/tcb/interior hidden
(style, no value)
This is a shortcut for interior style=\{draw=none,fill=none\}. Depending on the skin, this option switches off the drawing of the interior. Alternatively, use /tcb/interior empty^P.141 and/or /tcb/interior titled empty^P.140.

\tcbset{frame style={top color=red!20!white,
bottom color=red!20!white!75!black},
fonttitle=\bfseries,coltitle=black}
\begin{tcolorbox}[enhanced,title=My title,
interior hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

My title
This is a tcolorbox.
This is the lower part.
/tcb/segmentation style=(tikz keys)
(style, no default)
The (tikz keys) are used inside the tikz path command for drawing the segmentation line of the box.
This option is available if the /tcb/segmentation engine \(^{P.138}\) is set to path. It is not available for standard.

```
\tcset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,segmentation style={double=white,draw=blue, double distance=1pt,solid}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

My title
This is a tcolorbox.
This is the lower part.

/tcb/segmentation hidden (style, no value)
This is a shortcut for segmentation style={draw=none,fill=none}. Depending on the skin, this option switches off the drawing of the segmentation line. See also /tcb/lower separated \(^{P.25}\) which has the same effect for most skins. Alternatively, use /tcb/segmentation empty \(^{P.141}\).

```
\tcset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My title,enhanced,segmentation hidden]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

My title
This is a tcolorbox.
This is the lower part.

/tcb/title style=(tikz keys)
(style, no default)
The (tikz keys) are used inside the tikz path command for drawing the title area of the box.
This option is available if the /tcb/title engine \(^{P.138}\) is set to path, pathfirst, pathmiddle, or pathlast. It is not available for standard.

```
\tcset{colback=red!5!white,colframe=red!75!black, coltitle=blue!50!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title, title style={left color=blue!15!yellow, right color=red!85!black}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

My title
This is a tcolorbox.
This is the lower part.
/tcb/title style image=(file name)  (no default, initially unset)
Fills the title area with an external image referenced by (file name). For advanced features like blending of a picture with the background, use /tcb/title style"P.154 together with /tikz/fill stretch image"P.260.

\tcbset{colback=blue!5!white,colframe=blue!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title, title style image=blueshade.png] This is a tcolorbox. \tcblower This is the lower part. \end{tcolorbox}

My title
This is a tcolorbox.
This is the lower part.

/tcb/title style tile={(graphics options)}{(file name)}  (no default, initially unset)
Fills the title area with a tile pattern based on an external image referenced by (file name). The (graphics options) are given to the underlying \includegraphics command. For advanced features like blending of a picture with the background, use /tcb/title style"P.154 together with /tikz/fill tile image"P.264.

\tcbset{colback=red!5!white,colframe=red!75!black, coltitle=blue!50!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title, title style tile={width=1cm}{pink_marble.png}] This is a \textbf{tcolorbox}. \tcblower This is the lower part. \end{tcolorbox}

My title
This is a tcolorbox.
This is the lower part.

/tcb/title hidden  (style, no value)
This is a shortcut for title style={draw=none,fill=none}. Depending on the skin, this option switches off the drawing of the title background. See also /tcb/title filled"P.27 for a similar effect. Alternatively, use /tcb/title empty"P.142.

\tcbset{colback=red!5!white,colframe=red!75!black, fonttitle=\bfseries}
\begin{tcolorbox}[title=My title, enhanced,title hidden] This is a \textbf{tcolorbox}. \tcblower This is the lower part. \end{tcolorbox}

My title
This is a tcolorbox.
This is the lower part.
The \texttt{tikz} \texttt{keys} are used to draw a title rule, i.e. a rule below the optional title. The width of the rule is controlled by \texttt{/tcb/titlerule} \footnote{P.36}. It may be set directly to a smaller width to create mixed effects with the standard rule. This option is implemented as an \texttt{/tcb/underlay} \footnote{P.198}. Thus, it is not available for \texttt{standard} \footnote{P.207} and \texttt{standard jigsaw} \footnote{P.208}, but for all other skins, e.g. \texttt{enhanced} \footnote{P.209}. As an underlay, this option can be used multiple times and is removed by \texttt{/tcb/no underlay} \footnote{P.198}.

\begin{tcolorbox}
[enhanced, 
 colback=red!5!white,colframe=red!75!black, 
 colbacktitle=red!50!yellow,fonttitle=\bfseries, 
 title=My title, 
 titlerule=1mm, 
 titlerule style=yellow ]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
[enhanced, 
 colback=red!5!white,colframe=red!75!black, 
 colbacktitle=red!50!yellow,fonttitle=\bfseries, 
 title=My title, 
 titlerule=1mm, 
 titlerule style={yellow,line width=0.5mm} ]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
[enhanced, 
 colback=red!10!white,colframe=red!75!black, 
 colbacktitle=red!50!yellow,fonttitle=\bfseries, 
 frame hidden, 
 title=My title, 
 boxrule=0pt,titlerule=1mm, 
 titlerule style=red!50!black ]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}
[empty, 
 coltitle=red!75!black,fonttitle=\bfseries, 
 borderline horizontal={0.5mm}{0pt}{red!50!white}, 
 title=My title, 
 arrows = {Hooks[arc=270]-Hooks[arc=270]} ]  
This is a \textbf{tcolorbox}.
\end{tcolorbox}
The combined TikZ style applied to frame, interior, and title background can be used by authors in customizing code.

/tikz/tcb fill frame (style, no value)

This is a TikZ style which is finally applied to the frame of the box.

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tikz/tcb fill interior (style, no value)

This is a TikZ style which is finally applied to the interior of the box.

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}

/tikz/tcb fill title (style, no value)

This is a TikZ style which is finally applied to the title area of the box.

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
10.2 Boxed Title Option Keys

10.2.1 Boxed Title Placement

The following options place the title text into an own \tcbox. This boxed title can be customized independently from the main box using /tcb/boxed title style. The placement can be influenced by \( \text{boxed title options} \).

\textbf{/tcb/attach boxed title to top left=\{\text{boxed title options}\}} \quad \text{(style, default empty)}

The title is boxed with a \tcbox and attached to the top left corner of the main box.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top left]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\textbf{/tcb/attach boxed title to top center=\{\text{boxed title options}\}} \quad \text{(style, default empty)}

The title is boxed with a \tcbox and attached to the top of the main box.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top center]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\textbf{/tcb/attach boxed title to top right=\{\text{boxed title options}\}} \quad \text{(style, default empty)}

The title is boxed with a \tcbox and attached to the top right corner of the main box.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to top right]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\textbf{/tcb/attach boxed title to bottom left=\{\text{boxed title options}\}} \quad \text{(style, default empty)}

The title is boxed with a \tcbox and attached to the bottom left corner of the main box.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to bottom left]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\textbf{/tcb/attach boxed title to bottom center=\{\text{boxed title options}\}} \quad \text{(style, default empty)}

The title is boxed with a \tcbox and attached to the bottom of the main box.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to bottom center]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\textbf{/tcb/attach boxed title to bottom right=\{\text{boxed title options}\}} \quad \text{(style, default empty)}

The title is boxed with a \tcbox and attached to the bottom right corner of the main box.

\begin{tcolorbox}[enhanced,title=My title, attach boxed title to bottom right]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
This is a convenient style to mimic a standard title. It uses /tcb/attach boxed title to top center, /tcb/minipage boxed title, and sizes the boxed title to match the base box.

\begin{tcolorbox}[enhanced, title=My title, attach boxed title to top, boxed title style={colframe=red}]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.

In contrast to /tcb/attach boxed title to top, this style uses smaller left and right rules to avoid previewer glitches. Typically, one would not use different colors for the frame as in the example below.

\begin{tcolorbox}[enhanced, title=My title, attach boxed title to top*, boxed title style={colframe=red}]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

My title
This is a \textbf{tcolorbox}.

This is a convenient style to produce a standard-like title at the bottom of the box. It uses /tcb/attach boxed title to bottom center, /tcb/minipage boxed title, and sizes the boxed title to match the base box.

\begin{tcolorbox}[enhanced, title=My title, attach boxed title to bottom, boxed title style={colframe=red}]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

In contrast to /tcb/attach boxed title to top, this style uses smaller left and right rules to avoid previewer glitches.

\begin{tcolorbox}[enhanced, title=My title, attach boxed title to bottom*]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

This style combines /tcb/attach boxed title to bottom* with /tcb/boxed title style. The \texttt{(options)} are given to /tcb/boxed title style. 

\begin{tcolorbox}[tile, flip title={sharp corners}, title=My title, colback=red!10, colbacktitle=red!75!black]
  This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
10.2.2 Options for the Boxed Title Placement

The \texttt{boxtitle options} of the keys described above are shift values. The dimensions of the boxed title are stored into two macros \texttt{\tcboxedtitleheight} and \texttt{\tcboxedtitlewidth}. These macros can be used inside the following \texttt{boxtitle options}:

\begin{verbatim}
/tcb/boxtitle/xshift=\langle length \rangle \\
(no default, initially 0pt)
The boxed title is shifted by \langle length \rangle in the horizontal direction.
\end{verbatim}

\begin{verbatim}
\begin{tcolorbox}[enhanced,title=My title, 
attach boxed title to top left={xshift=-2mm},
boxed title style={size=small,colback=blue}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
/tcb/boxtitle/yshift=\langle length \rangle \\
(no default, initially 0pt)
The boxed title is shifted by \langle length \rangle in the vertical direction.
\end{verbatim}

\begin{verbatim}
\begin{tcolorbox}[enhanced,title=My title, 
attach boxed title to top center={yshift=-\tcboxedtitleheight/2},
boxed title style={size=small,colback=blue}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
/tcb/boxtitle/yshifttext=\langle length \rangle \\
(no default, initially 0pt)
The text inside the main box by \langle length \rangle to give room for e.g. a sunken title.
\end{verbatim}

\begin{verbatim}
\begin{tcolorbox}[enhanced,title=My title, 
attach boxed title to top center={yshift=-3mm,yshifttext=-1mm},
boxed title style={size=small,colback=blue}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
/tcb/boxtitle/yshift*=\langle length \rangle \\
(no default, initially 0pt)
Sets /tcb/boxtitle/yshift and /tcb/boxtitle/yshifttext the same time. 
/tcb/boxtitle/yshifttext is only set if necessary.
\end{verbatim}

\begin{verbatim}
\begin{tcolorbox}[enhanced,title=My title, 
attach boxed title to top center={yshift*=\texttt{\tcboxedtitleheight}-3mm},
boxed title style={size=small,colback=blue}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}
\end{verbatim}

The bounding box of the resulting total \texttt{tcolorbox} is adapted automatically to the vertical dimensions of the boxed title. Possible horizontal enlargements are not automatically computed.
10.2.3 Options for the Boxed Title Box

The boxed title options are implemented as an underlay, see Section 10.8 on page 198. Therefore, a boxed title is not drawn, if a skin does not support underlays like `standard`\textsuperscript{P.207}. Still, the room for the boxed titles gets reserved in these cases.

A Ti\kZ node \texttt{title} is produced by a boxed title which can be used inside `/tcb/frame code`\textsuperscript{P.140}, `/tcb/interior code`\textsuperscript{P.141}, underlays, overlays, and finishes.

A boxed title is almost always the first underlay. The only exceptions are underlays defined by `/tcb/underlay boxed title`\textsuperscript{P.199} which are drawn before. Additionally, underlays defined by `/tcb/underlay boxed title`\textsuperscript{P.199} are only drawn, if a boxed title is actually set. They are ignored, if there is no boxed title.

\begin{tcbitemize}
\item \texttt{/tcb/boxed title size}\texttt{=\langle size\rangle} (no default, initially \texttt{title})
  This setting defines the basic size for the title box. Further settings can be applied using \texttt{/tcb/boxed title style}\textsuperscript{P.162}. Feasible values for \texttt{\langle size\rangle} are:
  \begin{itemize}
  \item \texttt{title}: Sets the size according to \texttt{/tcb/size}\textsuperscript{P.44}=\texttt{title}.
  \item \texttt{standard}: No size setting. Typically, this is identical to \texttt{/tcb/size}\textsuperscript{P.44}=\texttt{normal}.
  \item \texttt{copy}: The size values for a title of the base box are copied for the title box.
  \end{itemize}
\end{tcbitemize}

\begin{verbatim}
\% \tcbsuselibrary{raster}
\begin{tcbraster}[raster columns=3,enhanced,boxrule=0.4pt, title=My title,attach boxed title to top center]
  \begin{tcolorbox}[boxed title size=title]
    This is a \textbf{tcolorbox}.
  \end{tcolorbox}
  \begin{tcolorbox}[boxed title size=standard]
    This is a \textbf{tcolorbox}.
  \end{tcolorbox}
  \begin{tcolorbox}[boxed title size=copy]
    This is a \textbf{tcolorbox}.
  \end{tcolorbox}
\end{tcbraster}
\end{verbatim}
By default, a boxed title is dimensioned with \texttt{/tcb/size=\texttt{title}} and inherits the \texttt{/tcb/skin} and \texttt{/tcb/colframe} of the main box. Also, the \texttt{/tcb/colback} is inherited from the main \texttt{/tcb/colbacktitle}. Font and color of the title text are set as usual. All other \texttt{(options)} are set by the \texttt{/tcb/boxed title style} key. Since a boxed title is set by \texttt{tcolorbox}, all \texttt{tcolorbox} options are applicable here. If \texttt{/tcb/boxed title style} is used several times, the \texttt{(options)} are appended.

\begin{tcolorbox}[enhanced,title=My title, fonttitle=\bfseries,coltitle=green!25!black, attach boxed title to top center=\{yshift=-2mm,yshifttext=-1mm\}, boxed title style=\{colframe=green!75!black, colback=yellow!50!green\}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,title=My title, colframe=red!50!black,colback=red!10!white, arc=1mm,colbacktitle=red!10!white, fonttitle=\bfseries,coltitle=red!50!black, attach boxed title to top left=\{xshift=3.2mm,yshift=-0.50mm\}, boxed title style=\{skin=enhancedfirst jigsaw, size=small,arc=1mm,bottom=-1mm, interior style=\{fill=none, top color=red!30!white, bottom color=red!20!white\}\}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enhanced,title=My title, colframe=blue!50!black,colback=blue!10!white,colbacktitle=blue!5!yellow!10!white, fonttitle=\bfseries,coltitle=black,attach boxed title to top center=\{yshift=-0.25mm-`\tcboxedtitleheight/2,yshifttext=2mm-`\tcboxedtitleheight/2\}, boxed title style=\{boxrule=0.5mm, frame code={\path[\tcb fill frame] (\[xshift=-4mm\]frame.west) -- (frame.north west) -- (frame.north east) -- (\[xshift=4mm\]frame.east) -- (frame.south east) -- (\[xshift=4mm\]frame.east) -- cycle; }, interior code={\path[\tcb fill interior] (\[xshift=-2mm\]interior.west) -- (interior.north west) -- (\[xshift=2mm\]interior.east) -- (interior.south east) -- (interior.south west) -- cycle; }}]
\lipsum[2]
\end{tcolorbox}

---


N 2016-02-26 \tcb:no boxed title style (style, initially set)

Removes all options which were set by \tcb/boxed title style.\textsuperscript{P.162}
The title text content is captured with a horizontal box. Especially, there are no linebreak possible.

\newtcolorbox{mybox}[1]{hbox boxed title, enhanced,attach boxed title to top center= {yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, title={#1}}
\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}

The title text content is captured with a minipage with a width of \textit{⟨length⟩}. By default, the resulting boxed title is somewhat smaller than the main box.

\newtcolorbox{mybox}[1]{minipage boxed title, enhanced,attach boxed title to top center= {yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, center title,title={#1}}
\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}

The title text content is captured with a minipage with a width of \textit{main box width plus ⟨length⟩}. By default, the resulting boxed title is somewhat smaller than the main box.

\newtcolorbox{mybox}[1]{minipage boxed title*=⟨length⟩, enhanced,attach boxed title to top center= {yshift=-3mm,yshifttext=-1mm}, boxed title style={size=small,colback=red}, center title,title={#1}}
\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}
The title text content is captured with a TikZ node with given TikZ \texttt{(options)}. The text is centered by default.

\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\bigskip
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}

This style needs the \texttt{varwidth} package \cite{varwidth} to be loaded manually. By default, the resulting boxed title is somewhat smaller than the main box.

\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\bigskip
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}

The title text content is captured with a \texttt{varwidth} environment with a width of \texttt{\langle length\rangle}. This style needs the \texttt{varwidth} package \cite{varwidth} to be loaded manually. By default, the resulting boxed title is somewhat smaller than the main box.

\begin{mybox}{Short title}
This is a \textbf{tcolorbox}.
\end{mybox}
\bigskip
\begin{mybox}{This title is not really very short}
This is a \textbf{tcolorbox}.
\end{mybox}
10.3 Watermark Option Keys

The following watermark options are applicable for all skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical environment}. Therefore, the skin \texttt{standard} does not support these watermarks, but all other skins, e.g. \texttt{enhanced}.

The watermark options rely on the more general overlay options described in Section 4.12 from page 73. Therefore, watermarks and overlays cannot be used mixed. But a mixture is possible with the \texttt{\protect\LIB} hooks library, see Section 22.

\begin{verbatim}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[enhanced,title=My title,watermark text=My Watermark]
\lipsum[1]
\tcblovertop}\lipsum[2]
\end{tcolorbox}
\end{verbatim}

/\texttt{tcb/watermark text}={(text)} (no default, initially unset)

Writes some \texttt{(text)} in the center of the interior region of a \texttt{tcolorbox}. This \texttt{(text)} is written after the frame and interior are drawn and before the text content is drawn. It is zoomed or stretched according the values of \texttt{/tcb/watermark zoom} or \texttt{/tcb/watermark stretch}.

/\texttt{tcb/watermark text on}={(part)} is \texttt{(text)} (no default, initially unset)

This option writes some \texttt{(text)} in the center of the interior region of a \texttt{tcolorbox} as described for \texttt{/tcb/watermark text}. But this is done only for boxes named \texttt{(part)} of a break sequence, see \texttt{/tcb/breakable}.

Feasible values for \texttt{(part)} are:
- \texttt{broken}: all broken box parts,
- \texttt{unbroken}: unbroken boxes only,
- \texttt{first}: first parts of a break sequence,
- \texttt{middle}: middle parts of a break sequence,
- \texttt{last}: last parts of a break sequence,
- \texttt{unbroken and first}: unbroken boxes and first parts of a break sequence,
- \texttt{middle and last}: middle and last parts of a break sequence,
- \texttt{first and middle}: first and middle parts of a break sequence.
/tcb/watermark graphics = (file name)  
(no default, initially unset)
Draws an external picture referenced by (file name) in the center of the interior region of a tcolorbox. The picture is drawn after the frame and interior are drawn and before the text content is drawn. It is zoomed or stretched according the values of /tcb/watermark zoom *P.171* or /tcb/watermark stretch *P.173.*

\begin{tcolorbox}[enhanced,title=My title,watermark graphics=Basilica_5.png, \texttt{watermark opacity}=0.15]  
\texttt{lipsum[1-2]}  
\texttt{tcblower}  
This example uses a public domain picture from \url{http://commons.wikimedia.org/wiki/File:Basilica_5.png}  
\end{tcolorbox}

My title

This example uses a public domain picture from \url{http://commons.wikimedia.org/wiki/File:Basilica_5.png}

/tcb/watermark graphics on= (part) is (file name)  
(no default, initially unset)
This option draws a picture referenced by (file name) in the center of the interior region of a tcolorbox as described for /tcb/watermark graphics. But this is done only for boxes named (part) of a break sequence, see /tcb/breakable *P.375*.
Feasible values for (part) are:
- **broken**: all broken box parts,
- **unbroken**: unbroken boxes only,
- **first**: first parts of a break sequence,
- **middle**: middle parts of a break sequence,
- **last**: last parts of a break sequence,
- **unbroken and first**: unbroken boxes and first parts of a break sequence,
- **middle and last**: middle and last parts of a break sequence.
\begin{tcolorbox}
\tcset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tcb}
\[\textbf{My title}\]
\lipsum[1]
\lipsum[2]
\end{tcb}
\end{tcolorbox}

\textbf{My title}


\textbf{/tcb/watermark tikz on=(part) is (graphical code)}

This option draws the given \texttt{tikz} \texttt{(graphical code)} in the center of the interior region of a \texttt{tcolorbox} as described for \texttt{/tcb/watermark tikz}. But this is done only for boxes named \texttt{(part)} of a break sequence, see \texttt{/tcb/breakable}\textsuperscript{P.375}.

Feasible values for \texttt{(part)} are:

- \texttt{broken}: all broken box parts,
- \texttt{unbroken}: unbroken boxes only,
- \texttt{first}: first parts of a break sequence,
- \texttt{middle}: middle parts of a break sequence,
- \texttt{last}: last parts of a break sequence,
- \texttt{unbroken and first}: unbroken boxes and first parts of a break sequence,
- \texttt{middle and last}: middle and last parts of a break sequence.

\textbf{/tcb/no watermark}

Removes the watermark if set before. This is an alias for \texttt{/tcb/no overlay}\textsuperscript{P.74}. 

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\texttt{\textcolor{red}{\textbackslash tcb/watermark opacity=} (fraction)} \hfill (no default, initially 1.00)

Sets the opacity value $\in [0,1]$ for a watermark.

\begin{tcolorbox}[title=Opacity 1.00,\textcolor{red}{watermark opacity=1.00}]
\lipsum[2]
\end{tcolorbox}
\hfill

\begin{tcolorbox}[title=Opacity 0.50,\textcolor{red}{watermark opacity=0.50}]
\lipsum[2]
\end{tcolorbox}

\textbf{Opacity 1.00}


\textbf{Opacity 0.50}


\texttt{\textcolor{red}{\textbackslash tcb/watermark zoom=} (fraction)} \hfill (no default, initially 0.75)

Sets the zoom value for a watermark. The zoom respects the aspect ratio. The value 1.0 means to fill the whole box until the watermark touches the frame.

\begin{tcolorbox}[title=Zoom 1.0,\textcolor{red}{watermark zoom=1.0}]
\lipsum[2]
\end{tcolorbox}
\hfill

\begin{tcolorbox}[title=Zoom 0.5,\textcolor{red}{watermark zoom=0.5}]
\lipsum[2]
\end{tcolorbox}

\textbf{Zoom 1.0}


\textbf{Zoom 0.5}

/tcb/watermark shrink=⟨fraction⟩ (no default, initially unset)

Identically to /tcb/watermark zoom, but the watermark never gets enlarged. Thus, the watermark keeps its original size or is shrunk.

/tcb/watermark overzoom=⟨fraction⟩ (no default, initially unset)

Sets the overzoom value for a watermark. The overzoom respects the aspect ratio. The value 1.0 means to fill the whole box until the watermark touches all four sides of the frame.

\tcbset{enhanced, colback=white, colframe=blue!50!black, fonttitle=\bfseries, watermark opacity=0.5, watermark graphics=lichtspiel.jpg, nobeforeafter, width=(\linewidth-2mm)/2}

\begin{tcolorbox}[title=Zoom 1.0, watermark zoom=1.0]
\lipsum[1]
\end{tcolorbox}
\begin{tcolorbox}[title=Overzoom 1.0, watermark overzoom=1.0]
\lipsum[1]
\end{tcolorbox}

If a /tcb/watermark overzoom value of 1.0 is used in connection with invisible top and bottom rules which still have a thickness greater than 0pt, the space of these invisible rules may not be covered by the watermark. For example, this situation may occur during the breaking of /tcb/enhanced boxes. To avoid this optical glitch, just set /tcb/pad at break to any desired value.
Sets the stretch value for a watermark. The stretch value is applied to width and height in relation to the box dimensions. It does not respect the aspect ratio. The value 1.0 means to fill the whole box.

```
\tcbset{enhanced,colback=white,colframe=blue!50!black,fonttitle=\bfseries,
watermark graphics=lichtspiel.jpg,watermark opacity=0.5,
nobeforeafter,width=(\linewidth-2mm)/2}

\begin{tcolorbox}[title=Stretch 1.00,watermark stretch=1.00]
\lipsum[2]
\end{tcolorbox}\hfill
\begin{tcolorbox}[title=Stretch 0.50,watermark stretch=0.50]
\lipsum[2]
\end{tcolorbox}
```

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[enhanced,title=My title,watermark text=My Watermark,
watermark color=yellow!50!red]
\lipsum[1]
\end{tcolorbox}
```
Sets the watermark to be clipped to the interior area.

\begin{tcolorbox}
\begin{tabular}{|l|}
\hline
\textbf{Clip (default)}
\hline
\hline
\textbf{No clip}
\hline
\end{tabular}
\end{tcolorbox}
10.4 Clip Environments

The following clip environments are applicable for all skins which use engines of type \texttt{path}, \texttt{pathfirst}, \texttt{pathmiddle}, or \texttt{pathlast}. Especially, the skin \texttt{enhanced} \cite{209} supports all of them and \texttt{standard} \cite{207} none. The typical area of application is inside overlay code, see Section 4.12 from page 73.

\begin{tcbclipframe}
\begin{environment content}
\end{tcbclipframe}

Defines a Tikz scope which clips to the frame area path.

\begin{picturebox}[title=My Picture Box]{lichtspiel.jpg}
\lipsum[1]
\end{picturebox}
Defines a Tikz scope which clips to the outside of the frame area path.

```latex
\begin{tikzpicture}
% draw two balls
\path [use as bounding box] (0,0.8) rectangle +(0.1,0.1);
\shadedraw [shading=ball] (0,0) circle (1cm);
\shadedraw [ball color=red] (3,-2.2) circle (1cm);
\end{tikzpicture}
```

```latex
\begin{tcolorbox}[title=A translucent box, overlay={\begin{tcbinvclipframe}
\draw [red,line width=1cm] ([xshift=-2mm,yshift=2mm]frame.north west) --([xshift=2mm,yshift=-2mm]frame.south east);
\draw [red,line width=1cm] ([xshift=-2mm,yshift=-2mm]frame.south west) --([xshift=2mm,yshift=2mm]frame.north east);
\end{tcbinvclipframe})
\lipsum[2]
\end{tcolorbox}
```

A translucent box

\begin{tcbclipinterior}
\begin{environment content}
Defines a Tikz scope which clips to the interior area path.
\end{environment content}
\end{tcbclipinterior}

\begin{tcolorbox}[enhanced,title=My Title,
overlay={\begin{tcbclipinterior}
\draw[red,line width=1cm] (interior.north west)--(interior.south east);
\draw[red,line width=1cm] (interior.south west)--(interior.north east);
\end{tcbclipinterior}}]
\lipsum[1]
\end{tcolorbox}

\begin{tcbcliptitle}
\begin{environment content}
Defines a Tikz scope which clips to the title area path.
\end{environment content}
\end{tcbcliptitle}

\begin{tcolorbox}[enhanced,title=My Title,colframe=blue,colback=yellow!10!white,
overlay={\begin{tcbcliptitle}
\node at (title)\includegraphics[width=\linewidth]{lichtspiel.jpg};\end{tcbcliptitle}}]
\lipsum[1]
\end{tcolorbox}
/tcb/clip title=true|false (default true, initially false)
Sets the title to be clipped to the title area.

\begin{tcolorbox}
\[title=\mbox{This is a title which is unbreakable and far too long}\]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}
\[title=\mbox{This is a title which is unbreakable and far too long},
\text{clip title}\]
This is a tcolorbox.
\end{tcolorbox}

/tcb/clip upper=true|false (default true, initially false)
Sets the upper part to be clipped to the interior area.

\newcommand{\mygraphics}[2][{}]{%
\tcbox[enhanced,boxsep=0pt,top=0pt,bottom=0pt,left=0pt,
right=0pt,boxrule=0.4pt,drop fuzzy shadow,clip upper,
colback=black/75!white,toptitle=2pt,bottomtitle=2pt,nobeforeafter,center title,fonttitle=\small\sffamily,title=\detokenize{#2}]{\includegraphics[width=\the\dimexpr(\linewidth-4mm)/2\relax]{#2}}%
\includegraphics[width=\the\dimexpr(\linewidth-4mm)/2\relax]{#2}}%

\mygraphics{lichtspiel.jpg}\hfill
\mygraphics{Basilica_5.png}
The example for \texttt{/tcb/clip upper}^{P.178} sizes the box according to the dimensions of the picture. To do it the other way around, the watermark options provide an easy solution.

\begin{mygraphics}{lichtspiel.jpg} \hfill \mygraphics{Basilica_5.png}
\end{mygraphics}

\texttt{/tcb/clip lower=true|false} \hspace{0.5cm} (default \texttt{true}, initially \texttt{false})
Sets the lower part to be clipped to the interior area.

\begin{tcblisting}{clip lower}
Donau\-dampf\-schiff\-fahrts\-ka\-pi\-t\"ans\-m\"ut\-zen\-fran\-sen
\end{tcblisting}
10.5 Border Line Option Keys

The following borderline options are applicable for most skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical
environment}. Therefore, the skin \texttt{standard} does not support these border lines, but most other skins, e.g. \texttt{enhanced}.

The borderlines are independent from the normal \texttt{tcolorbox} rules. They may be used with or without the \texttt{/tcb/segmentation
eengine}.

The borderlines are stackable, i.e. several different border lines can be used on the same \texttt{tcolorbox}. They are drawn \textit{after} the box frame and box interior and \textit{before} overlays or watermarks.

Technically, the normal \texttt{tcolorbox} rules result from a TikZ \textit{filling} process. The border lines are created by a TikZ \textit{drawing} process. This can be used to apply different effects.

\begin{tcolorbox}[	exttt{enhanced},title=Rounded corners,fonttitle=\bfseries,boxsep=5pt,arc=8pt,\]
borderline={0.5pt}{0pt}{red},
borderline={0.5pt}{5pt}{blue,dotted},
borderline={0.5pt}{-5pt}{green} ]
\end{tcolorbox}

This is a tcolorbox.

\begin{tcolorbox}[	exttt{enhanced},title=Sharp corners,fonttitle=\bfseries,boxsep=5pt,arc=8pt,sharp corners=downhill,\]
borderline={0.5pt}{0pt}{red},
borderline={0.5pt}{5pt}{blue,dotted},
borderline={0.5pt}{-5pt}{green} ]
\end{tcolorbox}

This is a tcolorbox.

\begin{tcolorbox}
\texttt{\begin{tcolorbox}[enhanced,title=Rounded corners,fonttitle=\bfseries,boxsep=5pt,arc=8pt,}
\texttt{borderline={0.5pt}{0pt}{red},}
\texttt{borderline={0.5pt}{5pt}{blue,dotted},}
\texttt{borderline={0.5pt}{-5pt}{green} ]}
\texttt{This is a tcolorbox.}
\end{tcolorbox}\bigskip
\texttt{\begin{tcolorbox}[enhanced,title=Sharp corners,fonttitle=\bfseries,boxsep=5pt,arc=8pt,sharp corners=downhill,}
\texttt{borderline={0.5pt}{0pt}{red},}
\texttt{borderline={0.5pt}{5pt}{blue,dotted},}
\texttt{borderline={0.5pt}{-5pt}{green} ]}
\texttt{This is a tcolorbox.}
\end{tcolorbox}}

Rounded corners

This is a tcolorbox.

Sharp corners

This is a tcolorbox.


My title


/tcb/no borderline
(no default, initially set)
Removes all borderlines if set before.

/tcb/show bounding box=(color)
(default red, initially unset)
Displays the bounding box borderline of a tcolorbox. Its intended use is debugging and fine tuning. It should not be part of a final document. The optional (color) is the base color for the bounding box borderline.

/tcbset{enhanced,nobeforeafter,width=4cm,fonttitle=\bfseries}
\begin{tcolorbox}[show bounding box,title=Normal]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[show bounding box=blue,title=Shadow,drop fuzzy shadow]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[show bounding box=green,title=Enlarged,drop fuzzy shadow, enlarge by=2mm]
This is a tcolorbox.
\end{tcolorbox}
The following partial borderlines act slightly different from the complete borderlines described before. They ignore rounded corner settings, their length is not modified by their \langle offset \rangle, they ignore skin settings but adapt to breakable boxes.

\begin{tcolorbox}[enhanced, borderline north={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[enhanced, borderline south={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[enhanced, borderline east={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.

\begin{tcolorbox}[enhanced, borderline west={2pt}{-2pt}{red}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

This is a \textbf{tcolorbox}.
\begin{tcolorbox}\textbf{tcolorbox}\end{tcolorbox}

10.6 Shadow Option Keys

The following shadow options are applicable for most skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical environment}. Therefore, the skin \texttt{standard} does not support these shadows, but most other skins, e.g. \texttt{enhanced}.

The shadows are stackable, i.e. several different shadows can be used on the same \texttt{tcolorbox}. They are drawn \textit{before} the box frame is drawn.

\texttt{/tcb/no shadow} (no default)

Removes all shadows if set before.

10.6.1 Common Shadows and Halos

\texttt{/tcb/drop shadow}=(\texttt{color})

Adds a new shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{\langle color\rangle} for the shadow can be changed.

\begin{tcolorbox}[drop shadow]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=Another shadow, drop shadow=blue]
This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/drop fuzzy shadow}=(\texttt{color})

Adds a new fuzzy shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{\langle color\rangle} for the shadow can be changed.

\begin{tcolorbox}[drop fuzzy shadow]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=Another shadow, drop fuzzy shadow=blue]
This is a tcolorbox.
\end{tcolorbox}

\texttt{/tcb/drop midday shadow}=(\texttt{color})

Adds a new shadow with standard dimensions to the stack of shadows. Optionally, the \texttt{\langle color\rangle} for the shadow can be changed.

\begin{tcolorbox}[drop midday shadow]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[title=Another shadow, drop midday shadow=blue]
This is a tcolorbox.
\end{tcolorbox}
/tcb/drop fuzzy midday shadow=(color) (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows. Optionally, the (color) for the shadow can be changed.

\tcbset{enhanced,colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[drop fuzzy midday shadow]
This is a tcolorbox.
\end{tcolorbox}
\par\bigskip
\begin{tcolorbox}[title=Another shadow, drop fuzzy midday shadow=blue]
This is a tcolorbox.
\end{tcolorbox}

/tcb/halo=(size) with (color) (style, default 0.9mm with yellow)
Adds a new halo shadow with the given (color) which overlaps the colorbox an all sides by (size).

\tcbset{enhanced,colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My own halo,halo]
This is a tcolorbox.
\end{tcolorbox}
\par\bigskip
\begin{tcolorbox}[title=Another halo, halo=2mm with green]
This is a tcolorbox.
\end{tcolorbox}

/tcb/fuzzy halo=(size) with (color) (style, default 0.9mm with yellow)
Adds a new fuzzy halo shadow with the given (color) which overlaps the colorbox an all sides by (size) plus 0.48mm.

\tcbset{enhanced,colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My own halo,fuzzy halo]
This is a tcolorbox.
\end{tcolorbox}
\par\bigskip
\begin{tcolorbox}[title=Another halo, fuzzy halo=2mm with green]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[blank,enhanced jigsaw,boxsep=2pt,arc=2pt, fuzzy halo=2mm with red!50!white, fuzzy halo=1mm with white]
\lipsum[1]
\end{tcolorbox}

For all following shadows, the optionally given \textit{⟨color⟩} for the shadow can be changed equivalent to the preceding examples.

\texttt{/tcb/drop shadow southeast=(color)} \hspace{2em} \text{(style, default \texttt{black!50!white})}

Adds a new shadow with standard dimensions to the stack of shadows. This shadow is identical to \texttt{/tcb/drop shadow} \cite{P.185}.

\begin{tcolorbox}
\begin{Verbatim}
\begin{tcolorbox}
drop shadow southeast, 
enhanced, colback=red!5!white, colframe=red!75!black
This is a tcolorbox.
\end{tcolorbox}
\end{Verbatim}
\end{tcolorbox}

\texttt{/tcb/drop shadow south=(color)} \hspace{2em} \text{(style, default \texttt{black!50!white})}

Adds a new shadow with standard dimensions to the stack of shadows. This shadow is identical to \texttt{/tcb/drop midday shadow} \cite{P.185}.

\begin{tcolorbox}
\begin{Verbatim}
\begin{tcolorbox}
drop shadow south, 
enhanced, colback=red!5!white, colframe=red!75!black
This is a tcolorbox.
\end{tcolorbox}
\end{Verbatim}
\end{tcolorbox}

\texttt{/tcb/drop shadow southwest=(color)} \hspace{2em} \text{(style, default \texttt{black!50!white})}

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\begin{Verbatim}
\begin{tcolorbox}
drop shadow southwest, 
enhanced, colback=red!5!white, colframe=red!75!black
This is a tcolorbox.
\end{tcolorbox}
\end{Verbatim}
\end{tcolorbox}

\texttt{/tcb/drop shadow west=(color)} \hspace{2em} \text{(style, default \texttt{black!50!white})}

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\begin{Verbatim}
\begin{tcolorbox}
drop shadow west, 
enhanced, colback=red!5!white, colframe=red!75!black
This is a tcolorbox.
\end{tcolorbox}
\end{Verbatim}
\end{tcolorbox}

\texttt{/tcb/drop shadow northwest=(color)} \hspace{2em} \text{(style, default \texttt{black!50!white})}

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\begin{Verbatim}
\begin{tcolorbox}
drop shadow northwest, 
enhanced, colback=red!5!white, colframe=red!75!black
This is a tcolorbox.
\end{tcolorbox}
\end{Verbatim}
\end{tcolorbox}

\texttt{/tcb/drop shadow north=(color)} \hspace{2em} \text{(style, default \texttt{black!50!white})}

Adds a new shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}
\begin{Verbatim}
\begin{tcolorbox}
drop shadow north, 
enhanced, colback=red!5!white, colframe=red!75!black
This is a tcolorbox.
\end{tcolorbox}
\end{Verbatim}
\end{tcolorbox}
//tb/drop shadow northeast=(color) (style, default black!50!white)
Adds a new shadow with standard dimensions to the stack of shadows.
\begin{tcolorbox}[drop shadow northeast,  
enhanced,colback=red!5!white,colframe=red!75!black]  
This is a tcolorbox.  
\end{tcolorbox}  
This is a tcolorbox.

//tb/drop shadow east=(color) (style, default black!50!white)
Adds a new shadow with standard dimensions to the stack of shadows.
\begin{tcolorbox}[drop shadow east,  
enhanced,colback=red!5!white,colframe=red!75!black]  
This is a tcolorbox.  
\end{tcolorbox}  
This is a tcolorbox.

//tb/drop fuzzy shadow southeast=(color) (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows. This shadow is identical to /tb/drop fuzzy shadow P.185.
\begin{tcolorbox}[drop fuzzy shadow southeast,  
enhanced,colback=red!5!white,colframe=red!75!black]  
This is a tcolorbox.  
\end{tcolorbox}  
This is a tcolorbox.

//tb/drop fuzzy shadow south=(color) (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows. This shadow is identical to /tb/drop fuzzy midday shadow P.186.
\begin{tcolorbox}[drop fuzzy shadow south,  
enhanced,colback=red!5!white,colframe=red!75!black]  
This is a tcolorbox.  
\end{tcolorbox}  
This is a tcolorbox.

//tb/drop fuzzy shadow southwest=(color) (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.
\begin{tcolorbox}[drop fuzzy shadow southwest,  
enhanced,colback=red!5!white,colframe=red!75!black]  
This is a tcolorbox.  
\end{tcolorbox}  
This is a tcolorbox.

//tb/drop fuzzy shadow west=(color) (style, default black!50!white)
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.
\begin{tcolorbox}[drop fuzzy shadow west,  
enhanced,colback=red!5!white,colframe=red!75!black]  
This is a tcolorbox.  
\end{tcolorbox}  
This is a tcolorbox.
/tcb/drop fuzzy shadow northwest\(=\langle\text{color}\rangle\) (style, default \text{black!50!white})
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow northwest, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow north\(=\langle\text{color}\rangle\) (style, default \text{black!50!white})
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow north, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow northeast\(=\langle\text{color}\rangle\) (style, default \text{black!50!white})
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow northeast, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop fuzzy shadow east\(=\langle\text{color}\rangle\) (style, default \text{black!50!white})
Adds a new fuzzy shadow with standard dimensions to the stack of shadows.

\begin{tcolorbox}[drop fuzzy shadow east, enhanced, colback=red!5!white, colframe=red!75!black]
This is a tcolorbox.
\end{tcolorbox}
10.6.2 Lifted Shadows

/tcb/drop lifted shadow=(color) (style, default black!50!white)

 Adds a new lifted shadow with standard dimensions to the stack of shadows. Optionally, the \(\langle\text{color}\rangle\) for the shadow can be changed.

\begin{tcolorbox}[drop lifted shadow]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Another shadow, drop lifted shadow=blue]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop small lifted shadow=(color) (style, default black!50!white)

 Adds a new small lifted shadow with standard dimensions to the stack of shadows. Optionally, the \(\langle\text{color}\rangle\) for the shadow can be changed.

\begin{tcolorbox}[drop small lifted shadow,size=fbox]
\{This is a tcolorbox.\}
\end{tcolorbox}

\begin{tcolorbox}[title=Another shadow, drop small lifted shadow=black]
This is a tcolorbox.
\end{tcolorbox}

/tcb/drop large lifted shadow=(color) (style, default black!50!white)

 Adds a new large lifted shadow with standard dimensions to the stack of shadows. Optionally, the \(\langle\text{color}\rangle\) for the shadow can be changed.

\begin{tcolorbox}[drop large lifted shadow]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Another shadow, drop large lifted shadow=blue]
This is a tcolorbox.
\end{tcolorbox}
10.6.3 Generic Shadows

\texttt{/tcb/shadow}={\{xshift\}}{\{yshift\}}{\{offset\}}{\{options\}} \hspace{1cm} \text{(no default)}

Adds a new shadow to the stack of shadows. This shadow follows the outline of the \texttt{tcolorbox} but is shifted by \{xshift\} and \{yshift\}. The \{offset\} value is a distance value from the frame outline. A positive \{offset\} value shrinks the shadow and a negative \{offset\} value enlarges the shadow. The shadow is filled along a \texttt{TikZ} path with the given \texttt{TikZ} \{options\}.

The shadows adapt to the rounded corners of the \texttt{tcolorbox}. An shrinked shadow will switch to sharp corners if necessary, an enlarged shadow may become more rounded depending on several factors. But \texttt{/tcb/sharp corners} \textsuperscript{P.48} have sharp shadows.

Shadows are not considered for the bounding box computation by default. Large shadows may be overlaped by the following content. But, the bounding box can be adapted if necessary.

\begin{verbatim}
\tcbset{enhanced,colback=red!5!white, colframe=red!75!black,fonttitle=\bfseries}
\begin{tcolorbox}[title=My own shadow, shadow={2mm}{-1mm}{0mm}{black!50!white}]
This is a tcolorbox.
\end{tcolorbox}
\par\bigskip
\begin{tcolorbox}[title=Another shadow, shadow={-1mm}{-2mm}{0mm}{fill=blue, opacity=0.5}]
This is a tcolorbox.
\end{tcolorbox}
\par\bigskip
\begin{tcolorbox}[title=Double shadow, shadow={-1.5mm}{-1.5mm}{0mm}{fill=blue, opacity=0.25}, shadow={1.5mm}{-1.5mm}{0mm}{fill=red, opacity=0.25}]
This is a tcolorbox.
\end{tcolorbox}
\par\bigskip
\begin{tcolorbox}[title=Far shadow, shadow={5.5mm}{-3.5mm}{2mm}{fill=black, opacity=0.25}]
This is a tcolorbox.
\end{tcolorbox}
\par\bigskip
\begin{tcolorbox}[title=Halo shadow, shadow={0mm}{0mm}{-1.5mm} {fill=yellow!75!red,opacity=0.5}]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}
/tcb/fuzzy shadow={(xshift)\math{\times}(yshift)\math{\times}(offset)\math{\times}(step)\math{\times}(options)} (no default)

Adds a new fuzzy shadow to the stack of shadows. Actually, this option adds several shadows which appear like a shadow with a fuzzy border. This fuzzy shadow follows the outline of the \texttt{tcolorbox} but is shifted by \langle xshift \rangle and \langle yshift \rangle. The \langle offset \rangle value is a distance value from the frame outline. A positive \langle offset \rangle value shrinks the shadow and a negative \langle offset \rangle value enlarges the shadow. The \{(step)\} value describes a shrink offset used for the combination of the partial shadows. The shadow is filled along a \texttt{TikZ} \langle options \rangle but any \texttt{opacity} value will be ignored.

\begin{tcolorbox}[title=My own shadow, fuzzy shadow={2mm}{-1mm}{0mm}{0.1mm}\%{black!50!white}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[title=Another shadow, fuzzy shadow={-1mm}{-2mm}{0mm}{0.2mm}\%{fill=blue}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[title=Double shadow, fuzzy shadow={-1.5mm}{-1.5mm}{0mm}{0.1mm}\%{blue}, fuzzy shadow={1.5mm}{-1.5mm}{0mm}{0.1mm}\%{red}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[title=Far shadow, fuzzy shadow={5.5mm}{-3.5mm}{0mm}{0.3mm}\%{black}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[title=Glow shadow, fuzzy shadow={0mm}{0mm}{-1.5mm}{0.15mm}\%{yellow!75!red}]
This is a \texttt{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[title=A multi shadow box]
This is a \texttt{tcolorbox}.
\end{tcolorbox}
If set to `true`, the shadow drawing algorithm tries to do a somewhat smart calculation of the arc for the shadow. The result is pleasing for typical boxes with rounded corners, but gives strange results for circular boxes.

```
\begin{tcolorbox}[drop shadow]
Smart shadow arc (arguably better than normal)
\end{tcolorbox}
\begin{tcolorbox}[smart shadow arc=false, drop shadow]
Normal shadow arc
\end{tcolorbox}
\begin{tcolorbox}[circular arc, drop shadow]
Smart shadow arc (worse than normal)
\end{tcolorbox}
\begin{tcolorbox}[circular arc, smart shadow arc=false, drop shadow]
Normal shadow arc
\end{tcolorbox}
```

```
\begin{tcolorbox}[title=My own shadow, lifted shadow={1mm}{-2mm}{3mm}{0.1mm}{black!50!white}]
This is a tcolorbox.
\end{tcolorbox}
```

```
\begin{tcolorbox}[title=My own shadow, lifted shadow={1mm}{-2mm}{3mm}{0.1mm}{black!50!white}]
This is a tcolorbox.
\end{tcolorbox}
```
10.6.4 TikZ Shadows

Alternatively to the package shadow options described before, shadows from the «Shadows Library» of TikZ can be used. Such shadows can be added directly to the frame path using `/tcb/frame style` on p. 151.

```latex
\begin{tcolorbox}
\setlength\parindent{0pt}
\setlength{\parskip}{5pt}
\begin{tcolorbox}[enhanced,
  colback=red!5!white,colframe=red!75!black,
  frame style={drop shadow} ]
This is a tcolorbox.
\end{tcolorbox}
\end{tcolorbox}
```

```latex
\begin{tcolorbox}
\setlength\parindent{0pt}
\setlength{\parskip}{5pt}
\begin{tcolorbox}[enhanced,height=3cm,
  colback=red!5!white,colframe=red!75!black,
  halign=center,valign=center,
  frame style={circular drop shadow} ]
This is a tcolorbox.
\end{tcolorbox}
\end{tcolorbox}
```

```latex
\begin{tcolorbox}
\setlength\parindent{0pt}
\setlength{\parskip}{5pt}
\begin{tcolorbox}[enhanced,width=2.5cm,
  square,circular arc,
  halign=center,valign=center,
  colback=red!5!white,colframe=red!75!black,
  frame style={circular glow={fill=red}} ]
tcolorbox\end{tcolorbox}
\end{tcolorbox}
```
10.7 TikZ Picture Option Keys

The following general options are applicable for skins which use \texttt{tikzpicture} as \texttt{/tcb/graphical environment} \cite{p.137}. Therefore, the skin \texttt{standard} \cite{p.207} does not support these options, but most other skins, e.g. \texttt{enhanced} \cite{p.209}.

\begin{itemize}
\item \texttt{/tcb/tikz=⟨tikz option list⟩} \hfill (no default, initially empty)
\end{itemize}

Adds the given \texttt{⟨tikz option list⟩} to the main \texttt{tikzpicture} environment used to draw the color box, see \cite{p.22}. If this option is applied a second time, the new \texttt{⟨tikz option list⟩} is appended to the current option list.

\begin{verbatim}
\tcbset{enhanced,colback=red!5!white,
  colframe=red!75!black,fonttitle=bfseries}
\begin{tcolorbox}[title=Transparent box,
  tikz={opacity=0.5,transparency group}]
  This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}

\begin{verbatim}
\tcbset{enhanced,colback=red!5!white,
  colframe=red!75!black,fonttitle=bfseries,
  fontupper=bfseries\huge,
  halign title=center,halign=center}
\begin{tcolorbox}[title=Rotated box,
  tikz={rotate=30}]
  Sold!
\end{tcolorbox}
\end{verbatim}

\begin{itemize}
\item \texttt{/tcb/tikz reset} \hfill (initially set)
\end{itemize}

Removes all options given by \texttt{/tcb/tikz}.

\begin{itemize}
\item \texttt{/tcb/at begin tikz=⟨tikz code⟩} \hfill (no default, initially empty)
\end{itemize}

The given \texttt{⟨tikz code⟩} is executed at the beginning of the \texttt{tikzpicture} environment after the TikZ option \texttt{execute at begin picture} was applied. If this option is applied a second time, the new \texttt{⟨tikz code⟩} is appended to the current code.

\begin{itemize}
\item \texttt{/tcb/at begin tikz reset} \hfill (initially set)
\end{itemize}

Removes all code given by \texttt{/tcb/at begin tikz}.

\begin{itemize}
\item \texttt{/tcb/at end tikz=⟨tikz code⟩} \hfill (no default, initially empty)
\end{itemize}

The given \texttt{⟨tikz code⟩} is executed at the ending of the \texttt{tikzpicture} environment before the TikZ option \texttt{execute at end picture} was applied. If this option is applied a second time, the new \texttt{⟨tikz code⟩} is appended to the current code.

\begin{itemize}
\item \texttt{/tcb/at end tikz reset} \hfill (initially set)
\end{itemize}

Removes all code given by \texttt{/tcb/at end tikz}.
/tcb/rotate={angle}  (no default, initially unset)
Rotates the tcolorbox by the given \( \langle \text{angle} \rangle \). Note that this is a \LaTeX\ coordinate transformation i.e. not all graphical elements like shadings will really be rotated.

\begin{tcolorbox}[title=Rotated box,rotate=30]
This is a tcolorbox.
\end{tcolorbox}

/tcb/scale={fraction}  (no default, initially unset)
Scales the tcolorbox by the given \( \langle \text{fraction} \rangle \). Note that this is a \LaTeX\ coordinate transformation i.e. not all graphical elements like line widths will really be scaled.

\begin{tcolorbox}[title=Scaled box,scale=0.5]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=Scaled box,scale=1.25]
This is a tcolorbox.
\end{tcolorbox}

/tcb/remember  (style, initially unset)
Shortcut for tikz={\texttt{remember picture}}. This allows one to reference nodes in other \LaTeX\ pictures.

\begin{tcolorbox}[enhanced,remember, colback=red!5!white, colframe=red!75!black, fonttitle=\textbfseries, title=The four corners of a paper, overlay={\draw[red!50!white,line width=1mm,opacity=0.5,shorten >=3mm] (frame.north west) edge[->] (current page.north west) (frame.north east) edge[->] (current page.north east) (frame.south west) edge[->] (current page.south west) (frame.south east) edge[->] (current page.south east);}]
This is a tcolorbox.
\end{tcolorbox}

The four corners of a paper
This is a tcolorbox.
The \texttt{frame} node will be remembered by the given \langle \textit{name} \rangle to be referenced in other \LaTeX\ pictures.

% \usepackage{lipsum}
\newtcolorbox{mybox}[1][\]{enhanced,colframe=blue!75!black,colback=blue!10!white,
fonttitle=\bfseries,#1}

\begin{mybox}[title=First Box,nobeforeafter,width=\linewidth/4,remember as=one]
This is a test.
\end{mybox}
\hfill
\begin{mybox}[title=Second Box,nobeforeafter,width=\linewidth/4,remember as=two]
This is a test.
\end{mybox}
\hfill
\begin{mybox}[title=Third Box,nobeforeafter,width=\linewidth/4,remember as=three]
This is a test.
\end{mybox}
\hfill
\begin{mybox}[title=Fourth Box,remember as=four]
This is a test.
\end{mybox}
\hfill
\begin{tikzpicture}[overlay,remember picture,line width=1mm,draw=red!75!black]
\draw[->] (one.east) to[bend right] node[above] {A} (two.west);
\draw[->] (two.east) to[bend left] node[above] {B} (three.west);
\draw[->] (three.east) to[bend left=90] node[right] {C} (four.east);
\draw[->] (four.west) to[bend left=90] node[left] {D} (one.west);
\end{tikzpicture}


Fourth Box
This is a test.
10.8 Underlay Option Keys

Underlays are quite similar to overlays described in Section 4.12 on page 73. Underlays are drawn after the frame and interior are drawn and before overlays and the text content is drawn; see Section 9.4 on page 144 for the general drawing scheme.

The differences between underlays and overlays are:

- Underlays are not applicable for the skins standard\(^P.207\) and standard jigsaw\(^P.208\), whereas overlays are applicable also for these skins. The skin spartan\(^P.250\) supports underlays but no overlays.

\begin{itemize}
  \item If an underlay is used with the standard\(^P.207\) skin, it is silently ignored.
  \item Underlays are stackable, i.e. several different underlays can be used on the same \texttt{tcolorbox}. Overlays are not stackable by default (but with some help of the library \texttt{LIB hooks}).
  \item Boxed titles are implemented with underlays (Section 10.2 on page 158), watermarks are implemented with overlays (Section 10.3 on page 168).
\end{itemize}

/tcb/underlay=⟨graphical code⟩ \hspace{1mm} (no default, initially unset)

Adds \langle graphical code \rangle to the box drawing process. This \langle graphical code \rangle is drawn after the frame and interior and before the text content.

\begin{verbatim}
\begin{mybox}[title=My box,watermark text=My Watermark]
\lipsum[2]
\end{mybox}
\end{verbatim}

My box

\texttt{\textcolor{yellow!50!white}{My Watermark}}

\texttt{\textcolor{yellow!50!white}{My Watermark}}

/tcb/no underlay \hspace{1mm} (style, no default, initially set)

Removes the underlay if set before.
If the box is set to be /tcb/breakable \textsuperscript{P.375} and is broken actually, then the \langle graphical code \rangle is added to the box drawing process. /tcb/underlay \textsuperscript{P.198} overwrites this key.

If the box is set to be /tcb/unbreakable \textsuperscript{P.376} but is not broken actually or if the box is set to be /tcb/unbreakable \textsuperscript{P.376}, then the \langle graphical code \rangle is added to the box drawing process. /tcb/underlay \textsuperscript{P.198} overwrites this key.

/tcb/no underlay unbroken (style, no default, initially set)
Removes the unbroken underlay if set before.

/tcb/underlay first=\langle graphical code \rangle (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.375} and is broken actually, then the \langle graphical code \rangle is added to the box drawing process for the first part of the break sequence. /tcb/underlay \textsuperscript{P.198} overwrites this key.

/tcb/no underlay first (style, no default, initially set)
Removes the first underlay if set before.

/tcb/underlay middle=\langle graphical code \rangle (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.375} and is broken actually, then the \langle graphical code \rangle is added to the box drawing process for the middle parts (if any) of the break sequence. /tcb/underlay \textsuperscript{P.198} overwrites this key.

/tcb/no underlay middle (style, no default, initially set)
Removes the middle underlay if set before.

/tcb/underlay last=\langle graphical code \rangle (no default, initially unset)
If the box is set to be /tcb/breakable \textsuperscript{P.375} and is broken actually, then the \langle graphical code \rangle is added to the box drawing process for the last part of the break sequence. /tcb/underlay \textsuperscript{P.198} overwrites this key.

/tcb/no underlay last (style, no default, initially set)
Removes the last underlay if set before.

/tcb/underlay boxed title=\langle graphical code \rangle (no default, initially unset)
If the box has a boxed title, see Section 10.2 on page 158, then the \langle graphical code \rangle is added to the box drawing process before the boxed title is drawn.

/tcb/no underlay boxed title (style, no default, initially set)
Removes the boxed title underlay if set before.

/tcb/underlay unbroken and first=\langle graphical code \rangle (no default, initially unset)
This is an abbreviation for setting /tcb/underlay unbroken and /tcb/underlay first together. /tcb/underlay \textsuperscript{P.198} overwrites this key.

/tcb/underlay middle and last=\langle graphical code \rangle (no default, initially unset)
This is an abbreviation for setting /tcb/underlay middle and /tcb/underlay last together. /tcb/underlay \textsuperscript{P.198} overwrites this key.

/tcb/underlay unbroken and last=\langle graphical code \rangle (no default, initially unset)
This is an abbreviation for setting /tcb/underlay unbroken and /tcb/underlay last together. /tcb/underlay \textsuperscript{P.198} overwrites this key.

/tcb/underlay first and middle=\langle graphical code \rangle (no default, initially unset)
This is an abbreviation for setting /tcb/underlay first and /tcb/underlay middle together. /tcb/underlay \textsuperscript{P.198} overwrites this key.
10.9 Finish Option Keys

Finishes are quite similar to underlays described in Section 10.8 on page 198 and overlays described in Section 4.12 on page 73. Finishes are drawn after the text content is drawn; see Section 9.4 on page 144 for the general drawing scheme. Therefore, a finish will reduce the readability of the text content.

Finishes are intended for special effects like highlights or glosses or text over text.

- Finishes are only applicable for the skins enhanced\footnote{P. 209}, empty\footnote{P. 240}, freelance\footnote{P. 253}, bicolor\footnote{P. 222}, beamer\footnote{P. 231}, and widget\footnote{P. 236}.

\begin{itemize}
  \item If a finish is used with the standard\footnote{P. 207} skin, it is silently ignored.
\end{itemize}

- Finishes are stackable, i.e. several different finishes can be used on the same \texttt{tcolorbox}.

\begin{itemize}
  \item /tcb/finish=⟨graphical code⟩ (no default, initially unset)
  \begin{itemize}
    \item Adds ⟨graphical code⟩ to the box drawing process. This ⟨graphical code⟩ is drawn after the text content.
  \end{itemize}
\end{itemize}

\begin{tcolorbox}[mybox][1][\{enhanced,colback=red!5!white,colbacktitle=red!85!black!50!white,colframe=red!75!black,fonttitle=\bfseries,finish={\begin{tcbclipframe}
\path[bottom color=black,top color=black!50!white,opacity=0.1]
(frame.south west) -- (frame.south east) -- (frame.north east) -- cycle;
\path[top color=white,bottom color=black!50!white,opacity=0.1]
(frame.south west) -- (frame.south east) -- (frame.north west) -- cycle;
\end{tcbclipframe}}\},#1]
\begin{mybox}[title=My box]
\lipsum[2]
\end{mybox}
\end{tcolorbox}

My box


\begin{tcolorbox}[mybox][1][\{enhanced,colback=red!5!white,colbacktitle=red!85!black!50!white,colframe=red!75!black,fonttitle=\bfseries,finish={\node[draw,fill=white,fill opacity=0.85,inner sep=5mm,rounded corners] at (frame.center) {\Huge\bfseries Finish!};},#1]
\begin{mybox}[title=My box]
\lipsum[2]
\end{mybox}
\end{tcolorbox}

My box

/tcb/no finish (style, no default, initially set)
Removes the finish if set before.

/tcb/finish broken=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \( \text{P.375} \) and is broken actually, then the \( \langle \text{graphical code} \rangle \) is added to the box drawing process. /tcb/finish \( \text{P.200} \) overwrites this key.

/tcb/finish unbroken=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \( \text{P.375} \) but is not broken actually or if the box is set to be /tcb/unbreakable \( \text{P.376} \), then the \( \langle \text{graphical code} \rangle \) is added to the box drawing process. /tcb/finish \( \text{P.200} \) overwrites this key.

/tcb/no finish unbroken (style, no default, initially set)
Removes the unbroken finish if set before.

/tcb/finish first=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \( \text{P.375} \) and is broken actually, then the \( \langle \text{graphical code} \rangle \) is added to the box drawing process for the first part of the break sequence. /tcb/finish \( \text{P.200} \) overwrites this key.

/tcb/no finish first (style, no default, initially set)
Removes the first finish if set before.

/tcb/finish middle=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \( \text{P.375} \) and is broken actually, then the \( \langle \text{graphical code} \rangle \) is added to the box drawing process for the middle parts (if any) of the break sequence. /tcb/finish \( \text{P.200} \) overwrites this key.

/tcb/no finish middle (style, no default, initially set)
Removes the middle finish if set before.

/tcb/finish last=(graphical code) (no default, initially unset)
If the box is set to be /tcb/breakable \( \text{P.375} \) and is broken actually, then the \( \langle \text{graphical code} \rangle \) is added to the box drawing process for the last part of the break sequence. /tcb/finish \( \text{P.200} \) overwrites this key.

/tcb/no finish last (style, no default, initially set)
Removes the last finish if set before.

/tcb/finish unbroken and first=(graphical code) (no default, initially unset)
This is an abbreviation for setting /tcb/finish unbroken and /tcb/finish first together. /tcb/finish \( \text{P.200} \) overwrites this key.

/tcb/finish middle and last=(graphical code) (no default, initially unset)
This is an abbreviation for setting /tcb/finish middle and /tcb/finish last together. /tcb/finish \( \text{P.200} \) overwrites this key.

/tcb/finish unbroken and last=(graphical code) (no default, initially unset)
This is an abbreviation for setting /tcb/finish unbroken and /tcb/finish last together. /tcb/finish \( \text{P.200} \) overwrites this key.

/tcb/finish first and middle=(graphical code) (no default, initially unset)
This is an abbreviation for setting /tcb/finish first and /tcb/finish middle together. /tcb/finish \( \text{P.200} \) overwrites this key.
10.10 Hyper Option Keys

All options of this section need the package `hyperref`\cite{hyperref} to be loaded separately. All these options are implemented as `/tcb/finish`\cite{tcb/finish} and can be disabled by `/tcb/no finish`\cite{tcb/no finish}.

If the package `hyperref`\cite{hyperref} is not loaded or if the `standard`\cite{tcb/standard} skin is used, all hyper option are silently ignored.

\texttt{/tcb/hyperref=⟨marker⟩} (no default, initially unset)

The whole \texttt{frame} of a \texttt{tcolorbox} is make an active hyperlink for a ⟨\texttt{marker}⟩ which was given by \texttt{\label} or `/tcb/label`\cite{tcb/label} or `/tcb/phantomlabel`\cite{tcb/phantomlabel}. Such, the \texttt{tcolorbox} is made a clickable button (depending on the previewer).

\texttt{/tcb/hyperref interior=⟨marker⟩} (no default, initially unset)

Identical to `/tcb/hyperref`, but only the \texttt{interior} of a \texttt{tcolorbox} is made a hyperlink (without frame and title).

\texttt{/tcb/hyperref title=⟨marker⟩} (no default, initially unset)

Identical to `/tcb/hyperref`, but only the \texttt{title} of a \texttt{tcolorbox} is made a hyperlink.

\texttt{/tcb/hyperref node={⟨marker⟩}){⟨node⟩}} (no default, initially unset)

Identical to `/tcb/hyperref`, but only the given TikZ ⟨\texttt{node}⟩ is made a hyperlink. This ⟨\texttt{node}⟩ may be \texttt{frame}, \texttt{interior}, \texttt{title}, or any other named node used for drawing the \texttt{tcolorbox}. The ⟨\texttt{node}⟩ may be defined inside `/tcb/underlay`\cite{tcb/underlay}, `/tcb/overlay`\cite{tcb/overlay} or `/tcb/finish`\cite{tcb/finish}. If the later is used, define the node before `/tcb/hyperref node` is applied.

\texttt{/tcb/hyperlink=⟨marker⟩} (no default, initially unset)

The whole \texttt{frame} of a \texttt{tcolorbox} is make an active hyperlink for a ⟨\texttt{marker}⟩ which was given by \texttt{\hypertarget} or `/tcb/hypertarget`\cite{tcb/hypertarget}. Such, the \texttt{tcolorbox} is made a clickable button (depending on the previewer).
Identical to /tcb/hyperlink \(^{P.202}\), but only the \textit{interior} of a \texttt{tcolorbox} is made a hyperlink (without frame and title).

Identical to /tcb/hyperlink \(^{P.202}\), but only the \textit{title} of a \texttt{tcolorbox} is made a hyperlink.

Identical to /tcb/hyperlink \(^{P.202}\), but only the given Ti\texttt{kZ} \langle node\rangle is made a hyperlink. This \langle node\rangle may be \texttt{frame}, \texttt{interior}, \texttt{title}, or any other named node used for drawing the \texttt{tcolorbox}. The \langle node\rangle may be defined inside /tcb/underlay \(^{P.198}\), /tcb/overlay \(^{P.73}\) or /tcb/finish \(^{P.200}\). If the later is used, define the node before /tcb/hyperlink node is applied.

The whole \texttt{frame} of a \texttt{tcolorbox} is make an active hyperlink for an \langle url\rangle in the same manner as using \href or \url. Such, the \texttt{tcolorbox} is made a clickable button (depending on the previewer).

\begin{tcolorbox}[enhanced,colback=red!50, hyperurl=http://www.ctan.org/pkg/tcolorbox]
View CTAN with a browser.
\end{tcolorbox}

Identical to /tcb/hyperurl, but only the \texttt{interior} of a \texttt{tcolorbox} is made a hyperlink (without frame and title).

Identical to /tcb/hyperurl, but only the \textit{title} of a \texttt{tcolorbox} is made a hyperlink.

Identical to /tcb/hyperurl, but only the given Ti\texttt{kZ} \langle node\rangle is made a hyperlink. This \langle node\rangle may be \texttt{frame}, \texttt{interior}, \texttt{title}, or any other named node used for drawing the \texttt{tcolorbox}. The \langle node\rangle may be defined inside /tcb/underlay \(^{P.198}\), /tcb/overlay \(^{P.73}\) or /tcb/finish \(^{P.200}\). If the later is used, define the node before /tcb/hyperlink node is applied.

Identical to /tcb/hyperurl, but additional \texttt{hyperref} \([15]\) \langle options\rangle are applied.

\begin{tcolorbox}[enhanced,colback=green!50, hyperurl*={page=3,pdfnewwindow=true} \% {tcolorbox-example.pdf}]
Open example file on Page 3.
\end{tcolorbox}

Identical to /tcb/hyperurl interior, but additional \texttt{hyperref} \([15]\) \langle options\rangle are applied.

Identical to /tcb/hyperurl title, but additional \texttt{hyperref} \([15]\) \langle options\rangle are applied.

Identical to /tcb/hyperurl node, but additional \texttt{hyperref} \([15]\) \langle options\rangle are applied.
10.11 Jigsaw Skin Variants

As described in Section 9.1 on page 136, a \texttt{tcolorbox} is drawn by up to four engines. Typically, the \textit{frame} engine fills the complete box area with color and the other engines fill certain areas with other colors. Finally, only the area which you see as \textit{frame} of the box will display the frame color. For most applications, this is a good approach.

For certain boxes, a more delicate procedure is needed. E.g., if the box should be translucent, an already painted area cannot be made unpainted. Therefore, more elaborate frame engines saw holes into the frame where the interior area and optionally the title area will be painted. The resulting skins are called jigsaw skins. For \texttt{standard} \footnote{P.207} and \texttt{enhanced} \footnote{P.209}, there are variants called \texttt{standard jigsaw} \footnote{P.208} and \texttt{enhanced jigsaw} \footnote{P.216}.

\begin{tikzpicture}
\path[use as bounding box] (0,0.8) rectangle +(0.1,0.1);
\shadedraw [shading=ball] (0,0) circle (1cm);
\shadedraw [ball color=red] (3,-2.2) circle (1cm);
\end{tikzpicture}

\begin{tcolorbox}[title=A normal box]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[title=A translucent jigsaw box, enhanced jigsaw,opacityback=0.35]
\lipsum[2]
\end{tcolorbox}
A normal box with hidden interior and title

This is a tcolorbox.

A jigsaw box with hidden interior and title

This is a tcolorbox.

\newtcolorbox{mybox}{
  skin=enhancedmiddle jigsaw,lefrule=5mm,rightrule=5mm,
  boxsep=0mm,top=0mm,bottom=0mm,
  frame style={top color=blue,bottom color=red},interior hidden}

\begin{mybox}
\lipsum[2]
\end{mybox}
10.12 Draft Mode

To reduce the compilation time while drafting a document, the draft mode can be applied. Basically, it changes all skins to spartan \(^{P.250}\) and sets the /tcb/fit algorithm \(^{P.429}\) to squeeze. Especially, when fuzzy shadows are used, the speedup will be considerable high.

It is strongly recommended that the draft mode is not used for the final document. Use spartan \(^{P.250}\) directly, if you want to stay with it. The draft mode implementation may change in future.

Normally, switching to the draft mode should not alter the geometry of your document. Since overlays are deactivated, any code placed there (e.g. counter changes) is not executed anymore! Also, \\texttt{tcb/remember as} \(^{P.197}\) will not have any effect. You may exclude critical code with \\texttt{tcbinterruptdraftmode} / \\texttt{tcbcontinuedraftmode} from converting to draft mode.

\texttt{tcbstartdraftmode}

Any following \texttt{tcolorbox} code is put into draft mode. All skin settings are overruled with spartan \(^{P.250}\). Overlays, watermarks, shadows, borderline, and rounded corners are deactivated for all \texttt{tcolorbox} layers.

\texttt{tcbstopdraftmode}

The draft mode is deactivated for the following code.

\texttt{tcbinterruptdraftmode}

If the compilation is in draft mode, the draft mode is deactivated until a following \texttt{tcbcontinuedraftmode} is detected.

If the compilation is not in draft mode, nothing happens and a following \texttt{tcbcontinuedraftmode} will not start the draft mode.

The pair \\texttt{tcbinterruptdraftmode} and \\texttt{tcbcontinuedraftmode} cannot be used nested.

\texttt{tcbcontinuedraftmode}

Continues the draft mode which was suspended by a preceding \texttt{tcbinterruptdraftmode}. Nothing happens, if there was no draft mode before \texttt{tcbinterruptdraftmode}.

Code, which is place between \\texttt{tcbinterruptdraftmode} and \\texttt{tcbcontinuedraftmode} is shielded from draft mode.

\texttt{tcb/draftmode=true|false} (default true, initially false)

If set to true, the draft mode is started. If set to false, the draft mode is stopped.

\begin{tcolorbox}[mybeamer][2][beamer, colback=Salmon!50!white, colframe=Firebrick!75!black, adjusted title={#2},#1]
This box looks like a box provided by the \texttt{beamer} class.
\end{tcolorbox}

\begin{tcolorbox}[mybeamer][draftmode][Beamer box]
This box looks like a box provided by the \texttt{beamer} class.
\end{tcolorbox}

\begin{tcolorbox}[mybeamer][draftmode][Beamer box]
This box looks like a box provided by the \texttt{beamer} class.
\end{tcolorbox}
10.13 Skin Family ’standard’

Note that the option keys /tcb/frame style\textsuperscript{P.151}, /tcb/interior style\textsuperscript{P.152}, /tcb/segmentation style\textsuperscript{P.154}, and /tcb/title style\textsuperscript{P.154} are not applicable to the standard skin. Also, watermarks (see Subsection 10.3) are not usable with the standard skin.

\textbf{/tcb/skin=standard} (skin)

This is the standard skin from the core package. All drawing engines are set to type \texttt{standard}. The drawing is based on \texttt{pgf} commands and does not need the \texttt{tikz} package.

\begin{center}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\end{center}

\begin{center}
\begin{tcolorbox}
This is my content.\tcblower
More content.
\end{tcolorbox}
\end{center}

\begin{center}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\end{center}

\begin{center}
\begin{tcolorbox}[adjusted title=My title]
This is my content.\tcblower
More content.
\end{tcolorbox}
\end{center}

\begin{center}
\begin{tcolorbox}[raster equal height,raster columns=4,colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen,left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcbraster}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
\end{center}

\textbf{Environment and engines for the skin ’standard’}

\begin{center}
\begin{tabular}{ll}
\texttt{/tcb/graphical environment=pgfpicture} & \textit{pgfpicture} \\
\texttt{/tcb/frame engine=standard} & \textit{standard} \\
\texttt{/tcb/interior titled engine=standard} & \textit{standard} \\
\texttt{/tcb/interior engine=standard} & \textit{standard} \\
\texttt{/tcb/segmentation engine=standard} & \textit{standard} \\
\texttt{/tcb/title engine=standard} & \textit{standard} \\
\end{tabular}
\end{center}

\textbf{/tcb/standard} (style, no value)

This is an abbreviation for setting \texttt{s}\texttt{kin=s}\texttt{tandard}. 

\begin{verbatim}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\end{verbatim}
This is the standard jigsaw skin from the core package. It differs from the skin `standard`\textsuperscript{P.207} by its frame engine, see Section 10.11 on page 204.

Environment and engines for the skin 'standard jigsaw'

/environment\textsuperscript{P.137}: pgfpicture
/frame engine\textsuperscript{P.137}: standardjigsaw
/interior titled engine\textsuperscript{P.137}: standard
/interior engine\textsuperscript{P.138}: standard
/segmentation engine\textsuperscript{P.138}: standard
/title engine\textsuperscript{P.138}: standard

This is an abbreviation for setting skin=standard jigsaw.

This is my content.
This is my content.
More content.
My title
This is my content.
More content.
This is my content.
More content.
If you like the standard appearance of a tcolorbox but you want to have some ‘enhanced’ features, the enhanced skin is what you are looking for.

\texttt{/tcb/skin=enhanced} (skin)

This skin translates the drawing commands of the core package into \texttt{tikz} path commands. Therefore, it allows all \texttt{tikz} high level options for these paths and has more flexibility compared to the \texttt{standard} \textsuperscript{P.207} skin. You pay for this with some prolonged compilation time. The \texttt{tikz} path options can be given with the option keys \texttt{/tcb/frame style} \textsuperscript{P.151}, \texttt{/tcb/interior style} \textsuperscript{P.152}, \texttt{/tcb/segmentation style} \textsuperscript{P.154}, and \texttt{/tcb/title style} \textsuperscript{P.154}.

\begin{tcbaster}{[enhanced,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbaster}

This is an abbreviation for setting \texttt{skin=enhanced}.
Nice box in rainbow colors

With the ‘enhanced’ skin, it is quite easy to produce fancy looking effects.

Note that this is still a \texttt{tcolorbox}.

A listing box with shadow and some specials

Of course, skins can be used for listings also.

\begin{equation}
\int_1^2 \frac{1}{x} \, dx = \ln(2).
\end{equation}
For unbreakable boxes, this is identical to using `/tcb/enhanced`. But, for breakable boxes, the break sequence is identical to the `standard` skin, see Section 18.8 from page 388.

This style relies on the skin `enhanced`. All drawing operations are hidden and all margins are set to 0pt. See `/tcb/blanker` for switching off the drawing engines.

```
\begin{tcolorbox}[blank,watermark text=A blank box]
\lipsum[1]
\end{tcolorbox}
```

\texttt{\textbackslash tcbline}

Sometimes, a line is only a line. With \texttt{\textbackslash tcblower}^{P.12} you separate the box content into two functional units. \texttt{\textbackslash tcbline} draws only a line which looks like the segmentation line between upper and lower part. Furthermore, you can use \texttt{\textbackslash tcbline} more than just once. \texttt{\textbackslash tcbline} always uses the \texttt{path} drawing engine. Therefore, the \texttt{/tcb/segmentation style}^{P.154} can be applied.

\begin{tcolorbox}[enhanced,colframe=blue!50!black,colback=white]
\lipsum[1]
\lipsum[2]
\lipsum[3]
\lipsum[4]
\end{tcolorbox}


\texttt{\textbackslash tcbline*}

Equivalent to \texttt{\textbackslash tcbline}, but in a breakable box, \texttt{\textbackslash tcbline*} is removed if at a page/box break. Also, it is removed at the end of a box.
This is a flavor of enhanced P.209 which is used as a first part in a break sequence for enhanced P.209. Nevertheless, this skin can be applied independently.

Environment and engines for the skin `enhancedfirst`

- `/tcb/graphical environment` P.137: tikzpicture
- `/tcb/frame engine` P.137: pathfirst
- `/tcb/interior titled engine` P.137: pathfirst
- `/tcb/interior engine` P.138: pathfirst
- `/tcb/segmentation engine` P.138: path
- `/tcb/title engine` P.138: pathfirst

\begin{tcbraster}[skin=enhancedfirst,raster equal height,raster columns=4,  colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen,  left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of enhanced\textsuperscript{P.209} which is used as a \textit{middle} part in a break sequence for enhanced\textsuperscript{P.209}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin ‘enhancedmiddle’

- `/tcb/graphical environment\textsuperscript{P.137}`: tikzpicture
- `/tcb/frame engine\textsuperscript{P.137}`: pathmiddle
- `/tcb/interior titled engine\textsuperscript{P.137}`: pathmiddle
- `/tcb/interior engine\textsuperscript{P.138}`: pathmiddle
- `/tcb/segmentation engine\textsuperscript{P.138}`: path
- `/tcb/title engine\textsuperscript{P.138}`: pathmiddle

```latex
\begin{tcbraster}[skin=enhancedmiddle,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
```
This is a flavor of enhanced which is used as a last part in a break sequence for enhanced. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'enhancedlast'

<table>
<thead>
<tr>
<th>Environment/Engine</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>P.137</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>P.137</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>P.137</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>P.138</td>
</tr>
<tr>
<td>/tcb/segregation engine</td>
<td>P.138</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>P.138</td>
</tr>
</tbody>
</table>

\begin{tcbraster}[skin=enhancedlast,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblocator
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblocator
More content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\end{tcbraster}
This is the jigsaw variant of skin enhanced\textsuperscript{P.209}. It differs by its frame engine, see Section 10.11 on page 204.

Environment and engines for the skin 'enhanced jigsaw'

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphical Environment</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>Frame Engine</td>
<td>pathjigsaw</td>
</tr>
<tr>
<td>Interior Titled Engine</td>
<td>pathjigsaw</td>
</tr>
<tr>
<td>Interior Engine</td>
<td>path</td>
</tr>
<tr>
<td>Segmentation Engine</td>
<td>path</td>
</tr>
<tr>
<td>Title Engine</td>
<td>path</td>
</tr>
</tbody>
</table>

This is an abbreviation for setting skin=enhanced jigsaw.

\begin{tcbraster}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}

For unbreakable boxes, this is identical to using /tcb/enhanced jigsaw. But, for breakable boxes, the break sequence is identical to the standard jigsaw\textsuperscript{P.208} skin, see Section 18.8 from page 388.
This is the jigsaw variant of skin `enhancedfirst` \(^{\text{P.213}}\). It differs by its frame engine, see Section 10.11 on page 204.

<table>
<thead>
<tr>
<th>Environment and engines for the skin 'enhancedfirst jigsaw'</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/tcb/graphical environment</code> (^{\text{P.137}}): tikzpicture</td>
</tr>
<tr>
<td><code>/tcb/frame engine</code> (^{\text{P.137}}): pathfirstjigsaw</td>
</tr>
<tr>
<td><code>/tcb/interior titled engine</code> (^{\text{P.137}}): pathfirst</td>
</tr>
<tr>
<td><code>/tcb/interior engine</code> (^{\text{P.138}}): pathfirst</td>
</tr>
<tr>
<td><code>/tcb/segmentation engine</code> (^{\text{P.138}}): path</td>
</tr>
<tr>
<td><code>/tcb/title engine</code> (^{\text{P.138}}): pathfirst</td>
</tr>
</tbody>
</table>

\begin{tcbraster}
\[\text{skin=enhancedfirst jigsaw, raster equal height, raster columns=4,}
\text{colback=LightGreen, colframe=DarkGreen, colbacktitle=LimeGreen!75!DarkGreen,}
\text{opacityframe=0.5, opacityback=0.5, opacitybacktitle=0.5,}
\text{left=1mm, right=1mm, top=1mm, bottom=1mm, middle=1mm}\]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This is the jigsaw variant of skin enhancedmiddle\footnote{P.214}. It differs by its frame engine, see Section 10.11 on page 204.

### Environment and engines for the skin 'enhancedmiddle jigsaw'

- `/tcb/graphical environment`\footnote{P.137}: tikzpicture
- `/tcb/frame engine`\footnote{P.137}: pathmiddlejigsaw
- `/tcb/interior titled engine`\footnote{P.137}: pathmiddle
- `/tcb/interior engine`\footnote{P.138}: pathmiddle
- `/tcb/segmentation engine`\footnote{P.138}: path
- `/tcb/title engine`\footnote{P.138}: pathmiddle

This is my content.

\begin{tcbraster}
  \begin{tcolorbox}
    This is my content.
  \end{tcolorbox}
  \begin{tcolorbox}
    This is my content.
  \end{tcolorbox}
  \begin{tcolorbox}[adjusted title=My title]
    This is my content.
  \end{tcolorbox}
  \begin{tcolorbox}[adjusted title=My title]
    This is my content.
  \end{tcolorbox}
\end{tcbraster}

This styles relies on the skin enhancedmiddle jigsaw. It is intended to be used as an optical marker like a highlighter pen.

\begin{tcolorbox}[marker]
\lipsum[2]
\end{tcolorbox}


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This examples demonstrates the creation of several text marker environments based on `enhancedmiddle`.¹

\tcbset{textmarker/.style={%
  skin=enhancedmiddle jigsaw,breakable,parbox=false,
  boxrule=0mm,lefterule=5mm,rightrule=5mm,boxsep=0mm,arc=0mm,
  left=3mm,right=3mm,top=1mm,bottom=1mm,toptitle=1mm,bottomtitle=1mm,oversize}}

\newtcolorbox{yellow}{textmarker,colback=yellow!5!white,colframe=yellow}
\newtcolorbox{orange}{textmarker,colback=DarkOrange!5!white
  colframe=DarkOrange!75!yellow}
\newtcolorbox{red}{textmarker,colback=red!5!white,colframe=red}
\newtcolorbox{green}{textmarker,colback=DeepSkyBlue!5!white,colframe=DeepSkyBlue}
\newtcolorbox{rainbow}{textmarker,interior hidden,
  frame style={top color=blue,bottom color=red,middle color=green}}

\begin{yellow}
  \lipsum[1-3]
\end{yellow}
\begin{orange}
  \lipsum[4]
\end{orange}
\begin{red}
  \lipsum[5]
\end{red}
\begin{green}
  \lipsum[6]
\end{green}
\begin{blue}
  \lipsum[7]
\end{blue}
\begin{rainbow}
  \lipsum[8]
\end{rainbow}


Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique,

This is the jigsaw variant of skin `enhancedlast`. It differs by its frame engine, see Section 10.11 on page 204.

### Environment and engines for the skin 'enhancedlast'

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/tcb/graphical environment</code></td>
<td>P.137</td>
</tr>
<tr>
<td><code>/tcb/frame engine</code></td>
<td>P.137</td>
</tr>
<tr>
<td><code>/tcb/interior titled engine</code></td>
<td>P.137</td>
</tr>
<tr>
<td><code>/tcb/interior engine</code></td>
<td>P.138</td>
</tr>
<tr>
<td><code>/tcb/segmentation engine</code></td>
<td>P.138</td>
</tr>
<tr>
<td><code>/tcb/title engine</code></td>
<td>P.138</td>
</tr>
</tbody>
</table>

\begin{tcbraster}[skin=enhancedlast jigsaw,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacktitle=LimeGreen!75!DarkGreen, opacityframe=0.5,opacityback=0.5,opacitybacktitle=0.5, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
10.15 Skin Family 'bicolor'

This skin is quite similar to the standard\textsuperscript{P.207} and enhanced\textsuperscript{P.209} skin. But instead of a segmentation line, the optional lower part of the box is filled with a different color or drawn with a different style.

Environment and engines for the skin 'bicolor'

- The most basic usage of this skin is to set the background color of the lower part by \tcb/colbacklower\textsuperscript{P.223} and all other options like for the standard\textsuperscript{P.207} skin.

\begin{tcolorbox}[skin=bicolor,title=The title, colframe=FireBrick!75!black,colback=Salmon!50!white,colbacklower=Salmon]
\tcblower 
\end{tcolorbox}

- The more advanced usage of this skin is to apply the \tcb/frame style\textsuperscript{P.151} and the \tcb/interior style\textsuperscript{P.152} like for the enhanced\textsuperscript{P.209} skin. Also, the \tcb/segmentation style\textsuperscript{P.154} can be used, but it is applied to the whole lower part.

\begin{tcolorbox}[skin=bicolor,title=The title, frame style={top color=FireBrick, bottom color=FireBrick!15!white,draw=black}, interior style={left color=Salmon,right color=Salmon!50!white}, segmentation style={right color=Salmon,left color=Salmon!50!white}]
\tcblower 
\end{tcolorbox}

\tcb/bicolor

This is an abbreviation for setting skin=bicolor.
This is my content.
This is my content.
This is my content.
More content.

This is my content.
This is my content.
My title
This is my content.
My title
This is my content.

This is my content.
This is my content.
This is my content.
More content.

\begin{tcblisting}{title={Snapshot of the staging area},
gitexample={The option \texttt{-a} automatically stages all tracked and modified files before the commit.\par
This can be combined with the message option \texttt{-m} as seen in the third line.})
git commit
git commit -a
git commit -am 'changes to my example'
\end{tcblisting}

Snapshot of the staging area

The option \texttt{-a} automatically stages all tracked and modified files before the commit.
This can be combined with the message option \texttt{-m} as seen in the third line.
This is a flavor of `bicolor` \(^{P.222}\) which is used as a *first* part in a break sequence for `bicolor` \(^{P.222}\). Nevertheless, this skin can be applied independently.

### Environment and engines for the skin ‘bicolorfirst’

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>\texttt{tikzpicture}</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>\texttt{pathfirst}</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>\texttt{special}</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>\texttt{pathfirst}</td>
</tr>
</tbody>
</table>

\begin{tcbraster}[skin=bicolorfirst,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen, colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm] \begin{tcolorbox}
This is my content. \end{tcolorbox} \begin{tcolorbox}
This is my content. \end{tcolorbox} \begin{tcolorbox}[adjusted title=My title]
This is my content. \end{tcolorbox} \begin{tcolorbox}[adjusted title=My title]
This is my content. \end{tcolorbox} \end{tcbraster}
This is a flavor of bicolor[^P.222] which is used as a *middle* part in a break sequence for bicolor[^P.222]. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin 'bicolormiddle'

<table>
<thead>
<tr>
<th>Environment/Engine</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>pathmiddle</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>pathmiddle</td>
</tr>
</tbody>
</table>

[^P.222]: Page 222

\begin{tcbraster}[skin=bicolormiddle,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen, colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of \texttt{bicolor}\textsuperscript{P.222} which is used as a \textit{last} part in a break sequence for \texttt{bicolor}\textsuperscript{P.222}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin \texttt{bicolorlast}'

- \texttt{/tcb/graphical environment}\textsuperscript{P.137}: \texttt{tikzpicture}
- \texttt{/tcb/frame engine}\textsuperscript{P.137}: \texttt{pathlast}
- \texttt{/tcb/interior titled engine}\textsuperscript{P.137}: \texttt{special}
- \texttt{/tcb/interior engine}\textsuperscript{P.138}: \texttt{special}
- \texttt{/tcb/segmentation engine}\textsuperscript{P.138}: \texttt{special}
- \texttt{/tcb/title engine}\textsuperscript{P.138}: \texttt{pathlast}

\begin{tcbraster}
\begin{tcolorbox}[skin=bicolorlast,raster equal height,raster columns=4,
colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,
colbacktitle=LimeGreen!75!DarkGreen,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}

\begin{tcbraster}
This is my content.  
This is my content.  
My title  
My title
\end{tcbraster}

\begin{tcbraster}
More content.  
This is my content.  
This is my content.  
More content.
\end{tcbraster}
10.16 Skin Family 'tile'

This skin is a variant of skin bicolor\textsuperscript{P.222}. Especially, the optional lower part of the box is colored by /tcb/colbacklower\textsuperscript{P.223}. The main difference to bicolor\textsuperscript{P.222} is that tile has no frame.

**Environment and engines for the skin 'tile'**

- /tcb/graphical environment\textsuperscript{P.137}: tikzpicture
- /tcb/frame engine\textsuperscript{P.137}: empty
- /tcb/interior titled engine\textsuperscript{P.137}: special
- /tcb/interior engine\textsuperscript{P.138}: special
- /tcb/segmentation engine\textsuperscript{P.138}: special
- /tcb/title engine\textsuperscript{P.138}: path

This is an abbreviation for setting skin=tile.

It also changes the geometry and some style options.

\begin{tcbraster}[tile,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen, colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\tcblower
More content.
\end{tcbraster}
\begin{tcbraster}[tile,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen, colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\tcblower
More content.
\end{tcbraster}
This is a flavor of tile which is used as a first part in a break sequence for tile. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin `tilefirst`

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Engine Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphical environment</td>
<td><code>tikzpicture</code></td>
</tr>
<tr>
<td>Frame engine</td>
<td><code>empty</code></td>
</tr>
<tr>
<td>Interior titled engine</td>
<td><code>special</code></td>
</tr>
<tr>
<td>Interior engine</td>
<td><code>special</code></td>
</tr>
<tr>
<td>Segmentation engine</td>
<td><code>special</code></td>
</tr>
<tr>
<td>Title engine</td>
<td><code>pathfirst</code></td>
</tr>
</tbody>
</table>

```latex
\begin{tcbbraster}
\begin{tcolorbox}[skin=tilefirst,raster equal height,raster columns=4,
  colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,
  colbacktitle=LimeGreen!75!DarkGreen,
  left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm,boxrule=0pt]
  \begin{tcolorbox}
    This is my content.
  \end{tcolorbox}
  \begin{tcolorbox}
    This is my content.
  \end{tcolorbox}
  \begin{tcolorbox}[adjusted title=My title]
    This is my content.
  \end{tcolorbox}
  \begin{tcolorbox}[adjusted title=My title]
    This is my content.
  \end{tcolorbox}
\end{tcolorbox}
\end{tcbbraster}
```
This is a flavor of tile \(^{\text{P.227}}\) which is used as a middle part in a break sequence for tile \(^{\text{P.227}}\). Nevertheless, this skin can be applied independently.

Environment and engines for the skin ‘tilemiddle’

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment (^{\text{P.137}})</td>
<td>tikzpicture</td>
</tr>
<tr>
<td>/tcb/frame engine (^{\text{P.137}})</td>
<td>empty</td>
</tr>
<tr>
<td>/tcb/interior titled engine (^{\text{P.137}})</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/interior engine (^{\text{P.138}})</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/segmentation engine (^{\text{P.138}})</td>
<td>special</td>
</tr>
<tr>
<td>/tcb/title engine (^{\text{P.138}})</td>
<td>pathmiddle</td>
</tr>
</tbody>
</table>

\begin{tcbraster}[skin=tilemiddle,raster equal height,raster columns=4,colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,colbacktitle=LimeGreen!75!DarkGreen,left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm,boxrule=0pt]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of \textit{tile} \textsuperscript{P.227} which is used as a \textit{last} part in a break sequence for \textit{tile} \textsuperscript{P.227}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin `tilelast`

<table>
<thead>
<tr>
<th>Environment/Engine</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tcb/graphical environment</td>
<td>P.137</td>
</tr>
<tr>
<td>/tcb/frame engine</td>
<td>P.137</td>
</tr>
<tr>
<td>/tcb/interior titled engine</td>
<td>P.137</td>
</tr>
<tr>
<td>/tcb/interior engine</td>
<td>P.138</td>
</tr>
<tr>
<td>/tcb/segmentation engine</td>
<td>P.138</td>
</tr>
<tr>
<td>/tcb/title engine</td>
<td>P.138</td>
</tr>
</tbody>
</table>

\begin{tcbraster}
\begin{tcolorbox}[skin=tilelast,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen, colbacktitle=LimeGreen!75!DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm,boxrule=0pt]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\end{tcbraster}
10.17 Skin Family 'beamer'

This skin resembles boxes known from the `beamer` class and therefore is called 'beamer'. It uses the normal colors from the core package but shades them a little bit. To use this skin, the `tikz` library `shadings` has to be included in the preamble by:

\usetikzlibrary{shadings}

Environment and engines for the skin 'beamer'

```
/tcb/graphical environment P.137: tikzpicture
/tcb/frame engine P.137: path
/tcb/interior titled engine P.137: special
/tcb/interior engine P.138: special
/tcb/segmentation engine P.138: special
/tcb/title engine P.138: path
```

This is an abbreviation for setting `skin=beamer`.

It also changes the geometry and some style options.

\begin{tcbraster}
\begin{tcolorbox}[beamer,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}

This is my content.

My title

My title

This is my content.

My title

This is my content.
A colored box with the 'beamer' skin

This box looks like a box provided by the beamer class.

Beamer Box with background picture


Beamerish block: myblock

This is a flavor of \texttt{beamer} which is used as a \textit{first} part in a break sequence for \texttt{beamer}. Nevertheless, this skin can be applied independently.

\begin{tcbraster}[beamer, skin=beamerfirst, raster equal height, raster columns=4, colback=LightGreen, colframe=DarkGreen, left=1mm, right=1mm, top=1mm, bottom=1mm, middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of \texttt{beamer} which is used as a \textit{middle} part in a break sequence for \texttt{beamer}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin `\texttt{beamermiddle}`

\begin{tcbraster}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
This is a flavor of \texttt{beamer} \textsuperscript{P.231} which is used as a last part in a break sequence for \texttt{beamer} \textsuperscript{P.231}. Nevertheless, this skin can be applied independently.

\begin{tcbraster}
\[\texttt{beamer,skin=beamerlast,raster equal height,raster columns=4,}
\texttt{colback=LightGreen,colframe=DarkGreen,}
\texttt{left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}\\
\texttt{\begin{tcolorbox}}\\
\texttt{This is my content.}\\
\texttt{\end{tcolorbox}}\\
\texttt{\begin{tcolorbox}}\\
\texttt{This is my content.}\\
\texttt{\tcblower}\\
\texttt{More content.}\\
\texttt{\end{tcolorbox}}\\
\texttt{\begin{tcolorbox}[adjusted title=My title]}\\
\texttt{This is my content.}\\
\texttt{\end{tcolorbox}}\\
\texttt{\begin{tcolorbox}[adjusted title=My title]}\\
\texttt{This is my content.}\\
\texttt{\tcblower}\\
\texttt{More content.}\\
\texttt{\end{tcolorbox}}\\
\texttt{\end{tcbraster}}
10.18 Skin Family ‘widget’

\texttt{/tcb/skin=widget} \hspace{1cm} \text{(skin)}

This skin uses the normal colors from the core package but shades them a little bit. To use this skin, the \texttt{tikz} library \texttt{shadings} has to be included in the preamble by:

\begin{verbatim}
\usetikzlibrary{shadings}
\end{verbatim}

The appearance of the skin can be controlled by \texttt{/tcb/frame style} \textsuperscript{P.151}, \texttt{/tcb/interior style} \textsuperscript{P.152}, and \texttt{/tcb/segmentation style} \textsuperscript{P.154}, if needed.

Environment and engines for the skin ‘widget’

\begin{verbatim}
\texttt{/tcb/graphical environment} \textsuperscript{P.137}: \texttt{tikzpicture}
\texttt{/tcb/frame engine} \textsuperscript{P.137}: \texttt{path}
\texttt{/tcb/interior titled engine} \textsuperscript{P.137}: \texttt{path}
\texttt{/tcb/interior engine} \textsuperscript{P.138}: \texttt{path}
\texttt{/tcb/segmentation engine} \textsuperscript{P.138}: \texttt{special}
\texttt{/tcb/title engine} \textsuperscript{P.138}: \texttt{special}
\end{verbatim}

\texttt{/tcb/widget} \hspace{1cm} \text{(style, no value)}

This is an abbreviation for setting \texttt{skin=widget}.

\begin{verbatim}
\begin{tcbraster}[widget,raster equal height,raster columns=4,  colback=LightGreen,colframe=DarkGreen,  left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}
\end{verbatim}

\begin{verbatim}
\begin{tcbraster}
This is my content. This is my content. My title This is my content.
\hline
More content. This is my content. My title This is my content.
\hline
\end{tcbraster}
\end{verbatim}

It also changes the geometry and some style options.
This is my content.

\texttt{tcbraster}\{widget,skin=widgetfirst,raster equal height,raster columns=4, colback=LightGreen,colframe=DarkGreen, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm\}
\begin{tcbraster}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}

\texttt{tcbraster}
This is a flavor of \texttt{widget} which is used as a \textit{middle} part in a break sequence for \texttt{widget}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin \texttt{widgetmiddle}

- \texttt{/tcb/graphical environment}: \texttt{tikzpicture}
- \texttt{/tcb/frame engine}: \texttt{pathmiddle}
- \texttt{/tcb/interior titled engine}: \texttt{pathmiddle}
- \texttt{/tcb/interior engine}: \texttt{pathmiddle}
- \texttt{/tcb/segmentation engine}: \texttt{special}
- \texttt{/tcb/title engine}: \texttt{special}

\begin{tcbraster}
\setkeys{tcb}{skin=widgetmiddle, raster equal height, raster columns=4, colback=LightGreen, colframe=DarkGreen, left=1mm, right=1mm, top=1mm, bottom=1mm, middle=1mm}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcb{
More content.
\}
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcb{
More content.
\}
\end{tcolorbox}
\end{tcbraster}
This is a flavor of \texttt{widget}\textsuperscript{P.236} which is used as a \textit{last} part in a break sequence for \texttt{widget}\textsuperscript{P.236}. Nevertheless, this skin can be applied independently.

\begin{tcbraster}
\tcbrasteritem[this=widgetlast,raster equal height,raster columns=4,\]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\texttt{tcblower} More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\texttt{tcblower} More content.
\end{tcolorbox}
\end{tcbraster}

\begin{verbatim}
\begin{tcbarray}[widget,skin=widgetlast,raster equal height,raster columns=4,\]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\texttt{tcblower} More content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\texttt{tcblower} More content.
\end{tcolorbox}
\end{tcbarray}
\end{verbatim}

\begin{verbatim}
\begin{tcbraster}
\tcbrasteritem[\begin{tcolorbox} This is my content. \end{tcolorbox} \begin{tcolorbox} This is my content. \texttt{tcblower} More content. \end{tcolorbox} \begin{tcolorbox}[adjusted title=My title] This is my content. \end{tcolorbox} \begin{tcolorbox}[adjusted title=My title] This is my content. \texttt{tcblower} More content. \end{tcolorbox} \end{tcbraster}
\end{verbatim}
10.19 Skin Family ‘empty’

/\texttt{tcb/skin=empty} \\
This skin sets all engines to empty, i.e. nothing is drawn at all. Therefore, this skin is a good starting point to create a complete new style by yourself.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|}
\hline
Environment and engines for the skin ’empty’ & \hline
/\texttt{tcb/graphical environment} & \texttt{tikzpicture} \footnote{P.137} \\
/\texttt{tcb/frame engine} & \texttt{empty} \footnote{P.137} \\
/\texttt{tcb/interior titled engine} & \texttt{empty} \footnote{P.137} \\
/\texttt{tcb/interior engine} & \texttt{empty} \footnote{P.138} \\
/\texttt{tcb/segmentation engine} & \texttt{empty} \footnote{P.138} \\
/\texttt{tcb/title engine} & \texttt{empty} \footnote{P.138} \\
\hline
\end{tabular}
\end{table}

/\texttt{tcb/empty} \\
This is an abbreviation for setting \texttt{skin=empty}.

\begin{tcbbraster}[empty,raster equal height,raster columns=4, coltitle=Navy,borderline={2pt}{0pt}{black!10!white}, left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tclower}
More content.
\end{tclower}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tclower}
More content.
\end{tclower}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tclower}
More content.
\end{tclower}
\end{tcbbraster}
This style relies on the skin empty. All engines are set to empty and all margins are set to 0pt. In contrast to /tcb/blanker, the graphical paths are not constructed with exception of the geometry nodes.

\begin{tcolorbox}[blanker,watermark text=A blank box]
\lipsum[1]
\end{tcolorbox}


% \tcbuselibrary{fitting}
\newtcbboxfit{mybox}{\begin{tcolorbox}[blanker,width=4cm,height=7cm,top=0pt,watermark text=#1]}\end{tcolorbox}}
\begin{tabular}{|c|c|c|}
\hline
\mybox{A}{\lipsum[1]} & \mybox{B}{\lipsum[2]} & \mybox{C}{\lipsum[3]}\
\hline
\end{tabular}

A & B & C

A

\begin{tabular}{|c|c|c|}
\hline
\lipsum[1] & \lipsum[2] & \lipsum[3]\
\hline
\end{tabular}

B

C

This style extends /tcb/blanker to allow all engines to be empty and all margins to be set to 0 pt. In contrast to /tcb/blanker, also title, shadow, underlay, overlay, finish and borderline are removed.

% 	cbuselibrary{raster}
\begin{tcbraster}[raster columns=3,raster equal height, 
title=Box \thetcbrasternum,,
enhanced,size=small,colframe=red!50!black,colback=red!10!white, 
coltitle=yellow!85!black, 
drop fuzzy shadow,watermark text={Box \thetcbrasternum}, 
borderline={.25mm}{-0.5mm}{green!40!black}, 
finish={\begin{tcbclipframe}\draw[blue,opacity=0.1,line width=1cm] (frame.south west) -- (frame.north east);\end{tcbclipframe}}, 
] 
\begin{tcolorbox}\lipsum[4]\end{tcolorbox} 
\begin{tcolorbox}[blanker]\lipsum[4]\end{tcolorbox} 
\begin{tcolorbox}[blankest]\lipsum[4]\end{tcolorbox} 
\end{tcbraster}

Box 1

Box 2
This is a flavor of `empty` which is used as a *first* part in a break sequence for `empty`. Nevertheless, this skin can be applied independently.

**Environment and engines for the skin 'emptyfirst'**

<table>
<thead>
<tr>
<th>Environment/Engine</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>tcb/graphical environment</code></td>
<td><code>tikzpicture</code></td>
</tr>
<tr>
<td><code>tcb/frame engine</code></td>
<td><code>empty</code></td>
</tr>
<tr>
<td><code>tcb/interior titled engine</code></td>
<td><code>empty</code></td>
</tr>
<tr>
<td><code>tcb/interior engine</code></td>
<td><code>empty</code></td>
</tr>
<tr>
<td><code>tcb/segmentation engine</code></td>
<td><code>empty</code></td>
</tr>
<tr>
<td><code>tcb/title engine</code></td>
<td><code>empty</code></td>
</tr>
</tbody>
</table>

```latex
\begin{tcbraster}[empty,skin=emptyfirst,raster equal height, raster columns=4, 
coltitle=Navy, borderline={2pt}{0pt}{black!10!white}, 
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm]
\begin{tcolorbox} 
This is my content. 
\end{tcolorbox}
\begin{tcolorbox}
This is my content. 
\tcblower
More content. 
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content. 
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content. 
\tcblower
More content. 
\end{tcolorbox}
\end{tcbraster}
```

This is my content. This is my content. More content. My title This is my content. My title This is my content. More content.
This is a flavor of empty \(^{P.240}\) which is used as a middle part in a break sequence for empty \(^{P.240}\). Nevertheless, this skin can be applied independently.

### Environment and engines for the skin 'emptymiddle'

- **/tcb/graphical environment \(^{P.137}\):** \texttt{tikzpicture}
- **/tcb/frame engine \(^{P.137}\):** \texttt{empty}
- **/tcb/interior titled engine \(^{P.137}\):** \texttt{empty}
- **/tcb/interior engine \(^{P.138}\):** \texttt{empty}
- **/tcb/segmentation engine \(^{P.138}\):** \texttt{empty}
- **/tcb/title engine \(^{P.138}\):** \texttt{empty}

\begin{tcbraster}{empty,skin=emptymiddle,raster equal height,raster columns=4,coltitle=Navy,borderline={2pt}{0pt}{black!10!white},left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster}

This is my content. This is my content. My title This is my content. My title

This is a flavor of empty\textsuperscript{P.240} which is used as a last part in a break sequence for empty\textsuperscript{P.240}. Nevertheless, this skin can be applied independently.

### Environment and engines for the skin ‘emptylast’

- `/tcb/graphical environment`\textsuperscript{P.137}: `tikzpicture`
- `/tcb/frame engine`\textsuperscript{P.137}: `empty`
- `/tcb/interior titled engine`\textsuperscript{P.137}: `empty`
- `/tcb/interior engine`\textsuperscript{P.138}: `empty`
- `/tcb/segmentation engine`\textsuperscript{P.138}: `empty`
- `/tcb/title engine`\textsuperscript{P.138}: `empty`
This example demonstrates a breakable customized box. Here, we define an environment `freebox`. The first application of `freebox` produces an unbroken `tcolorbox`. The box is drawn by the code given by `/tcb/frame code` and `/tcb/interior code`.

The second application of `freebox` is broken into several parts which are drawn by the codes given by `/tcb/skin first is subskin of`, `/tcb/skin middle is subskin of`, and `/tcb/skin last is subskin of`.

% Preamble:
%\usepackage{tikz,lipsum}
%\tcbuselibrary{skins,breakable}
\tikzset{coltria/.style={fill=red!15!white}}
\newtcolorbox{freebox}[1][]{empty,breakable,leftrule=5mm,left=2mm, frame style={fill,top color=red!75!black,bottom color=red!75!black,middle color=red}, colback=yellow!50!white, watermark color=red!50!yellow!75!white, watermark text on=unbroken is unbroken box, watermark text on=first is first part, watermark text on=middle is middle part, watermark text on=last is last part,}
% code for unbroken boxes:
frame code={\path[\tcb fill frame] (\text south west)--(\text north west) --\text--(\text north east)--(\text south east)--cycle; },
interior code={\path[\tcb fill interior] (\text south west)--(\text north west)--\text north east--\text south east--cycle; },
% code for the first part of a break sequence:
\% skin first is subskin of={emptyfirst}{
\% frame code={\path[\tcb fill frame] (\text south west)--(\text north west) --\text--(\text north east)--(\text south east)--cycle; },
\path[coltria] (\text south west) -- +(120:2mm) -- +(300:2mm) -- cycle; },
interior code={\path[\tcb fill interior] (\text south west)--(\text north west)--\text south east--cycle; },
\% code for the middle part of a break sequence:
\% skin middle is subskin of={emptymiddle}{
\% frame code={\path[\tcb fill frame] (\text south west)--(\text north west) --\text--(\text north east)--(\text south east)--cycle; },
\path[coltria] \text south west -- +(240:2mm) -- +(300:2mm) -- cycle; },
\% code for the last part of a break sequence:
\% skin last is subskin of={emptylast}{
\% frame code={\path[\tcb fill frame] (\text south west)--(\text north west) --\text--(\text north east)--(\text south east)--cycle; },
\path[coltria] \text south west -- +(240:2mm) -- +(300:2mm) -- cycle; },
\}


10.20 Skin 'spartan'

This skin is quite ... spartan. It supports no rounded corners, no overlays, no shadows, no borderlines, and no finishes. The only exception are underlays. One cannot do very fancy things with this skin, but it compiles very fast. Therefore, the spartan skin is used for the draft mode, see Section 10.12 on page 206. Nevertheless, it can be used as a normal skin.

Environment and engines for the skin 'spartan'

- `/tcb/graphical environment`: tikzpicture
- `/tcb/frame engine`: spartan
- `/tcb/interior titled engine`: spartan
- `/tcb/interior engine`: spartan
- `/tcb/segmentation engine`: spartan
- `/tcb/title engine`: spartan

This is an abbreviation for setting `skin=spartan`.
10.21 Skin 'draft'

\begin{tcbraster}[draft, raster equal height, raster columns=4, colback=LightGreen, colframe=DarkGreen, colbacktitle=LimeGreen!75!DarkGreen, left=1mm, right=1mm, top=1mm, bottom=1mm, middle=1mm]
\begin{tcolorbox}
This is my content.
\end{tcolorbox}
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
\end{tcbraster

This skin family 'freelance' is deprecated with \texttt{tcolorbox} 3.00. It is not longer needed, because \texttt{/tcb/frame code} \texttt{\textasciitilde P.140}, \texttt{/tcb/interior code} \texttt{\textasciitilde P.141}, \texttt{/tcb/interior titled code} \texttt{\textasciitilde P.140}, and \texttt{/tcb/title code} \texttt{\textasciitilde P.142} can be applied to every skin now. In this sense, everything has become \texttt{freelance} now.

For users of \texttt{/tcb/freelance}: Old code should continue to work. There may be exceptions for breakable freelance boxes under certain circumstances. For new code, use \texttt{/tcb/empty} \texttt{\textasciitilde P.240} or \texttt{/tcb/enhanced} \texttt{\textasciitilde P.209} where you would have used \texttt{/tcb/freelance} before.

\texttt{/tcb/skin=freelance} \texttt{(skin)}

This skin gives full freedom for the appearance of the \texttt{tcolorbox}. All drawing engines are set to type \texttt{freelance}; they use the \texttt{tikz} package and compute the \texttt{/tcb/geometry} nodes \texttt{\textasciitilde P.139}.

Environment and engines for the skin 'freelance'

\begin{verbatim}
/tcb/graphical environment \textasciitilde P.137: tikzpicture
/tcb/frame engine \textasciitilde P.137: freelance
/tcb/interior titled engine \textasciitilde P.137: freelance
/tcb/interior engine \textasciitilde P.138: freelance
/tcb/segmentation engine \textasciitilde P.138: freelance
/tcb/title engine \textasciitilde P.138: freelance
\end{verbatim}

\texttt{/tcb/freelance} \texttt{(style, no value)}

This is an abbreviation for setting \texttt{skin=freelance}.

\texttt{/tcb/skin=freelancefirst} \texttt{(skin)}

This skin equals \texttt{freelance} with exception of the break sequence, see Section 18.8 on page 388.

\texttt{/tcb/skin=freelancemiddle} \texttt{(skin)}

This skin equals \texttt{freelance} with exception of the break sequence, see Section 18.8 on page 388.

\texttt{/tcb/skin=freelancelast} \texttt{(skin)}

This skin equals \texttt{freelance} with exception of the break sequence, see Section 18.8 on page 388.

\texttt{/tcb/extend freelance=(options)} \texttt{(no default, initially empty)}

The \texttt{(options)} are added to the skin definition of \texttt{freelance}.

\texttt{/tcb/extend freelancefirst=(options)} \texttt{(no default, initially empty)}

The \texttt{(options)} are added to the skin definition of \texttt{freelancefirst} which is used as first part of the break sequence of \texttt{freelance}. See \texttt{/tcb/skin first is subskin of} \texttt{\textasciitilde P.143} for a substitute of this key.

\texttt{/tcb/extend freelancemiddle=(options)} \texttt{(no default, initially empty)}

The \texttt{(options)} are added to the skin definition of \texttt{freelancemiddle} which is used as middle part of the break sequence of \texttt{freelance}. See \texttt{/tcb/skin middle is subskin of} \texttt{\textasciitilde P.143} for a substitute of this key.

\texttt{/tcb/extend freelancelast=(options)} \texttt{(no default, initially empty)}

The \texttt{(options)} are added to the skin definition of \texttt{freelancelast} which is used as last part of the break sequence of \texttt{freelance}. See \texttt{/tcb/skin last is subskin of} \texttt{\textasciitilde P.143} for a substitute of this key.
11 Inclusion of Boxed Image Files

The \texttt{skins} library adds some commands to conveniently include boxed image files. For the following macros and options, the \texttt{skins} library has to be loaded by a package option or inside the preamble by:

\begin{verbatim}
tcbuselibrary{skins}
\end{verbatim}

See Section 10 on page 151 for the documentation of all other options of the \texttt{skins} library.

11.1 Macros

\texttt{\tcbincludegraphics[(options)]\{file name\}}

In principle, this macro includes an image file denoted by \texttt{(file name)} using the standard \texttt{\includegraphics} and puts it into a \texttt{tcolorbox}. The \texttt{(options)} are \texttt{tcolorbox} keys to set up the colored box. Use \texttt{/tcb/graphics options} to specify options for the underlying \texttt{\includegraphics}. Some \texttt{tcolorbox} option keys are automatically set, namely \texttt{/tcb/enhanced} and options to center the image inside the box.

The sizing of the included image is done depending on the following:

- If a \texttt{/tcb/width} is specified, but no fixed \texttt{/tcb/height}, the image is sized to fill the inner width of the box. The height of the box adapts to the image.
- If a fixed \texttt{/tcb/height} is specified, the image is sized to fill the fixed inner area of the box.
- If the \texttt{/tcb/capture} mode \texttt{/tcb/hbox} is specified, the image is sized according to given \texttt{\includegraphics} options only. The box adapts to the image.

\begin{verbatim}
\begin{tcbraster}[raster columns=3,raster force size=false,size=fbox, colframe=red!50!black,colback=red!20!black, fonttitle=\bfseries,center title,drop fuzzy shadow]
\tcbincludegraphics[title=Normal]{goldshade.png}
\tcbincludegraphics[title=Fixed height,height=3cm]{goldshade.png}
\tcbincludegraphics[title=hbox mode,hbox,graphics options={width=3cm}]{goldshade.png}
\end{tcbraster}
\end{verbatim}
The auxiliary macro `\imagename` may be used inside `\tcbincludesgraphics` to display the name of the file. `\imagename` is already partially detokenized and is allowed to contain special characters like the underscore. Note that an appropriate font is required to display such characters.

\begin{tcbraster}[size=fbox, colframe=red!50!black, colback=red!20!black, fonttitle=\bfseries\ttfamily,center title,drop fuzzy shadow]
\tcbincludesgraphics[title=\imagename]{goldshade.png}
\tcbincludesgraphics[finish={\node[fill=white,fill opacity=0.5,text opacity=1] at (frame.center) {\bfseries\ttfamily\imagename};}]{blueshade.png}
\end{tcbraster}
This is a generalized version of \tcbincludegraphics\footnote{P.254} which allows to include a complete PDF file denoted by \texttt{(file name)}. Every page is boxed into an own \texttt{tcolorbox}\footnote{P.12} customized by the given \texttt{(options)}. It is reasonable to put such a series of boxes inside a \texttt{tcbraster}\footnote{P.288} for alignment.

Use /\texttt{tcb/graphics pages}\footnote{P.257} to use a selection of pages instead of using the whole file. The auxiliary macro \texttt{imagepage} may be used inside \texttt{tcbincludepdf} to display the current page number.

% \texttt{tcbuselibrary(raster)}
\begin{tcbraster}[raster columns=3,colframe=blue,colback=white, colbacktitle=blue!50!white,fonttitle=\small\textbf{ttfamily},
left=0pt,right=0pt,top=0pt,bottom=0pt,boxsep=0pt,boxrule=0.6pt, toptitle=1mm,bottomtitle=1mm,drop lifted shadow,center title, graphics pages={1,...,6},title={\texttt{\textbackslash imagename} \ [\texttt{\textbackslash imagepage}]}, \tcbincludepdf{tcolorbox-example.pdf} \end{tcbraster}

\begin{equation}
\sum_{i=1}^{n} i = \frac{n(n+1)}{2}.
\end{equation}

3.2 Theorem (Summation of Numbers): For all natural number $n$ it holds:

$$\sum_{i=1}^{n} i = \frac{n(n+1)}{2}.$$ (4)
11.2 Option Keys

\texttt{/tcb/graphics\ options=\langle options\rangle} \hspace{1cm} \text{(no default, initially empty)}

Used for \texttt{\tcbincludegraphics} \footnote{P. 254} and \texttt{\tcbincludepdf} \footnote{P. 256} to specify
\texttt{\includegraphics\ \langle options\rangle}.

\begin{verbatim}
\% \tcbusetlibrary{raster}
\begin{tcbraster}[raster columns=3,size=fbox,raster equal height, colframe=red!50!black,colback=red!20!black,drop fuzzy shadow] \tcbincludegraphics{goldshade.png} \newcommand{\myangle}{angle=20}\% \tcbincludegraphics[graphics options=\myangle]{goldshade.png} \tcbincludegraphics[graphics options={viewport=0cm 0cm 8cm 4cm,clip}]{goldshade.png} \end{tcbraster}
\end{verbatim}

\texttt{/tcb/graphics\ directory=\langle directory\rangle} \hspace{1cm} \text{(no default, initially empty)}

Used for \texttt{\tcbincludegraphics} \footnote{P. 254} and \texttt{\tcbincludepdf} \footnote{P. 256} to specify a file system
\langle directory\rangle where the image files are located.

\begin{verbatim}
\tcbset{
  graphics directory=\{.\},
  graphics directory=\{examples\},
  graphics directory=\{../../pictures\},
}
\end{verbatim}

The \texttt{\graphicspath} macro from the \texttt{graphics} package is superior to this option.
\texttt{/tcb/graphics\ directory} may be used especially for \texttt{\tcbincludepdf} \footnote{P. 256}.

\texttt{/tcb/graphics\ pages=\langle selection\rangle} \hspace{1cm} \text{(no default, initially 1,...,\pdfpages)}

Used for \texttt{\tcbincludepdf} \footnote{P. 256} to specify a \langle selection\rangle of pages to be included. The largest
page number is accessible by \texttt{\pdfpages}. The \langle selection\rangle has to be given using the \texttt{\foreach}
syntax of \texttt{Ti\kern.16667em kZ}.

\begin{verbatim}
\tcbset{
  graphics pages=\{1,3,7\},
  graphics pages=\{1,...,10\},
  graphics pages=\{1,3,...,18\},
  graphics pages=\{100,...,\pdfpages\},
}
\end{verbatim}
/tcb/graphics orientation=⟨orientation⟩ (no default, initially as-is)

Used for \tcbincludegraphics\[^P.254^\] and \tcbincludepdf\[^P.256^\] to guarantee a certain ⟨orientation⟩ of the included image. After all other options for the image are processed, the result is possibly rotated to be in landscape or portrait mode.

Feasible values for ⟨orientation⟩ are:

- **as-is**: no rotation of the processed image.
- **landscape**: the processed image is possibly rotated by 90 degrees to ensure that the final width is not smaller than the final height.
- **landscape***: the processed image is possibly rotated by -90 degrees to ensure that the final width is not smaller than the final height.
- **portrait**: the processed image is possibly rotated by 90 degrees to ensure that the final height is not smaller than the final width.
- **portrait***: the processed image is possibly rotated by -90 degrees to ensure that the final height is not smaller than the final width.
12 TikZ Image and Picture Fill Extensions; Auxiliary Macros

The \texttt{skins} library adds some image and picture fill options to the vast option set of TikZ \citep{tikzmanual}. These options can be used in any \texttt{tikzpicture}. For the following options, the \texttt{skins} library has to be loaded by a package option or inside the preamble by:

\begin{tcbbuselibrary}{skins}
\end{tcbbuselibrary}

See Section 10 on page 151 for the documentation of all other options of the \texttt{skins} library.

12.1 Fill Plain

\texttt{/tikz/fill plain image=⟨file name⟩} (no default, initially unset)

Fills the current path with an external image referenced by \langle file name\rangle. The image is put in the center of the path, but it is not resized to fit into the path area.

\begin{tikzpicture}
\path[draw,fill plain image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\texttt{/tikz/fill plain image*=⟨file name⟩} (no default, initially unset)

Fills the current path with an external image referenced by \langle file name\rangle. The image is put in the center of the path, but it is not resized to fit into the path area. The \langle graphics options\rangle are given to the underlying \texttt{\includegraphics} command.

\begin{tikzpicture}
\path[draw,fill plain *=width=2.5cm]{goldshade.png}
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\texttt{/tikz/fill plain picture=⟨graphical code⟩} (no default, initially unset)

Fills the current path with the given \langle graphical code\rangle. The result is put in the center of the path, but it is not resized to fit into the path area. Note that this is almost identical to the standard \texttt{path picture} option.

\begin{tikzpicture}
\path[draw,fill plain picture={%
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
12.2 Fill Stretch

\begin{tikzpicture}
\path[fill stretch image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\begin{tikzpicture}
\path[fill stretch image*=
{angle=90,origin=c}{goldshade.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\begin{tikzpicture}
\path[draw,fill stretch picture={%
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
12.3 Fill Overzoom

\texttt{/tikz/fill overzoom image=\langle file name \rangle}  \hspace{1em} (no default, initially unset)

Fills the current path with an external image referenced by \langle file name \rangle. The image is zoomed such that the path area fills the image.

\begin{tikzpicture}
\path[fill overzoom image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\texttt{/tikz/fill overzoom image*=\langle graphics options \rangle\{\langle file name \rangle\}}  \hspace{1em} (no default, initially unset)

Fills the current path with an external image referenced by \langle file name \rangle. The \langle graphics options \rangle are given to the underlying \texttt{\includegraphics} command. The image is zoomed such that the path area fills the image.

\begin{tikzpicture}
\path[fill overzoom image*=\{angle=90,origin=c\}\{goldshade.png\}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\texttt{/tikz/fill overzoom picture=\langle graphical code \rangle}  \hspace{1em} (no default, initially unset)

Fills the current path with the given \langle graphical code \rangle. The result is zoomed such that the path area fills the image.

\begin{tikzpicture}
\path[draw,fill overzoom picture=\{]
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
\}
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
12.4 Fill Zoom

\tikz/fill zoom image=⟨file name⟩
Fills the current path with an external image referenced by ⟨file name⟩. The image is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill zoom image=goldshade.png]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
  { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\tikz/fill zoom image*=⟨graphics options⟩⟨file name⟩
Fills the current path with an external image referenced by ⟨file name⟩. The ⟨graphics options⟩ are given to the underlying \includegraphics command. The image is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill zoom image*=angle=90,origin=c,goldshade.png]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
  { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

\tikz/fill zoom picture=⟨graphical code⟩
Fills the current path with the given ⟨graphical code⟩. The result is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill zoom picture={
  \draw[red!50!yellow,line width=2mm]
    (0,0) circle (1cm);
  \draw[red!50!yellow,line width=1mm]
    (-1,-1) -- (1,1);
  \draw[red!50!yellow,line width=1mm]
    (-1,1) -- (1,-1);
}]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
  { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
12.5 Fill Shrink

/tikz/fill shrink image=(file name)  (no default, initially unset)
Fills the current path with an external image referenced by (file name). The image is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill shrink image=goldshade.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill shrink image**(file name)  (no default, initially unset)
Fills the current path with an external image referenced by (file name). The (graphics options) are given to the underlying \includegraphics command. The image is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill shrink image**={width=1.5cm}{goldshade.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill shrink picture=(graphical code)  (no default, initially unset)
Fills the current path with the given (graphical code). The result is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

\begin{tikzpicture}
\path[draw,fill shrink picture={%
\draw[red!50!yellow,line width=2mm]
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
12.6 Fill Tile

/tikz/fill tile image={(file name)} (no default, initially unset)
Fills the current path with a tile pattern using an external image referenced by \textit{(file name)}.

\begin{tikzpicture}
\path[fill tile image=pink_marble.png]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill tile image*={⟨graphics options⟩}{⟨file name⟩} (no default, initially unset)
Fills the current path with a tile pattern using an external image referenced by \textit{(file name)}. The \textit{⟨graphics options⟩} are given to the underlying \texttt{\includegraphics} command.

\begin{tikzpicture}
\path[fill tile image*={width=1cm}{pink_marble.png}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill tile picture={(graphical code)} (no default, initially unset)
Fills the current path with a tile pattern using the given \textit{⟨graphical code⟩}.

\begin{tikzpicture}
\path[draw,fill tile picture={% \draw[red!50!yellow,line width=2mm] 
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}

/tikz/fill tile picture*={⟨fraction⟩}{⟨graphical code⟩} (no default, initially unset)
Fills the current path with a tile pattern using the given \textit{⟨graphical code⟩}. The graphic is resized by \textit{⟨fraction⟩}.

\begin{tikzpicture}
\path[draw,fill tile picture*={0.25}{% \draw[red!50!yellow,line width=2mm] 
(0,0) circle (1cm);
\draw[red,line width=5mm] (-1,-1) -- (1,1);
\draw[red,line width=5mm] (-1,1) -- (1,-1);
}]
(2.75,-0.75) -- (3,0) -- (2.75,0.75)
\foreach \w in {45,90,...,315}
{ -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
12.7 Filling Options

\texttt{/tikz/fill image opacity=⟨fraction⟩} \hfill (no default, initially 1.0)

Sets the fill opacity for the image or picture fill options to the given ⟨fraction⟩.

\begin{tikzpicture}
\path[fill stretch image=goldshade.png] (0,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.75] (2,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.5] (4,0) circle (1cm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.25] (6,0) circle (1cm);
\path[fill=red] (8,0) circle (1cm);
\end{tikzpicture}

\texttt{/tikz/fill image scale=⟨fraction⟩} \hfill (no default, initially 1.0)

Stretches, zooms, overzooms or shrinks the image or picture to the given ⟨fraction⟩ of the width and height of the current path.

\begin{tikzpicture}
\path[draw,fill zoom image=goldshade.png] (0,0) rectangle +(2,2);
\path[draw,fill zoom image=goldshade.png,fill image scale=0.75] (3,0) rectangle +(2,2);
\path[draw,fill zoom image=goldshade.png,fill image scale=1.5] (6,0) rectangle +(2,2);
\end{tikzpicture}

\texttt{/tikz/fill image options=⟨graphics options⟩} \hfill (no default, initially empty)

The ⟨graphics options⟩ are given to the underlying \texttt{\includegraphics} command for the image fill options. This can be just together with \texttt{/tikz/fill stretch image} \textasciitilde P.260, \texttt{/tikz/fill overzoom image} \textasciitilde P.261, \texttt{/tikz/fill zoom image} \textasciitilde P.262, and \texttt{/tikz/fill tile image} \textasciitilde P.264.

\begin{tikzpicture}
\path[fill image options={width=1cm}, fill tile image=pink_marble.png] (2.75,-0.75) -- (3,0) -- (2.75,0.75) \foreach \w in {45,90,...,315} { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
12.8 Straightening of the Arcs

This patch is considered as an experimental feature. It changes some of the original TikZ code. This change may break with future updates of TikZ.

`\tcbpatcharcangular`

The TikZ package provides a nice rounded corners option to replace all corners by little arcs. `\tcbpatcharcangular` is a patch which straightens the arcs. To say it more prosaic, the little arcs are replaced by little straight lines.

`\begin{tikzpicture}
\draw[thick,rounded corners=8pt]
 (0,0) -- (0,2) -- (1,3.25) -- (2,2) -- (2,0)
 -- (0,2) -- (2,2) -- (0,0) -- (2,0);
\tcbpatcharcangular
\draw[thick,rounded corners=8pt,xshift=2.5cm]
 (0,0) -- (0,2) -- (1,3.25) -- (2,2) -- (2,0)
 -- (0,2) -- (2,2) -- (0,0) -- (2,0);
\end{tikzpicture}`

`\tcbpatcharcround`

This macro reverts `\tcbpatcharcangular`, i.e., the patch from `\tcbpatcharcangular` is replaced by the original code.
12.9 Extracting Node Dimensions

The following auxiliary macros are defined by the \skins library. They allow to determine the width and height of an arbitrary \TikZ node. To be more specific, they determine the east-to-west and the north-to-south dimensions which may be not the maximal dimensions for a non-rectangular node. Note that the following dimensions are measured exactly including the line width of the border line. If a new rectangle or node with the same dimensions and a border is to be drawn, this border width has to be substracted.

\begin{tikzpicture}
\node[align=center,draw=red,fill=yellow] (A) {This is my\example node};
\tcbsetmacrotowidthofnode\mywidth{A}
\tcbsetmacrotoheightofnode\myheight{A}
\path\fill=blue!25!white\ % rectangle without border
 (\[xshift=2mm\]A.south east) rectangle node{Copy} +(\mywidth,\myheight);
\node[draw=blue,fill=blue!25!white, \ % standard border width 0.4pt
minimum width=\mywidth-0.4pt, \ % minus width of border
minimum height=\myheight-0.4pt \ % minus height of border
at (\[xshift=5cm\]A) \{Copy 2\};
\end{tikzpicture}

12.10 Hyper Nodes

The following auxiliary macro is defined by the \skins library.

\begin{tikzpicture}% \usepackage{hyperref}
\node[align=center,draw=red,fill=red!5] (mybutton) {Click me to jump to Section\ref*{sec:tikzimagefilling}};
\tcbhypernode\hyperref[sec:tikzimagefilling]{mybutton}
\end{tikzpicture}

\begin{tikzpicture}
\begin{scope}[x=0.75cm]
\node[align=center,draw=red,fill=red!5] (mybutton) {Click me to jump to Section 12};
\end{scope}
\end{tikzpicture}
13 Beamer Support

The \texttt{skins} library adds some supporting options for the \texttt{beamer} package [23]. For the following options, the \texttt{skins} library has to be loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{skins}
\end{verbatim}

See Section 10 on page 151 for the documentation of all other options of the \texttt{skins} library.

\begin{verbatim}
/\texttt{tcb/only=}\langle\texttt{overlay specification}\rangle\{\texttt{options}\} \hspace{1cm} \texttt{(style, no default, initially unset)}
\end{verbatim}

Sets the given \texttt{tcolorbox} \texttt{(options)} in dependency of a \texttt{beamer} \texttt{(overlay specification)}. Note that this needs the \texttt{beamer} class [23]. The \texttt{(options)} will only be used on the specified \texttt{beamer} frames.

\begin{verbatim}
\documentclass{beamer}
\usepackage[many]{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcolorbox}[title=My title,fonttitle=\textbf{\texttt{bfseries}},
  enhanced,colframe=red!50!black,colback=red!10,colbacktitle=red,
  sidebyside,righthand width=3cm,
  lowerbox=invisible,lower separated=false,
  drop lifted shadow,
  only=<1>{colbacktitle=yellow,coltitle=red!50!black,colframe=red},
  only=<3>{colback=yellow!50,watermark text={Attention!}},
  only=<3>{lowerbox=visible} ]
This is a test.
\begin{itemize}[<+->]
  \item One
  \item Two
  \item \textcolor<3>{red}{Three}
  \item Four
\end{itemize}
\tcblower
\begin{equation*}
  \int\limits_{1}^{x} \frac{1}{t}~dt = \ln(x).
\end{equation*}
\end{tcolorbox}
\end{frame}
\end{document}
\end{verbatim}
\documentclass{beamer}
\usepackage[most]{tcolorbox}
\begin{document}
\begin{frame}[fragile]
\begin{tcblisting}{beamer,colback=blue!5,colframe=blue!20!gray,coltitle=yellow,
title=Example,only=<1>{lowerbox=invisible},only=<2>{}
\}
This is an \textbf{example listing}
\end{tcblisting}
\end{frame}
\end{document}

The option /tcb/only\textsuperscript{P.268} belonged to the base package before version 4.20.

/tcb/hide=⟨overlay specification⟩> (style, no default, initially unset)
Sets the /tcb/beamer hidden style in dependency of a beamer ⟨overlay specification⟩. /tcb/beamer hidden can be redefined for customization.

/tcb/beamer hidden (style, no options, initially nirvana)
This style is not intended to be used directly, but in concealed way by applying /tcb/hide. The style can be redefined.

\tcbset{
  beamer hidden/.style={invisible,interior hidden,colframe=blue!20!gray!15},
}
/tcb/alert=⟨overlay specification⟩\ (style, no default, initially unset)

Sets the /tcb/beamer alerted\ P.270 style in dependency of a beamer \overlay specification. /tcb/beamer alerted\ P.270 can be redefined for customization.

/tcb/beamer alerted\ (style, no options, initially fuzzy halo)

This style is not intended to be used directly, but in concealed way by applying /tcb/alert. The style can be redefined.

\tcbset{
   beamer alerted/.style={colframe=red!50!gray},
}

The following examples use tcbitemize\ P.289 from \ratraster for convenient use of a list of boxes which are uncovered one by one.

\documentclass{beamer}
\usepackage[most]{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcbitemize}[raster equal height=rows, enhanced,colback=blue!5,colframe=blue!20!gray,coltitle=yellow,]
\tcbitem[title=One,alert=<1>]
First Statement
\tcbitem[title=Two,hide=<-1>,alert=<2>]
Second Statement
\tcbitem[title=Three,hide=<-2>,alert=<3>]
Test
\tcbitem[title=Four,hide=<-3>,alert=<4>]
\begin{equation*}
\int_{1}^{x} \frac{1}{t}~dt = \ln(x).
\end{equation*}
\tcbitem[title=Five,hide=<-4>,alert=<5>]
\includegraphics[width=1cm]{goldshade.png}
\tcbitem[title=Six,hide=<-5>,alert=<6>]
Test
\end{tcbitemize}
\end{frame}
\end{document}
\documentclass{beamer}
\usepackage[most]{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcbitemize}[raster equal height=rows, enhanced,colback=blue!5,colframe=blue!20!gray,coltitle=yellow, beamer hidden/.style={invisible,interior hidden,colframe=blue!20!gray!15}, beamer alerted/.style={colframe=red!50!gray}]
\tcbitem[title=One,alert=<1>]
First Statement
\tcbitem[title=Two,hide=<-1>,alert=<2>]
Second Statement
\tcbitem[title=Three,hide=<-2>,alert=<3>]
Test
\tcbitem[title=Four,hide=<-3>,alert=<4>]
\begin{equation*}
\int_{1}^{x} \frac{1}{t} \, dt = \ln(x).
\end{equation*}
\tcbitem[title=Five,hide=<-4>,alert=<5>]
\includegraphics[width=1cm]{goldshade.png}
\tcbitem[title=Six,hide=<-5>,alert=<6>]
Test
\end{tcbitemize}
\end{frame}
\end{document}
\documentclass{beamer}
\usepackage[most]{tcolorbox}
\begin{document}
\begin{frame}
\begin{tcbitemize}[raster equal height=rows,
  beamer,colback=blue!5,colframe=blue!20!gray,coltitle=yellow,
  beamer]
\tcbitem \[title=One,alert=<1>\]
  First Statement
\tcbitem \[title=Two,hide=<-1>,alert=<2>\]
  Second Statement
\tcbitem \[title=Three,hide=<-2>,alert=<3>\]
  \[\int_1^x \frac{1}{t} \, dt = \ln(x).\]
\end{tcbitemize}
\end{frame}
\end{document}
\begin{equation*}
\int_{1}^{x} \frac{1}{t} \, dt = \ln(x).
\end{equation*}
14 Library vignette

The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{vignette}

This also loads the skins library, see Section 10 on page 151, and the fadings library of tikz [22].

14.1 Vignette Drawing

\tcbvignette{options}

In this context, a vignette is a four part rectangular frame. It is constructed as several Ti\text{}kZ paths and, therefore, can only be used inside a \texttt{tikzpicture} environment or inside tcolorbox options.

The \texttt{options} control position, size and style settings of the vignette. Theses options have the common key path /tcb/vig/ and are described in the following.

The next examples show direct \texttt{tcbvignette} usage without a tcolorbox.

\begin{tikzpicture}
\tcbvignette
\end{tikzpicture}

\begin{tikzpicture}
\node[draw,fill=blue!15!white] (A) {Test};
\tcbvignette{outside node=A,raised color=blue}
\end{tikzpicture}

\begin{tikzpicture}
\node[draw,fill=blue!15!white] (A) {Another Test};
\tcbvignette{size=3mm,outside node=A,
 north style=red,east style=yellow,
 south style=blue,west style=green}
\end{tikzpicture}

\begin{tikzpicture}
\node[inner sep=3mm,fill=red!75] (A) {Test};
\tcbvignette{over node=A,fade in}
\end{tikzpicture}

\tcbvignette can be used directly inside appropriate options keys for tcolorbox. Note that options like /tcb/underlay need /tcb/enhanced or similar settings.
Mostly, convenient short cuts like \texttt{/tcb/underlay vignette} can be used to add a vignette to a \texttt{tcolorbox}. Here, \texttt{tcbvignette} is used internally.

\begin{tcolorbox}
\[enhanced, size=small, sharp corners, 
  colback=green!10, colframe=green!50!black, 
  boxrule=1mm, titlerule=0mm, 
  title=My title, center title, fonttitle=\bfseries, 
  underlay vignette\]
  This is a \texttt{tcolorbox}.
\end{tcolorbox}

\section{Generic Geometry Settings}

\begin{itemize}
  \item \texttt{/tcb/vig/xmin=\{length\}} \hfill \textup{(no default, initially 0\texttt{pt})}
    Sets the lower horizontal limit of a \texttt{tcbvignette}. \hfill \textsuperscript{P.274}
  \item \texttt{/tcb/vig/xmax=\{length\}} \hfill \textup{(no default, initially 1\texttt{cm})}
    Sets the upper horizontal limit of a \texttt{tcbvignette}. \hfill \textsuperscript{P.274}
  \item \texttt{/tcb/vig/ymin=\{length\}} \hfill \textup{(no default, initially 0\texttt{pt})}
    Sets the lower vertical limit of a \texttt{tcbvignette}. \hfill \textsuperscript{P.274}
  \item \texttt{/tcb/vig/ymax=\{length\}} \hfill \textup{(no default, initially 1\texttt{cm})}
    Sets the upper vertical limit of a \texttt{tcbvignette}. \hfill \textsuperscript{P.274}
  \item \texttt{/tcb/vig/lower left corner=\{coordinates\}} \hfill \textup{(style, initially 0,0)}
    Sets the lower left corner of a \texttt{tcbvignette}. This style sets \texttt{/tcb/vig/xmin} and \texttt{/tcb/vig/ymin}. \hfill \textsuperscript{P.274}
  \item \texttt{/tcb/vig/upper right corner=\{coordinates\}} \hfill \textup{(style, initially 1,1)}
    Sets the upper right corner of a \texttt{tcbvignette}. This style sets \texttt{/tcb/vig/xmax} and \texttt{/tcb/vig/ymax}. \hfill \textsuperscript{P.274}
  \item \texttt{/tcb/vig/inside node=\{name\}} \hfill \textup{(style, initially unset)}
    Places the \texttt{tcbvignette} inside the node with the given \texttt{\{name\}}. The outer limits of the vignette are adapted to the node geometry.
\end{itemize}

\begin{tikzpicture}
  \fill [black!20] (0,0) rectangle (3,2);
  \path [pattern=checkerboard,pattern color=black!30] (0,0) rectangle (3,2);
  \tcbvignette{xmin=1cm,xmax=2.5cm,ymin=0.5cm,ymax=1.75cm}
\end{tikzpicture}

\begin{tikzpicture}
  \node[minimum width=2cm, minimum height=1cm] (A) {Node A};
  \tcbvignette{inside node=A}
  \draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}
\begin{tikzpicture}
  \node[minimum width=2cm, minimum height=1cm] (A) {Node A};
  \tcbvignette{outside node=A}
  \draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}

\begin{tikzpicture}
  \node[minimum width=2cm, minimum height=1cm] (A) {Node A};
  \tcbvignette{over node offset=1mm, over node=A}
  \draw[very thick] (A.south west) rectangle (A.north east);
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{north size=4mm}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{south size=4mm}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{east size=4mm}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{west size=4mm}
\end{tikzpicture}

\begin{tikzpicture}
  \tcbvignette{vertical size=4mm}
\end{tikzpicture}
Sets /tcb/vig/east size \textsuperscript{P.276} and /tcb/vig/west size \textsuperscript{P.276}, to the given \textit{length}.

/tcb/vig/north size \textsuperscript{P.276}, /tcb/vig/south size \textsuperscript{P.276}, /tcb/vig/east size \textsuperscript{P.276}, and /tcb/vig/west size \textsuperscript{P.276} to the given \textit{length}.

/\textit{tcb/vig/north size} \textsuperscript{P.276} /\textit{tcb/vig/south size} \textsuperscript{P.276}, etc. have to be set \textit{before} /\textit{tcb/vig/outside node} \textsuperscript{P.276} is used.

14.3 Generic Color and Style Settings

Sets Ti\textit{kZ} \textit{style} options for the north \textit{vignette} part.

Sets Ti\textit{kZ} \textit{style} options for the south \textit{vignette} part.
Sets TikZ \langle style \rangle options for the east vignette part.

\begin{tikzpicture}
\tcbvignette{east style={left color=yellow!75!black, right color=blue!75!black}}
\end{tikzpicture}

Sets TikZ \langle style \rangle options for the west vignette part.

\begin{tikzpicture}
\tcbvignette{west style={preaction={fill=black!20}, pattern=checkerboard, pattern color=black!30}}
\end{tikzpicture}

The four vignette parts are drawn inside a TikZ \texttt{scope} environment which takes the given \langle style \rangle as option.

\begin{tikzpicture}
\tcbvignette{scope={transparency group,opacity=0.25}}
\end{tikzpicture}

Creates a raised frame impression by setting the four style options \texttt{/tcb/vig/north style}, \texttt{/tcb/vig/south style}, \texttt{/tcb/vig/east style}, and \texttt{/tcb/vig/west style} to darkened and lightened variations of the given \texttt{color}.

\begin{tikzpicture}
\tcbvignette{raised color=blue}
\end{tikzpicture}

Creates a lowered frame impression by setting the four style options \texttt{/tcb/vig/north style}, \texttt{/tcb/vig/south style}, \texttt{/tcb/vig/east style}, and \texttt{/tcb/vig/west style} to darkened and lightened variations of the given \texttt{color}.

\begin{tikzpicture}
\tcbvignette{lowered color=green!75!black}
\end{tikzpicture}

Sets the four style options \texttt{/tcb/vig/north style}, \texttt{/tcb/vig/south style}, \texttt{/tcb/vig/east style}, and \texttt{/tcb/vig/west style} such that the color shades from the \langle inner \rangle color to the \langle outer \rangle color.

\begin{tikzpicture}
\tcbvignette{color from=red to blue!50}
\end{tikzpicture}

Sets the base color for \texttt{/tcb/vig/raised color}, \texttt{/tcb/vig/lowered color}, \texttt{/tcb/finish fading vignette}. Typically, this value has not to be set directly.

\begin{tikzpicture}
\tcbvignette{base color=green!75!black}
\end{tikzpicture}
Especially, if shadings or fadings are used, the drawn \textit{vignette} graphs are displayed sometimes not as perfect as expected. Glitches and imperfections are very dependent on the previewer software. The \texttt{/tcb/vig/draw method} intends to give a choice of alternative drawing methods.

- \textbf{direct}: The \textit{vignette} parts are drawn/filled by using a single TiKZ graph. This is the preferred (and default) method for solid color graphs.
- \textbf{clipped}: The \textit{vignette} parts are drawn somewhat oversized and are clipped to the intended region. In combination with shadings and fadings this seems to give a better/different optical result (depends on the previewer).

\begin{tikzpicture}
\tcbvignette[color from=red to yellow]
\end{tikzpicture}

\begin{tikzpicture}
\tcbvignette[color from=red to yellow,draw method=clipped]
\end{tikzpicture}

\begin{itemize}
  \item This option is a stopgap and may be changed or preferably removed in future.
\end{itemize}

\section*{14.4 Generic Fading Settings}

The \texttt{fadings} library of \texttt{tikz} \cite{tikz} is loaded automatically by the \texttt{vignette} library. Amongst others, the fadings \texttt{west}, \texttt{east}, \texttt{north}, and \texttt{south} are defined inside the \texttt{fadings} library.

The \texttt{vignette} library adds some more fadings called \texttt{semi west}, \texttt{semi east}, \texttt{semi north}, and \texttt{semi south}. These fadings are much \textit{weaker} than the normal fadings.

\begin{tikzpicture}
\fill [black!20] (0,0) rectangle (1,1);
\path [pattern=checkerboard,pattern color=black!30] (0,0) rectangle (1,1);
\fill [path fading=semi west,blue] (0,0) rectangle (1,1);
\end{tikzpicture}

### Comparison of the Fadings

\begin{tabular}{ll}
\texttt{west} & \texttt{east} \\
\texttt{north} & \texttt{south} \\
\texttt{semi west} & \texttt{semi east} \\
\texttt{semi north} & \texttt{semi south}
\end{tabular}

\begin{itemize}
  \item \texttt{/tcb/vig/fade in=}\texttt{(style)}
  \texttt{(style, default white)}
\end{itemize}

Sets the four style options \texttt{/tcb/vig/north style} \cite[p.277]{tcb/vig/north style}, \texttt{/tcb/vig/south style} \cite[p.277]{tcb/vig/south style}, \texttt{/tcb/vig/east style} \cite[p.278]{tcb/vig/east style}, and \texttt{/tcb/vig/west style} \cite[p.278]{tcb/vig/west style} such that the paths fade from outside to inside.
Sets the four style options `/tcb/vig/north style` \(^{P.277}\), `/tcb/vig/south style` \(^{P.277}\), `/tcb/vig/east style` \(^{P.278}\), and `/tcb/vig/west style` \(^{P.278}\) such that the paths fade from inside to outside.

\begin{tikzpicture}
\fill [black!20] (-0.5,-0.5) rectangle (1.5,1.5);
\path [pattern=checkerboard,pattern color=black!30]
(-0.5,-0.5) rectangle (1.5,1.5);
\tcbvignette{semi fade in=blue}
\end{tikzpicture}
This puts a `vignette` with the given `options` as `/tcb/underlay` to a `tcolorbox`. The dimensions of the `vignette` are matched to the dimensions of the `tcolorbox`. For example, `/tcb/lefrule` is used as `/tcb/vig/west size`. Also, `/tcb/colframe` is used as `/tcb/vig/raised color`. For a `/tcb/breakable` `tcolorbox`, the `vignette` is also been broken. Alternatively, `/tcbvignette` could be used directly inside an `/tcb/underlay` with appropriate settings.

\begin{tcolorbox}[enhanced,size=small,sharp corners,colback=green!10,colframe=green!50!black,boxrule=2mm,titlerule=0mm,title=My title,center title,fonttitle=\bfseries,underlay vignette]  
This is a tcolorbox.\end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,arc=0pt,colback=blue!10,colframe=blue,boxrule=2mm,underlay vignette={size=1.5mm}]  
This is a tcolorbox.\end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,sharp corners,colframe=red,interior hidden,boxrule=2mm,colupper=white,center upper,fontupper=\bfseries,underlay vignette]  
This is a tcolorbox.\end{tcolorbox}

\begin{tcolorbox}[enhanced,size=small,sharp corners,colback=red!50!yellow,frame hidden,boxrule=2mm,underlay vignette={color from=red!50!yellow to white,draw method=clipped,size=2.1mm}]  
This is a tcolorbox.\end{tcolorbox}

\tcbox[enhanced,sharp corners,colback=red!10,colframe=red]{Test}  
\tcbox[enhanced,sharp corners,colback=red!10,colframe=red,underlay vignette]{Test}
/tcb/underlay raised shading vignette={⟨options⟩} (style, no default)

This is a special style derived from /tcb/underlay vignette \textsuperscript{P.281}, where the frame color is shaded to create a soft raised frame impression.

\begin{tcolorbox}[enhanced,sharp corners, 
colback=green!10, 
colframe=green!50!black, 
size=small,boxrule=2mm,titlerule=0mm, 
title=My title,center title,fonttitle=\bfseries, 
underlay raised shading vignette] 
This is a tcolorbox. 
\end{tcolorbox}

/tcb/underlay raised fading vignette={⟨options⟩} (style, no default)

This style gives a similar effect as /tcb/underlay raised shading vignette, but a path fading is used here. Different optical impression are very previewer-dependent.

\begin{tcolorbox}[enhanced,sharp corners, 
colback=green!10, 
colframe=green!50!black, 
size=small,boxrule=2mm,titlerule=0mm, 
title=My title,center title,fonttitle=\bfseries, 
underlay raised fading vignette] 
This is a tcolorbox. 
\end{tcolorbox}

/tcb/underlay shade in vignette={⟨options⟩} (style, no default)

This is a special style derived from /tcb/underlay vignette \textsuperscript{P.281}, where the frame color is shaded into the interior color.

\begin{tcolorbox}[enhanced,sharp corners,frame hidden, 
colback=green!10, 
colframe=green!50!black, 
size=small,boxrule=2mm,titlerule=0mm, 
underlay shade in vignette] 
This is a tcolorbox. 
\end{tcolorbox}

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14.6 Vignette as Finish

\[ \text{/tcb/finish vignette} = \{\langle \text{options} \rangle \} \] (style, no default)

This puts a \texttt{\textbackslash tvbignette} \textsuperscript{P.274} with the given \langle \text{options} \rangle as \texttt{\textbackslash tcb/finish} \textsuperscript{P.200} to a \texttt{tcolorbox} \textsuperscript{P.12}. The default style settings create a raised frame impression by drawing black and white color parts with reduced opacity.

\begin{verbatim}
\begin{tcolorbox}[enhanced,size=small,
colback=green!10,colframe=green!50!black,
boxrule=0.5mm,titlerule=0mm,
title=My title,center title,fonttitle=\bfseries,
finish vignette={size=1mm}]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}

\texttt{\textbackslash tcbincludegraphics}[blankest,width=3cm,
finish vignette={size=3mm}]{pink_marble.png}

\[ \text{/tcb/finish raised fading vignette} = \{\langle \text{options} \rangle \} \] (style, no default)

This puts a \texttt{\textbackslash tvbignette} \textsuperscript{P.274} with the given \langle \text{options} \rangle as \texttt{\textbackslash tcb/finish} \textsuperscript{P.200} to a \texttt{tcolorbox} \textsuperscript{P.12}. The default style settings create a soft raised frame impression by drawing fading black and white color parts.

\begin{verbatim}
\begin{tcolorbox}[enhanced,size=small,
colback=green!10,colframe=green!50!black,
boxrule=0.5mm,titlerule=0mm,
title=My title,center title,fonttitle=\bfseries,
finish raised fading vignette={size=1mm}]
This is a tcolorbox.
\end{tcolorbox}
\end{verbatim}

\texttt{\textbackslash tcbincludegraphics}[blankest,width=3cm,
finish raised fading vignette={size=3mm}]{pink_marble.png}
/tcb/finish fading vignette={⟨options⟩} (style, no default)

This puts a \texttt{tcbvignette} P.274 with the given ⟨options⟩ as /tcb/finish P.200 to a \texttt{tcolorbox} P.12. The default style settings fade the box into white from inside to outside. Note that /tcb/vig/over node P.276 is used here. /tcb/vig/over node offset P.276 can be adapted to overlap the box more or less. The fade color can be set using /tcb/vig/base color P.278.

\begin{tcolorbox}[enhanced,size=small,
  colback=green!10,colframe=green!50!black,
  boxrule=0.5mm,titlerule=0mm,
  title=My title,center title,fonttitle=\bfseries,
  finish fading vignette={size=2mm}]
  This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[colback=blue!50!black,size=small,
  title=Example]
  \tcbincludegraphics[blankest,width=3cm,
  finish fading vignette={size=3mm}]{pink_marble.png}
\end{tcolorbox}
15 Library \texttt{raster}

The library is loaded by a package option or inside the preamble by:

\begin{tcbuselibrary}{raster}

15.1 Concept of Rasters

A \textit{raster} is used to align several colored boxes in a regular way. It can be seen as a far related counterpart to the \texttt{matrix} construct of Ti\textsc{k}Z, but it differs in many aspects.

In principle, \texttt{tcolorbox}es are arranged in rows and columns when put inside a \texttt{tcbraster} environment. The boxes are fluently added to the raster like adding text to a paragraph. Especially, line/row breaks are done automatically and one cannot end a line/row ahead of schedule. Further, a \textit{raster} is not restricted to a single page but may break into an arbitrary series of pages.


Nine Boxes.


A raster arranges enclosed boxes in a regular way, mainly into rows and columns. The \texttt{options} are used to control the raster parameters and to set the properties for the enclosed boxes.

- The \textit{raster} is only allowed to contain a series of \texttt{tcolorbox}\textsuperscript{P.12} environments or derived constructs. With some small restrictions, boxes created with \texttt{tcboxfit}\textsuperscript{P.421} can also be added. Boxes created with \texttt{tcbox}\textsuperscript{P.14} are not reasonable here, but may be used to a certain degree.
- Do not add anything else between the boxes inside the raster with exception of white-space. Especially, do not use \texttt{\\} or \texttt{\par} to end a row; row breaks are done automatically.
- The boxes inside a raster are numbered automatically. \texttt{\thetcbrasternum} may be used inside a box to access this number.

\begin{tcbraster}[raster columns=3, raster equal height, size=small,colframe=red!50!black,colback=red!10!white,colbacktitle=red!50!white, title={Box \thetcbrasternum}]
\begin{tcolorbox}First box\end{tcolorbox}
\begin{tcolorbox}Second box\end{tcolorbox}
\begin{tcolorbox}This is a box with a second line\end{tcolorbox}
\begin{tcolorbox}Another box\end{tcolorbox}
\begin{tcolorbox}A box again\end{tcolorbox}
\end{tcbraster}

\begin{tcbraster}
raster columns=2, raster equal height=rows, size=small,colframe=red!50!black,colback=red!10!white,colbacktitle=red!50!white, title={Box \thetcbrasternum}
\begin{tcolorbox}First box\end{tcolorbox}
\begin{tcolorbox}Second box\end{tcolorbox}
\begin{tcolorbox}This is a box with a second line\end{tcolorbox}
\begin{tcolorbox}Another box\end{tcolorbox}
\begin{tcolorbox}A box again\end{tcolorbox}
\end{tcbraster}

\begin{tcbraster}
raster columns=2, raster equal height=rows, size=small,colframe=red!50!black,colback=red!10!white,colbacktitle=red!50!white, title={Box \thetcbrasternum}
\begin{tcolorbox}First box\end{tcolorbox}
\begin{tcolorbox}Second box\end{tcolorbox}
\begin{tcolorbox}This is a box with a second line\end{tcolorbox}
\begin{tcolorbox}Another box\end{tcolorbox}
\begin{tcolorbox}A box again\end{tcolorbox}
\end{tcbraster}
This is a special case of a `tcbraster` \textsuperscript{P.288} with the given \textit{options}.

- Here, the enclosed boxes are created using \texttt{\textbackslash tcbitem}.
- There has to be at least one \texttt{\textbackslash tcbitem}.
- One cannot use anything else than \texttt{\textbackslash tcbitem} to add something to the \textit{raster}.

This leads to a very compact syntax.

```latex
\begin{tcbitemize}
\begin{tcbraster}
\tcbitem First box
\tcbitem Second box
\tcbitem[\textcolor{yellow},colbacktitle=yellow!50!black] Another box
\tcbitem A box again
\end{tcbraster}
\end{tcbitemize}
```

\begin{tabular}{|c|c|}
\hline
Box \# 1 & Box \# 2 \\
First box & Second box \\
\hline
Box \# 3 & Box \# 4 \\
This is a box with a second line & Another box \\
\hline
Box \# 5 & \\
A box again & \\
\hline
\end{tabular}

\texttt{tcbitemize} has more restrictions than \texttt{tcbraster} \textsuperscript{P.288}. Especially, the \texttt{/tcb/capture} \textsuperscript{P.96} mode has to be \texttt{minipage}. For example, \texttt{/tcb/fit} \textsuperscript{P.423} cannot be used safely. If \texttt{/tcb/fit} \textsuperscript{P.423} should be used, turn over to \texttt{tcbraster} \textsuperscript{P.288}.

\texttt{\textbackslash tcbitem} \texttt{[\textit{options}]} \textsuperscript{P.12}

Used inside \texttt{tcbitemize} to create a new \texttt{tcolorbox} \textsuperscript{P.12} with the given \textit{options}.

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This is a convenience environment which combines a `tcolorbox` with an embedded `tcbraster`. The ⟨box options⟩ are given to the outer `tcolorbox`, while the ⟨raster options⟩ are given to the embedded `tcbraster`. This environment is especially useful for rasters inside rasters.
This is a convenience environment which combines a \texttt{tcolorbox} with an embedded \texttt{tcbitemize}. The \texttt{(box options)} are given to the outer \texttt{tcolorbox}, while the \texttt{(raster options)} are given to the embedded \texttt{tcbitemize}. This environment is especially useful for rasters inside rasters.

\begin{tcboxeditemize}[(raster options)]{(box options)}
\begin{itemize}
\item First box
\item Second box
\item This is a box with a second line
\item Another box
\item A box again
\end{itemize}
\end{tcboxeditemize}
15.3 Option Keys of the Library

\texttt{/tcb/raster columns=⟨number⟩} \hspace{1em} (no default, initially 2)

Sets the \langle number \rangle of columns for a \textit{raster}.

\begin{tcbitemize}[raster columns=3, size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}

\begin{tcbitemize}[raster columns=4, size=small,colframe=blue!50!black,colback=blue!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}

\texttt{/tcb/raster rows=⟨number⟩} \hspace{1em} (no default, initially 2)

Sets the \langle number \rangle of rows for a \textit{raster}. Note that this is only relevant in connection with setting \texttt{/tcb/raster height} P.294 to a value greater than 0pt. Then, it defines the number of rows per given height.

\texttt{/tcb/raster width=⟨length⟩} \hspace{1em} (no default, initially \texttt{\linewidth})

Sets the total raster width to the given \langle length \rangle. \texttt{/tcb/raster left skip} P.295 and \texttt{/tcb/raster right skip} P.295 are part of the total width. Note that both skip values are not changed by this option.

\begin{tcbitemize}[raster width=\texttt{\linewidth}/2, size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}
Sets the total \texttt{tcb/raster width} to \texttt{\linewidth} and adapts \texttt{tcb/raster left skip} and \texttt{tcb/raster right skip} to place the raster on the left hand side with a visual width of the given \texttt{⟨length⟩}.

\begin{tcbitemize}[raster width flush left=\linewidth/2, size=small,colframe=red!50!black,colback=red!10!white]
  \tcitem One
  \tcitem Two
  \tcitem Three
  \tcitem Four
\end{tcbitemize}

Note that the results of \texttt{tcb/raster width} and \texttt{tcb/raster width flush left} look identical, but differ on technical side since the later always fills the available \texttt{\linewidth}.

Sets the total \texttt{tcb/raster width} to \texttt{\linewidth} and adapts \texttt{tcb/raster left skip} and \texttt{tcb/raster right skip} to center the raster with a visual width of the given \texttt{⟨length⟩}.

\begin{tcbitemize}[raster width center=\linewidth/2, size=small,colframe=red!50!black,colback=red!10!white]
  \tcitem One
  \tcitem Two
  \tcitem Three
  \tcitem Four
\end{tcbitemize}

Sets the total \texttt{tcb/raster width} to \texttt{\linewidth} and adapts \texttt{tcb/raster left skip} and \texttt{tcb/raster right skip} to place the raster on the right hand side with a visual width of the given \texttt{⟨length⟩}.

\begin{tcbitemize}[raster width flush right=\linewidth/2, size=small,colframe=red!50!black,colback=red!10!white]
  \tcitem One
  \tcitem Two
  \tcitem Three
  \tcitem Four
\end{tcbitemize}
/tcb/raster height=(length) \hspace{1cm} (no default, initially \texttt{0pt})

Sets the raster height per /tcb/raster rows\textsuperscript{,}P.292 to the given \texttt{(length)}. This forces an appropriate height for the enclosed boxes. /tcb/raster before skip and /tcb/raster after skip are not part of this calculation. If the \texttt{(length)} is set to \texttt{0pt}, this feature is deactivated.

\begin{tcbitemize}[raster height=4cm, raster rows=2,  
size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item[enhanced,  
finish={\draw[blue,very thick,<->] (frame.south)   
-- node[right,pos=.75]{4cm} +(0,4); }]
Three
\item Four
\item Five
\end{tcbitemize}

\begin{tcbitemize}[raster equal skip=4mm,  
size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item Two
\item Three
\item Four
\end{tcbitemize}

/tcb/raster before skip=(glue) \hspace{1cm} (no default, initially \texttt{2mm})

Space of the given \texttt{(glue)} is inserted vertically before the \texttt{raster}. This space is discardable.

/tcb/raster after skip=(glue) \hspace{1cm} (no default, initially \texttt{2mm})

Space of the given \texttt{(glue)} is inserted vertically after the \texttt{raster}. This space is discardable.

/tcb/raster equal skip=(length) \hspace{1cm} (style, no default)

Shortcut to set /tcb/raster before skip, /tcb/raster after skip, /tcb/raster column skip\textsuperscript{,}P.295, and /tcb/raster row skip\textsuperscript{,}P.295 to the same \texttt{(length)} value.
Space of the given \langle length \rangle is inserted horizontally left of the raster.

\begin{tcbitemize}[raster left skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}

Space of the given \langle length \rangle is inserted horizontally right of the raster.

\begin{tcbitemize}[raster right skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}

Space of the given \langle length \rangle is inserted horizontally between the columns.

\begin{tcbitemize}[raster column skip=2cm, size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}

Space of the given \langle length \rangle is inserted vertically between the rows.

\begin{tcbitemize}[raster row skip=2mm, size=small,colframe=red!50!black,colback=red!10!white]
  \tcbitem One
  \tcbitem Two
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}
\begin{tcbitemize}[raster halign=center, size=small, colframe=red!50!black, colback=red!10!white]
  \tcitem One
  \tcitem Two
  \tcitem Three
\end{tcbitemize}

\begin{tcbitemize}[raster valign=top, raster columns=3, size=small, colframe=red!50!black, colback=red!10!white]
  \tcitem \huge One
  \tcitem \Large Two
  \tcitem Three
\end{tcbitemize}

\begin{tcbitemize}[raster valign=bottom, raster columns=3, size=small, colframe=red!50!black, colback=red!10!white]
  \tcitem \huge One
  \tcitem \Large Two
  \tcitem Three
\end{tcbitemize}
/tcb/raster equal height\=(type) \quad \text{(default all, initially none)}

Puts the enclosed boxes into a common /tcb/equal height group \cite{P.61}. The \langle id\rangle of the equal height group is chosen automatically, but it may be set manually by /tcb/raster equal height group. Also see /tcb/minimum for current equal height group \cite{P.62}. Feasible values for \langle type\rangle are:

- \text{none}: no equal height setting,
- \text{rows}: all boxes in a row are set to equal height,
- \text{all}: all boxes in the raster are set to equal height.

Note that you have to compile twice to see changes.

\begin{tcbitemize}[raster equal height=rows,
    size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item \Huge Two
\item Three
\item Four
\end{tcbitemize}

\begin{tcbitemize}[raster equal height,
    size=small,colframe=red!50!black,colback=red!10!white]
\item One
\item \Huge Two
\item Three
\item Four
\end{tcbitemize}

\textbf{Note that you have to compile twice to see changes.}

/tcb/raster equal height group\=(id) \quad \text{(no default)}

Overwrites the automatically chosen id with the given \langle id\rangle. If this is used to share a common height between the raster and another raster or box, the /tcb/raster equal height option should be set to all.

```
/tcbset{size=small,colframe=red!50!black,colback=red!10!white}
\begin{tcolorbox}[equal height group=raster-manual-id]
A single box
\end{tcolorbox}
\begin{tcbitemize}[raster equal height,raster equal height group=raster-manual-id]
\item One
\item \Huge Two
\end{tcbitemize}
```

A single box

\begin{tcbitemize}[raster equal height,raster equal height group=raster-manual-id]
\item One
\item \Huge Two
\end{tcbitemize}

A single box
/tcb/raster force size=true|false (default true, initially true)
Enforces the raster size computations onto the enclosed boxes. If set to false, individual settings can be used (for the better or worse).

\begin{tcbitemize}[raster force size=false, raster halign=center, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem Two
\tcbitem[add to width=-3cm] Three
\tcbitem[add to width=-3cm] Four
\tcbitem[add to width=-3cm] Five
\tcbitem[add to width=3cm] Six
\end{tcbitemize}

One Two
Three Four
Five Six

/tcb/raster reset (no value)
Sets all raster settings back to their default values. Note that /tcb/reset P.108 does not execute this option. Style settings like /tcb/raster odd column etc. are not touched by /tcb/raster reset.

15.4 Adding Styles for Specific Boxes

The following styles can be defined to address certain boxes inside a raster. Note that such style definitions are not removed by /tcb/reset P.108 or /tcb/raster reset. The style definitions are used in the order given below.

/tcb/raster every box (style)
This style is used for every box.

/tcb/raster odd column (style)
This style is used for every box in an odd column.

\begin{tcbitemize}[size=small,colframe=red!50!black,colback=red!10!white, raster odd column/.style={colframe=blue!50!black,colback=blue!10!white}]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

One Two
Three Four

/tcb/raster even column (style)
This style is used for every box in an even column.

/tcb/raster column n (style)
This style is used for every box in the n-th column. n has to be replaced by a number.

/tcb/raster odd row (style)
This style is used for every box in an odd row.
/tcb/raster even row

This style is used for every box in an even row.

\begin{tcbitemize}[size=small,colframe=red!50!black,colback=red!10!white, raster row 2/.style={colframe=blue!50!black,colback=blue!10!white}]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}

One Two

Three Four

/tcb/raster row m

This style is used for every box in the m-th row. m has to be replaced by a number.

/tcb/raster odd number

This style is used for every box with an odd number.

/tcb/raster even number

This style is used for every box with an even number.

\begin{tcbitemize}[size=small,colframe=red!50!black,colback=red!10!white, raster columns=3, raster even number/.style={colframe=blue!50!black,colback=blue!10!white}]
\tcbitem One
\tcbitem Two
\tcbitem Three
\tcbitem Four
\tcbitem Five
\tcbitem Six
\end{tcbitemize}

One Two Three

Four Five Six

/tcb/raster row m column n

This style is used for the box in the m-th row and n-th column. m and n have to be replaced by numbers.

/tcb/raster number n

This style is used for the box with number n. n has to be replaced by a number.
15.5 Combining Columns or Rows

\texttt{\textbackslash tcb/raster multicolumn=\textit{number}}

(no default, initially unset)

This option has to be set inside the option list of a \texttt{tcolorbox} \cite{P.12} inside a \texttt{tcbraster} \cite{P.288} or inside \texttt{\tcbitem} \cite{P.289} inside \texttt{tcbitemize} \cite{P.289}. It merges the given \textit{number} of boxes into one single box on the same line. The resulting box gets the \texttt{\thetcbrasternum} of the first box. If there are not enough boxes available on the current line, this option is ignored and a warning is given.

\begin{tcbitemize}[raster equal height=rows,raster columns=3,title=\texttt{\thetcbrasternum},colframe=red!50!black,colback=red!10!white]
  \tcbitem[colframe=blue!50!black,colback=blue!10!white,raster multicolumn=1]
    multicolumn=1
  \tcbitem
  \tcbitem
  \tcbitem[colframe=blue!50!black,colback=blue!10!white,raster multicolumn=2]
    multicolumn=2
  \tcbitem
  \tcbitem[colframe=blue!50!black,colback=blue!10!white,raster multicolumn=3]
    multicolumn=3
  \tcbitem
  \tcbitem[colframe=blue!50!black,colback=blue!10!white,raster multicolumn=2]
    multicolumn=2
\end{tcbitemize}
\begin{tcbitemize}[raster rows=3,raster columns=3,raster height=6cm, raster every box/.style={colframe=red!50!black,colback=red!10!white}]
  \tcbitem
  \tcbitem
  \tcbitem[\textcolor{blue}{multirow=2}]
  \tcbitem[\textcolor{blue}{raster multicolumn=2,raster multirow=2,blankest}]
  \begin{tcbitemize}[raster rows=2,raster columns=2,raster height=\textwidth]
    \tcbitem
    \tcbitem
    \tcbitem
    \tcbitem
  \end{tcbitemize}
\end{tcbitemize}
For rasters without fixed \texttt{/tcb/raster height} \textsuperscript{P.294}, \texttt{/tcb/raster multirow} \textsuperscript{P.304} cannot be used. Note that \texttt{/tcbtextheight} \textsuperscript{P.150} also cannot be used like in the previous example.

But, with combination of \texttt{/tcb/raster equal height} \textsuperscript{P.297} and \texttt{/tcb/space to} \textsuperscript{P.59}, a similar effect can be created:

\begin{tcbitemize}[raster columns=3,raster equal height=rows,
raster every box/.style={colframe=red!50!black,colback=red!10!white}]
\tcbitem
\tcbitem
\tcbitem
\tcbitem
\lipsum[2]
\tcbitem[raster multicolumn=2,blankest,space to=\myspace]
\begin{tcbitemize}[raster columns=2]
\tcbitem
\tcbitem
\tcbitem[height=\myspace]
\tcbitem[height=\myspace]
\end{tcbitemize}
\end{tcbitemize}

\begin{tcbitemize}
\tcbitem
\tcbitem
\tcbitem
\tcbitem
\lipsum[2]
\tcbitem[raster multicolumn=2,blankest,space to=\myspace]
\begin{tcbitemize}[raster columns=2]
\tcbitem
\tcbitem
\tcbitem[height=\myspace]
\tcbitem[height=\myspace]
\end{tcbitemize}
\end{tcbitemize}

\begin{tcbitemize}
\tcbitem
\tcbitem
\tcbitem
\tcbitem
\lipsum[2]
\tcbitem[raster multicolumn=2,blankest,space to=\myspace]
\begin{tcbitemize}[raster columns=2]
\tcbitem
\tcbitem
\tcbitem[height=\myspace]
\tcbitem[height=\myspace]
\end{tcbitemize}
\end{tcbitemize}


This is a box of the inner raster.

This is a box of the inner raster.
15.6 Rasters inside Rasters

A raster inside a raster cannot be used directly, because a raster can only contain a \texttt{tcolorbox} or something derived from a \texttt{tcolorbox}. So, a raster can be put inside a \texttt{tcolorbox} inside a raster.

Some examples for such constructions can be found at \texttt{tcboxedraster} \textsuperscript{P.290}, \texttt{/tcb/raster multicolumn} \textsuperscript{P.300}, \texttt{/tcb/raster multirow} \textsuperscript{P.301}.

15.6.1 Raster Setup

The intermediating \texttt{tcolorbox} \textsuperscript{P.12} can be made invisible by using \texttt{/tcb/blankest} \textsuperscript{P.242}.

\begin{verbatim}
\begin{tcbraster}
[raster equal height=rows,
  raster every box/.style={colframe=red!50!black,colback=red!10!white}]
\begin{tcolorbox}[blankest]
\begin{tcbraster}
[raster columns=1]
\begin{tcolorbox}
One
\end{tcolorbox}
\begin{tcolorbox}
Two
\end{tcolorbox}
\end{tcbraster}
\end{tcolorbox}
\begin{tcolorbox}
raster+tcolorbox+raster
\end{tcolorbox}
\end{tcbraster}
\end{verbatim}

\begin{verbatim}
\begin{tcbraster}[raster equal height=rows,
  raster every box/.style={colframe=red!50!black,colback=red!10!white}]
\begin{tcboxedraster}[raster columns=1]{blankest}
\begin{tcolorbox}
One
\end{tcolorbox}
\begin{tcolorbox}
Two
\end{tcolorbox}
\end{tcboxedraster}
\begin{tcolorbox}
raster+tcboxedraster
\end{tcolorbox}
\end{tcbraster}
\end{verbatim}

\begin{verbatim}
\begin{tcbraster}
[raster equal height=rows,
  raster every box/.style={colframe=red!50!black,colback=red!10!white}]
\tcbitem[blankest]
\begin{tcbritemize}[raster columns=1]
\tcbitem One
\tcbitem Two
\end{tcbritemize}
\tcbitem tcbitemize+tcbitem+tcbitemize
\end{tcbritemize}
\end{verbatim}
15.6.2 Placing Spaces

If the heights of boxes inside staggered rasters should be matched, the space has to be distributed accordingly.

- For fixed height boxes/rasters using `/tcb/raster height`\(^{\text{P.294}}\), the height of boxes is available by `/tcbtextheight`\(^{\text{P.150}}\). This can be used to size deeper layered boxes/rasters.

- For boxes/rasters layed out using `/tcb/raster equal height`\(^{\text{P.297}}\), space can be distributed by `/tcb/space to`\(^{\text{P.59}}\). It can take several compilations until all spaces are distributed correctly.

```
\begin{tcbitemize}[raster rows=2,raster height=6cm,
  raster every box/.style={colframe=red!50!black,colback=red!10!white}]
  \tcbitem[blankest]
  \begin{tcbitemize}[raster columns=1,raster rows=2,raster height=/tcbtextheight]
    \tcbitem One
    \tcbitem Two
  \end{tcbitemize}
  \tcbitem This is a fixed height box.
  \tcbitem Three
  \tcbitem Four
\end{tcbitemize}
```

<table>
<thead>
<tr>
<th>One</th>
<th>This is a fixed height box.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two</td>
<td></td>
</tr>
<tr>
<td>Three</td>
<td></td>
</tr>
<tr>
<td>Four</td>
<td></td>
</tr>
</tbody>
</table>
One
Two
Three
Four

Twelve
Eleven

This is an example with fixed height boxes.

Five
Six

Ten
Nine
Eight
Seven
This box will adapt its height.

This is a flexible height box.

One
This box will adapt its height.

This box will adapt its height.
16 Libraries \texttt{listings}, \texttt{listingsutf8}, and \texttt{minted}

16.1 Loading the Libraries

In contrast to other \texttt{tcolorbox} libraries, the libraries \texttt{listings}, \texttt{listingsutf8}, and \texttt{minted} are concurrent in the sense that they all do the same thing, i.e. displaying listings with or without typesetting the listing in \LaTeX parallel. The difference is the underlying \LaTeX package which does the core job for displaying a listing. So, typically, you need just \textit{one} of these libraries. If you do not have a clue which one of them you should use and you are using \texttt{pdflatex}, you should take \texttt{listingsutf8}. If you are using \texttt{xelatex} or \texttt{lualatex}, you should take \texttt{listings} as \texttt{xelatex} and \texttt{lualatex} are not compatible with \texttt{listingsutf8}.

The order in which the libraries are included influences the default settings and the \texttt{/tcb/reset} behavior. The settings of a later loaded library overwrite the settings of a previous loaded library. A library is never loaded twice.

16.1.1 Loading \texttt{listings}

This library uses the package \texttt{listings} \cite{6} to typeset listings. It is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{listings}
\end{verbatim}

This also loads the package \texttt{listings} \cite{6}.

The \texttt{/tcb/listing engine} \cite{320} is set to \texttt{listings} by the library. To reactivate this setting, if overwritten by other libraries, use

\begin{verbatim}
\tcbset{listing engine=listings}
\end{verbatim}

16.1.2 Loading \texttt{listingsutf8}

This library is not needed (and troublesome) when using Xe\LaTeX or Lua\LaTeX.

To extend \texttt{listings} for UTF-8 encoded sources, you can use the support from the package \texttt{listingsutf8} \cite{11} by loading the library variant \texttt{listingsutf8}.

\begin{verbatim}
\tcbuselibrary{listingsutf8}
\tcbset{listing utf8=latin1}% optional; 'latin1' is the default.
\end{verbatim}

This also loads the library \texttt{listings} and the packages \texttt{listings} \cite{6} and \texttt{listingsutf8} \cite{11}.

The \texttt{/tcb/listing engine} \cite{320} is set to \texttt{listings} by the library. To reactivate this setting, if overwritten by other libraries, use

\begin{verbatim}
\tcbset{listing engine=listings}
\end{verbatim}
16.1.3 Loading \texttt{minted}

This library uses the package \texttt{minted} [12] to typeset listings. It is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{minted}
\end{verbatim}

This also loads the package \texttt{minted} [12].

\begin{quote}
The \texttt{minted} package uses the external tool \texttt{Pygments} [14] to apply syntax highlighting. It has to be installed and set up, before the library can be used, see [12] and [14]. The \texttt{tcolorbox} library \texttt{minted} does not work, if the package \texttt{minted} [12] does not work.
\end{quote}

The \texttt{/tcb/listing engine} is set to \texttt{minted} by the library. To reactivate this setting, if overwritten by other libraries, use

\begin{verbatim}
\tcbset{listing engine=minted}
\end{verbatim}

16.2 Common Macros of the Libraries

\begin{verbatim}
\begin{tcblisting}{⟨options⟩}
⟨environment content⟩
\end{tcblisting}
\end{verbatim}

Creates a colored box based on a \texttt{tcolorbox} [P.12]. Controlled by the given \texttt{⟨options⟩}, the environment content is typeset normally and/or as a listing. Furthermore, the \texttt{⟨options⟩} control appearance and functions of the \texttt{tcolorbox}. By default, the listing is interpreted as a \LaTeX\ listing.

\begin{verbatim}
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black}
This is a \LaTeX\ example which displays the text as source code and in compiled form.
\end{tcblisting}
\end{verbatim}

This is a \LaTeX\ example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code and in compiled form.
This is source code in another language (XML)

```xml
<?xml version="1.0"?>
<project name="Package tcolorbox" default="documentation" basedir=".">
  <description>
    Apache Ant build file (http://ant.apache.org/)
  </description>
</project>
```

This is source code in another language (XML)

```xml
<?xml version="1.0"?>
<project name="Package tcolorbox" default="documentation" basedir=".">
  <description>
    Apache Ant build file (http://ant.apache.org/)
  </description>
</project>
```

This box is as wide as needed (listing only !!)

```latex
\begin{tcblisting}
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
\end{tcblisting}
```

```latex
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
```
\begin{tcboutputlisting}
\begin{environment content}
\end{environment content}
\end{tcboutputlisting}

Saves the environment content to a file which is named by the key value of `listing file`. Later, this file can be loaded by \texttt{\tcbinputlisting} or \texttt{\tcbuselistingtext} or \texttt{\tcbuselistinglisting}.

\begin{tcboutputlisting}
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
\end{tcboutputlisting}

\texttt{\tcbinputlisting}\{\texttt{\optlist}\}

Creates a colored boxed based on a \texttt{tcolorbox}. The text content is read from a file named by the key value of `listing file`. Apart from that, the function is equal to that of \texttt{tcblisting} \texttt{\textsuperscript{P.309}}.

\begin{tcbinputlisting}
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
\end{tcbinputlisting}

\texttt{\tcbuselistingtext}

Loads text from a file named by the key value of `listing file`.

\begin{tcbinputlisting}
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
\end{tcbinputlisting}

\texttt{\tcbuselistinglisting}

Typesets text as listing from a file named by the key value of `listing file`.

\begin{tcbinputlisting}
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
\end{tcbinputlisting}

\texttt{\tcbusetemplisting}

Typesets text as listing from a temporary file which was written by \texttt{tcbwritetemp} \texttt{\textsuperscript{P.128}}.
See Section 23.4 on page 451 and Section 23.5 on page 453 for more elaborate methods to create new environments and commands.

If a new sort of `tcblisting` environments should be created with one optional argument only, one is highly recommended to use `\DeclareTcBListing` or `\NewTcBListing` instead of `\newtcblisting` to avoid content scanning problems.

`\newtcblisting[(init options)]{⟨name⟩}{⟨number⟩}{⟨default⟩}{⟨options⟩}`

Creates a new environment `⟨name⟩` based on `tcblisting` on page 309. Basically, `\newtcblisting` operates like `\newenvironment`. This means, the new environment `⟨name⟩` optionally takes `⟨number⟩` arguments, where `⟨default⟩` is the default value for the optional first argument. The `⟨options⟩` are given to the underlying `tcblisting`. Note that `/tcb/savedelimiter` is set to the given `⟨name⟩` automatically. The `⟨init options⟩` allow setting up automatic numbering, see Section 5 from page 110.

\begin{tcblisting}{mybox}\%
  colback=red!5!white,
  colframe=red!75!black
\begin{mybox}
This is my \LaTeX\ box.
\end{mybox}
\end{tcblisting}

This is my \LaTeX\ box.
This is my \LaTeX\ box.

\begin{tcblisting}{mybox}[1]{%\%
  colback=red!5!white,
  colframe=red!75!black,
  fonttitle=\bfseries,
  title=#1}
\begin{mybox}{Listing Box}
This is my \LaTeX\ box.
\end{mybox}
\end{tcblisting}

Listing Box
This is my \LaTeX\ box.
This is my \LaTeX\ box.

\begin{tcblisting}{mybox}[2]{%\%
  colback=red!5!white,
  colframe=red!75!black,
  fonttitle=\bfseries,
  title=#2,#1}
\begin{mybox}[listing only]
  {Listing Box}
This is my \LaTeX\ box.
\end{mybox}
\bigskip
\begin{mybox}[listing side text]
  {Listing Box}
This is my \LaTeX\ box.
\end{mybox}
\end{tcblisting}

Listing Box
This is my \LaTeX\ box.

Listing Box
This is my \LaTeX\ box.
This is my \LaTeX\ box.
Definition in the preamble:
\begin{mycbox}{Listing Box}
This is my \LaTeX\ box.
\end{mycbox}
Listing 1: Listing Box
This is my \LaTeX\ box.
\begin{mycbox}{Listing Box}
This is my \LaTeX\ box.
\end{mycbox}
\renewtcblisting{(init options)}{(name)}{(number)}{(default)}{(options)}
Operates like \texttt{\newtcblisting} \texttt{P.312}, but based on \texttt{\renewenvironment} instead of \texttt{\newenvironment}. An existing environment is redefined.
\newtcbinputlisting[(init options)]{(name)}{(number)}{(default)}{(options)}

Creates a new macro \(\langle\text{name}\rangle\) based on \texttt{tcbinputlisting}. Basically, \texttt{newtcbinputlisting} operates like \texttt{newcommand}. The new macro \(\langle\text{name}\rangle\) optionally takes \(\langle\text{number}\rangle\) arguments, where \(\langle\text{default}\rangle\) is the default value for the optional first argument. The \(\langle\text{options}\rangle\) are given to the underlying \texttt{tcbinputlisting}. The \(\langle\text{init options}\rangle\) allow setting up automatic numbering, see Section 5 from page 110.

\[\text{\newtcbinputlisting[use counter from=mycbox]{\mylisting}[2][]{%}
\text{listing file=\#2,}
\text{title=Listing (\thetcbcounter) of \texttt{\#2},}
\text{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,}
\text{listing only,breakable,\#1}}\]

\[\text{\mylisting[before upper=\textit{This is the included file content:}]{\jobname.tcbtemp}}\]

\textbf{Listing (2) of tcolorbox.tcbtemp}

This is the included file content:
\[\text{\newtcbinputlisting[use counter from=mycbox]{\mylisting}[2][]{%}
\text{listing engine=minted,minted language=latex,minted style=colorful,}
\text{listing file=\#2,}
\text{title=Listing (\thetcbcounter) of \texttt{\#2},}
\text{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,}
\text{listing only,breakable,\#1}}\]

\[\text{\mylisting[before upper=\textit{This is the included file content:}]{\jobname.tcbtemp}}\]

\textbf{Listing (3) of tcolorbox.tcbtemp}

This is the included file content:
\[\text{\newtcbinputlisting[use counter from=mycbox]{\mylisting}[2][]{%}
\text{listing engine=minted,minted language=latex,minted style=colorful,}
\text{listing file=\#2,}
\text{title=Listing (\thetcbcounter) of \texttt{\#2},}
\text{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,}
\text{listing only,breakable,\#1}}\]

\[\text{\mylisting[before upper=\textit{This is the included file content:}]{\jobname.tcbtemp}}\]

\textbf{\renewtcbinputlisting[(init options)]{(name)}{(number)}{(default)}{(options)}}

Operates like \texttt{newtcbinputlisting}, but based on \texttt{renewcommand} instead of \texttt{newcommand}. An existing macro is redefined.
16.3 Option Keys of the \textbf{listings} Library

\texttt{/tcb/listing options=\{key list\}} (no default, initially \texttt{style=tcblatex})

Sets the options from the package listings [6] which are used during typesetting of the listing. For \LaTeX\ listings, there is a predefined \texttt{listings} style named \texttt{tcblatex} which can be used.

\begin{tcblisting}{colback=red!5!white,colframe=red!25,left=6mm,
listing options={style=tcblatex,numbers=left,numberstyle=\tiny\color{red!75!black}}}
This is a \LaTeX\ example which displays the text as source code and in compiled form. Additionally, we use line numbers here.
\end{tcblisting}

1 This is a \LaTeX\ example which displays the text as source code and in compiled form. Additionally, we use line numbers here.

2 This is a \LaTeX\ example which displays the text as source code and in compiled form. Additionally, we use line numbers here.

\texttt{/tcb/no listing options} (no value, initially unset)

Abbreviation for \texttt{listing options=}{}. This removes all options for the \texttt{listings} package. This includes the \texttt{tcblisting} standard style \texttt{tcblatex} and the encoding presets. Use this option, if you want to set the \texttt{listings} options outside of \texttt{tcblisting}, e.g. globally in the preamble.

\begin{tcblisting}{no listing options}
All \textit{listings} options removed.
\end{tcblisting}

All \textit{listings} options removed.

\texttt{/tcb/listing style=\{style\}} (no default, initially \texttt{tcblatex})

Abbreviation for \texttt{listing options=}{}. This key sets a \texttt{(style)} for the \texttt{listings} package, see [6]. For \LaTeX, there is a predefined style named \texttt{tcblatex}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,
listing style=tcblatex}
Here, we use the predefined style.
\end{tcblisting}

Here, we use the predefined style.
/tcb/listing inputencoding = (encoding) (no default, initially \inputencodingname)
Sets the input encoding value for the predefined listing style tcblatex and
tcbdocumentation from the library \documentclass. The initial value is derived
from the package inputenc if used.

/tcb/listing remove caption = true | false (default true, initially true)
If set to true, some part of the caption building code of the listings package is silenced to
prevent some unwanted interaction with the hyperref package resulting in additional verti-
cal space. If set to false, the listings package code is kept unchanged. Note that listings
outside tcblisting \textsuperscript{P.309} and \tcbinputlisting \textsuperscript{P.311} are always processed normally.
Typically, a user is not expected to use this key at all.

/tcb/every listing line = (text) (no default, initially unset/empty)
Inserts some \textit{(text)} to the begin of every line of a listing. Note that this a hack of the
listings package code. This may become unusable or superfluous in the future.

\newtcblisting{commandshell}{colback=black, colupper=white, colframe=yellow!75!black,
listing only, listing options={style=tcblatex, language=sh},
every listing line={\textcolor{red}{\small\ttfamily\bfseries root \$> }}}
\begin{commandshell}
ls -al
cd /usr/lib
\end{commandshell}

\newtcblisting{commandshell}{colback=black, colupper=white, colframe=yellow!75!black,
listing only, listing options={style=tcblatex, language=sh}, hbox,
every listing line={\textcolor{red}{\small\ttfamily\bfseries root \$> }}}
\begin{commandshell}
ls -al
cd /usr/lib
\end{commandshell}

See further options in Section 16.6 on page 320.

For an combined example of using \lstinline inside a tcolorbox, see
\DeclaGreekTotalTCBox \textsuperscript{P.449}.
16.4  Option Keys of the \lstinline{listingsutf8} Library

The \lstinline{listingsutf8} library is not needed (and troublesome) when using XeLaTEX or LuaLaTEX.

The \lstinline{listingsutf8} library is an extension of the \lstinline{listings} library, so all options from Section 16.3 on page 315 are applicable.

\texttt{/tcb/listing utf8\{(one-byte-encoding)\}} \hspace{25pt} (style, no default, initially \texttt{latin1})

Abbreviation for using \texttt{/tcb/listing inputencoding\texttt{utf8}} together with UTF-8 support from the package \lstinline{listingsutf8} [11]. This option is available only for the library variant \lstinline{listingsutf8}. The \texttt{(one-byte-encoding)} is one of the applicable encodings from [11], e.g. \texttt{latin1} which is the default.

Be aware that this means restriction to this specific \texttt{(one-byte-encoding)}: e.g. \texttt{latin1} comprises umlauts and other accented characters, but not the Euro sign. If you want to use the \lstinline{listings} package and «real» UTF-8 source code, then do \emph{not} use \lstinline{listingsutf8} but \lstinline{listings} with \texttt{/tcb/listing inputencoding\texttt{utf8}} and with specific manual hacks for specific UTF-8-encoded characters.

See further options in Section 16.6 on page 320.
16.5 Option Keys of the `minted` Library

Sets a `(programming language)` known to Pygments [14].

```
\begin{tcblisting}{listing engine=minted,minted style=trac,}
minted language=java,
colback=red!5!white,colframe=red!75!black,listing only}
\begin{verbatim}
public class HelloWorld {
    // A 'Hello World' in Java
    public static void main(String[] args) {
        System.out.println("Hello World!");
    }
}
\end{verbatim}
\end{tcblisting}
```

```
public class HelloWorld {
    // A 'Hello World' in Java
    public static void main(String[] args) {
        System.out.println("Hello World!");
    }
}
```

Sets the options from the package `minted` [12] which are used during typesetting of the listing.

```
\begin{myjava}
public class HelloWorld {
    // A 'Hello World' in Java
    public static void main(String[] args) {
        System.out.println("Hello World!");
    }
}
\end{myjava}
```

```
public class HelloWorld {
    // A 'Hello World' in Java
    public static void main(String[] args) {
        System.out.println("Hello World!");
    }
}
```

Sets a ⟨style⟩ known to Pygments [14]. This is independent from \tcb/minted options\textsuperscript{P.318}. Note that styles are always applied globally; all following examples will be set in the given ⟨style⟩ until a new style is set. Also note that setting \usemintedstyle{⟨style⟩} only once per document is more economic, if all styles in a document are the same. For examples of different styles, see \tcb/minted language\textsuperscript{P.318} and \tcb/minted options\textsuperscript{P.318}.

See further options in Section 16.6 on the next page.
16.6 Common Option Keys of all Libraries

For the \langle options \rangle in \texttt{tcblisting}\(^\text{P.\,309}\) respectively \texttt{tcbinputlisting}\(^\text{P.\,311}\) the following \texttt{pgf} keys can be applied. The key tree path /tcb/ is not to be used inside these macros.

\texttt{/tcb/listing engine=\langle engine \rangle} (no default)

Sets the \langle engine \rangle which typesets the listings. Feasible values are

- \texttt{listings}, if library \texttt{listings} or \texttt{listingsutf8} is loaded.
- \texttt{minted}, if library \texttt{minted} is loaded.

\texttt{/tcb/listing file=\langle file name \rangle} (no default, initially \texttt{\jobname.listing})

Sets the \langle file name \rangle of the file which is used to save listings.

\texttt{/tcb/listing and text} (no value, initially set)

Typesets the environment content as listing in the upper part and as compiled text in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing and text}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

This is a \LaTeX\ example.

\texttt{/tcb/text and listing} (no value)

Typesets the environment content as compiled text in the upper part and as listing in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text and listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

This is a \LaTeX\ example.

\texttt{/tcb/listing only} (no value)

Typesets the environment content as listing.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing only}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
/tcb/text only

Typesets the environment content as compiled text.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text only}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

/tcb/comment=(text)

Records a comment with \langle text \rangle as content. The comment is displayed e.g. in conjunction with /tcb/listing and comment → P.324 and /tcb/comment and listing → P.324.

\begin{tcblisting}{comment={This comment is really only a comment},
 colback=red!5!white,colframe=red!75!black}
This is a \textbf{tcolorbox}.
\end{tcblisting}

This is a \textbf{tcolorbox}.

This is a tcolorbox.

/tcb/comment only

Typesets the environment content with the comment text.

\begin{tcblisting}{comment only,
 comment={This is a comment.},
 colback=red!5!white,colframe=red!75!black}
This is a \textbf{tcolorbox}.
\end{tcblisting}

This is a comment.

/tcb/image comment=(options){(filename)}

Uses an image denoted by \langle filename \rangle as comment for the listing. The image is included by the standard \includegraphics macro with given \langle options \rangle.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment,
 image comment={width=2.5cm}{example-image-a.pdf},center lower}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
\texttt{/tcb/tcbimage comment=\langle filename\rangle} \hspace{1cm} (style, no default, initially unset)

Uses an image denoted by \langle filename\rangle as \textit{comment} for the listing. The image is included by the \texttt{\tcbincludegraphics} \hspace{1cm} \textsuperscript{P.254} macro. The inclusion can be customized by \texttt{/tcb/comment style} \hspace{1cm} \textsuperscript{P.324}.

![The library \textcolor{red}{\texttt{\textbackslash{}skins}} is needed to apply this option.]

\begin{verbatim}
% \tcbuselibrary{skins}
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment,
  righthand width=3cm,lower separated=false,
  tcbimage comment={example-image-a.pdf},
  comment style={size=fbox,colframe=blue,colback=blue!50,sharp corners,
    drop fuzzy shadow}}
This is a \LaTeX\ example.
\end{tcblisting}
\end{verbatim}

![This is a \LaTeX\ example.]

\texttt{/tcb/pdf comment=\langle filename\rangle} \hspace{1cm} (style, default listing file, initially unset)

Uses a PDF file denoted by \langle filename\rangle as \textit{comment} for the listing. The image is included by \texttt{\tcbincludepdf} \hspace{1cm} \textsuperscript{P.256} inside a \texttt{tcbraster} \hspace{1cm} \textsuperscript{P.288}. The inclusion can be customized by \texttt{/tcb/comment style} \hspace{1cm} \textsuperscript{P.324}.

![The libraries \textcolor{red}{\texttt{\textbackslash{}skins}} and \textcolor{blue}{\texttt{\textbackslash{}raster}} are needed to apply this option.]

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This is a \LaTeX\ example.
/tcb/pdf extension=(extension)  
(no default, initially pdf)
Sets the PDF file name extension for /tcb/pdf comment \textsuperscript{P.322} to \textit{extension}. Note that \textit{extension} always overwrites any actual extension given inside /tcb/pdf comment \textsuperscript{P.322}.

/tcb/comment style=(options)  
(no default, initially empty)
Sets the \textit{options} for /tcb/tcbimage comment \textsuperscript{P.322} and /tcb/pdf comment \textsuperscript{P.322}. These are \texttt{tcolorbox} options to customize the colored box drawn around the image(s), also image options encapsulated by /tcb/graphics options \textsuperscript{P.257}, and \texttt{tcbraster} \textsuperscript{P.288} options for /tcb/pdf comment \textsuperscript{P.322}.

/tcb/listing and comment  
(no value)
Typesets the environment content as listing in the upper part and a given comment in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing and comment,  
comment={This is my comment. It may contain line breaks.\par  
It can even use the environment content  
\texttt{\flqq ignorespaces\tcbuselistingtext\unskip\frqq}}}  
This is a \LaTeX\ example.  
\end{tcblisting}

This is my comment. It may contain line breaks. It can even use the environment content «This is a \LaTeX\ example.»

/tcb/comment and listing  
(no value)
Typesets a given comment in the upper part and the environment content as listing in the lower part.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment and listing,  
comment={This is my comment.}}  
This is a \LaTeX\ example.  
\end{tcblisting}

This is my comment.

This is a \LaTeX\ example.
/tcb/listing side text  
Typesets the environment content side by side as listing in the left (upper) part and as compiled text in the right (lower) part. This is a shortcut for setting /tcb/listing and text P.320 and /tcb/sidebyside P.118.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side text}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.  
This is a \LaTeX\ example.

Note that sidebyside=false has to be added, if the setting of /tcb/listing side text is to be annihilated.

/tcb/text side listing  
Typesets the environment content side by side as compiled text in the left (upper) part and as listing in the right (lower) part. This is a shortcut for setting /tcb/text and listing P.320 and /tcb/sidebyside P.118.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text side listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.  
This is a \LaTeX\ example.

/tcb/listing outside text  
Typesets the environment content side by side as listing in a tcolorbox and as compiled text outside the box in the right part of the page. Nevertheless, the outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 118.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing outside text}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.  
This is a \LaTeX\ example.

/tcb/text outside listing  
Typesets the environment content side by side as listing in a tcolorbox and as compiled text outside the box in the left part of the page. Nevertheless, the outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 118.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text outside listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.  
This is a \LaTeX\ example.
/tcb/listing side comment (style, no value)
Typesets the environment content side by side as listing in the left (upper) part and a
given comment in the right (lower) part. This is a shortcut for setting /tcb/listing and
comment →P.324 and /tcb/sidebyside →P.118.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side comment, righthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

/tcb/comment side listing (style, no value)
Typesets the environment content side by side with a given comment in the left (upper) part and as listing in the right (lower) part. This is a shortcut for setting /tcb/comment and listing →P.324 and /tcb/sidebyside →P.118.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment side listing, lefthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment outside listing, lefthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

/tcb/listing outside comment (no value)
Typesets the environment content side by side as listing in a tcolorbox and a given comment outside the box in the right part of the page. Nevertheless, the outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 118.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing outside comment, righthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

/tcb/comment outside listing (no value)
Typesets the environment content side by side as listing in a tcolorbox and a given comment outside the box in the left part of the page. Nevertheless, the outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 6 on page 118.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment outside listing, lefthand width=1.5cm,image comment={width=1.5cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.
Typesets the environment content as listing in a tcolorbox and as compiled text outside and below the box. The outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The distance between box and text is controlled by \texttt{/tcb/middle}~\textsuperscript{P.43}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing above text}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text above listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text above listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

\texttt{N 2014-11-07 /tcb/text above listing}

Typesets the environment content as listing in a tcolorbox and as compiled text outside and above the box. The outside text is treated as lower part of the tcolorbox and can be formatted with all lower part options. The distance between box and text is controlled by \texttt{/tcb/middle}~\textsuperscript{P.43}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text above listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

\texttt{N 2014-11-07 /tcb/text above* listing}

Widely equal to \texttt{/tcb/text above listing}, but the outside text is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and text is controlled by \texttt{/tcb/before}~\textsuperscript{P.80}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text above listing}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

\texttt{N 2014-11-07 /tcb/text above* listing}

Widely equal to \texttt{/tcb/text above listing}, but the outside text is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and text is controlled by \texttt{/tcb/before}~\textsuperscript{P.80}.
/tcb/listing above comment (no value)
Typesets the environment content as listing in a \texttt{tcolorbox} and a given comment outside and below the box. The outside text is treated as \textit{lower} part of the \texttt{tcolorbox} and can be formatted with all lower part options. The distance between box and comment is controlled by \texttt{/tcb/middle} \textit{\ref{P.43}}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing above comment, center lower,image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment above listing, center lower,image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

\textbf{/tcb/listing above* comment} (no value)
Widely equal to \texttt{/tcb/listing above comment}, but the outside comment is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and comment is controlled by \texttt{/tcb/after} \textit{\ref{P.80}}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment above listing, center lower,image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

\textbf{/tcb/comment above listing} (no value)
Typesets the environment content as listing in a \texttt{tcolorbox} and a given comment outside and above the box. The outside text is treated as \textit{lower} part of the \texttt{tcolorbox} and can be formatted with all lower part options. The distance between box and comment is controlled by \texttt{/tcb/middle} \textit{\ref{P.43}}.

\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment above listing, center lower,image comment={width=3cm}{example-image-a.pdf}}
This is a \LaTeX\ example.
\end{tcblisting}

This is a \LaTeX\ example.

\textbf{/tcb/comment above* listing} (no value)
Widely equal to \texttt{/tcb/comment above listing}, but the outside comment is not formatted with the lower part options. Also, it is not put into a minipage and it may span several pages. The distance between box and comment is controlled by \texttt{/tcb/before} \textit{\ref{P.80}}.
16.7 Option Keys for Processing and Full Document Examples

A complete \LaTeX document including `\documentclass`, `\begin{document}` and `\end{document}` cannot be processed directly by tcolorbox. It always has to be compiled separately. There are two methods supported by the package to process and display such a full document example:

- Prepare and compile the example document independent from your main document. The source file and the resulting PDF file can be included into the main document afterwards. This is the most economic way since the example document can be left untouched after the example is complete.

- The other possibility is to compile the example on the fly while the main document is compiled. This way has some charm, because the example can be edited inside the main document. But be aware that the compilation of the example is issued on every run of the main document. Also, there are fewer degrees of freedom how the example is compiled.

For both methods, the resulting example PDF file can be included as a `/tcb/pdf comment`. The following example shows how to apply the first method. There already is a file `tcolorbox-example.tex` and a PDF file `tcolorbox-example.pdf`. Both of them are input partly by the following:

```latex
\documentclass{article}
\usepackage{tikz,lipsum,lmodern}
\usepackage[most]{tcolorbox}
\begin{document}
%----------------------------------------------------------
\section{Colored boxes}
\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black]
My box.
\end{tcolorbox}
\begin{tcolorbox}[colback=blue!5!white,colframe=blue!75!black,title=My title]
My box with my title.
\end{tcolorbox}
\begin{tcolorbox}[colback=green!5!white,colframe=green!75!black]
Upper part of my box.
\tcblower
Lower part of my box.
\end{tcolorbox}
\end{document}
```

---

% \tcbuselibrary{breakable,skins,raster}
\tcbinputlisting{
  enhanced jigsaw,breakable,pad at break=*2mm,height fixed for=first and middle,
  lower separated=false,
  leftlower=0pt,rightlower=0pt,middle=0pt,
  colframe=red!50!black,colback=yellow!10!white,
  listing and comment,
  listing file={tcolorbox-example},
  listing options=
  {style=tcblatex,texcsstyle={\color{red!70!black},firstline=20,lastline=85},
   after upper={\par\bf\tiny\ldots\par},
   pdf comment,
   comment style={drop lifted shadow,graphics pages={1,...,4}},
  }
\}

\documentclass{article}
\usepackage{tikz,lipsum,lmodern}
\usepackage[most]{tcolorbox}
\begin{document}
%----------------------------------------------------------
\section{Colored boxes}
\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black]
My box.
\end{tcolorbox}
\begin{tcolorbox}[colback=blue!5!white,colframe=blue!75!black,title=My title]
My box with my title.
\end{tcolorbox}
\begin{tcolorbox}[colback=green!5!white,colframe=green!75!black]
Upper part of my box.
\tcblower
Lower part of my box.
\end{tcolorbox}
\end{document}

---
I can do this also with a title.

Lower part of my box.

Now, we play hide and seek. Where is the lower part?

I'm invisible until you find me.

This box is filled with an external image. Title and interior are made partly transparent to show the image.

This box uses a \textit{boxed title}. The box of the title can be formatted independently from the main box.
Theorem 3.1: Summation of Numbers

For all natural number \( n \) it holds:
\[
\sum_{i=1}^{n} i = \frac{n(n + 1)}{2}.
\]
\documentclass{beamer}
\usetheme{Warsaw}
\begin{document}
\begin{frame}{Beamer example}
\begin{block}{Hello World}
\begin{itemize}[:-]\item One \item Two\end{itemize}
\end{block}
\begin{alertblock}{Integral}\begin{equation}
\end{equation}\end{alertblock}
\end{frame}
\end{document}
\documentclass{beamer}
\usetheme{Warsaw}
\begin{document}
\begin{frame}{Beamer example}
\begin{block}{Hello World}
\begin{itemize}[<+->]
\item One
\item Two
\end{itemize}
\end{block}
\begin{alertblock}{Integral}
\begin{equation}
\int_1^x \frac{1}{t} \, dt = \ln(x). \tag{1}
\end{equation}
\end{alertblock}
\end{frame}
\end{document}
\begin{tcblisting}{enhanced jigsaw, 
title={PSTricks with pdflatex},fonttitle=\bfseries, 
colframe=red!50!black,colback=yellow!10!white, 
listing options={style=tcblatex,texcsstyle=\color{red!70!black}}, 
lower separated=false,middle=0pt, 
listing side comment,righthand width=4cm, 
compilable listing, 
runk latex,runk dvips,runk ps2pdf, 
pdf comment,freeze pdf, 
comment style={raster columns=1, 
graphics options={viewport=0.5in 7.7in 3.5in 10.5in,clip}}, 
} 
\documentclass{article} 
\usepackage{pstricks,multido} 
\begin{document} 
\psset{unit=3} \%
\multido{\nHue=0.01+0.01}{100}{% 
\definecolor{MyColor}{hsb}{\nHue,1,1}% 
\pscircle[linewidth=0.01,linestyle=MyColor]{\nHue}} 
\end{document} 
\end{tcblisting}
For most applications, you will like to add `/tcb/freeze pdf` as option, since the included `pdf` file is only refreshed, if the source for this file has changed.

```
/tcb/freeze file=(file)
```

(no default, initially unset)

Observes some `(file)`, usually the final file produced by `/tcb/process code`\(^{P.332}\), `/tcb/run system command`\(^{P.332}\), `/tcb/run pdflatex`\(^{P.332}\), etc. If the MD5 checksum of the current `/tcb/listing file`\(^{P.320}\) is unchanged and `(file)` exists, the processing is skipped and the `(file)` is kept (frozen). Typically, the style `/tcb/freeze pdf` can be used for convenience.

```
/tcb/freeze none
```

(no default, initially set)

Freeze no file and always execute the given process commands.

```
/tcb/freeze extension=(text)
```

(style, no default)

Calls `/tcb/freeze file` with the current `/tcb/listing file`\(^{P.320}\) stripped with its extension plus `(text)` as new extension.

```
... listing file=myfile.tex, freeze extension=modified.pdf, % -> myfile-modified.pdf is observed ...
```

```
/tcb/freeze pdf
```

(no value)

Calls `/tcb/freeze file` with the current `/tcb/listing file`\(^{P.320}\) stripped with its extension plus `.pdf` as new extension.

```
/tcb/freeze png
```

(no value)

Calls `/tcb/freeze file` with the current `/tcb/listing file`\(^{P.320}\) stripped with its extension plus `.png` as new extension. See the examples for `/tcb/run pdflatex`\(^{P.332}\) and `/tcb/run ps2pdf`\(^{P.334}\).

```
/tcb/freeze jpg
```

(no value)

Calls `/tcb/freeze file` with the current `/tcb/listing file`\(^{P.320}\) stripped with its extension plus `.jpg` as new extension.

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16.8 Creation of \LaTeX\ Tutorials

The following source code gives a guideline for the creation of \LaTeX\ tutorials. In the next section, a framework for \LaTeX\ exercises is described. All examples shall be numbered optionally.

Firstly, some additional \texttt{tcb} keys are defined for the appearance. For the examples, three environments \texttt{texexp}, \texttt{texexptitled}, and \texttt{texexptitledspec} are defined with automatic numbering.

- \texttt{texexp} is used for untitled examples,
- \texttt{texexptitled} is used for titled examples,
- \texttt{texexptitledspec} is used for titled examples with special treatment.

\begin{quote}
\textit{Definition in the preamble:}
\begin{verbatim}
\tcbset{
  texexp/.style={colframe=red!50!yellow!50!black, colback=red!50!yellow!5!white, 
  coltitle=red!50!yellow!3!white, 
  fonttitle=\small\textsf{\bfseries}, fontupper=\small, fontlower=\small},
 example/.style 2 args={texexp, 
  title={Example \thetcbcounter: #1},label={#2}},
}
\newtcblisting{texexp}[1]{texexp,#1}
\newtcblisting[auto counter,number within=section]{texexptitled}[3][]{% 
  example={#2}{#3},#1}
\newtcolorbox[use counter from=texexptitled]{texexptitledspec}[3][]{% 
  example={#2}{#3},#1}
\end{verbatim}
\end{quote}

\begin{quote}
\begin{tcblisting}{texexp}
This is a \LaTeX\ example which displays the text as source code and in compiled form.
\end{tcblisting}
\end{quote}

This is a \LaTeX\ example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code and in compiled form.

\begin{quote}
\begin{tcblisting}{texexptitled}
\texttt{First example with a title line}\{firstExample\}
Here, we use Example \texttt{\ref{firstExample}} with a title line.
\end{tcblisting}
\end{quote}

\begin{quote}
\textbf{Example 16.1: First example with a title line}
Here, we use Example \texttt{\ref{firstExample}} with a title line.
\end{quote}

Here, we use Example 16.1 with a title line.
This is a \LaTeX\ example which displays the text as source code and in compiled form.

---

This is a \LaTeX\ example which displays the text as source code and in compiled form.

---

This is a \LaTeX\ example which displays the text as source code only.

---

This is an example which displays the text in compiled form only.

---

Example 16.2: An Example with a Heading

This is a \LaTeX\ example with a numbered heading line which can be referred to.

Here, we see Example 16.2.
The keys can be used in combination. Here, an example with a heading line and source code only is given.

Here, we see Example \ref{heading2}.

\begin{texexptitled}{listing only}{Another Example with a Heading}{heading2}
The keys can be used in combination. Here, an example with a heading line and source code only is given.
\end{texexptitled}

Example 16.3: Another Example with a Heading

The keys can be used in combination. Here, an example with a heading line and source code only is given.

Here, we see Example 16.3.

\begin{texexptitled}{float}{A floating Example with a Heading}{heading3}
This is another \LaTeX\ example with numbered heading line. But now, the box is a floating object.
\end{texexptitled}

Example 16.4: A floating Example with a Heading

This is another \LaTeX\ example with numbered heading line. But now, the box is a floating object.

This is another \LaTeX\ example with numbered heading line. But now, the box is a floating object.

The floating box of the last example is seen as Example \ref{heading3} on page \pageref{heading3}.

The floating box of the last example is seen as Example 16.4 on page 338.

\begin{texexptitledspec}{Special application}{texexpbox1}
\begin{lstlisting}[style=tcblatex]
Some \LaTeX\ source code.
\end{lstlisting}
\tcblower
For special cases, the environment |texexptitledspec| with style |example| can be used directly. As one can see, the upper and the lower part of the box can be used uncoupled also.
\end{texexptitledspec}

Example 16.5: Special application

Some \LaTeX\ source code.

For special cases, the environment \texttt{texexptitledspec} with style \texttt{example} can be used directly. As one can see, the upper and the lower part of the box can be used uncoupled also.

The following series of examples demonstrate the application of \texttt{tcolorbox} \textsuperscript{\textsuperscript{P.12}} options for diversification.
Example 16.6: How to use options (1):
The basic example

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}

Example 16.7: How to use options (2):
The text output is centered and the segmentation line has vanished.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
### Example 16.8: How to use options (3):
Here, the \texttt{tikzpicture} is totally hidden. The \texttt{bicolor} skin highlights the output.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}

### Example 16.9: How to use options (4):
The \texttt{bicolor} skin also works with side by side mode.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
Example 16.10: How to use options (5):
Putting our picture outside is just a matter of one word.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
 (\w:1cm) circle (7mm);}
\end{tikzpicture}

Example 16.11: How to use options (6):
The picture may also be put above the listing box.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
 (\w:1cm) circle (7mm);}
\end{tikzpicture}
Example 16.12: How to use options (7): Our style is easily transformed into a beamerish one.

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
 (\w:1cm) circle (7mm);}
\end{tikzpicture}
16.9 Creation of \texttt{\LaTeX} Exercises

In the following, a guideline is given for the creation of \LaTeX exercises with solutions. These solutions are saved to disk for application at a place of choice. Therefore, all used exercises are logged to a file \texttt{jobname.records} for automatic processing. The solution contents themselves are saved to a subdirectory named \texttt{solutions}. Also see Section 8 on page 130.

- Before the first exercise is given, \texttt{\tcbstartrecording} has to be called to start recording.

- The solution is given as content of a \texttt{tcboutputlisting} environment. Note, that you can use this content also inside the exercise with \texttt{\tcbuselistingtext} in compiled form.

- After the last exercise is given (and before using the solutions), \texttt{\tcbstoprecording} has to be called to stop recording.

- The solutions are loaded by \texttt{\tcbinputrecords}.

Inside the exercise text, there may be text parts which are needed as \LaTeX source code and as compiled text as well. These parts can be saved by \texttt{\tcbwritetemp} and used in compiled form by \texttt{\tcbusetemp} or as source code by \texttt{\tcbusetemplisting}.

At first, we generate some a common style for the exercises and the solutions. Further, since exercises and solutions should be numbered, we force to use a label \langle \textit{marker} \rangle. Automatically, the label \texttt{exe:⟨marker⟩} is used to mark the exercise and the label \texttt{sol:⟨marker⟩} is used to mark the solution.

\begin{verbatim}
\tcbset{texercisestyle/.style={arc=0.5mm, colframe=blue!25!yellow!90!white, colback=blue!25!yellow!5!white, coltitle=blue!25!yellow!40!black, fonttitle=\small\sffamily\bfseries, fontupper=\small, fontlower=\small, listing options={style=tcblatex,texcsstyle=\textcolor{red!40!black}},}}
\end{verbatim}

With these preparations, the kernel environment \texttt{texercise} for our exercises is created quickly:

\begin{verbatim}
\newtcolorbox[auto counter,number within=section,list inside=exam]{texercise}[2][]{% texercisestyle, listing file={solutions/texercise/\thetcbcounter.tex}, label={exe:#2}, record={\string\processsol{solutions/texercise/\thetcbcounter.tex}{#2}}, title={Exercise \thetcbcounter\hfill Solution on page \pageref{sol:#2}}, list text={Exercise with solution on page \pageref{sol:#2}},#1}
\end{verbatim}

\texttt{Definition in the preamble:}

\begin{verbatim}
\newcolorbox[auto counter,number within=section,list inside=exam]{texercise}[2][]{% texercisestyle, listing file={solutions/texercise/\thetcbcounter.tex}, label={exe:#2}, record={\string\processsol{solutions/texercise/\thetcbcounter.tex}{#2}}, title={Exercise \thetcbcounter\hfill Solution on page \pageref{sol:#2}}, list text={Exercise with solution on page \pageref{sol:#2}},#1}
\end{verbatim}
The following examples demonstrate the application.

\begin{tcboutputlisting}
\begin{tabular}{|p{3cm}|p{3cm}|p{3cm}|p{3cm}|}
\hline
\multicolumn{4}{|c|}{\bfseries Das alte Italien} \\
\hline
\multicolumn{2}{|c|}{\bfseries Antike} & \multicolumn{2}{c|}{\bfseries Mittelalter} \\
\hline
\multicolumn{1}{|c|}{\itshape Republik} & \multicolumn{1}{c|}{\itshape Kaiserreich} & \multicolumn{1}{c|}{\itshape Franken} & \multicolumn{1}{c|}{\itshape Teilstaaten} \\
\hline
In den Zeiten der römischen Republik standen dem Staat jeweils zwei Konsuln vor, deren Machtbefugnisse identisch waren. & Das römische Kaiserreich wurde von einem Alleinherrscher, dem Kaiser, regiert. & In der Völkerwanderungszeit übernahmen die Goten und später die Franken die Vorherrschaft. & Im späteren Mittelalter regierten Fürsten einen Fleckenteppich von Einzelstaaten. \\
\hline
\end{tabular}
\end{tcboutputlisting}

Exercise 16.1

Create the following table:

<table>
<thead>
<tr>
<th>Antike</th>
<th>Mittelalter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Republik</td>
<td>Kaiserreich</td>
</tr>
</tbody>
</table>
Create a new macro \verb+\headingline+ which produces the following output:
\headingline{Very important heading}

Exercise 16.2

Create a new macro \verb+\minitable+ which produces the following output:
\minitable{My heading}{In this tiny tabular, there is only a heading and some text below which has a width of ten centimeters.}

Exercise 16.3
Create a new macro \verb+\synop+ which typesets a synoptic text according to the following example. Base your macro on a tabular which takes the total line width.

\begin{tcbverbatiminline}
\synop{Neil Armstrong}
{That's one small step for a man, one giant leap for mankind.}
{Das ist ein kleiner Schritt für einen Mann, ein riesiger Sprung für die Menschheit.}
\end{tcbverbatiminline}

Exercise 16.4

Create a new macro \verb+\synop+ which typesets a synoptic text according to the following example. Base your macro on a tabular which takes the total line width.

\begin{tcbverbatiminline}
\synop{Neil Armstrong}
{That's one small step for a man, one giant leap for mankind.}
{Das ist ein kleiner Schritt für einen Mann, ein riesiger Sprung für die Menschheit.}
\end{tcbverbatiminline}

Now, we give a list of all exercises with:

\begin{tcbverbatiminline}
\listof
\subsection{List of Exercises}
\label{listofexercises}
\begin{itemize}
\item[16.1] Exercise with solution on page 347 ........................................... 344
\item[16.2] Exercise with solution on page 347 ........................................... 345
\item[16.3] Exercise with solution on page 347 ........................................... 345
\item[16.4] Exercise with solution on page 348 ........................................... 346
\end{itemize}
\end{tcbverbatiminline}

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16.11 Solutions for the given \LaTeX\ Exercises

For all solutions, a macro \texttt{\processsol} was written to the file \texttt{\jobname.records}. Now, we need a definition for this macro to use the solutions.

```latex
\usepackage{hyperref} % for phantomlabel
\newtcbinputlisting{\processsol}[2]{
\texttt{\textexercisestyle},
listing only,
listing file={#1},
phantomlabel={sol:#2},%
title={Solution for Exercise \ref{exe:#2} on page \pageref{exe:#2}},
}
```

The loading of all solutions is done by:

\texttt{\tcbinputrecords}

With this, we get:

Solution for Exercise 16.1 on page 344

```latex
\begin{tabular}{|p{3cm}|p{3cm}|p{3cm}|p{3cm}|}
\hline
\multicolumn{4}{|c|}{\bfseries\itshape Das alte Italien}\
\hline
\multicolumn{2}{|c|}{\bfseries Antike} & \multicolumn{2}{c|}{\bfseries Mittelalter}\
\hline
\multicolumn{1}{|c|}{\itshape Republik} & \multicolumn{1}{c|}{\itshape Kaiserreich} & \multicolumn{1}{c|}{\itshape Franken} & \multicolumn{1}{c|}{\itshape Teilstaaten}\
\hline
In den Zeiten der römischen Republik standen dem Staat jeweils zwei Konsuln vor, deren Machtbefugnisse identisch waren. & Das römische Kaiserreich wurde von einem Alleinherrscher, dem Kaiser, regiert. & In der Völkerwanderungszeit übernahmen die Goten und später die Franken die Vorherrschaft. & Im späten Mittelalter regierten Fürsten einen Fleckenteppich von Einzelstaaten.
\hline
\end{tabular}
```

Solution for Exercise 16.2 on page 345

```latex
\newcommand{\headingline}[1]{
\begin{center}\Large\bfseries #1\end{center}}
```

Solution for Exercise 16.3 on page 345

```latex
\newcommand{\minitable}[2]{
\begin{center}\begin{tabular}{p{10cm}}
\hline
\multicolumn{1}{c}{\bfseries #1}\
\hline
#2\
\hline
\end{tabular}\end{center}}
```
\newcommand{\synop}[3]{%
  \begin{tabular}{@{}p{\linewidth-\tabcolsep*2-\arrayrulewidth/2}|%
    p{\linewidth-\tabcolsep*2-\arrayrulewidth/2}@{}}
  \hline
  \multicolumn{2}{c}{\bfseries #1}\\ \hline
  \multicolumn{1}{c|}{\itshape English}&
  \multicolumn{1}{c}{\itshape German}\\ \hline
  #2 & #3 \\
  \hline
  \end{tabular}%
}
17 Library \textit{theorems}

The library is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{theorems}
\end{verbatim}

This also loads the package \texttt{amsmath}.

17.1 Macros of the Library

\newtcbtheorem[(init options)]{(name)}{(display name)}{(options)}{(prefix)}

Creates new environments \langle name\rangle and \langle name\rangle* based on \texttt{tcolorbox} to frame a (mathematical) theorem. The \langle display name\rangle is used in the title line with a number, e.g. «Theorem 5.1». The \langle options\rangle are given to the underlying \texttt{tcolorbox} to control the appearance. The \langle init options\rangle allow setting up automatic numbering, see Section 5 on page 110. The new environment \langle name\rangle takes one optional and two mandatory parameters. The optional parameter supplements the options and should be used only in rare cases. The first mandatory parameter is the title text for the theorem and is also set as /tcb/nameref \textsuperscript{P.101} identifier. The second mandatory parameter is a \langle marker\rangle. The theorem is automatically labeled with \langle prefix\rangle\langle separator\rangle\langle marker\rangle where \langle separator\rangle is predefined as ‘:’, see /tcb/label separator \textsuperscript{P.356}. The new environment \langle name\rangle* takes one optional and one mandatory parameter and represents an unnumbered variant of the environment \langle name\rangle. This variant is not labeled and not listed in lists of theorems.

\begin{verbatim}
\texttt{Definition in the preamble:}
\newtcbtheorem[number within=section]{mytheo}{My Theorem}\
{colback=green!5,colframe=green!35!black,fonttitle=\bfseries}{th}
\end{verbatim}

\begin{verbatim}
% usage of \texttt{nameref} needs \texttt{nameref} or \texttt{hyperref} to be loaded
\begin{mytheo}{This is my title}{theoexample}\
This is the text of the theorem. The counter is automatically assigned and, in this example, prefixed with the section number. This theorem is numbered with \texttt{ref(th:theoexample)}, it is given on page \texttt{pageref(th:theoexample)}, and it is titled \texttt{flqq/nameref(th:theoexample)\frqq.}
\end{mytheo}
\end{verbatim}

\begin{verbatim}
My Theorem 17.1: This is my title
This is the text of the theorem. The counter is automatically assigned and, in this example, prefixed with the section number. This theorem is numbered with 17.1, it is given on page 349, and it is titled «This is my title».
\end{verbatim}

\begin{verbatim}
\begin{mytheo}[label=myownlabel]{This is my title}{}
The label parameter can be left empty without \LaTeX error. Or you may use an own label to reference Theorem \texttt{ref(myownlabel)}.
\end{mytheo}
\end{verbatim}

\begin{verbatim}
My Theorem 17.2: This is my title
The label parameter can be left empty without \LaTeX error. Or you may use an own label to reference Theorem 17.2.
\end{verbatim}
\begin{mytheo}{}
The title can also be left empty without problem. Note that the ':' vanished magically.
\end{mytheo}

My Theorem 17.3

The title can also be left empty without problem. Note that the ':' vanished magically.

\begin{mytheo}{Unnumbered Theorem}
This theorem is not numbered.
\end{mytheo}

My Theorem: Unnumbered Theorem

This theorem is not numbered.

\begin{mytheo}{}
This theorem has no number and no title.
\end{mytheo}

My Theorem

This theorem has no number and no title.

To switch off the nameref feature permanently, add nameref/.style={} inside the \langle options \rangle list.

\renewtcbtheorem[\langle init options \rangle]{\langle name \rangle}{\langle display name \rangle}{\langle options \rangle}{\langle prefix \rangle}

Operates like \newtcbtheorem^P.349, but based on \renewenvironment instead of \newenvironment. An existing environment is redefined.

\tcbmaketheorem{\langle name \rangle}{\langle display name \rangle}{\langle options \rangle}{\langle counter \rangle}{\langle prefix \rangle}

\texttt{\newtcbtheorem}^P.349 supersedes this macro.

Creates a new environment \langle name \rangle based on tcolorbox to frame a (mathematical) theorem. The \langle display name \rangle is used in the title line with a number, e.g. «Theorem 5.1». The \langle options \rangle are given to the underlying tcolorbox to control the appearance. The \langle counter \rangle is used for automatic numbering. The new environment \langle name \rangle takes one optional and two mandatory parameters. The optional parameter supplements the options and should be used only in rare cases. The first mandatory parameter is the title text for the theorem and the second mandatory parameter is a \langle marker \rangle. The theorem is automatically labeled with \langle prefix \rangle\langle separator \rangle\langle marker \rangle where \langle separator \rangle is predefined as ':', see \texttt{/tcb/label separator}^P.356.
\tcboxmath\{(options)\}\{(mathematical box content)\}

Creates a tcolorbox \textsuperscript{P.12} which is fitted to the width of the given \textit{mathematical box content}. This box is intended to be applied as part of a larger formula and may be used as replacement for the \texttt{boxed} macro of \texttt{amsmath}.

\begin{equation}
\tcboxset{fonttitle=\scriptsize} \tcboxmath\{colback=LightBlue!25!white,colframe=blue\} a^2 = 16 \quad \Rightarrow \quad \tcboxmath\{colback=Salmon!25!white,colframe=red,title=Implication\}
\{ a = 4 \vee a = -4. \}
\end{equation}

\tcboxmath\{(options)\}\{(mathematical box content)\}

This is a special case of the \tcboxmath macro which uses the style /tcb/highlight math \textsuperscript{P.359}. It is intended to provide context sensitive highlighting of formula parts. The color settings via /tcb/highlight math style \textsuperscript{P.359} may be different inside theorems or other colored areas and outside.

\begin{align}
\tcboxhighmath\{\sum\limits_{n=1}^{\infty} \frac{1}{n}\} &= \infty. \\
\int x^2 \text{d}x &= \frac13 x^3 + c.
\end{align}

\begin{tcolorbox}[ams align,myformula]
\tcboxhighmath\{\sum\limits_{n=1}^{\infty} \frac{1}{n}\} &= \infty. \\
\int x^2 \text{d}x &= \frac13 x^3 + c.
\end{tcolorbox}

\begin{align}
\sum\limits_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \text{d}x &= \frac13 x^3 + c.
\end{align}

\begin{align}
\sum\limits_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 \text{d}x &= \frac13 x^3 + c.
\end{align}
\texttt{\textbackslash tcbhighmath} \textsuperscript{P.351} can be used in symbiosis with the \texttt{empheq} package which allows to specify own boxing commands to mark multiline formulas.

\begin{empheq}[box=\tcbhighmath]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x\, dx
\end{empheq}

\begin{empheq}[box=\tcbhighmath]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x\, dx
\end{empheq}

Besides \texttt{\textbackslash tcbhighmath} \textsuperscript{P.351}, one can easily define an independent new box based on \texttt{\textbackslash tcbox} \textsuperscript{P.14} which acts like \texttt{\textbackslash tcbhighmath} \textsuperscript{P.351}:

\begin{empheq}[box=\otherbox]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x\, dx
\end{empheq}

\begin{equation}
\text{\texttt{\textbackslash tcbhighmath} \{E\} = \texttt{\textbackslash otherbox} \{mc^2\}}
\end{equation}

\begin{empheq}[box=\otherbox]{align}
a &= \sin(z) \\
E &= mc^2 + \int_a^b x\, dx
\end{empheq}

\begin{equation}
E = mc^2
\end{equation}
17.2 Option Keys of the Library

\texttt{/tcb/separatorder\ m{sign}} (no default, initially :)

The given \texttt{sign} is used inside the title text of a theorem as separator between display name combined with number and the specific title text. It is omitted, if there is no specific title text.

\begin{verbatim}
\% \usepackage{amssymb}
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}%
{colback=white,colframe=red!50!black,fonttitle=\bfseries,
 separator sign={\ \$\blacktriangleright\$}}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
\end{verbatim}

\begin{tcbconstant}
Theorem 17.4 ⇒ My example
My theorem text.
\end{tcbconstant}

\texttt{/tcb/separatorder\ colon} (style, no value, initially set)

Sets \texttt{/tcb/separatorder\ sign} to the default colon : sign.

\begin{verbatim}
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}%
{colback=white,colframe=red!50!black,fonttitle=\bfseries,
 separator sign dash}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
\end{verbatim}

\begin{tcbconstant}
Theorem 17.5 – My example
My theorem text.
\end{tcbconstant}

\texttt{/tcb/separatorder\ none} (style, no value)

Sets \texttt{/tcb/separatorder\ sign} to empty.

\begin{verbatim}
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}%
{colback=white,colframe=red!50!black,fonttitle=\bfseries,
 separator sign none}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
\end{verbatim}

\begin{tcbconstant}
Theorem 17.6 My example
My theorem text.
\end{tcbconstant}

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The given \langle left\rangle and \langle right\rangle delimiter signs are used to frame the descriptive title text of a theorem.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}
{colback=white,colframe=red!50!black,fonttitle=\bfseries,
description delimiters={\flqq}{\frqq}}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 17.7: «My example»
My theorem text.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}
{colback=white,colframe=red!50!black,fonttitle=\bfseries,
description delimiters parenthesis}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 17.8: (My example)
My theorem text.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}
{colback=white,colframe=red!50!black,fonttitle=\bfseries,
description delimiters none}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 17.9: My example
My theorem text.
/tcb/description font=(text) (default empty, initially empty)
Sets \langle text \rangle (e.g. font settings) before the descriptive title text deviating from
/tcb/fonttitle\textsuperscript{P.29}. The \langle text \rangle is removed, if description font is used without
value.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,
description delimiters=\{\glqq\}{\grqq},
description font=\mdseries\itshape}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 17.10: „My example“
My theorem text.

/tcb/description formatter=(macro) (default empty, initially empty)
Sets \langle macro \rangle as formatter for the descriptive title text. The \langle macro \rangle has to take one manda-
tory argument (the description text).
Note that /tcb/description delimiters\textsuperscript{P.354}, /tcb/description color\textsuperscript{P.354}, and
/tcb/description font are ignored, if this option is used.
If description formatter is used without value, the formatter is reset to its standard
behavior.

\newtcbbox{formbox}{enhanced,frame empty,size=minimal,boxsep=2pt,arc=1pt,
on line,interior style image=goldshade.png}
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,
description formatter=\formbox}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 17.11: My example
My theorem text.

/tcb/terminator sign=(sign) (no default, initially empty)
The given \langle sign \rangle is used as terminator at the end of the title text of a theorem.

\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries,
terminator sign=\{}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 17.12: My example.
My theorem text.
Sets \texttt{/tcb/terminator sign colon} \textsuperscript{P.355} to the colon \texttt{:} sign.

\begin{tcblisting}[use counter from=mytheo]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries, separator sign dash,terminator sign colon}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 17.13 – My example:

My theorem text.

\newtcbtheorem\[use counter from=mytheo\]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries, \begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

Theorem 17.14: My example –

My theorem text.

\newtcbtheorem\[use counter from=mytheo\]{sometheorem}{Theorem}{colback=white,colframe=red!50!black,fonttitle=\bfseries, label separator=\text{"}{theo}}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}

See Example~\ref{theo*myex}.

Theorem 17.15: My example

My theorem text.

See Example 17.15.
The given \( \langle \text{style} \rangle \) is used in connection with labels created with environments which are defined themselves by \texttt{\newtcbtheorem \P.349}. This \( \langle \text{style} \rangle \) uses one argument which is automatically set to the full label marker of the environment, i.e. a text consisting of \( \langle \text{prefix} \rangle \) (defined by \texttt{\newtcbtheorem \P.349}), \texttt{/tcb/label separator \P.356}, and \( \langle \text{marker} \rangle \) (defined by an actual theorem environment).

\begin{verbatim}
% The following adds a hyper target to all environments
% created with \texttt{\newtcbtheorem}
\tcbset{theorem full label supplement={hypertarget={#1}}}
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{
  colback=white,colframe=red!50!black,fonttitle=\bfseries}{theo}
\begin{sometheorem}{My example}{myex2}
My theorem text.
\end{sometheorem}
This automated \hyperlink{theo:myex2}{hyper target can be linked to with a hyper link}.
\end{verbatim}

Theorem 17.16: My example

My theorem text.

This automated \hyperlink{theo:myex2}{hyper target can be linked to with a hyper link}.

A second usage of \texttt{/tcb/theorem full label supplement} overwrites the first setting.

\begin{verbatim}
% 'marginnote' has to be loaded
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}{
  colback=white,colframe=red!50!black,fonttitle=\bfseries, 
  theorem label supplement={hypertarget={XYZ-##1}}, 
  theorem full label supplement={code={\marginnote{##1}}}}{theo}
\begin{sometheorem}{My example}{myex3}
My theorem text.
\end{sometheorem}
This automated \hyperlink{XYZ-myex3}{hyper target can be linked to with a hyper link}.
\end{verbatim}

Theorem 17.17: My example

My theorem text.

This automated \hyperlink{XYZ-myex3}{hyper target can be linked to with a hyper link}.

\texttt{\newtcbtheorem\P.349}
Theorem 17.18: My example

My theorem text.

17.19 Theorem: My example

My theorem text.

Theorem: My example

My theorem text. 17.20
This key is internally used by \texttt{tcbmaketheorem}\textsuperscript{+P.350}, but can be used directly in a \texttt{tcolorbox} for a more flexible approach. The \textit{(display name)} is used together with the increased \textit{(counter)} value and the \textit{(title)} for the title line of the box. Additionally, a \texttt{\label} with the given \textit{(marker)} is created.

\begin{tcolorbox}[colback=green!10, colframe=green!50!black, arc=4mm, theorem={Test}\{texercise}\{Direct usage\}\{myMarker\}]

Here, we see the test \texttt{\ref{myMarker}}.
\end{tcolorbox}

Test 1: Direct usage

Here, we see the test 1.

For a common appearance inside the document, the key \texttt{theorem} should not be used directly as in the example above, but as part of a new environment created by hand or using \texttt{tcbmaketheorem}\textsuperscript{+P.350} or using its successor \texttt{newtcbtheorem}\textsuperscript{+P.349}.

/\texttt{tcb/highlight math}\textsuperscript{(style, no value)}

Predefined style which is used for \texttt{tcbhighmath}\textsuperscript{+P.351}. It can be changed comfortable with /\texttt{tcb/highlight math style}.  

/\texttt{tcb/highlight math style}=(\textit{style definition})\textsuperscript{(style, no default)}

Changes the definition for /\texttt{tcb/highlight math} to the given \textit{(style definition)}. See \texttt{tcbhighmath}\textsuperscript{+P.351} for another example.

\begin{align*}
\texttt{tcbhighmath}[\texttt{remember as=fx}]\{f(x)\} &= \int\limits_{1}^{x} \frac{1}{t^2} \, dt \\
&= \left[ -\frac{1}{t} \right]_{1}^{x} \\
&= -\frac{1}{x} + \frac{1}{1} \\
&= 1 - \frac{1}{x}
\end{align*}
/tcb/math upper (style, no value)
Sets the upper part to mathematical mode with font \textstyle.

/tcb/math lower (style, no value)
Sets the lower part to mathematical mode with font \textstyle.

/tcb/math (style, no value)
Sets the upper part \textit{and} lower part to mathematical mode with font \textstyle.

\begin{tcolorbox}[math,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}

The following styles are only tested to work with the original \texttt{amsmath} environments. If e.g. the \texttt{equation} environment is redefined as \texttt{gather}, then \texttt{/tcb/ams equation} should \textit{not} be used. Obviously, you are encouraged to use \texttt{/tcb/ams gather} in this case.

\begin{tcolorbox}[ams equation,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}

\begin{tcolorbox}[ams equation*,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}

\begin{tcolorbox}[ams equation*,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}
/tcb/ams align upper (style, no value)
Add an amsmath align environment to the start and end of the upper part.

/tcb/ams align lower (style, no value)
Add an amsmath align environment to the start and end of the lower part.

/tcb/ams align (style, no value)
Add an amsmath align environment to the start and end of the upper and lower part.

\begin{tcolorbox}[ams align,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 ~\text{d}x &= \frac{1}{3} x^3 + c. \\
\end{tcolorbox}

\[ \sum_{n=1}^{\infty} \frac{1}{n} = \infty. \quad (16) \]
\[ \int x^2 \, dx = \frac{1}{3} x^3 + c. \quad (17) \]

/tcb/ams align* upper (style, no value)
Add an amsmath align* environment to the start and end of the upper part.

/tcb/ams align* lower (style, no value)
Add an amsmath align* environment to the start and end of the lower part.

/tcb/ams align* (style, no value)
Add an amsmath align* environment to the start and end of the upper and lower part.

\begin{tcolorbox}[ams align*,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} &= \infty. \\
\int x^2 ~\text{d}x &= \frac{1}{3} x^3 + c. \\
\end{tcolorbox}

\[ \sum_{n=1}^{\infty} \frac{1}{n} = \infty. \]
\[ \int x^2 \, dx = \frac{1}{3} x^3 + c. \]
/tcb/ams gather upper (style, no value)
Add an amsmath gather environment to the start and end of the upper part.

/tcb/ams gather lower (style, no value)
Add an amsmath gather environment to the start and end of the lower part.

/tcb/ams gather (style, no value)
Add an amsmath gather environment to the start and end of the upper and lower part.

\begin{tcolorbox}[ams gather,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty. \\
\int x^2 \, dx = \frac13 x^3 + c.
\end{tcolorbox}

∞
∑
\(n=1\)
1
\(n\)
= \infty.

\int x^2 \, dx = \frac13 x^3 + c.

/tcb/ams gather* upper (style, no value)
Add an amsmath gather* environment to the start and end of the upper part.

/tcb/ams gather* lower (style, no value)
Add an amsmath gather* environment to the start and end of the lower part.

/tcb/ams gather* (style, no value)
Add an amsmath gather* environment to the start and end of the upper and lower part.

\begin{tcolorbox}[ams gather*,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty. \\
\int x^2 \, dx = \frac13 x^3 + c.
\end{tcolorbox}

∞
∑
\(n=1\)
1
\(n\)
= \infty.

\int x^2 \, dx = \frac13 x^3 + c.
Neutralizes the \abovedisplayskip of a following \texttt{align} or \texttt{gather} environment for the upper part. Note that the text content has to start with such a formula.

Neutralizes the \abovedisplayskip of a following \texttt{align} or \texttt{gather} environment for the lower part. Note that the text content has to start with such a formula.

Neutralizes the \abovedisplayskip of a following \texttt{align} or \texttt{gather} environment for the upper part and lower part. Note that the text content has to start with such a formula.

\begin{tcolorbox}[ams nodisplayskip,colback=yellow!10!white,colframe=red!50!black]
\begin{gather}
\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \\
\int x^2 \, dx = \frac{1}{3} x^3 + c.
\end{gather}
\end{tcolorbox}

And now for something completely different.

New colored mathematical environments are easily created using \texttt{\newtcolorbox}:\nopagebreak

\begin{tcolorbox}[ams nodisplayskip,colback=yellow!10!white,colframe=red!50!black]
\begin{gather}
\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \\
\int x^2 \, dx = \frac{1}{3} x^3 + c.
\end{gather}
\end{tcolorbox}

\newtcolorbox{mymath}{ams gather*,colback=yellow!10!white,colframe=red!50!black}

\begin{mymath}
\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \\
\int x^2 \, dx = \frac{1}{3} x^3 + c.
\end{mymath}

All described options like \texttt{/tcb/ams gather upper}\nopagebreak \texttt{\textsuperscript{P.362}}, \texttt{/tcb/ams gather lower}\nopagebreak \texttt{\textsuperscript{P.362}}, \texttt{/tcb/ams gather upper app}\nopagebreak \texttt{\textsuperscript{P.433}} are (partially) setting (overwriting) the keys \texttt{/tcb/before upper}\nopagebreak \texttt{\textsuperscript{P.65}}, \texttt{/tcb/after upper}\nopagebreak \texttt{\textsuperscript{P.66}}, \texttt{/tcb/before lower}\nopagebreak \texttt{\textsuperscript{P.67}}, \texttt{/tcb/after lower}\nopagebreak \texttt{\textsuperscript{P.68}}.

Therefore, e.g. \texttt{\tcbset{ams gather,before upper={\text{Pythagoras:}}}} produces an invalid result. For this case, you are invited to use \texttt{\tcbset{ams gather,before upper app={\text{Pythagoras:}}}}, see \texttt{/tcb/before upper app}\nopagebreak \texttt{\textsuperscript{P.433}}.
\texttt{/tcb\theoremstyle=(name)} \hspace{1cm} (no default, initially \texttt{standard})

Applies a predefined style \texttt{(name)} to the theorem environment. Some of the feasible \texttt{(name)} values resemble style names from the packages \texttt{theorem} and \texttt{ntheorem} to give convenient access to known patterns.

The styles alter \texttt{/tcb\textbackslash separator sign} _P.353, \texttt{/tcb\textbackslash description delimiters} _P.354, \texttt{/tcb\textbackslash terminator sign} _P.355, and more. Therefore, one should apply such keys \textit{after} a theorem style.

For the following examples, we use:

\begin{verbatim}
\newtcbtheorem[use counter from=mytheo]{theorem}{Theorem}{
  \%fonttitle={bfseries,upshape},fontupper={itshape},
  colframe=green!50!black,colback=green!10!white,
  colbacktitle=green!20!white,coltitle=blue!75!black}{theo}
\end{verbatim}

The predefined styles are:

- \texttt{standard}: This is the initial value.

\begin{verbatim}
\begin{theorem}{theorem style=standard}{standard}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}\end{theorem}
\end{verbatim}

Theorem 17.21: standard

\begin{verbatim}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{verbatim}

- \texttt{change standard}

\begin{verbatim}
\begin{theorem}{theorem style=change standard}{change standard}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}\end{theorem}
\end{verbatim}

17.22 Theorem: change standard

\begin{verbatim}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{verbatim}

- \texttt{plain}

\begin{verbatim}
\begin{theorem}{theorem style=plain}{plain}{}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}\end{theorem}
\end{verbatim}

Theorem 17.23 (plain): This is my theorem.

\begin{verbatim}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*}
\end{verbatim}
This is my theorem. $a^2 + b^2 = c^2$.  

**Theorem 17.24 (break):**  
This is my theorem.  

\[ a^2 + b^2 = c^2. \]

**Theorem 17.25 (plain apart)**  
This is my theorem.  

\[ a^2 + b^2 = c^2. \]

**17.26 Theorem (change):** This is my theorem.  

\[ a^2 + b^2 = c^2. \]

**17.27 Theorem (change break):**  
This is my theorem.  

\[ a^2 + b^2 = c^2. \]

**17.28 Theorem (change apart)**  
This is my theorem.  

\[ a^2 + b^2 = c^2. \]
• margin break

\begin{theorem}[theorem style=margin break, left=10mm]{margin break}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}
\begin{theorem}[theorem style=margin break, left=10mm, oversize]{margin break}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

17.31 Theorem (margin break): This is my theorem.

\begin{equation*} a^2 + b^2 = c^2. \end{equation*}

17.32 Theorem (margin break): This is my theorem.

\begin{equation*} a^2 + b^2 = c^2. \end{equation*}

• margin apart

\begin{theorem}[theorem style=margin apart, left=10mm]{margin apart}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}
\begin{theorem}[theorem style=margin apart, left=10mm, oversize]{margin apart}
This is my theorem. \begin{equation*} a^2 + b^2 = c^2. \end{equation*} \end{theorem}

17.33 Theorem (margin apart)

This is my theorem.

\begin{equation*} a^2 + b^2 = c^2. \end{equation*}

17.34 Theorem (margin apart)

This is my theorem.

\begin{equation*} a^2 + b^2 = c^2. \end{equation*}
17.3 Examples for Definitions and Theorems

In the following, the application of \texttt{tcbmaketheorem}\textsuperscript{P.350} to highlight mathematical definitions, theorems, or the like is demonstrated.

At first, additional \texttt{tcb} keys are created for the appearance of the colored boxes. It is assumed that theorems and corollaries should be identically colored. All following environments are numbered with a common counter, but this can be changed easily. Here, the counter output is supplemented by the subsection number. Further, the \texttt{cleveref} package [5] is used for clever references.

\begin{quote}
\textit{Definition in the preamble:}
\begin{verbatim}
\usepackage{cleveref}
\tcbset{
defstyle/.style={fonttitle=\bfseries\upshape, fontupper=\slshape, arc=0\text{mm}, colback=blue!5!white,colframe=blue!75!black},
theostyle/.style={fonttitle=\bfseries\upshape, fontupper=\slshape, colback=red!10!white,colframe=red!75!black},}
\newtcbtheorem[number within=subsection,crefname={definition}{definitions}]\%
{defstyle}{def} \{Definition\}
\newtcbtheorem[use counter from=Definition,crefname={theorem}{theorems}]\%
{theostyle}{theo} \{Theorem\}
\newtcbtheorem[use counter from=Definition,crefname={corollary}{corollaries}]\%
{theostyle}{cor} \{Corollary\}
\end{verbatim}
\end{quote}

By \texttt{tcbmaketheorem}\textsuperscript{P.349}, commonly numbered theorem environments are created now. \texttt{defstyle} and \texttt{theostyle} are used for the appearance.

Now, everything is prepared for the following examples.

\begin{quote}
The following theorem is numbered as \texttt{Cref{theo:diffbarstetig}} and referenced with the marker \texttt{theo:diffbarstetig}. \texttt{\textbackslash \texttt{bigskip}}
\begin{Theorem}{Differenzierbarkeit bedingt Stetigkeit, wobei diese Benennung zu Testzwecken ungewöhnlich lang ist}{diffbarstetig}
Eine Funktion $f:I\to\mathbb{R}$ ist in $x_0\in I$ stetig, wenn $f$ in $x_0$ differenzierbar ist.
\end{Theorem}
\end{quote}

The following theorem is numbered as Theorem 17.3.1 and referenced with the marker \texttt{theo:diffbarstetig}.

\begin{quote}
\texttt{\textbackslash \texttt{Theorem}}
\begin{Theorem}{Differenzierbarkeit bedingt Stetigkeit, wobei diese Benennung zu Testzwecken ungewöhnlich lang ist}{diffbarstetig}
Eine Funktion $f:I\to\mathbb{R}$ ist in $x_0\in I$ stetig, wenn $f$ in $x_0$ differenzierbar ist.
\end{Theorem}
\end{quote}
The following definition is numbered as \Cref{def:diffbarkeit} and referenced with the marker \texttt{def:diffbarkeit}.

\begin{Definition}{Differenzierbarkeit}{diffbarkeit}
Eine Funktion $f: \mathbb{R} \to \mathbb{R}$ auf einem Intervall $I$ heißt in $x_0 \in I$ differenzierbar oder linear approximierbar, wenn der Grenzwert
\begin{equation*}
\lim_{x \to x_0} \frac{f(x)-f(x_0)}{x-x_0} = \lim_{h \to 0} \frac{f(x_0+h)-f(x_0)}{h}
\end{equation*}
existiert. Bei Existenz heißt dieser Grenzwert Ableitung oder Differentialquotient von $f$ in $x_0$ und man schreibt für ihn$
\begin{equation*}
f'(x_0) \quad \text{oder} \quad \frac{df}{dx}(x_0).$
\end{equation*}
\end{Definition}

The following corollary is numbered as \Cref{cor:nullstellen} and referenced with the marker \texttt{cor:nullstellen}.

\begin{Corollary}{Nullstellenexistenz}{nullstellen}
Ist $f: [a,b] \to \mathbb{R}$ stetig und haben $f(a)$ und $f(b)$ entgegengesetzte Vorzeichen, also $f(a)f(b)<0$, so besitzt $f$ eine Nullstelle $x_0 \in (a,b)$.
\end{Corollary}

The following corollary is numbered as Corollary 17.3.3 and referenced with the marker \texttt{cor:nullstellen}.

\begin{Corollary}{Nullstellenexistenz}{nullstellen}
Ist $f : [a,b] \to \mathbb{R}$ stetig und haben $f(a)$ und $f(b)$ entgegengesetzte Vorzeichen, also $f(a)f(b)<0$, so besitzt $f$ eine Nullstelle $x_0 \in (a,b)$.
\end{Corollary}
Hinreichende Bedingung für Wendepunkte

$f$ sei eine auf einem Intervall $[a,b]$ dreimal stetig differenzierbare Funktion. Ist $f''(x_0) = 0$ in $x_0 \in [a,b]$ und $f'''(x_0) \neq 0$, so ist $(x_0, f(x_0))$ ein Wendepunkt von $f$.

Theorem 17.3.4: Hinreichende Bedingung für Wendepunkte

$f$ sei eine auf einem Intervall $[a,b]$ dreimal stetig differenzierbare Funktion. Ist $f''(x_0) = 0$ in $x_0 \in [a,b]$ und $f'''(x_0) \neq 0$, so ist $(x_0, f(x_0))$ ein Wendepunkt von $f$.

\begin{Theorem}[boxrule=2mm,toptitle=-1.5mm,bottomtitle=-1.5mm]
Hinreichende Bedingung für Wendepunkte

$f$ sei eine auf einem Intervall $[a,b]$ dreimal stetig differenzierbare Funktion. Ist $f''(x_0) = 0$ in $x_0 \in [a,b]$ und $f'''(x_0) \neq 0$, so ist $(x_0, f(x_0))$ ein Wendepunkt von $f$.
\end{Theorem}

Theorem 17.3.5 (Mittelwertsatz für $n$ Variable)

Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x] \subseteq D$ einen Punkt $x_1 \in [x_0,x]$, so dass gilt

$f(x) - f(x_0) = \text{grad } f(x_1)^\top (x - x_0)$

Here, $\textcleveref{theo:meanvaluetheorem}$ support is used to reference $\textcleveref{theo:meanvaluetheorem}$ on $\textpageref{theo:meanvaluetheorem}$. This $\textnamecref{theo:meanvaluetheorem}$ can also be referenced by $\textVref{theo:meanvaluetheorem}$ resulting in $\textVref{theo:meanvaluetheorem}$.

Note that $\texttt{/tcblib/label type} \cdot \texttt{P.100}$ was used in the example above to feed $\texttt{cleveref}$ [5] with the needed name information.
Here, using \Vref resulting in \Vref{theo:meanvaluetheorem} is more interesting...

Here, using \Vref resulting in Theorem 17.3.5 on the previous page is more interesting...

% \tcbuselibrary{skins}
\newtcbtheorem[use counter from=Definition]{YetAnotherTheorem}{Theorem}\
{\textit{theorem style}=change apart, enhanced, arc=0mm, outer arc=0mm,\
boxrule=0mm, toprule=1mm, bottomrule=1mm, left=1mm, right=1mm,\
titlerule=0mm, toptitle=1mm, bottomtitle=1mm, top=0mm,\
colframe=red!50!black, colback=red!5!white, coltitle=red!50!black,\
title style={top color=yellow!50!white, bottom color=red!5!white,\
middle color=yellow!50!white},\
fonttitle={\bfseries\sffamily\normalsize, fontupper={\normalsize\itshape}},\
}{\{theo\}}
\begin{YetAnotherTheorem}{Mittelwertsatz für $n$ Variable}{mittelwertsatz_n2}\
Es sei $n\in\mathbb{N}$, $D\subseteq\mathbb{R}^n$ eine offene Menge und $f\in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $\[x_0,x]\subset D$ einen Punkt $\xi\in\[x_0,x]$, so dass gilt\
\begin{equation*}\
f(x)-f(x_0) = \operatorname{grad} f(\xi)^\top (x-x_0)\
\end{equation*}
\end{YetAnotherTheorem}

17.3.6 Theorem (Mittelwertsatz für $n$ Variable)

Es sei $n\in\mathbb{N}$, $D\subseteq\mathbb{R}^n$ eine offene Menge und $f\in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x]\subset D$ einen Punkt $\xi\in[x_0,x]$, so dass gilt

$$f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top (x-x_0)$$

% \usepackage{varwidth} \tcbuselibrary{skins}
\newtcbtheorem[use counter from=Definition]{YetAnotherTheorem}{Theorem}\
{\textit{enhanced, frame empty, interior empty, colframe=ForestGreen!50!white,\
coltitle=ForestGreen!50!black, fonttitle=\bfseries, colbacktitle=ForestGreen!15!white,\
borderline={0.5mm}{0mm}{ForestGreen!15!white},
borderline={0.5mm}{0mm}{ForestGreen!50!white,dashed},
attach boxed title to top center={yshift=-2mm},
boxed title style={boxrule=0.4pt}, varwidth boxed title=false}{\{theo\}}
\begin{YetAnotherTheorem}{Mittelwertsatz für $n$ Variable}{mittelwertsatz_n3}\
Es sei $n\in\mathbb{N}$, $D\subseteq\mathbb{R}^n$ eine offene Menge und $f\in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x]\subset D$ einen Punkt $\xi\in[x_0,x]$, so dass gilt\
\begin{equation*}\
f(x)-f(x_0) = \operatorname{grad} f(\xi)^\top (x-x_0)\
\end{equation*}
\end{YetAnotherTheorem}

Theorem 17.3.7: Mittelwertsatz für $n$ Variable

Es sei $n\in\mathbb{N}$, $D\subseteq\mathbb{R}^n$ eine offene Menge und $f\in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0,x]\subset D$ einen Punkt $\xi\in[x_0,x]$, so dass gilt

$$f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top (x-x_0)$$
Let’s try a more conservative approach:

\begin{yetanothertheorem}{mittelwertsatz_n4}\%
\text{Es sei } n \in \mathbb{N}, \ D \subseteq \mathbb{R}^n \text{ eine offene Menge und } f \in C^1(D, \mathbb{R}). \ \text{Dann gibt es auf jeder Strecke } $[x_0, x] \subseteq D \text{ einen Punkt } \xi \in [x_0, x]$, \text{ so dass gilt}
\begin{equation*}
f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top (x - x_0)
\end{equation*}
\end{yetanothertheorem}

Theorem 17.3.9 (Mittelwertsatz für $n$ Variable): Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D, \mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0, x] \subseteq D$ einen Punkt $\xi \in [x_0, x]$, so dass gilt

\[ f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top (x - x_0) \]
17.4 Using other theorem environments with \texttt{tcolorbox}

Instead of creating theorem environments with the methods described before, environments from other packages can be boxed with a \texttt{tcolorbox}.

Environments may be created e.g. by methods from the \texttt{theorem} package or the \texttt{amsthm} package. \texttt{\textbackslash \texttt{tcolorboxenvironment} \texttt{P} \texttt{17}} can be used to put a box around these environments.

\begin{mdframed}
\textbf{Definition in the preamble:}

\begin{verbatim}
\usepackage{amsthm}
\theoremstyle{plain} % from 'amsthm'
\newtheorem{lem}{Lemma} % from 'amsthm'
\tcolorboxenvironment{lem}{ enhanced jigsaw, colframe=cyan, interior hidden, breakable, before skip=10pt, after skip=10pt }
\tcolorboxenvironment{proof}{ % 'proof' from 'amsthm'
\blanker, breakable, left=5mm, before skip=10pt, after skip=10pt, borderline west={1mm}{0pt}{red}}
\end{verbatim}

\begin{verbatim}
\begin{lem}
\lipsum[2]
\end{lem}
\lipsum[3]
\begin{proof}
\lipsum*[4]
\end{proof}
\end{verbatim}

\end{mdframed}


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The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{breakable}

18.1 Technical Overview

The library \texttt{breakable} supports the automatic breaking of a \texttt{tcolorbox}. This feature is enabled by \texttt{/tcb/breakable} \textsuperscript{P.375} and disabled by \texttt{/tcb/unbreakable} \textsuperscript{P.376}.

If a \texttt{tcolorbox} is set to be \texttt{/tcb/breakable} \textsuperscript{P.375}, then the following algorithm is executed:

1. The box content is read to a box register similar but not identical to the unbreakable case.
2. If the total box fits into the current page, it is shipped out visibly unbroken and the algorithm stops.

   \begin{table}[h]
   \centering
   \begin{tabular}{|p{0.5\textwidth}|}
   \hline
   \textbf{Unbroken Box} \\
   \hline
   The box. \\
   \hline
   \end{tabular}
   \caption{Unbroken Box}
   \end{table}

3. Otherwise, it is checked if at least \texttt{/tcb/lines before break} \textsuperscript{P.376} of the upper box can be placed on the current page. If not, a page break is inserted and the algorithm goes back to Step 2.

4. Now, the \textit{break sequence} starts. The upper box part or the lower box part is split such that it fits into the current page. The fitting part is named \textit{first part} of the \textit{break sequence} and shipped out.

   \begin{table}[h]
   \centering
   \begin{tabular}{|p{0.5\textwidth}|}
   \hline
   \textbf{Broken Box} \\
   \hline
   The box. \\
   \hline
   \end{tabular}
   \caption{Broken Box}
   \end{table}

5. If the remaining content of the total box fits into the current page, the algorithm continues with Step 7, else with Step 6.

6. The upper box part or the lower box part is split such that it fits into the current page. The fitting part is named \textit{middle part} of the \textit{break sequence} and shipped out. Then, the algorithm goes back to Step 5.

   \begin{table}[h]
   \centering
   \begin{tabular}{|p{0.5\textwidth}|}
   \hline
   The box. \\
   \hline
   \end{tabular}
   \caption{Middle Box}
   \end{table}

7. The remaining part is named \textit{last part} of the \textit{break sequence} and shipped out. The algorithm stops.

   \begin{table}[h]
   \centering
   \begin{tabular}{|p{0.5\textwidth}|}
   \hline
   The box. \\
   \hline
   \end{tabular}
   \caption{Last Box}
   \end{table}

The algorithm takes care that the optional segmentation line never appears at the end of a box. The optional lower box part is also checked to have at least \texttt{/tcb/lines before break} \textsuperscript{P.376}. 

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In principle, all boxes of the break sequence share the same geometric parameters. The differences are:

- The given `/tcb/before`°P.80 and `/tcb/after`°P.80 values are used only before the first and after the last part of the break sequence.

- A special behavior between the parts of the break sequence can be given by `/tcb/toprule` at break °P.379, `/tcb/bottomrule` at break °P.379, `/tcb/enlarge top at break` by °P.85, and `/tcb/enlarge bottom at break` by °P.85.

- The `/tcb/skin`°P.136 decides how the first, middle, and last part look like. Actually, every part type has its own skin given by the options `/tcb/skin first`°P.136, `/tcb/skin middle`°P.136, and `/tcb/skin last`°P.136. Typically, these options are set automatically by the main skin, see Subsection 18.8 from page 388.

18.2 Limitations and Known Bugs

- The maximal total height of the upper and of the lower part of normal breakable `tcolorbox`es is about 65536pt (ca. 2300 cm) apiece. If such a part gets longer, the output will get buggy without warning. For very oversized boxes which are longer than 65536pt, use the unlimited value for `/tcb/breakable`°P.375. With the unlimited setting, the applied algorithm has (virtually) no height limit for boxes, but very likely the compiler memory will have to be increased for boxes longer than 300 pages (depending on compiler settings and box content). But it is recommended to use unlimited for critical large boxes only.

- You can nest an unbreakable `tcolorbox` inside another `tcolorbox`, even inside a breakable one. But you cannot nest a breakable box inside a breakable box. The `/tcb/breakable`°P.375 key for a nested box is ignored automatically3, i.e. inner boxes are always unbreakable.

After all, in the unlikely case you really want to have the nested box to be breakable, use `/tcb/enforce breakable`°P.376 for the nested box4. But, a breakable box inside a breakable box will usually give a mess.

- If your text content contains some text color changing commands, your color will not survive the break to the next box. But, with the fonts package and xelatex or lualatex, you can use `\addfontfeatures{Color=mycolor}` to add a font color which survives the break.

- The perpage option of the footmisc package is deliberately deactivated inside a breakable box since all footnotes are placed at the end of the box (possibly far away from the reference point).

- Making a box `/tcb/breakable`°P.375 which actually is not broken creates a box which acts almost like an unbreakable box. Visual differences are kept as indiscernible as possible, but can appear with certain `/tcb/before`°P.80 and `/tcb/after`°P.80 settings, especially, if there is an automatic page break before the box.

- LuaTEX version 0.95 changes the behaviour of the basic `\vsplit` (a bug?!) resulting in badly broken boxes. Thanks to Jeremy Engel, the `breakable` library contains a patch for this which also loads the the ifluatex package.

3Until `tcolorbox` 3.04, the `/tcb/breakable`°P.375 key was not ignored for nested boxes.
18.3 Main Option Keys

/tcb/breakable=\{true|false|unlimited\} \hspace{1em} (default: true, initially false)

Allows the \texttt{tcolorbox} to be breakable. If the box is larger than the available space at the current page, the box is automatically broken and continued to the next page. All sorts of \texttt{tcolorbox} can be made breakable. It depends on the skin how the breaking looks like. If you do not know better, use \texttt{/tcb/enhanced} \textsuperscript{P. 209} for breaking a box. The parts of the \textit{break sequence} are numbered by the counter \texttt{tcbbreakpart}.

- \texttt{false}: Sets the \texttt{tcolorbox} to be unbreakable.
- \texttt{true}: Breaks the \texttt{tcolorbox} from one page to another. The maximal total height of the upper and of the lower part is about 65536pt (ca. 2300 cm or ca. 90 pages) apiece.
- \texttt{unlimited}: Experimental code for unlimited total height of breakable boxes. For boxes longer than 300 pages (or even shorter ones) the compiler memory will have to be increased.

% \usepackage{lipsum} % preamble
\tcbset{enhanced jigsaw, colback=red!5!white, colframe=red!75!black, 
  watermark color=yellow!25!white, watermark text=\textit{\arabic{tcbbreakpart}}, 
  fonttitle=\textbf,}
\begin{tcolorbox}[breakable, title=My breakable box]
\lipsum[1-6]
\end{tcolorbox}

My breakable box


Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacinus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea

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/tcb/unbreakable (no value, initially set)
Sets the tcolorbox to be unbreakable.

/tcb/enforce breakable (no value)
A tcolorbox inside a tcolorbox is automatically set to be unbreakable. Using /tcb/breakable \textsuperscript{P.375} on such an inner box has no effect. If one really wants the inner box to be breakable, use /tcb/enforce breakable. This will usually give a mess of shattered boxes. You are advised to not use this option.
Note that /tcb/enforce breakable has the functionality that /tcb/breakable \textsuperscript{P.375} had until package version 3.04 and exists for backward compatibility.

/tcb/title after break=(text) (no default, initially empty)
The /tcb/title \textsuperscript{P.18} is used only for the first part of a break sequence. Use title after break to create a heading line with \textit{text} as content for all following parts. Also see /tcb/extras title after break \textsuperscript{P.382} for formatting the title text.

/tcb/notitle after break (no value, initially set)
Removes the title line or following parts in a break sequence if set before.

/tcb/adjusted title after break=(text) (style, no default, initially unset)
Works like /tcb/adjusted title \textsuperscript{P.18} but applied to /tcb/title after break.

/tcb/lines before break=(number) (no default, initially 2)
Assures that the given \textit{number} of lines of the upper box part or the lower box part are placed before a break happens.
\texttt{tcb/break at=⟨length⟩/⟨length⟩/.../⟨length⟩}

(no default, initially \texttt{Opt})

Defines break points at the given \texttt{⟨length⟩} values. The first \texttt{⟨length⟩} defines the (maximal) height of the first partial box, the second \texttt{⟨length⟩} defines the (maximal) height of the second partial box, and so on. The last \texttt{⟨length⟩} value is applied to all following partial boxes if any.

- Setting a \texttt{⟨length⟩} to \texttt{Opt} means that the naturally available space is used for breaking.
- Setting a \texttt{⟨length⟩} to a negative value means that the sum of this negative value and the naturally available space is used for breaking (boxes will shrink in height). That before version 4.10 negative values were treated like \texttt{Opt}.

\begin{tcolorbox}
\[enhanced\text{ jigsaw, size=small, vfill before first,}
\text{colframe=red, colback=yellow!10!white, before title=\texttt{raggedright,}}
\text{title=\texttt{Broken box inside a \texttt{multicols} environment}, fonttitle=\texttt{\bfseries,}}
\text{enforce breakable, X use only breakable in the real world!}
\text{pad at break=1mm, break at=3cm/6.3cm} ]
\lipsum[1]
\end{tcolorbox}

/tcb/height fixed for may also be considered for \texttt{multicols} environments.

\begin{multicols}{3}

Breakable boxes inside a \texttt{multicols} environment need special attendance. They are broken by default at \texttt{\textheight}. The \texttt{break at} option can be used to insert better break points by hand.

\begin{tcolorbox}
\[breakable, enlargepage=0mm/\baselineskip/2\baselineskip/0mm, ...]
\end{tcolorbox}

The example code enlarged the second partial box by one line, the third partial box by two lines, and all following parts are not enlarged.

/tcb/enlargepage=⟨length⟩/⟨length⟩/.../⟨length⟩

(no default, initially \texttt{Opt})

Inserts a \texttt{\enlargethispage{⟨length⟩}} to the pages of the break sequence, i.e. allows one to enlarge (or shrink) partial boxes. The first \texttt{⟨length⟩} is applied to the first partial box, the second \texttt{⟨length⟩} is applied to the second partial box, and so on. The last \texttt{⟨length⟩} value is applied to all following partial boxes if any. Note that floating boxes will not be enlarged.

\begin{tcolorbox}
\texttt{breakable, enlargepage=0mm/\baselineskip/2\baselineskip/0mm,...}
\end{tcolorbox}

The example code enlarged the second partial box by one line, the third partial box by two lines, and all following parts are not enlarged.

If an automated page break occurs before the first partial box, the page enlargement is applied to the page before the first partial box \textit{and} again to the page of the first partial box. Insert a manual break to prevent this.

In general, \texttt{enlargepage} should be used at the final stage of a document for fine-tuning only.
/tcb/enlargepage flexible=(length)  (no default, initially 0pt)
This allows an automated page enlargement for up to (length). The algorithm can use this
to avoid breaking a box, if there is enough room after enlargement. Also, the last partial
box of a break sequence may be enlarged to avoid further breaking.
Note that this potential enlargement is additive to settings of /tcb/enlargepage\P.377.
But /tcb/enlargepage flexible overwrites settings of /tcb/pad before break*\P.379
or /tcb/pad at break*\P.379.

% The following setting hinders orphan lines for the last partial box
\tcbset{enlargepage flexible=\baselineskip}

/tcb/compress page=(option)  (default all, initially baselineskip)
This option controls the space management on the page which contains the unbroken box
or the first part of a break sequence. Feasible (option) values are:
• all (default value): All shrinkable glue on the page is potentially used for the unbroken
  box or the first part of a break sequence. Thus, all vertical spaces on the page will
  potentially be reduced to their minimal values.
• baselineskip (initial value): Shrinkable glue up to one \baselineskip on the page
  is potentially used for the unbroken box or the first part of a break sequence.
• none: The break algorithm respects the target size of the given glue values on the
  page. This was the initial value before version 3.34.

! Note that the box content is not influenced by this option.

/tcb/shrink break goal=(length)  (no default, initially 0pt)
This is an emergency parameter if the break algorithm produces unpleasant breaks. It
shrinks the goal height of the current box part by (length) which may result in smaller
boxes. Never use negative values. Usually, this option will never be needed at all.
18.4 Option Keys for the Break Appearance

\texttt{/tcb/toprule at break=⟨length⟩} \hspace{1cm} (no default, initially 0.5mm)
Sets the line width of the top rule to \textit{⟨length⟩} if the box is \texttt{/tcb/breakable}. In this case, it is applied to middle and last parts in a break sequence. Note that \texttt{/tcb/toprule=P.35} overwrites this value if used afterwards.

\texttt{/tcb/bottomrule at break=⟨length⟩} \hspace{1cm} (no default, initially 0.5mm)
Sets the line width of the bottom rule to \textit{⟨length⟩} if the box is \texttt{/tcb/breakable}. In this case, it is applied to first and middle parts in a break sequence. Note that \texttt{/tcb/bottomrule=P.35} overwrites this value if used afterwards.

\texttt{/tcb/topsep at break=⟨length⟩} \hspace{1cm} (no default, initially 0mm)
Additional vertical space of \textit{⟨length⟩} which is added at the top of middle and last parts in a break sequence. In general, it is not advisable to change this value if these parts start with a rule or a title.

\texttt{/tcb/bottomsep at break=⟨length⟩} \hspace{1cm} (no default, initially 0mm)
Additional vertical space of \textit{⟨length⟩} which is added at the bottom of first and middle parts in a break sequence. In general, it is not advisable to change this value if these parts end with a rule.

\texttt{/tcb/pad before break=⟨length⟩} \hspace{1cm} (style, no default, initially 3.5mm)
Sets the total amount of vertical space after the text content and before the break point to \textit{⟨length⟩}. This style sets \texttt{/tcb/toprule at break=0pt} and changes \texttt{/tcb/topsep at break} as required. In general, it is not advisable to change this value if the middle and last parts in a break sequence start with a rule or a title.

\texttt{/tcb/pad before break*=⟨length⟩} \hspace{1cm} (style, no default)
Sets \texttt{/tcb/pad before break=⟨length⟩} and \texttt{/tcb/enlargepage flexible=P.378} to an appropriate value such that empty closing frames are avoided.

\texttt{/tcb/pad after break=⟨length⟩} \hspace{1cm} (style, no default, initially 3.5mm)
Sets the total amount of vertical space after the break point and before the text content to \textit{⟨length⟩}. This style sets \texttt{/tcb/bottomrule at break=0pt} and changes \texttt{/tcb/bottomsep at break} as required. In general, it is not advisable to change this value if the first and middle parts in a break sequence end with a rule.

\texttt{/tcb/pad at break=⟨length⟩} \hspace{1cm} (style, no default, initially 3.5mm)
Abbreviation for setting \textit{⟨length⟩} to \texttt{/tcb/pad before break} and \texttt{/tcb/pad after break}.

\texttt{/tcb/pad at break*=⟨length⟩} \hspace{1cm} (style, no default)
Sets \texttt{/tcb/pad at break=⟨length⟩} and \texttt{/tcb/enlargepage flexible=P.378} to an appropriate value such that empty closing frames are avoided.

\begin{tcolorbox}
\[\texttt{\begin{tcolorbox}[enhanced jigsaw,breakable,pad at break*=0mm,\}
\text{title={For this box, the pad space at the break point is set to 0mm}}\]
\texttt{\lipsum[1-2]}\]
\end{tcolorbox}

For this box, the pad space at the break point is set to 0mm


/tcb/pad at break\textsuperscript{P.379} or /tcb/pad at break\textsuperscript{P.379} should be used as very last option in an option list, because they adapt other settings.

Also see /tcb/enlarge top at break by \textsuperscript{P.85} and /tcb/enlarge bottom at break by \textsuperscript{P.85}.

/tcb/height fixed for\textsuperscript{(part)} (no default, initially none)

When certain amount of space is available for a partial box of a break sequence, the partial box typically is smaller than this space (depending on the box content). For given \textsl{(part)}(s), the height can be set to all available space.

- none: Every partial \texttt{tcolorbox} is set with its natural height.
- first: The first partial box is set to a height which matches the available space.
- middle: All middle partial boxes are set to a height which matches the available space.
- last: The last partial box is set to a height which matches the available space.
- first and middle: The first and all middle partial boxes are set to a height which matches the available space.
- middle and last: All middle partial boxes and the last partial box are set to a height which matches the available space.
- all: All partial boxes are set to a height which matches the available space.

If the box keeps unbroken, this option is not applied. See /tcb/height\textsuperscript{P.53} for setting a fixed height for unbroken boxes. See /tcb/height fill\textsuperscript{P.56} for giving unbroken boxes maximum height.

/tcb/vfill before first\textsuperscript{true|false} (default true, initially false)

Inserts a \texttt{vfill} at the begin of the first partial box to move this partial box to the end of the current page. This may be used as an alternative to /tcb/height fixed for\textsuperscript{first} to get justified columns or pages. The \texttt{vfill} is not inserted, if the box gets not actually broken.

/tcb/segmentation at break\textsuperscript{true|false} (default true, initially true)

If a breakable box contains an upper part and a lower part and the break happens at the segmentation between both parts, then

- the segmentation line (or similar) is drawn as first element of the partial box containing the lower part, if /tcb/segmentation at break is set to be true.
- the segmentation line (or similar) is not drawn at all, if /tcb/segmentation at break is set to be false. This may be preferable for skins like \texttt{bicolor}\textsuperscript{P.222}, \texttt{tile}\textsuperscript{P.227}, or \texttt{beamer}\textsuperscript{P.231}.
18.5 Extra Options for Partial Boxes

\texttt{/tcb/extras=\{\langle options\rangle\}} \quad \text{(no default, initially unset)}

Adds \texttt{tcolorbox \langle options\rangle} to every box of a break sequence after skin settings are done. This is quite late in box processing. Geometry and break settings should \textit{not be used} here, because they will either be ignored or have unexpected negative results. But it is possible to change most colors, skin effects, shadows, borders, frame code, etc. Note that using \texttt{/tcb/extras} for every box is very seldom an advantage over setting the options directly. Usually, \texttt{/tcb/extras first}, \texttt{/tcb/extras middle}, etc. are sensible to apply.

\texttt{/tcb/no extras} \quad \text{(style, no default, initially set)}

Removes all extras if set before.

\texttt{/tcb/extras broken=\{\langle options\rangle\}} \quad \text{(no default, initially unset)}

If the box is set to be \texttt{/tcb/breakable \textsuperscript{P.375} and is broken actually, then the \langle options\rangle are added to every box of the break sequence. /tcb/extras overwrites this key.}

\texttt{/tcb/extras unbroken=\{\langle options\rangle\}} \quad \text{(no default, initially unset)}

If the box is set to be \texttt{/tcb/breakable \textsuperscript{P.375} but \textit{is not} broken actually or if the box is set to be \texttt{/tcb/unbreakable \textsuperscript{P.376}}, then the \langle options\rangle are added to the box. /tcb/extras overwrites this key.

\texttt{/tcb/no extras unbroken} \quad \text{(style, no default, initially set)}

Removes the unbroken extras if set before.

\texttt{/tcb/extras first=\{\langle options\rangle\}} \quad \text{(no default, initially unset)}

If the box is set to be \texttt{/tcb/breakable \textsuperscript{P.375} and is broken actually, then the \langle options\rangle are added to the first box of the break sequence. /tcb/extras overwrites this key.}

\texttt{/tcb/no extras first} \quad \text{(style, no default, initially set)}

Removes the first extras if set before.

\texttt{/tcb/extras middle=\{\langle options\rangle\}} \quad \text{(no default, initially unset)}

If the box is set to be \texttt{/tcb/breakable \textsuperscript{P.375} and is broken actually, then the \langle options\rangle are added to every middle box (if any) of the break sequence. /tcb/extras overwrites this key.}

\texttt{/tcb/no extras middle} \quad \text{(style, no default, initially set)}

Removes the middle extras if set before.

\texttt{/tcb/extras last=\{\langle options\rangle\}} \quad \text{(no default, initially unset)}

If the box is set to be \texttt{/tcb/breakable \textsuperscript{P.375} and is broken actually, then the \langle options\rangle are added to the last box of the break sequence. /tcb/extras overwrites this key.}

\texttt{/tcb/no extras last} \quad \text{(style, no default, initially set)}

Removes the last extras if set before.

\texttt{/tcb/extras unbroken and first=\{\langle options\rangle\}} \quad \text{(no default, initially unset)}

This is an abbreviation for setting \texttt{/tcb/extras unbroken} and \texttt{/tcb/extras first} together. /tcb/extras overwrites this key.

\texttt{/tcb/extras middle and last=\{\langle options\rangle\}} \quad \text{(no default, initially unset)}

This is an abbreviation for setting \texttt{/tcb/extras middle} and \texttt{/tcb/extras last} together. /tcb/extras overwrites this key.

\texttt{/tcb/extras unbroken and last=\{\langle options\rangle\}} \quad \text{(no default, initially unset)}

This is an abbreviation for setting \texttt{/tcb/extras unbroken} and \texttt{/tcb/extras last} together. /tcb/extras overwrites this key.

\texttt{/tcb/extras first and middle=\{\langle options\rangle\}} \quad \text{(no default, initially unset)}

This is an abbreviation for setting \texttt{/tcb/extras first} and \texttt{/tcb/extras middle} together. /tcb/extras overwrites this key.
If the box has a `title after break` \(^{\text{P.376}}\), then the \((options)\) are added for all titles after the first break, i.e. all middle and last. The color, font, and alignment of titles after break can be adapted choosing \((options)\), e.g. by `/tcb/coltitle` \(^{\text{P.28}}\), `/tcb/fonttitle` \(^{\text{P.29}}\), `/tcb/halign title` \(^{\text{P.32}}\). Note that `/tcb/colbacktitle` \(^{\text{P.27}}\) has to be placed into `/tcb/extras middle and last` \(^{\text{P.381}}\).

Removes the title after break extras if set before.
\begin{mybox}[title=My unbroken box]
\lipsum[1]
\end{mybox}

\begin{multicols}{3}
\begin{mybox}[title=My broken box, enforce breakable, break at=4.2cm, pad at break=2mm, height fixed for=first and middle,]
\lipsum[2]
\end{mybox}
\end{multicols}

My unbroken box

My broken box
18.6 Breakable boxes and the multicol package

With version 4.10, the algorithm for detecting the available height for a \texttt{tcolorbox} inside a \texttt{multicol} environment was improved with help of Frank Mittelbach. This change \textit{may} impact existing user code which \textit{may} have to be adapted.

Unbreakable \texttt{tcolorbox}es can be used without special care inside a \texttt{multicol}s environment from the \texttt{multicol} package \cite{9}. Since version 3.10, a breakable \texttt{tcolorbox} detects, if it is used inside a \texttt{multicols} environment. But choosing break points for a breakable box cannot be done by the balancing routine of \texttt{multicols}. By default, boxes will break at maximum column height. To get pleasant results, use the \texttt{/tcb/break at} \texttt{P.377} and \texttt{/tcb/height fixed for} \texttt{P.380} options.

\begin{verbatim}
\% \usepackage{lipsum,multicol} \% preamble
\footnotesize
\begin{multicols}{2}
  \lipsum[1]
  \begin{tcolorbox}[enhanced jigsaw,breakable,size=title,
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
  title=My breakable box,pad at break=1mm, break at=-\baselineskip/0pt]
    \lipsum[2-4]
  \end{tcolorbox}
  \lipsum[4]
\end{multicols}
\end{verbatim}


\textbf{My breakable box}


This example is already set inside a `multicols` environment. This time, a `middle` part has full column height (here \textwidth). `/tcb/height fixed for` \textsuperscript{P.380} is used to spread this box part over the full height to align with neighboring columns.

```latex
% \usepackage{lipsum,multicol}
\lipsum[1]
\begin{tcolorbox}[enhanced jigsaw, breakable, size=title, colback=red!5!white, colframe=red!75!black, fonttitle=\bfseries, title=My breakable box, pad at break=2mm, break at=-\baselineskip/0pt, height fixed for=middle ]
\lipsum[2-7]
\end{tcolorbox}
\lipsum[8]
```


**My breakable box**


quis dolor. Donec pellentesque, erat ac sagittis semper, nunc id lobortis purus, quis congue purus metus ultricies tellus. Proin et quam. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Praesent sapien turpis, fermentum vel, eleifend faucibus, vehicula eu, lacus.


The following example has a `tcolorbox` which fills the `multicols` environment completely. Here, `/tcb/height fixed for` P.380 is used to give all three columns the full height. Note that the appropriate `/tcb/break at` P.377 value is not computed automatically but set manually.

```latex
% \usepackage{lipsum,multicol} % preamble
\small
\begin{multicols}{3}
\begin{tcolorbox}[enhanced jigsaw,breakable,size=small,
colback=red!5!white,colframe=red!75!black,fonttitle=bfseries,
title=My breakable box, pad at break=2mm, drop fuzzy shadow,
height fixed for=all, break at=11.4cm ]
\lipsum[1-3]
\end{tcolorbox}
\end{multicols}
```

My breakable box


18.7 Break Point Insertion

A *breakable* box is not broken, if there is enough space on the current page or column. Therefore, typical penalty insertion with \break, \pagebreak, \columnbreak, ... *may* only work as expected, if the box is broken at least into two parts *without* inserting the penalties.

To *force* a page or column break, \tcbbreak starts a new paragraph and inserts an insane tall rule which causes a break and which is immediately discarded. You may ignore this technical information and just use it as you would use \pagebreak.

For an *unbreakable box*, \tcbbreak is identical to insert \par, i.e. it just starts a new paragraph.

Also see \texttt{/tcb/break} at \texttt{P.377} for defining height dependend breaks.

```latex
\begin{multicols}{3}
\begin{tcolorbox}
[breakable,enhanced jigsaw,size=small,
 colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
 title=Break into parts
]
First part \tcbbreak
Second part \tcbbreak
Third part
\end{tcolorbox}
\end{multicols}

\begin{multicols}{3}
\begin{tcolorbox}
[enhanced jigsaw,size=small,
 colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
 title=You shall not break
]
First part \tcbbreak
Second part \tcbbreak
Third part
\end{tcolorbox}
\end{multicols}
```

**Break into parts**

<table>
<thead>
<tr>
<th>First part</th>
<th>Second part</th>
<th>Third part</th>
</tr>
</thead>
</table>

**You shall not break**

<table>
<thead>
<tr>
<th>First part</th>
<th>Second part</th>
<th>Third part</th>
</tr>
</thead>
</table>
18.8 Break Sequence for the Skins

The following diagrams document the *break sequence* for different skins. Depending on the main skin of a tcolorbox, the actual skins of the *break sequence* parts are displayed.
<table>
<thead>
<tr>
<th>Unbroken Box</th>
<th>Broken Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>skin=enhanced</td>
<td>skin=enhancedfirst</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedlast</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>skin=enhancedfirst</td>
<td>skin=enhancedfirst</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>skin=enhancedmiddle</td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>skin=enhancedlast</td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedlast</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>skin=enhanced jigsaw</td>
<td>skin=enhancedfirst jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedlast jigsaw</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>skin=enhancedfirst jigsaw</td>
<td>skin=enhancedfirst jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>skin=enhancedmiddle jigsaw</td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>skin=enhancedlast jigsaw</td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedmiddle jigsaw</td>
</tr>
<tr>
<td></td>
<td>skin=enhancedlast jigsaw</td>
</tr>
<tr>
<td>Unbroken Box</td>
<td>Broken Boxes</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>skin=bicolor</td>
<td>skin=bicolorfirst</td>
</tr>
<tr>
<td></td>
<td>skin=bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>skin=bicolorlast</td>
</tr>
<tr>
<td></td>
<td>skin=bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>skin=bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>skin=bicolorlast</td>
</tr>
<tr>
<td></td>
<td>skin=bicolormiddle</td>
</tr>
<tr>
<td></td>
<td>skin=bicolorlast</td>
</tr>
</tbody>
</table>
Unbroken Box
skin=freelance

Broken Boxes
skin=freelancefirst
skin=freelancemiddle
skin=freelancelast

Unbroken Box
skin=freelancefirst

Broken Boxes
skin=freelancefirst
skin=freelancemiddle
skin=freelancemiddle

Unbroken Box
skin=freelancemiddle

Broken Boxes
skin=freelancemiddle
skin=freelancemiddle
skin=freelancemiddle

Unbroken Box
skin=freelancelast

Broken Boxes
skin=freelancemiddle
skin=freelancemiddle
skin=freelancelast
18.9 Break by Hand (Faked Break)

See Section 18.6 on page 384 for real column breaks.

Since the appearance of broken boxes is done by skins, it is quite easy to 'fake a break'. For this, you actually don’t need the \breakable library at all.

\begin{tcolorbox}[title=My broken box,skin=enhancedfirst]
This is a box which breaks from one column to another
\end{tcolorbox}
% \begin{tcolorbox}[skin=enhancedmiddle] column. I am sorry to say that this is a trick. Nevertheless, you may use this trick for your \end{tcolorbox}
% \begin{tcolorbox}[skin=enhancedlast] own purposes. \end{tcolorbox}
The main purpose of this library is to store a \texttt{tcolorbox} into an array of box registers for later usage.

If the \texttt{tcolorbox} is not breakable, there is not much add-on compared to usual \TeX/\LaTeX{} box storage and usage (and you do not really need this library for that use case). For a breakable \texttt{tcolorbox}, this library allows to capture all partial boxes into a sequence of registers. The partial boxes can be used anywhere in arbitrary order.

The name of this library indicates \textit{magazine} in the sense of storage, but also in the sense of a journal where an article often is \textit{continued on page} \textit{x}. An example for this kind of application is given throughout this section starting on the right hand side. The creation of this library was motivated by Ulrike Fischer and Steven B. Segletes.

The library is loaded by a package option or inside the preamble by:

\begin{verbatim}
\tcbuselibrary{magazine}
\end{verbatim}

This also loads the library \texttt{breakable}, see Section 18 on page 373.

\begin{itemize}
\item The box register operations of this library are global. \TeX{} grouping will not clear the registers when leaving the current group. Also be aware that extensive use of large box arrays may eat up \TeX{}’s available memory and registers.
\end{itemize}

### 19.1 Creation and Resetting of Box Arrays

\begin{verbatim}
\newboxarray\{name\}
\end{verbatim}

This creates a new box array called \texttt{name}. There already is a box array available with name \texttt{default} which can be used directly. Note that the creation is a global operation.

\begin{verbatim}
\newboxarray{myarray}
\end{verbatim}

\begin{verbatim}
\newboxarray{myarray}
\end{verbatim}

\begin{verbatim}
\boxarrayreset\{name\}
\end{verbatim}

Resets the size counter of a box array \texttt{name} to zero. If \texttt{name} is not provided, \texttt{default} is used as name. Use this or \texttt{/tcb/reset box array} before you apply \texttt{/tcb/store to box array}. Otherwise, all boxes would be appended to the already existing boxes. This command does not clear box registers.

\begin{verbatim}
\boxarrayreset % resets 'default'
\boxarrayreset{myarray} % resets 'myarray'
\end{verbatim}

\begin{verbatim}
\tcbset{reset box array, % resets 'default'
reset box array=myarray, % resets 'myarray'
}
\end{verbatim}

\begin{verbatim}
\tcbset{reset box array, % resets 'default'
reset box array=myarray, % resets 'myarray'
}
\end{verbatim}
Works like \boxarrayreset \textsuperscript{P.398} to reset the size counter of a box array \textlangle name \textrangle to zero. Additionally, all allocated box registers of the box array are cleared of their content. Note that the allocated box registers stay allocated. So, this may be useful to clear memory, but not to free registers for other applications. If \texttt{\consumeboxarray} \textsuperscript{P.402} or \texttt{\consumetcboxarray} \textsuperscript{P.402} was used to apply the stored boxes, there is no advantage in using \texttt{\boxarrayclear}.

\begin{tabular}{|c|c|}
\hline
\texttt{\boxarrayclear} & \% clears ‘default’ \\
\texttt{\boxarrayclear\{myarray\}} & \% clears ‘myarray’ \\
\hline
\end{tabular}

\section{Storing Content}

\texttt{\tcb@store to box array=\langle name \rangle} \textsuperscript{P.398} (default default, initially unset)

Stores a \texttt{tcolorbox} or all parts of a break sequence of a \texttt{tcolorbox} into a box array \textlangle name \textrangle. If no \textlangle name \textrangle is given, the already existing \texttt{default} box array is used. Otherwise, the box array has to be created beforehand with \texttt{\newboxarray} \textsuperscript{P.398}. Note that the box has to be \texttt{\tcb/breakable} \textsuperscript{P.375}, if the box shall break into several parts. Typically, manual break points are additionally defined by \texttt{\tcb/break at} \textsuperscript{P.377}. Otherwise, the box parts will have a length of about \texttt{\textheight}. For most use cases, a \texttt{\tcb/reset box array} \textsuperscript{P.398} should be applied to reset the box array counter.

\begin{tcolorbox}[enhanced jigsaw,size=fbox,width=4cm,  
colback=yellow!10,colframe=yellow!10!black,  
enforce breakable,\% use only breakable in the real world!  
break at=7cm/4cm,  
height fixed for=all,  
watermark text=\arabic{tcbbreakpart},  
reset box array,  
store to box array  
]
\lipsum[1]  
\end{tcolorbox}

\begin{tabular}{|c|c|}
\hline
\multicolumn{2}{c}{\includegraphics[width=7cm]{Basilica_5.png}}  
\useboxarray\{1\} & \hfill \useboxarray\{2\} \, & \useboxarray\{3\}  
\hline
\end{tabular}

\lipsum[1]
If the first box part should fill the rest of the available space of the current page, you can use \texttt{\pagegoal-\pagetotal} minus some distance for the first element of \texttt{/tcb/break at \textsuperscript{P.377}}. You may want to have some additional distance to the preceding text.

\begin{tcolorbox}
\[enhanced,breakable,reset box array,store to box array,break at=\texttt{\pagegoal-\pagetotal-5mm/Opt},height fixed for=first and middle]\lipsum[1-15]\end{tcolorbox}

% \usepackage{lipsum}
\begin{tcolorbox}\[blanker,width=4cm,fontupper=\footnotesize,enforce breakable,\% use only breakable in the real world!break at=4cm,height fixed for=all,watermark text=\texttt{arabic\{tcbbreakpart\}},reset box array,store to box array\]\includegraphics[width=\linewidth]{Basilica_5.png}\par\lipsum[1-2]\end{tcolorbox}

\begin{tcbitemize}\[raster columns=3,raster equal height,size=small,halign=center,sharp corners,colback=blue!5]\tcbitem\texttt{\consumeboxarray}{5}\tcbitem\texttt{\consumeboxarray}{6}\tcbitem\texttt{\consumeboxarray}{1}\tcbitem\texttt{\consumeboxarray}{2}\tcbitem\texttt{\consumeboxarray}{3}\tcbitem\texttt{\consumeboxarray}{4}\end{tcbitemize}

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dico
tum gravida mauris. Curabitur auctor sem nulla. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus

ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus


\useboxarray\{name\}\{macro\}

Stores the environment content into a box array \langle name \rangle. This corresponds to the standard \LaTeX\ environment \texttt{lrbox}, but the storage operation is global. As long as \texttt{\boxarrayreset} is not used, every new \texttt{\boxarraystore} adds a further box to the array.

\begin{boxarraystore}\langle name \rangle\end{boxarraystore}

\begin{tabular}{l}
\texttt{\fbox{Mary}} \\
\texttt{\fbox{Had}} \\
\texttt{\fbox{a}} \\
\texttt{\fbox{Little}} \\
\texttt{\fbox{Lamb}}
\end{tabular}

\begin{tabular}{lll}
\texttt{\useboxarray\{1\}} & \texttt{\useboxarray\{2\}} & \texttt{\useboxarray\{3\}}
\end{tabular}

19.3 Retrieving Content

\texttt{\boxarraygetsize\{\textit{macro}\}}

Stores the current size of a box array \langle name \rangle into a given \langle macro \rangle. If no \langle name \rangle is given, the already existing default box array is used.

\begin{tabular}{l}
\texttt{\boxarraygetsize\langle \textit{macro} \rangle}
\end{tabular}

Current size of the default box array: 5.

\texttt{\foreach \n in \{1,...,\langle \textit{macro} \rangle \} \{ \useboxarray\{\n\} \}}

\useboxarray\{name\}\{index\}

Typesets the box with the given \langle index \rangle number from the box array \langle name \rangle. If no \langle name \rangle is given, the already existing default box array is used. It is considered an error, if a not existing box array \langle name \rangle is used. It is silently ignored, if the \langle index \rangle is out of range. Note that \texttt{\useboxarray} corresponds to the standard \texttt{\usebox} macro, respectively, \texttt{\copy}.
\usetcboxarray\{(name)\}\{(index)\}\{(options)\}

Typesets the box with the given \texttt{(index)} number from the box array \texttt{(name)} using \useboxarray as content of a \tcbox. If no \texttt{(name)} is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \texttt{(name)} is used. It is silently ignored, if the \texttt{(index)} is out of range. The \tcbox can be customized by \texttt{tcolorbox \{(options)\}}.

\begin{verbatim}
\boxarraygetsize\{\mysize\}
\foreach \n in \{1,...,\mysize\} \{ \usetcboxarray\{\n\}\{on line,colframe=yellow, colback=yellow!10\} \}
\end{verbatim}

\begin{itemize}
\item Mary
\item Had
\item a
\item Little
\item Lamb
\end{itemize}

\begin{verbatim}
\consumeboxarray\{(name)\}\{(index)\}

Typesets the box with the given \texttt{(index)} number from the box array \texttt{(name)}. If no \texttt{(name)} is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \texttt{(name)} is used. It is silently ignored, if the \texttt{(index)} is out of range. In contrast to \useboxarray, \consumeboxarray corresponds to the standard \texttt{box} macro, i.e. after typesetting the box register is cleared and cannot be used again.

\begin{verbatim}
\boxarraygetsize\{\mysize\}
\foreach \n in \{1,...,\mysize\} \{ \consumeboxarray\{\n\} \}
\end{verbatim}

First run: \begin{verbatim}
\foreach \n in \{1,...,\mysize\} \{ \consumeboxarray\{\n\} \}
\end{verbatim}
Second run: \begin{verbatim}
\foreach \n in \{1,...,\mysize\} \{ \consumeboxarray\{\n\} \}
\end{verbatim}

First run: Mary Had a Little Lamb
Second run: Mary Had a Little Lamb

\begin{verbatim}
\consumeetcboxarray\{(name)\}\{(index)\}\{(options)\}

Typesets the box with the given \texttt{(index)} number from the box array \texttt{(name)} using \consumeboxarray as content of a \tcbox. If no \texttt{(name)} is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \texttt{(name)} is used. It is silently ignored, if the \texttt{(index)} is out of range. The \tcbox can be customized by \texttt{tcolorbox \{(options)\}}. After typesetting the box register is cleared and cannot be used again.

— continued from page 401 —

the appropriate places you see. The linking texts like \texttt{continued on page x} are created by \texttt{/tcb/finish} commands for the embedding \tcbox. To label the box parts, \texttt{/tcb/phantomlabel} is used. These quite small partial boxes are

— continued on page 405 —
19.4 Box Dimensions

```latex
\texttt{\textbf{boxarraygetwidth}}\langle\texttt{name}\rangle\{\langle\texttt{macro}\rangle\}\{\langle\texttt{index}\rangle\}
```
Assigns the width of the box with the given \(\langle\texttt{index}\rangle\) number from the box array \(\langle\texttt{name}\rangle\) to a \(\langle\texttt{macro}\rangle\). If no \(\langle\texttt{name}\rangle\) is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \(\langle\texttt{name}\rangle\) is used. If the \(\langle\texttt{index}\rangle\) is out of range, the \(\langle\texttt{macro}\rangle\) will be set to 0pt.

```latex
\begin{tabular}{ll}
\texttt{\textbf{useboxarray}}\langle\texttt{1}\rangle & width of box 1: \texttt{boxarraygetwidth}\langle\texttt{mylen}\rangle\{\langle\texttt{index}\rangle\}\{\texttt{1}\} \texttt{mylen}\\ \\
\texttt{\textbf{useboxarray}}\langle\texttt{2}\rangle & width of box 2: \texttt{boxarraygetwidth}\langle\texttt{mylen}\rangle\{\langle\texttt{index}\rangle\}\{\texttt{2}\} \texttt{mylen}
\end{tabular}
```

<table>
<thead>
<tr>
<th>Test</th>
<th>width of box 1: 30.35799pt</th>
<th>width of box 2: 0pt</th>
</tr>
</thead>
</table>

```latex
\texttt{\textbf{boxarraygetheight}}\langle\texttt{name}\rangle\{\langle\texttt{macro}\rangle\}\{\langle\texttt{index}\rangle\}
```
Assigns the height of the box with the given \(\langle\texttt{index}\rangle\) number from the box array \(\langle\texttt{name}\rangle\) to a \(\langle\texttt{macro}\rangle\). If no \(\langle\texttt{name}\rangle\) is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \(\langle\texttt{name}\rangle\) is used. If the \(\langle\texttt{index}\rangle\) is out of range, the \(\langle\texttt{macro}\rangle\) will be set to 0pt.

```latex
\begin{tabular}{ll}
\texttt{\textbf{useboxarray}}\langle\texttt{1}\rangle & height of box 1: \texttt{boxarraygetheight}\langle\texttt{mylen}\rangle\{\langle\texttt{index}\rangle\}\{\texttt{1}\} \texttt{mylen}\\ \\
\texttt{\textbf{useboxarray}}\langle\texttt{2}\rangle & height of box 2: \texttt{boxarraygetheight}\langle\texttt{mylen}\rangle\{\langle\texttt{index}\rangle\}\{\texttt{2}\} \texttt{mylen}
\end{tabular}
```

<table>
<thead>
<tr>
<th>Test</th>
<th>height of box 1: 9.89883pt</th>
<th>height of box 2: 0pt</th>
</tr>
</thead>
</table>

```latex
\texttt{\textbf{boxarraygetdepth}}\langle\texttt{name}\rangle\{\langle\texttt{macro}\rangle\}\{\langle\texttt{index}\rangle\}
```
Assigns the depth of the box with the given \(\langle\texttt{index}\rangle\) number from the box array \(\langle\texttt{name}\rangle\) to a \(\langle\texttt{macro}\rangle\). If no \(\langle\texttt{name}\rangle\) is given, the already existing \texttt{default} box array is used. It is considered an error, if a not existing box array \(\langle\texttt{name}\rangle\) is used. If the \(\langle\texttt{index}\rangle\) is out of range, the \(\langle\texttt{macro}\rangle\) will be set to 0pt.

```latex
\begin{tabular}{ll}
\texttt{\textbf{useboxarray}}\langle\texttt{1}\rangle & depth of box 1: \texttt{boxarraygetdepth}\langle\texttt{mylen}\rangle\{\langle\texttt{index}\rangle\}\{\texttt{1}\} \texttt{mylen}\\ \\
\texttt{\textbf{useboxarray}}\langle\texttt{2}\rangle & depth of box 2: \texttt{boxarraygetdepth}\langle\texttt{mylen}\rangle\{\langle\texttt{index}\rangle\}\{\texttt{2}\} \texttt{mylen}
\end{tabular}
```

<table>
<thead>
<tr>
<th>Test</th>
<th>depth of box 1: 3.69884pt</th>
<th>depth of box 2: 0pt</th>
</tr>
</thead>
</table>
Assigns the total height of the box with the given \(index\) number from the box array \(name\) to a \(macro\). If no \(name\) is given, the already existing default box array is used. It is considered an error, if a not existing box array \(name\) is used. If the \(index\) is out of range, the \(macro\) will be set to 0pt.

\[\text{boxarraygettotalheight}(name)(macro)(index)\]

for demonstration purposes. With the tools of this section, a magazine type document could be created, but this still needs a lot of manual control.
19.5 Leaflet Example

The following full application example can be used to create leaflets. Obviously, the code can be adapted and customized in many ways.

```latex
\documentclass[a4paper,landscape]{article}
\usepackage[noleadfoot,margin=0pt]{geometry}
\usepackage[skins,raster,magazine]{tcolorbox}
\usepackage{lipsum}
\newenvironment{leaflet}{\begin{tcolorbox}[nobeforeafter,empty,colback=white,
sharp corners,size=minimal,left=10mm,right=10mm,top=10mm,bottom=10mm,
width=\textwidth/3, \breakable,
break at=\textheight,
height fixed for=all, \reset box array, \store to box array,#1]}{\end{tcolorbox}
\begin{tcbitemize}[raster columns=3,raster equal skip=0pt,blankest]
\tcbitem\consumeboxarray
\tcbitem\consumeboxarray
\tcbitem\consumeboxarray
\tcbitem\consumeboxarray
\tcbitem\consumeboxarray
\tcbitem\consumeboxarray
\tcbitem\consumeboxarray
\tcbitem\consumeboxarray\end{tcbitemize}
\begin{document}
\begin{leaflet}[underlay={\node[above=5mm,font=\footnotesize]
at (frame.south) {- \arabic{tcbbreakpart} -};}]
\includegraphics[width=\linewidth]{Basilica_5.png}
\begin{center}
\bfseries\LARGE Example
\end{center}
\section{Introduction}
\lipsum[1]
\section{Main Part A}
\lipsum[2-8]
\section{Main Part B}
\lipsum[9-15]
\section{Conclusion}
\lipsum[16-18]
\end{leaflet}
\end{document}
```
Suspendisse vel felis. Ut lorem lorem, interdum eu, lacus vel est. Curabitur consectetuer.


4 Conclusion

Nulla mattis lectus et pede. Vivamus eget turpis sed id cursus turpis. Cumulatur nullam sodum concluden-

dum. Donec feus, euismod, congue vulputate. Integer porttitor eu metus vulputate malesuada eu, ut.

1 Introduction

Lorum ipsum dolor et amet, consequat adipiscing elit. Ut enim ad minim veniam, quis nostrud exercitation

2 Main Part A

Nam dui ligula, fringilla a, sollicitudin sed, sed orci. Nulla nec non est. Nam nec non

luctus et ultrices posuere cubilia Curae. Aenean in, malesuada, diam tellus vulputate. Nulla

Cursus sodales, augue est scelerisque sapien, venenatis congue nulla arcu et pede. Ut suscipit enim vel


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The main purpose of this library is to support creation of single page posters with \texttt{tcolorbox}es. A \texttt{tcbposter}\textsuperscript{\texttt{-p.409}} is a \texttt{tikzpicture} where \texttt{tcolorbox}es can be placed in a column oriented manner using \texttt{\posterbox}\textsuperscript{\texttt{-p.414}} commands. This base concept is more or less copied from the great \texttt{baposter} package.

The \texttt{raster} library, see Section 15 on page 286, can produce similar looking results and may be more appropriate depending on the actual project.

- The \texttt{raster} library has a flow oriented concept, just like a conventional text flow. The text flow (box flow) is a merely endless ribbon which gets broken into lines (and paragraphs) and the lines are broken into pages. \texttt{raster} shapes the boxes to convenient sizes to fill lines and pages in a pleasant way.
- The \texttt{tcbposter} library supports a quite free placement of boxes inside a page. Basically, boxes are placed like nodes are placed inside a \texttt{tikzpicture}. In contrast to \texttt{raster}, this is a single page and not a flow of pages. The poster is divided into columns and rows. There is a more or less gentle force to use the columns (or spans of columns) for positioning and sizing while the row placement is completely optional.

The creation of this library was motivated by Ignasi.

\begin{itemize}
\item Inside a \texttt{tikzpicture} there should be no embedded \texttt{tikzpicture}s. This rule is violated by the \texttt{poster} library. Be aware that there may be some unwanted interactions between the main \texttt{tikzpicture} and the embedded ones inside the \texttt{tcolorbox}es.
\end{itemize}

The library is loaded by a package option or inside the preamble by:

\texttt{\textbackslash tcbuselibrary\{poster\}}

This also loads the libraries \texttt{skins}, see Section 10 on page 151, \texttt{breakable}, see Section 18 on page 373, \texttt{magazine}, see Section 19 on page 398, and \texttt{fitting}, see Section 21 on page 421.

\subsection{Overview}

Click me to see the tutorial

You get the best overview of the \texttt{poster} library and its facilities, if you look at the \textbf{Poster Tutorial} which is part of the \texttt{tcolorbox} documentation:

\texttt{tcolorbox-tutorial-poster.pdf}
20.2 Main Poster Environment

\begin{tcbposter}[\langle options \rangle]
\end{tcbposter}

This creates a \texttt{tikzpicture} environment with suitable additional settings defined by the given \texttt{(options)}. Basically, \texttt{posterbox} \texttt{P.414} and \texttt{posterboxenv} \texttt{P.414} are used to place \texttt{tcolorboxes} as nodes into the environment, but additional Ti\textit{k}Z code can also be used. As \texttt{(options)} all \texttt{/tcb/posterset/} keys may be applied, namely:

- \texttt{/tcb/posterset/poster} \texttt{P.411}: poster settings like columns, rows, sizes...
- \texttt{/tcb/posterset/coverage} \texttt{P.412} and \texttt{/tcb/posterset/no coverage} \texttt{P.412}: settings for a surrounding \texttt{tcolorbox} for background and margins.
- \texttt{/tcb/posterset/boxes} \texttt{P.413}: style of the \texttt{tcolorboxes} used for the poster.
- \texttt{/tcb/posterset/fontsize} \texttt{P.413}: scaling of used fonts.

\begin{tcbposter}
poster = {showframe,height=10cm,spacing=2mm},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{tcbposter}

\begin{tabular}{ccc}
row1
& col1 & col2 & col3 \\
row2
& A & & \\
row3
& B & & \\
row4
& C & & \\
\end{tabular}

My first box
My second box
My third box
Inside \texttt{tcbposter} \textsuperscript{P.409}, there are several predefined \TeX{}Z nodes. These nodes share a common \texttt{/tcb/poster/prefix} \textsuperscript{P.411} which is \texttt{TCBPOSTER@} by default. This prefix is used to discriminate the poster nodes from local nodes of any embedded \texttt{tikzpicture} environment. You will never need this prefix using \texttt{\posterbox} \textsuperscript{P.414} and its placement options, but if you want to refer to a predefined node using pure \TeX{}Z code. The predefined nodes (shown without prefix) are:

- \texttt{poster}: defines the bounding box of the poster (without the coverage).
- \texttt{top}: top position plus row spacing
- \texttt{bottom}: bottom position minus row spacing
- \texttt{middle}: vertical middle position
- \texttt{col\_1, col\_2, \ldots}: bounding box of column 1, column 2, \ldots
- \texttt{row\_1, row\_2, \ldots}: bounding box of row 1, row 2, \ldots

Further nodes are defined using the \texttt{/tcb/posterloc/name} \textsuperscript{P.415} option.

\begin{quote}
\begin{center}
Never use a \texttt{tcbposter} \textsuperscript{P.409} inside a \texttt{tcbposter} \textsuperscript{P.409}. But, if you do anyway, use a different \texttt{/tcb/poster/prefix} \textsuperscript{P.411} for the embedded poster or you surely get a total mess.
\end{center}
\end{quote}

There are several properties inside a \texttt{tcbposter} \textsuperscript{P.409} which may be useful for advanced code (skip the following on first reading):

- \texttt{\textbackslash tcbposterwidth}: Width of the poster (without margins).
- \texttt{\textbackslash tcbposterheight}: Height of the poster (without margins).
- \texttt{\textbackslash tcbpostercolspacing}: Column distance.
- \texttt{\textbackslash tcbposterrowspacing}: Row distance.
- \texttt{\textbackslash tcbpostercolumns}: Column quantity.
- \texttt{\textbackslash tcbposterrows}: Row quantity.
- \texttt{\textbackslash tcbpostercolwidth}: Width of a column.
- \texttt{\textbackslash tcbposterrowheight}: Height of a row.

\texttt{\textbackslash tcbposterset\{(options)\}}

Sets options for every following \texttt{tcbposter} \textsuperscript{P.409} inside the current \TeX{} group. For example, the numbers for rows and columns may be defined for the whole document by this:

\begin{quote}
\texttt{\textbackslash tcbposterset\{poster={columns=2,rows=3}\}}
\end{quote}

See \texttt{tcbposter} \textsuperscript{P.409} for all feasible options.
20.3 Poster Settings

\begin{tcbposter}
  \[ \text{poster} = \{ \text{showframe}, \text{columns}=5, \text{rows}=2, \text{spacing}=1mm, \text{height}=4cm \} \]
\end{tcbposter}

For the \textit{(option list)}, see the following keys.

\begin{itemize}
  \item \texttt{tcb/poster/columns=}\texttt{(number)} (no default, initially 3)
    Sets the \texttt{(number)} of columns for a \texttt{tcbposter}.
  \item \texttt{tcb/poster/rows=}\texttt{(number)} (no default, initially 4)
    Sets the \texttt{(number)} of rows for a \texttt{tcbposter}.
  \item \texttt{tcb/poster/colspacing=}\texttt{(length)} (no default, initially 4mm)
    Sets \texttt{(length)} as distance between columns.
  \item \texttt{tcb/poster/rowspacing=}\texttt{(length)} (no default, initially 4mm)
    Sets \texttt{(length)} as distance between rows.
  \item \texttt{tcb/poster/spacing=}\texttt{(length)} (style, no default, initially 4mm)
    Sets \texttt{(length)} as distance between columns and rows.
  \item \texttt{tcb/poster/showframe=}\texttt{true|false} (default \texttt{true}, initially \texttt{false})
    Displays a red auxiliary mesh as optical support during poster creation. Also, every
    \texttt{/tcb/posterloc/name} is displayed.
  \item \texttt{tcb/poster/width=}\texttt{(length)} (no default, initially \texttt{\linewidth})
    Sets \texttt{(length)} as width of the poster. For a typical poster, this has not to be set manually.
  \item \texttt{tcb/poster/height=}\texttt{(length)} (no default, initially unset)
    Sets \texttt{(length)} as height of the poster. For a typical poster, this has not to be set manually,
    but is set automatically to an appropriate value.
  \item \texttt{tcb/poster/prefix=}\texttt{(name)} (no default, initially \texttt{TCBPOSTER@})
    \texttt{(name)} is set as prefix for any TikZ node which is generated automatically by the \texttt{poster} library. This encompasses predefined nodes like \texttt{top, bottom, ...}, and nodes defined by
    using \texttt{/tcb/posterloc/name}. Also, see Section 20.2 on page 409. For a typical poster, this value can stay as it is.
\end{itemize}
20.4 Coverage

\begin{tcbposter}
\[ \text{poster} = \{\text{showframe, spacing=1mm}\}, \]
\[ \text{coverage} = \{\text{height=5cm,} \]
\[ \text{interior style=\{top color=yellow, bottom color=yellow!50!red\},} \]
\[ \text{watermark text=\{My Poster\}, watermark color=white,} \]
\[ \}, \]
\end{tcbposter}

\begin{tcbposter}
\[ \text{poster} = \{\text{showframe, spacing=1mm}\}, \]
\[ \text{coverage} = \{\text{height=5cm,} \]
\[ \text{interior style=\{top color=yellow, bottom color=yellow!50!red\},} \]
\[ \text{watermark text=\{My Poster\}, watermark color=white,} \]
\[ \}, \]
\end{tcbposter}

- For a typical poster, the option \texttt{/tcb/spread} \citep{p:90} will use the whole page for the poster coverage.
- Poster margins can be adapted by \texttt{/tcb/left} \citep{p:39}, \texttt{/tcb/right} \citep{p:40}, \texttt{/tcb/top} \citep{p:42}, \texttt{/tcb/bottom} \citep{p:43}.
- Poster background can be changed by \texttt{/tcb/colback} \citep{p:27}, \texttt{/tcb/interior style} \citep{p:152}, \texttt{/tcb/interior style image} \citep{p:153}, etc.

\begin{tcbposter}
\[ \text{poster} = \{\text{showframe, spacing=1mm}\}, \]
\[ \text{coverage} = \{\text{height=5cm,} \]
\[ \text{interior style=\{top color=yellow, bottom color=yellow!50!red\},} \]
\[ \text{watermark text=\{My Poster\}, watermark color=white,} \]
\[ \}, \]
\end{tcbposter}

Removes the surrounding \texttt{tcolorbox} completely.
20.5 Common Box Settings

\texttt{/tcb/posterset/boxes=\{\langle option list\}\}} \quad \text{(style, no default)}

This option can be applied inside \texttt{tcbposter} \textsuperscript{P.409} and \texttt{tcbposterset} \textsuperscript{P.410} and it is used to set up the style of the \texttt{tcolorbox}es inside the poster. The \langle option list\rangle can contain any \texttt{tcolorbox} option, but box size options are not assumed to be useful here, because the size will be determined by the placement options.

\begin{tcbposter}
\begin{itemize}
\item \texttt{poster} = \{\text{spacing=2mm,columns=3,rows=2},
\item \texttt{coverage} = \{\text{height=5cm,}
\item \texttt{interior style=\{top color=yellow,bottom color=yellow!50!red\},}
\item \texttt{boxes} = \{\text{sharp corners=downhill,arc=3mm,boxrule=1mm,}
\item \texttt{colback=white,colframe=cyan,}
\item \texttt{title style=\{left color=black,right color=cyan\},}
\item \texttt{fonttitle=\bfseries\scshape}\}
\end{itemize}
\end{tcbposter}

\begin{tcbposter}
\begin{itemize}
\item \texttt{posterbox}[\texttt{adjusted title=First}]\{\texttt{column=1,row=1,span=2}\}\{\texttt{First box}\}
\item \texttt{posterbox}[\texttt{adjusted title=Second}]\{\texttt{column=1,row=2,span=2}\}\{\texttt{Second box}\}
\item \texttt{posterbox}[\texttt{adjusted title=Third}]\{\texttt{column=3,row=1,rowspan=2}\}\{\texttt{Third box}\}
\end{itemize}
\end{tcbposter}

20.6 Font Scaling

\texttt{/tcb/posterset/fontsize=\langle length\rangle} \quad \text{(style, no default, initially unset)}

This option can be applied inside \texttt{tcbposter} \textsuperscript{P.409} and \texttt{tcbposterset} \textsuperscript{P.410}. It uses \texttt{/tcb/fit basedim} \textsuperscript{P.424} and \texttt{/tcb/fit fontsize macros} \textsuperscript{P.425} to redefine \texttt{\normalsize} to \langle length\rangle and all other standard font size macros like \texttt{\small} and \texttt{\large} accordingly.

This needs a freely scalable font family like \texttt{lmodern} to work. If \texttt{/tcb/posterset/fontsize} is not applied, there standard font size macros are not changed in any way.

\begin{tcbposter}
\begin{itemize}
\item \texttt{poster} = \{\text{spacing=2mm,columns=3,rows=2},
\item \texttt{coverage} = \{\text{height=5cm,}
\item \texttt{interior style=\{top color=yellow,bottom color=yellow!50!red\},}
\item \texttt{fontsize = 15pt, % \textless--- \texttt{\normalsize} is now 15pt}
\end{itemize}
\end{tcbposter}

...
20.7 Box Placement

\texttt{\textbackslash posterbox[\{options\}]{placement}{box content}}

Inside a \texttt{tcbposter} environment, this places a \texttt{tcolorbox} with additional \texttt{tcolorbox} \texttt{\{options\}} and the given \texttt{\{box content\}} at a place determined by \texttt{\{placement\}}. All \texttt{\{placement\}} options are described in the following. Note that \texttt{\{box content\}} cannot contain \texttt{verbatim} material, see \texttt{posterboxenv}.

\begin{tcbposter}
\[\begin{array}{c}
\text{poster} = \{\text{showframe},\text{height}=4\text{cm},\text{spacing}=2\text{mm},\text{rows}=2\},
\text{boxes} = \{\text{beamer},\text{colframe}=\text{blue!50!black},\text{colback}=\text{blue!50},\text{colupper}=\text{yellow!50}\},
\end{array}\]
\texttt{\textbackslash posterbox[title=My title]{name=A,column=2,row=2}{My first box}}
\end{tcbposter}

This is the environment version of \texttt{\textbackslash posterbox}, i.e. inside a \texttt{tcbposter} environment, this places a \texttt{tcolorbox} with additional \texttt{tcolorbox} \texttt{\{options\}} and the given \texttt{\{environment content\}} at a place determined by \texttt{\{placement\}}. In contrast to \texttt{\textbackslash posterbox}, the \texttt{\{environment content\}} is allowed to contain \texttt{verbatim} material. Note that the implementation of \texttt{\textbackslash posterbox} is more efficient than the implementation of \texttt{posterboxenv}.

\begin{tcbposter}
\begin{tcblisting}{size=small,colback=yellow!10}
My \textbf{first} poster listing.
\end{tcblisting}
\end{tcbposter}
Sets \langle{name} \rangle as reference for the current \posterbox or posterboxenv. A Ti\kZ shape name is constructed automatically as combination of /tcb/poster/prefix and \langle{name} \rangle.

\begin{tcbposter}
\begin{align*}
&\text{poster} = \{\text{showframe,height=2.5cm,spacing=2mm,rows=2}, \\
&\text{boxes} = \{\text{beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50}, \\
&\\}
\end{align*}
\posterbox\{name=A,column=2,row=2\}{My first box}
\node[below right=4mm,fill=yellow] (X) at (TCBPOSTER@poster.north west) {Example A};
\draw[blue,very thick,-] (X) |- (TCBPOSTER@A);
\end{tcbposter}

\begin{tcbposter}
\begin{align*}
&\text{poster} = \{\text{showframe,height=2.5cm,spacing=2mm,rows=2}, \\
&\text{boxes} = \{\text{beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50}, \\
&\\}
\end{align*}
\posterbox\{row=1,column=2,span=2\}{First box}
\posterbox\{row=2,column=2,span=0.8\}{Second box}
\end{tcbposter}

\begin{tcbposter}
\begin{align*}
&\text{poster} = \{\text{showframe,height=2.5cm,spacing=2mm,rows=2}, \\
&\text{boxes} = \{\text{beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50}, \\
&\\}
\end{align*}
\posterbox\{row=1,column*=2,span=2\}{First box}
\posterbox\{row=2,column*=2,span=0.8\}{Second box}
\end{tcbposter}
\begin{tcbposter}
\begin{tabular}{ccc}
\text{col1} & \text{col2} & \text{col3} \\
\hline
\text{row1} & \text{First box} & \text{Second box} & \text{Third box} \\
\text{row2} & & & \\
\end{tabular}
\end{tcbposter}

\begin{tcbposter}
\begin{tabular}{ccc}
\text{col1} & \text{col2} & \text{col3} \\
\hline
\text{row1} & \text{First box} & \text{Second box} & \text{Third box} \\
\text{row2} & & & \\
\end{tabular}
\end{tcbposter}

\begin{tcbposter}
\begin{tabular}{ccc}
\text{col1} & \text{col2} & \text{col3} \\
\hline
\text{row1} & \text{First box} & \text{Second box} & \text{Third box} \\
\text{row2} & & & \\
\end{tabular}
\end{tcbposter}

/tcb/posterloc/span=(number)  
(no default, initially 1)
Sets the width of the current box to span (number) columns. (number) is also allowed to be a real number like 0.5 or 1.7. See /tcb/posterloc/column*\textsuperscript{P.415} and /tcb/posterloc/column*\textsuperscript{P.415} for examples.

/tcb/posterloc/row=(number)  
(no default, initially unset)
If this option is applied, the box is placed at the row denoted by (number). Also, the height is set as fixed according to /tcb/posterloc/rowspan.

\begin{tcbposter}
\begin{tabular}{ccc}
\text{col1} & \text{col2} & \text{col3} \\
\hline
\text{row1} & \text{First box} & \text{Second box} & \text{Third box} \\
\text{row2} & & & \\
\end{tabular}
\end{tcbposter}

\begin{tcbposter}
\begin{tabular}{ccc}
\text{col1} & \text{col2} & \text{col3} \\
\hline
\text{row1} & \text{First box} & \text{Second box} & \text{Third box} \\
\text{row2} & & & \\
\end{tabular}
\end{tcbposter}

/tcb/posterloc/rowspan=(number)  
(no default, initially 1)
Sets the height of the current box to span (number) rows. (number) is also allowed to be a real number like 0.5 or 1.7.

\begin{tcbposter}
\begin{tabular}{ccc}
\text{col1} & \text{col2} & \text{col3} \\
\hline
\text{row1} & \text{First box} & \text{Second box} & \text{Third box} \\
\text{row2} & & & \\
\end{tabular}
\end{tcbposter}

/tcb/posterloc/fixed height  
(no value, initially Opt)
Sets the height of the current box span rows as denoted by /tcb/posterloc/rowspan. This can be used, if not /tcb/posterloc/row, but another height placement option is applied.
The box is placed below another box with the given \langle \text{name} \rangle. Also, \langle \text{name} \rangle can be a predefined node, see Section 20.2 on page 409.

\begin{tcbposter}
\begin{align*}
\text{poster} &= \{\text{showframe, height=3cm, spacing=2mm, rows=2}, \\
\text{boxes} &= \{\text{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50}\}, \\
\end{align*}
\text{posterbox}\{\text{name=A, column=1, below=top}\}{\text{First box}} \\
\text{posterbox}\{\text{name=B, column=1, below=A}\}{\text{Second box}} \\
\text{posterbox}\{\text{name=C, column=2, below=B}\}{\text{Third box}} \\
\text{posterbox}\{\text{name=D, column=3, below=row1}\}{\text{Fourth box}}
\end{tcbposter}

\begin{tabular}{|c|c|c|}
\hline
|    | col1 | col2 | col3 |
\hline
row1 |       |       |       |
\hline
row2 |       |       |       |
\hline
\end{tabular}

The box is placed above another box with the given \langle \text{name} \rangle. Also, \langle \text{name} \rangle can be a predefined node, see Section 20.2 on page 409.

\begin{tcbposter}
\begin{align*}
\text{poster} &= \{\text{showframe, height=3cm, spacing=2mm, rows=2}, \\
\text{boxes} &= \{\text{beamer, colframe=blue!50!black, colback=blue!50, colupper=yellow!50}\}, \\
\end{align*}
\text{posterbox}\{\text{name=A, column=1, above=bottom}\}{\text{First box}} \\
\text{posterbox}\{\text{name=B, column=1, above=A}\}{\text{Second box}} \\
\text{posterbox}\{\text{name=C, column=2, above=B}\}{\text{Third box}} \\
\text{posterbox}\{\text{name=D, column=3, above=row2}\}{\text{Fourth box}}
\end{tcbposter}

\begin{tabular}{|c|c|c|}
\hline
|    | col1 | col2 | col3 |
\hline
row1 |       |       |       |
\hline
row2 |       |       |       |
\hline
\end{tabular}
The box is placed at the position with the given \(\langle name\rangle\). This is quite likely a predefined node, see Section 20.2 on page 409.

\begin{tcbposter}
poster = {showframe,height=3cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{tcbposter}

\begin{tcbposter}
poster = {showframe,height=3cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{tcbposter}

The box is placed below a box \(\langle name1\rangle\) and above another box \(\langle name2\rangle\). Also, \(\langle name1\rangle\) and \(\langle name2\rangle\) can be predefined nodes, see Section 20.2 on page 409.

\begin{tcbposter}
poster = {showframe,height=3cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{tcbposter}

\begin{tcbposter}
poster = {showframe,height=3cm,spacing=2mm,rows=2},
boxes = {beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50},
\end{tcbposter}
The box is broken into partial boxes. These partial boxes are placed following the given \textit{sequence} of placements. The feasible syntax for the \textit{sequence} is:

\begin{enumerate}
\item \textit{column a} between \textit{name a1} and \textit{name a2}
\item \textit{column b} between \textit{name b1} and \textit{name b2}
\item \textit{column c} between \textit{name c1} and \textit{name c2}
\end{enumerate}

Obviously, this places the first part box at \textit{column a} between \textit{name a2} and \textit{name a2}. The second box part is placed at \textit{column b} between \textit{name b2} and \textit{name b2}, and so on.

If the box content of a \texttt{/tcb/posterloc/sequence} is too short to fill all reserved box parts, the empty boxes are drawn with the \texttt{/tcb/placeholder} style. This style can be redefined, e.g. to \texttt{/tcb/blankest}, if nothing should be drawn for empty boxes.
Horizontal shift of a box by \( \langle \text{length} \rangle \).

\begin{tcbposter}
\[ \text{poster = \{showframe,height=3cm,spacing=2mm,rows=2\},} \]
\[ \text{boxes = \{beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50\},} \]
\end{tcbposter}

\begin{tcbposter}
\posterbox\{name=A,column=1,row=1,xshift=6mm\}{First box} \posterbox\{name=B,column=2,row=2,xshift=-6mm\}{Second box}
\end{tcbposter}

Vertical shift of a box by \( \langle \text{length} \rangle \).

\begin{tcbposter}
\[ \text{poster = \{showframe,height=3cm,spacing=2mm,rows=2\},} \]
\[ \text{boxes = \{beamer,colframe=blue!50!black,colback=blue!50,colupper=yellow!50\},} \]
\end{tcbposter}

\begin{tcbposter}
\posterbox\{name=A,column=1,row=1,yshift=-4mm\}{First box} \posterbox\{name=B,column=2,row=2,yshift=4mm\}{Second box}
\end{tcbposter}
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{fitting}

### 21.1 Macros of the Library

\tcboxfit[\{options\}]{\{box content\}}

Creates a colored box where the given \{box content\} is fitted to the width and height of the box. A \tcboxfit has to have a fixed height. If no fixed height is given, a square box is constructed. In principle, most \{options\} for a \texttt{tcolorbox}\textsuperscript{P.12} can be used for \tcboxfit with some restrictions. A \tcboxfit cannot have a lower part and cannot be broken.
See Section 23.6 on page 454 for more elaborate methods to create new commands.

\newtcboxfit{\langle init options \rangle}{\langle name \rangle}{\langle number \rangle}{\langle default \rangle}{\langle options \rangle}

Creates a new macro \langle name \rangle based on \tcboxfit. Basically, \newtcboxfit operates like \newcommand. The new macro \langle name \rangle optionally takes <number>+1 arguments, where <default> is the default value for the optional first argument. The <options> are given to the underlying \tcboxfit. The <init options> allow setting up automatic numbering, see Section 5 from page 110.

\newtcboxfit\{mybox\}{colback=red!5!white, colframe=red!75!black,width=4cm, height=1.5cm,halign=center}
\mybox{This is my own box.}\par
\mybox{This is my own box with more text to be written.}

This is my own box.
This is my own box with more text to be written.

% \usepackage{lipsum}
\newtcboxfit\{mybox\}{colback=red!5!white, colframe=red!75!black,fonttitle=\textbfseries, boxsep=1mm,left=0mm,right=0mm,top=0mm, bottom=0mm,halign=center,valign=center, nobeforeafter,width=#1,height=#2}
\mybox{2.5cm}{1cm}{First box}
% \mybox{2.5cm}{1cm}{Second box with more text}\%
\mybox{5cm}{2cm}{Third box with text}\%
\mybox{5cm}{3cm}{\lipsum[1]}% 

First box
Second box with more text
Third box with text

% \usepackage{lipsum}
\newtcboxfit\{mybox\}{colback=red!5!white, colframe=red!75!black,\}
{colback=yellow}{\lipsum[2]}%

\renewtcboxfit{\langle init options \rangle}{\langle name \rangle}{\langle number \rangle}{\langle default \rangle}{\langle options \rangle}

Operates like \newtcboxfit, but based on \renewcommand instead of \newcommand. An existing macro is redefined.

\tcbfontsize{\langle factor \rangle}

Selects a font size inside a tcolorbox which is scaled with the given <factor> relative to \tcbfitdim.

\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[fit basedim=10pt]
\{\tcbfontsize{0.25} Very tiny,\}\%
\{\tcbfontsize{0.5} Small,\}\%
\{\tcbfontsize{1} Normal,\}\%
\{\tcbfontsize{2} Large,\}\%
\{\tcbfontsize{4} Huge.\}
\end{tcolorbox}

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21.2 Option Keys of the Library

The font size for the content of a box with fixed width and fixed height can be adjusted automatically. This is called the *fitbox capture mode*. Note that the fit control algorithm constructs a series of versions for the box and selects the 'best'. Therefore, the compilation time is quite longer than for a normal box. The algorithm will fail, if a different selected font size does not change the overall size of the box content. The \texttt{tcboxfit} \footnote{P.421} macro uses this algorithm by default.

The fit control keys are only applicable to unbreakable boxes without a lower part. The box content should not change counters.

\texttt{/tcb/fit} \footnote{(style, initially unset)}

Sets the \texttt{/tcb/capture} \footnote{P.96} mode to fitbox, i.e. enables the font size adjustment algorithm. Thereby, a \texttt{tcolorbox} \footnote{P.12} acts like \texttt{tcboxfit} \footnote{P.421} where the given \texttt{(box content)} is fitted to the width and height of the box. Therefore, the box has to have a fixed height. If no fixed height is given, a square box is constructed. The font dimension \texttt{tcboxfitdim} can also be used to adjust the margins of the box since a box with a tiny font may not need large margins. The number of constructed boxes is saved to the macro \texttt{tcboxfitsteps} for analysis.

\begin{quote}
\begin{Verbatim}
\% \usepackage{lipsum}
\% \tcbuselibrary{skins}
\newtcolorbox{fitting}[2][]{fit,height=#2,boxsep=1pt,valign=center,opacityupper=0.5,
top=0.4\texttt{tcboxfitdim},bottom=0.4\texttt{tcboxfitdim},left=0.75\texttt{tcboxfitdim},
right=0.75\texttt{tcboxfitdim},
enhanced,watermark text={\texttt{tcboxfitsteps}},colframe=blue!75!black,colback=white,#1}
\begin{fitting}{4cm}
\lipsum[1]
\end{fitting}
\begin{fitting}{2cm}
\lipsum[2]
\end{fitting}
\begin{fitting}{1cm}
\lipsum[3]
\end{fitting}
\end{Verbatim}
\end{quote}


/tcb/fit to ⟨width⟩ and ⟨height⟩ (style, initially unset)
Shortcut for using /tcb/fit and setting the ⟨width⟩ and ⟨height⟩ values separately.

\begin{tcolorbox}
\[fit to=3cm and 2cm\]
This box content is fitted to the given dimensions.
\end{tcolorbox}

\begin{tcolorbox}
\[fit to=4cm and 2cm, fit basedim=50pt\]
Enough words for the box.
\end{tcolorbox}

/tcb/fit to height=⟨height⟩ (style, initially unset)
Shortcut for using /tcb/fit and setting the ⟨height⟩ value separately.

\begin{tcolorbox}
\[fit to height=2cm\]
This box content is fitted to the given height.
\end{tcolorbox}

/tcb/fit basedim=⟨length⟩ (no default, initially 10pt)
Sets the starting font dimension for the font size adjustment algorithm to ⟨length⟩. The algorithm never enlarges this dimension.

\begin{tcolorbox}
\[fit to=4cm and 2cm\]
Too few words for the box.
\end{tcolorbox}

\begin{tcolorbox}
\[fit to=4cm and 2cm, fit basedim=50pt\]
Enough words for the box.
\end{tcolorbox}

/tcb/fit skip=⟨real value⟩ (no default, initially 1.2)
Sets the skip value of the selected font to ⟨real value⟩ times \tcbfitdim.

\begin{tcolorbox}
\[fit to=5cm and 4cm, fit skip=1.0 \]
\end{tcolorbox}
Redefines the standard \LaTeX\ font size macros \texttt{\tiny}, \texttt{\scriptsize}, \texttt{\footnotesize}, \texttt{\small}, \texttt{\normalsize}, \texttt{\large}, \texttt{\Large}, \texttt{\LARGE}, \texttt{\huge}, and \texttt{\Huge}, to set font sizes relative to the current \texttt{\tcbfittdim}. Note that the display skip values for mathematical formulas are respected by the redefined macros.

\% \usepackage{lipsum}
\tcbsset{colback=red!5!white, colframe=red!75!black,left=1mm, right=1mm,boxsep=0mm}
\begin{tcolorbox}[fit to height=4cm]
{\Large\bfseries This text is not adapted:\par}
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[fit to height=4cm, fit fontsize macros]
{\Large\bfseries This text is adapted:\par}
\lipsum[2]
\end{tcolorbox}

This text is not adapted:


This text is adapted:


The relative relative font size macros are also usable without the \texttt{fit} algorithm.

\texttt{\Huge Adapted Huge} — \texttt{\Huge Original Huge}

Adapted title

The box is allowed to enlarge the fixed height up to the given $\langle\text{dimension}\rangle$, before a font size fit is applied. An optional \texttt{/tcb/fit width plus} is tried after the height adaption.

% \usepackage{lipsum}
\tcbset{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,bottom=1mm,right=1mm,boxsep=0mm,width=3cm,height=3cm,nobeforeafter}

\begin{tcolorbox}[fit]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit,fit height plus=1cm]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[fit,fit height plus=1cm]
\lipsum[2]
\end{tcolorbox}

\textbf{The box is allowed to enlarge the fixed \textit{width} up to the given $\langle\text{dimension}\rangle$, before a font size fit is applied. An optional \texttt{/tcb/fit height plus} is tried after the width adaption.}

% \usepackage{lipsum}
\tcbset{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,bottom=1mm,right=1mm,boxsep=0mm,width=3cm,height=3cm,nobeforeafter}

\begin{tcolorbox}[fit]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit,fit width plus=1cm]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[fit,fit width plus=1cm]
\lipsum[2]
\end{tcolorbox}
Typically but not necessarily, the optional title of a \texttt{tcolorbox} is not part of the fit operation. If a \texttt{/tcb/fit width plus} is applied, the title is also adapted to the new width. If counters are increased inside the title text, they may be increased more than one time. To avoid this, you are encouraged to use \texttt{/tcb/phantom} or \texttt{/tcb/step and label} to set counters or use automatic numbering, see Subsection 5.1 from page 110.

% \usepackage{lipsum}
\tcbset{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,bottom=1mm,right=1mm,boxsep=0mm,height=4cm}

\begin{tcolorbox}[fit,width=\linewidth/2]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[fit width from=\linewidth/2 to \linewidth]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}
\par
\end{tcolorbox}
\begin{mybox}
This is a tcolorbox.
\end{mybox}

\begin{mybox}
This is a tcolorbox. This is a tcolorbox. This is a tcolorbox.
\end{mybox}

\begin{mybox}
\lipsum[2]
\end{mybox}
/tcb/fit algorithm=(name) (no default, initially fontsize)

Sets the algorithm for the fitting process after optionally width and height are adapted. Feasible values for (name) are:

- **fontsize** (initial): The algorithm is a bisection method that adapts the font size until certain stop conditions are fulfilled. This is the most time-consuming method but it is robust and gives pleasant results.

  ![The used font has to be freely scalable for this method! Other content than text is not scaled down. The aspect ratio is fully guaranteed.]

- **fontsize**: First, the fontsize algorithm is applied. If the font was scaled down and the resulting height is too small, the box is squeezed to fit the area.

  ![The used font has to be freely scalable for this method! Other content than text may be slightly rescaled. The aspect ratio cannot be fully guaranteed.]

- **areasisze**: The algorithm calculates the area size for the text without scaling the font. The text box is shaped for the needed aspect ratio in one or two steps. Finally, it is scaled down with a standard \resizebox macro.

  ![The used font has not to be scalable. Every box content is scaled down. The aspect ratio cannot be fully guaranteed.]

- **areasisze**: The areasisze algorithm is applied, but if the content was scaled down and the resulting height is too small, the box is squeezed to fit the area.

  ![The used font has not to be scalable. Every box content is scaled down. The aspect ratio cannot be fully guaranteed.]

- **hybrid**: First, this algorithm estimates the needed font size in one or two steps. Then an areasisze fitting as above is applied.

  ![The used font has to be freely scalable for this method! Other content than text may be slightly rescaled. The aspect ratio cannot be fully guaranteed.]

- **hybrid**: First, this algorithm estimates the needed font size in one or two steps. Then an areasisze* fitting as above is applied.

  ![The used font has to be freely scalable for this method! Other content than text may be slightly rescaled. The aspect ratio cannot be fully guaranteed.]

- **squeeze**: The text box is brutally scaled down to fit.

  ![The aspect ratio is very likely to be horrible. You should not use this method for final documents.]

N 2014-10-29
Quality \dotfill versus \dotfill Speed

\begin{itemize}
\end{itemize}

\begin{itemize}
\end{itemize}
The following options set control parameters for the fit algorithm. Mainly, they apply to the `fontsize` variant, see \texttt{/tcb/fit algorithm} \textsuperscript{7}P.429. The options should be seen as experimental and are likely to change in future versions, if necessary.

\texttt{/tcb/fit maxstep=⟨number⟩} \hspace{1cm} (no default, initially 20)

Sets the maximal step size for the font size adjustment algorithm. In normal situations, the algorithm stops before reaching the intial value of 20 steps. If the box content does not shrink, this value prevents an endless loop.

\texttt{/tcb/fit maxfontdiff=⟨dimension⟩} \hspace{1cm} (no default, initially 0.1pt)

The algorithm stops, if the font size is determined within a deviation of \texttt{⟨dimension⟩}.

\texttt{/tcb/fit maxfontdiffgap=⟨dimension⟩} \hspace{1cm} (no default, initially 1pt)

The algorithm stops, if the number of lines is determined and the font size is determined within a deviation of \texttt{⟨dimension⟩}.

\texttt{/tcb/fit maxwidthdiff=⟨dimension⟩} \hspace{1cm} (no default, initially 1pt)

The algorithm stops, if the (optionally) flexible box width is determined within a deviation of \texttt{⟨dimension⟩}.

\texttt{/tcb/fit maxwidthdiffgap=⟨dimension⟩} \hspace{1cm} (no default, initially 10pt)

The algorithm stops, if the number of lines is determined and the (optionally) flexible box width is determined within a deviation of \texttt{⟨dimension⟩}.

\texttt{/tcb/fit warning=⟨value⟩} \hspace{1cm} (no default, initially off)

Typically, the fit control algorithm constructs several auxiliary boxes to determine the optimal one. If not switched off, the construction of the auxiliary boxes may produce many \texttt{hbox} warnings. This option key changes the \texttt{\hbadness} value.

- \texttt{off}: Most of ‘Underfull \texttt{hbox}’ and ‘Overfull \texttt{hbox}’ warnings are switched off (including the ones for the finally used box).
- \texttt{on}: All warnings for all auxiliary boxes are displayed.
- \texttt{final}: Only warnings for the finally used box are displayed. Note that an additional box has to be contructed for theses messages.

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The library is loaded by a package option or inside the preamble by:

```latex
\usepackage{hooks}
```

For the skin related options, the library `skins` has to be loaded separately.

### 22.1 Concept of Hooks

A hook is a placeholder in some LaTeX code where additional code can be added. For example, the LaTeX macro `\AtBeginDocument` adds code to a hook which is placed at the beginning of every document.

Several option keys of `tcolorbox` allow providing some code which is added to specific places of a colored box. For example, `/tcb/before upper` places code before the content of the upper part. A following usage of this key overwrites any prior settings.

The library `hooks` extends `/tcb/before upper` and several more existing keys to ‘hookable’ versions, e.g. `/tcb/before upper app` and `/tcb/before upper pre`. The ‘hookable’ keys don’t overwrite prior settings but either append or prepend the newly given code to the existing code.

The general naming convention (with some small exceptions) is:

- `(option key) app`: works like `(option key)` but appends its code to the existing code.
- `(option key) pre`: works like `(option key)` but prepends its code to the existing code.

If the original `(option key)` is used (again), all code will be overwritten. Therefore, the order of the option key usage is crucial.

```latex
\begin{tcolorbox}
\begin{tabular}{X||Y|Y|Y|Y||Y}
\hline
\textbf{Group} & One & Two & Three & Four & Sum \\
\hline
Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
\hline
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
\hline
Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
\hline
Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\hline
\end{tabular}
\end{tcolorbox}
```

My table

<table>
<thead>
<tr>
<th></th>
<th>One</th>
<th>Two</th>
<th>Three</th>
<th>Four</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>1000.00</td>
<td>2000.00</td>
<td>3000.00</td>
<td>4000.00</td>
<td>10000.00</td>
</tr>
<tr>
<td>Green</td>
<td>2000.00</td>
<td>3000.00</td>
<td>4000.00</td>
<td>5000.00</td>
<td>14000.00</td>
</tr>
<tr>
<td>Blue</td>
<td>3000.00</td>
<td>4000.00</td>
<td>5000.00</td>
<td>6000.00</td>
<td>18000.00</td>
</tr>
<tr>
<td>Sum</td>
<td>6000.00</td>
<td>9000.00</td>
<td>12000.00</td>
<td>15000.00</td>
<td>42000.00</td>
</tr>
</tbody>
</table>
### 22.2 Box Content Additions

The following option keys extend the options given in Subsection 4.11 from page 64.

- `/tcb/before title app=(code)` (no default)
  Appends the given ⟨code⟩ to `/tcb/before title` after the color and font settings and before the content of the title.

- `/tcb/before title pre=(code)` (no default)
  Prepends the given ⟨code⟩ to `/tcb/before title` after the color and font settings and before the content of the title.

- `/tcb/after title app=(code)` (no default)
  Appends the given ⟨code⟩ to `/tcb/after title` after the content of the title.

- `/tcb/after title pre=(code)` (no default)
  Prepends the given ⟨code⟩ to `/tcb/after title` after the content of the title.

- `/tcb/before upper app=(code)` (no default)
  Appends the given ⟨code⟩ to `/tcb/before upper` or `/tcb/before upper*` after the color and font settings and before the content of the upper part.

- `/tcb/before upper pre=(code)` (no default)
  Prepends the given ⟨code⟩ to `/tcb/before upper` or `/tcb/before upper*` after the color and font settings and before the content of the upper part.

- `/tcb/after upper app=(code)` (no default)
  Appends the given ⟨code⟩ to `/tcb/after upper` or `/tcb/after upper*` after the content of the upper part.

- `/tcb/after upper pre=(code)` (no default)
  Prepends the given ⟨code⟩ to `/tcb/after upper` or `/tcb/after upper*` after the content of the upper part.

\[
\begin{tcolorbox}
\text{\textbf{Box Content Additions}}
\end{tcolorbox}
\]

\[
\begin{align*}
\frac{2}{\sqrt{2}} &= \sqrt{2}. \quad (22) \\
\sum_{n=1}^{\infty} \frac{1}{n} &= \infty. \quad (23) \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c. \quad (24) \\
\sin \left( \frac{\pi}{2} \right) &= 1. \quad (25)
\end{align*}
\]
22.3 Embedding into the Surroundings

The following option keys extend the options given in Subsection 4.14 from page 80.

The 'hookable' versions are usable inside the document. In the preamble, they can only be used after explicit setting of /tcb/before* and /tcb/after* or by e.g. /tcb/parskip*.

\begin{tcolorbox}
[tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}
\begin{tabular}{l}
My title
\hline
This is a \textbf{tcolorbox}.
\end{tabular}
\end{tcolorbox}

This is the end.
22.4 Overlays

The following option keys extend the options given in Subsection 4.12 from page 73.

/tcb/overlay app=⟨graphical code⟩ (no default)

Appends the given ⟨graphical code⟩ to /tcb/overlay\(^{\text{P.73}}\).

/tcb/overlay pre=⟨graphical code⟩ (no default)

Prepends the given ⟨graphical code⟩ to /tcb/overlay\(^{\text{P.73}}\).

/tcb/overlay unbroken app=⟨graphical code⟩ (no default)

Appends the given ⟨graphical code⟩ to /tcb/overlay unbroken\(^{\text{P.74}}\).

/tcb/overlay unbroken pre=⟨graphical code⟩ (no default)

Prepends the given ⟨graphical code⟩ to /tcb/overlay unbroken\(^{\text{P.74}}\).

/tcb/overlay first app=⟨graphical code⟩ (no default)

Appends the given ⟨graphical code⟩ to /tcb/overlay first\(^{\text{P.74}}\).

/tcb/overlay first pre=⟨graphical code⟩ (no default)

Prepends the given ⟨graphical code⟩ to /tcb/overlay first\(^{\text{P.74}}\).
/tcb/overlay middle app=⟨graphical code⟩ (no default)
Appends the given ⟨graphical code⟩ to /tcb/overlay middle •P.74.

/tcb/overlay middle pre=⟨graphical code⟩ (no default)
Prepends the given ⟨graphical code⟩ to /tcb/overlay middle •P.74.

/tcb/overlay last app=⟨graphical code⟩ (no default)
Appends the given ⟨graphical code⟩ to /tcb/overlay last •P.74.

/tcb/overlay last pre=⟨graphical code⟩ (no default)
Prepends the given ⟨graphical code⟩ to /tcb/overlay last •P.74.

/tcb/overlay broken app=⟨graphical code⟩ (no default)
Appends the given ⟨graphical code⟩ to /tcb/overlay broken •P.74.

/tcb/overlay broken pre=⟨graphical code⟩ (no default)
Prepends the given ⟨graphical code⟩ to /tcb/overlay broken •P.74.

/tcb/overlay unbroken and first app=⟨graphical code⟩ (no default)
Appends the given ⟨graphical code⟩ to /tcb/overlay unbroken and first •P.74.

/tcb/overlay unbroken and first pre=⟨graphical code⟩ (no default)
Prepends the given ⟨graphical code⟩ to /tcb/overlay unbroken and first •P.74.

/tcb/overlay middle and last app=⟨graphical code⟩ (no default)
Appends the given ⟨graphical code⟩ to /tcb/overlay middle and last •P.74.

/tcb/overlay middle and last pre=⟨graphical code⟩ (no default)
Prepends the given ⟨graphical code⟩ to /tcb/overlay middle and last •P.74.

/tcb/overlay unbroken and last app=⟨graphical code⟩ (no default)
Appends the given ⟨graphical code⟩ to /tcb/overlay unbroken and last •P.74.

/tcb/overlay unbroken and last pre=⟨graphical code⟩ (no default)
Prepends the given ⟨graphical code⟩ to /tcb/overlay unbroken and last •P.74.

/tcb/overlay first and middle app=⟨graphical code⟩ (no default)
Appends the given ⟨graphical code⟩ to /tcb/overlay first and middle •P.74.

/tcb/overlay first and middle pre=⟨graphical code⟩ (no default)
Prepends the given ⟨graphical code⟩ to /tcb/overlay first and middle •P.74.
22.5 Watermarks

The following option keys extend the options given in Subsection 10.3 from page 168.

Watermarks are special overlays. The \texttt{\textbf{hooks}} library allows the combination of several watermarks and overlays.

\verb+/tcb/watermark text app=(text)+ (no default)

Appends a \texttt{/tcb/watermark text} to the colored box.

\verb+/tcb/watermark text pre=(text)+ (no default)

Prepends a \texttt{/tcb/watermark text} to the colored box.

\verb+/tcb/watermark text app on=(part) is=(text)+ (no default)

Appends a \texttt{/tcb/watermark text} on the named \texttt{(part)} of a break sequence.

\verb+/tcb/watermark text pre on=(part) is=(text)+ (no default)

Prepends a \texttt{/tcb/watermark text} on the named \texttt{(part)} of a break sequence.
Appends a /tcb/watermark graphics$^{\text{P.169}}$ referenced by ⟨file name⟩ to the colored box.

Prepends a /tcb/watermark graphics$^{\text{P.169}}$ referenced by ⟨file name⟩ to the colored box.

Appends a /tcb/watermark graphics on$^{\text{P.169}}$ the named ⟨part⟩ of a break sequence. The picture is referenced by ⟨file name⟩.

Prepends a /tcb/watermark graphics on$^{\text{P.169}}$ the named ⟨part⟩ of a break sequence. The picture is referenced by ⟨file name⟩.

Appends a /tcb/watermark tikz$^{\text{P.170}}$ with the given tikz ⟨graphical code⟩ to the colored box.

Prepends a /tcb/watermark tikz$^{\text{P.170}}$ with the given tikz ⟨graphical code⟩ to the colored box.

/
\begin{tcolorbox}[enhanced,title=My title, watermark text=Watermark, smiley]
\lipsum[1-2]
\end{tcolorbox}

My title


\begin{tcolorbox}[enhanced,title=My title, watermark text=Watermark, smiley]
\lipsum[1-2]
\end{tcolorbox}

Prepends a /tcb/watermark tikz on$^{\text{P.170}}$ the named ⟨part⟩ of a break sequence.

Prepends a /tcb/watermark tikz on$^{\text{P.170}}$ the named ⟨part⟩ of a break sequence.
22.6 Underlays

The following option keys extend the options given in Section 10.8 on page 198. There are no app type keys since underlays are stackable by default.

\[\text{/tcb/underlay pre}=(\text{graphical code})\]  
Prepends the given \(\text{graphical code}\) to \(/tcb/underlay\) \(\text{P.198}\).  

\[\text{/tcb/underlay unbroken pre}=(\text{graphical code})\]  
Prepends the given \(\text{graphical code}\) to \(/tcb/underlay\ unbroken\) \(\text{P.199}\).  

\[\text{/tcb/underlay first pre}=(\text{graphical code})\]  
Prepends the given \(\text{graphical code}\) to \(/tcb/underlay first\) \(\text{P.199}\).  

\[\text{/tcb/underlay middle pre}=(\text{graphical code})\]  
Prepends the given \(\text{graphical code}\) to \(/tcb/underlay middle\) \(\text{P.199}\).  

\[\text{/tcb/underlay last pre}=(\text{graphical code})\]  
Prepends the given \(\text{graphical code}\) to \(/tcb/underlay last\) \(\text{P.199}\).  

\[\text{/tcb/underlay boxed title pre}=(\text{graphical code})\]  
Prepends the given \(\text{graphical code}\) to \(/tcb/underlay boxed title\) \(\text{P.199}\).  

\[\text{/tcb/underlay broken pre}=(\text{graphical code})\]  
Prepends the given \(\text{graphical code}\) to \(/tcb/underlay broken\) \(\text{P.199}\).  

\[\text{/tcb/underlay unbroken and first pre}=(\text{graphical code})\]  
Prepends the given \(\text{graphical code}\) to \(/tcb/underlay unbroken and first\) \(\text{P.199}\).  

\[\text{/tcb/underlay middle and last pre}=(\text{graphical code})\]  
Prepends the given \(\text{graphical code}\) to \(/tcb/underlay middle and last\) \(\text{P.199}\).  

\[\text{/tcb/underlay unbroken and last pre}=(\text{graphical code})\]  
Prepends the given \(\text{graphical code}\) to \(/tcb/underlay unbroken and last\) \(\text{P.199}\).  

\[\text{/tcb/underlay first and middle pre}=(\text{graphical code})\]  
Prepends the given \(\text{graphical code}\) to \(/tcb/underlay first and middle\) \(\text{P.199}\).
22.7 Finishes

The following option keys extend the options given in Section 10.9 on page 200. There are no app type keys since finishes are stackable by default.

/tcb/finish pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/finish\textsuperscript{P.200}.

/tcb/finish unbroken pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/finish unbroken\textsuperscript{P.201}.

/tcb/finish first pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/finish first\textsuperscript{P.201}.

/tcb/finish middle pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/finish middle\textsuperscript{P.201}.

/tcb/finish last pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/finish last\textsuperscript{P.201}.

/tcb/finish broken pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/finish broken\textsuperscript{P.201}.

/tcb/finish unbroken and first pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/finish unbroken and first\textsuperscript{P.201}.

/tcb/finish middle and last pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/finish middle and last\textsuperscript{P.201}.

/tcb/finish unbroken and last pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/finish unbroken and last\textsuperscript{P.201}.

/tcb/finish first and middle pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/finish first and middle\textsuperscript{P.201}.

22.8 Skin Code

The following option keys extend the options given in Subsection 9.2 from page 140.

/tcb/frame code app=(graphical code) (no default)
Appends the given (graphical code) to /tcb/frame code\textsuperscript{P.140}.

/tcb/frame code pre=(graphical code) (no default)
Prepends the given (graphical code) to /tcb/frame code\textsuperscript{P.140}.

/tcb/interior titled code app=(graphical code) (no default)
Appends the given (graphical code) to /tcb/interior titled code\textsuperscript{P.140}.
22.9 Extras

The following option keys extend the options given in Section 18.5 on page 381. There are no `app` type keys since extras are stackable by default.

- `/tcb/extras pre={(options)}` (no default)
  Prepends the given `(options)` to `/tcb/extras`\(^{P.381}`.

- `/tcb/extras unbroken pre={(options)}` (no default)
  Prepends the given `(options)` to `/tcb/extras unbroken`\(^{P.381}`.

- `/tcb/extras first pre={(options)}` (no default)
  Prepends the given `(options)` to `/tcb/extras first`\(^{P.381}`.

- `/tcb/extras middle pre={(options)}` (no default)
  Prepends the given `(options)` to `/tcb/extras middle`\(^{P.381}`.

- `/tcb/extras last pre={(options)}` (no default)
  Prepends the given `(options)` to `/tcb/extras last`\(^{P.381}`.

- `/tcb/extras broken pre={(options)}` (no default)
  Prepends the given `(options)` to `/tcb/extras broken`\(^{P.381}`.

- `/tcb/extras unbroken and first pre={(options)}` (no default)
  Prepends the given `(options)` to `/tcb/extras unbroken and first`\(^{P.381}`.

- `/tcb/extras middle and last pre={(options)}` (no default)
  Prepends the given `(options)` to `/tcb/extras middle and last`\(^{P.381}`.

- `/tcb/extras unbroken and last pre={(options)}` (no default)
  Prepends the given `(options)` to `/tcb/extras unbroken and last`\(^{P.381}`.

- `/tcb/extras first and middle pre={(options)}` (no default)
  Prepends the given `(options)` to `/tcb/extras first and middle`\(^{P.381}`.
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{xparse}

This also loads the package \texttt{xparse} [13].

The purpose of this library is to give comfortable access to the powerful document command production with \texttt{xparse} for \texttt{tcolorbox}. See the \texttt{xparse} package documentation [13] for details about the argument \texttt{(specification)} used in this section.

23.1 Option Keys

\texttt{/tcb/verbatim} \hspace{1em} (style, no value)

Sets options for a \textit{verbatim} style \texttt{\tcbox} \textsuperscript{P.14}. Since the indented boxes may contain only very few words, the dimensions are made smaller and \texttt{/tcb/nobeforeafter} \textsuperscript{P.80} and \texttt{/tcb/tcbox raise base} \textsuperscript{P.98} are set.

\begin{tcbbox}{myverb}{v}{verbatim, colframe=red!75!black,colupper=blue}{#1}
myverb\textbf is a \texttt{myverb} \texttt{\LaTeX} command.
\end{tcbbox}

\texttt{/tcb/IfNoValueTF}={⟨argument⟩}{⟨true options⟩}{⟨false options⟩} \hspace{1em} (no default)

Wraps the \texttt{\IfNoValueTF} command of \texttt{xparse} for option setting. If the \texttt{⟨argument⟩} has no value, the \texttt{⟨true options⟩} are set. Otherwise, the \texttt{⟨false options⟩} are set.

\begin{tcbbox}{mybox}{o}{colframe=red!75!black, IfNoValueTF={#1}{colback=red!5!white}{enhanced,interior style image=#1}}
\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}[goldshade.png]
This is a tcolorbox.
\end{mybox}

This is a tcolorbox.

This is a tcolorbox.
\texttt{\textbackslash tcb/IfValueTF}={\langle argument\rangle}{\langle true options\rangle}{\langle false options\rangle} \hspace{1em} \text{(no default)}

Wraps the \texttt{\textbackslash IfValueTF} command of \texttt{\textit{xparse}} for option setting. If the \texttt{\langle argument\rangle} has a value, the \texttt{\langle true options\rangle} are set. Otherwise, the \texttt{\langle false options\rangle} are set.

\begin{verbatim}
\DeclareTColorBox{mybox}{ o }{colframe=red!75!black,colback=red!5!white, IfValueTF={#1}{title={\textit{#1}},fonttitle=\bfseries}{}}
\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}[My title]
This is a tcolorbox.
\end{mybox}
\end{verbatim}

\textbackslash tcb/IfBooleanTF={\langle argument\rangle}{\langle true options\rangle}{\langle false options\rangle} \hspace{1em} \text{(no default)}

Wraps the \texttt{\textbackslash IfBooleanTF} command of \texttt{\textit{xparse}} for option setting. If the \texttt{\langle argument\rangle} is \texttt{\textit{BooleanTrue}}, the \texttt{\langle true options\rangle} are set. If the \texttt{\langle argument\rangle} is \texttt{\textit{BooleanFalse}}, the \texttt{\langle false options\rangle} are set.

\begin{verbatim}
\DeclareTColorBox{mybox}{ s }{colframe=red!75!black, IfBooleanTF={#1}{colback=yellow!50!red}{colback=red!5!white}}
\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}* This is a tcolorbox.
\end{mybox}
\end{verbatim}
23.2 Producing \tcolorbox Environments and Commands

\texttt{\textbackslash DeclareTColorBox[(init \ options)]\{name\}\{specification\}\{options\}}

Creates a new environment \texttt{\{name\}} based on \texttt{tcolorbox} \textsuperscript{P.12}.

Basically, \texttt{\textbackslash DeclareTColorBox} operates like \texttt{\textbackslash DeclareDocumentEnvironment}. This means, the new environment \texttt{\{name\}} is constructed with the given argument \texttt{\{specification\}}. The \texttt{\{options\}} are given to the underlying \texttt{tcolorbox} \textsuperscript{P.12}.

Note that \texttt{/tcb/savedelimiter} \textsuperscript{P.26} is set to the given \texttt{\{name\}} automatically.

The \texttt{\{init \ options\}} allow setting up automatic numbering, see Section 5 from page 110.

The new environment is always created, irrespective of an already existing environment with the same name.

\begin{verbatim}
\% counter from previous example
\texttt{\textbackslash DeclareTColorBox[use counter from=pabox]\{mybox\}\{ O\{red\} m d"" !O{} \}}
\{enhanced,colframe=#1!75!black,colback=#1!5!white, fonntitle=\textbf{series},title={\texttt{\the\tcbcounter}\texttt{-#2}}, IfValueTF={#3}{watermark text={#3}}{},#4\}

\texttt{\begin{mybox}\{My title\}
This is a tcolorbox.
\end{mybox}}

\texttt{\begin{mybox}\{blue\}\{My title\}
This is a tcolorbox.
\end{mybox}}

\texttt{\begin{mybox}\{green\}\{My title\}"My Watermark"
This is a tcolorbox.
\end{mybox}}

\texttt{\begin{mybox}\{yellow\}\{My title\}[colbacktitle=yellow!50!white,coltitle=black]
This is a tcolorbox.
\end{mybox}}

\texttt{\begin{mybox}\{purple\}\{My title\}"All together"[coltitle=yellow]
This is a tcolorbox.
\end{mybox}}
\end{verbatim}
\NewTColorBox\texttt{\textbackslash\{init options\}\{name\}\{specification\}\{options\}}

Operates like \texttt{\DeclareTColorBox} \textsuperscript{\texttt{\textbackslash P.445}}, but based on \texttt{\NewDocumentEnvironment} instead of \texttt{\DeclareDocumentEnvironment}. An error is issued if \texttt{name} has already been defined.

\RenewTColorBox\texttt{\textbackslash\{init options\}\{name\}\{specification\}\{options\}}

Operates like \texttt{\DeclareTColorBox} \textsuperscript{\texttt{\textbackslash P.445}}, but based on \texttt{\RenewDocumentEnvironment} instead of \texttt{\DeclareDocumentEnvironment}. An existing environment is redefined.

\ProvideTColorBox\texttt{\textbackslash\{init options\}\{name\}\{specification\}\{options\}}

Operates like \texttt{\DeclareTColorBox} \textsuperscript{\texttt{\textbackslash P.445}}, but based on \texttt{\ProvideDocumentEnvironment} instead of \texttt{\DeclareDocumentEnvironment}. The environment \texttt{name} is only created if it is not already defined.
\DeclareTotalTColorBox[(init options)]{⟨name⟩}{⟨ specification ⟩}{⟨ options ⟩}{⟨ content ⟩}

Creates a new command \langle name \rangle based on \texttt{tcolorbox} \textsuperscript{P.12}. In contrast to \DeclareTColorBox \textsuperscript{P.445}, also the \langle content \rangle of the \texttt{tcolorbox} is specified.

Basically, \DeclareTotalTColorBox operates like \DeclareDocumentCommand. This means, the new command \langle name \rangle is constructed with the given argument \langle specification \rangle. The \langle options \rangle are given to the underlying \texttt{tcolorbox} \textsuperscript{P.12} which is filled with the specified \langle content \rangle.

Note that \texttt{/tcb/savedelimiter} \textsuperscript{P.26} is set to the given \langle name \rangle automatically.

The \langle init options \rangle allow setting up automatic numbering, see Section 5 from page 110.

The new command is always created, irrespective of an already existing command with the same name.

\begin{Verbatim}
\begin{verbatim}
\DeclareTotalTColorBox{\diabox}{ O{v m} }
{ bicolor,nobeforeafter,equal height group=diabox,width=5.7cm,
  fonttitle=\bfseries\texttt{family},adjusted title=\#2,center title,
  colframe=blue!20!black,leftupper=0mm,rightupper=0mm,colback=black!75!white,#1
  \{ \tikz\path[fill zoom image=\#2] (0,0) rectangle (\linewidth,4cm);
  \tcblower\#3}
\end{verbatim}
\end{Verbatim}

\begin{itemize}
  \item \texttt{\diabox{blueshade.png}}{\texttt{Created with GIMP.}} \url{http://www.gimp.org}
  \item \texttt{\diabox{goldshade.png}}{\texttt{Created with GIMP.}} \url{http://www.gimp.org}
\end{itemize}

\NewTotalTColorBox[(init options)]{⟨name⟩}{⟨ specification ⟩}{⟨ options ⟩}{⟨ content ⟩}

Operates like \DeclareTotalTColorBox, but based on \NewDocumentCommand instead of \DeclareDocumentCommand. An error is issued if \langle name \rangle has already been defined.

\RenewTotalTColorBox[(init options)]{⟨name⟩}{⟨ specification ⟩}{⟨ options ⟩}{⟨ content ⟩}

Operates like \DeclareTotalTColorBox, but based on \RenewDocumentCommand instead of \DeclareDocumentCommand. An existing command is redefined.

\ProvideTotalTColorBox[(init options)]{⟨name⟩}{⟨ specification ⟩}{⟨ options ⟩}{⟨ content ⟩}

Operates like \DeclareTotalTColorBox, but based on \ProvideDocumentCommand instead of \DeclareDocumentCommand. The command \langle name \rangle is only created if it is not already defined.
23.3 Producing \texttt{tcbox} Commands

\texttt{\textbackslash DeclareTCBox[\textlangle init options\textrangle]}\{\textlangle name\textrangle\}\{\textlangle specification\textrangle\}\{\textlangle options\textrangle\}

Creates a new command \textlangle name\textrangle based on \texttt{tcbox}^\textsuperscript{P.14}. Basically, \texttt{\textbackslash DeclareTCBox} operates like \texttt{\textbackslash DeclareDocumentCommand}. This means, the new command \textlangle name\textrangle is constructed with the given argument \textlangle specification\textrangle. The \textlangle options\textrangle are given to the underlying \texttt{tcbox}^\textsuperscript{P.14}.

Note that /tcb/savedelimiter^\textsuperscript{P.26} is set to the given \textlangle name\textrangle automatically. The \textlangle init options\textrangle allow setting up automatic numbering, see Section 5 from page 110. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
% counter from previous example
\texttt{\textbackslash DeclareTCBox}[use counter from=pabox]\{mybox\}{ s m s }
{ nobeforeafter, colback=red!5!white, colframe=red!75!black, title=\#2 (Box \texttt{\textbackslash thetcbcounter}), fonttitle=bfseries, IfBooleanTF={\#1}{enhanced, drop shadow}{}], IfBooleanTF={\#3}{colbacktitle=red!50!white}{} }

\texttt{mybox}{Bird}\{This is my first box.\}
\texttt{\llap{\hfill}}
\texttt{mybox*}{Tree}\{This is my second box.\}
\texttt{par\bigskip}
\texttt{mybox}{\texttt{Bike}*}\{This is my third box.\}
\texttt{\llap{\hfill}}
\texttt{mybox}{City}*>\{This is my fourth box.\}
\end{verbatim}

\begin{verbatim}
\texttt{\textbackslash NewTCBox}[\textlangle init options\textrangle]}\{\textlangle name\textrangle\}\{\textlangle specification\textrangle\}\{\textlangle options\textrangle\}

Operates like \texttt{\textbackslash DeclareTCBox}, but based on \texttt{\textbackslash NewDocumentCommand} instead of \texttt{\textbackslash DeclareDocumentCommand}. An error is issued if \textlangle name\textrangle has already been defined.

\texttt{\textbackslash RenewTCBox}[\textlangle init options\textrangle]}\{\textlangle name\textrangle\}\{\textlangle specification\textrangle\}\{\textlangle options\textrangle\}

Operates like \texttt{\textbackslash DeclareTCBox}, but based on \texttt{\textbackslash RenewDocumentCommand} instead of \texttt{\textbackslash DeclareDocumentCommand}. An existing command is redefined.

\texttt{\textbackslash ProvideTCBox}[\textlangle init options\textrangle]}\{\textlangle name\textrangle\}\{\textlangle specification\textrangle\}\{\textlangle options\textrangle\}

Operates like \texttt{\textbackslash DeclareTCBox}, but based on \texttt{\textbackslash ProvideDocumentCommand} instead of \texttt{\textbackslash DeclareDocumentCommand}. The command \textlangle name\textrangle is only created if it is not already defined.
\DeclareTotalTCBox\{\textbf{init options}\}\{\{name\}\{\{specification\}\{\{options\}\{\{content\}\}}\}

Creates a new command \{name\} based on \texttt{tcbox} \cite{P.14}. In contrast to \texttt{DeclareTCBox} \cite{P.448}, also the \{content\} of the \texttt{tcbox} is specified. Basically, \texttt{DeclareTotalTCBox} operates like \texttt{DeclareDocumentCommand}. This means, the new command \{name\} is constructed with the given argument \{specification\}. The \{options\} are given to the underlying \texttt{tcbox} \cite{P.14} which is filled with the specified \{content\}.

Note that /tcb/savedelimiter \cite{P.26} is set to the given \{name\} automatically. The \{init options\} allow setting up automatic numbering, see Section 5 from page 110. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
\DeclareTotalTCBox\{myverb\}{ O{red} v !O{} }
{ fontupper=\ttfamily,nobeforeafter,tcbox raise base,arc=0pt,outer arc=0pt,
top=0pt,bottom=0pt,left=0mm,right=0mm,
lefterule=0pt,rightrule=0pt,toprule=0.3mm,bottomrule=0.3mm,boxsep=0.5mm,
colback=#1!10!white,colframe=#1!50!black,#3}{#2}
\end{verbatim}

To set a word \textbf{bold} in \texttt{myverb}\{\LaTeX\}, use \texttt{myverb[green]{\textbf{bold}}}. Alternatively, write \texttt{myverb[yellow]\{\bfseries bold\}}. In \texttt{myverb[blue]\{\LaTeX\}[enhanced,fuzzy halo]}, other font settings are done in the same way, e.g. \texttt{myverb[\textit]}, \texttt{myverb[\itshape]} or \texttt{myverb[\texttt]{\ttfamily}}.

\texttt{The next example uses \texttt{\lstinline} from the \texttt{listings} package to typeset the verbatim content.}

\begin{verbatim}
% \usepackage{listings} or \texttt{tcbuselibrary{listings}}
\DeclareTotalTCBox\{commandbox\}{ s v }
{verbatim,colupper=white,colback=black!75!white,colframe=black}
{\IfBooleanTF{#1}{\textcolor{red}{\ttfamily\bfseries > }}{}}
\lstinline[language=command.com,keywordstyle=\color{blue!35!white}\bfseries]{^#2^}
\end{verbatim}

\texttt{To set a word \textbf{bold} in \LaTeX, use \texttt{\textbf{bold}}}\texttt{. Alternatively, write \{\bfseries bold\}. In \LaTeX, other font settings are done in the same way, e.g. \texttt{\textit}, \texttt{\itshape} or \texttt{\texttt}, \texttt{\ttfamily}.}

The next example uses \texttt{\lstinline} from the \texttt{listings} package to typeset the verbatim content.

\begin{verbatim}
% \usepackage{listings} or \texttt{tcbuselibrary{listings}}
\DeclareTotalTCBox\{commandbox\}{ s v }
{verbatim,colupper=white,colback=black!75!white,colframe=black}
{\IfBooleanTF{#1}{\textcolor{red}{\ttfamily\bfseries > }}{}}
\lstinline[language=command.com,keywordstyle=\color{blue!35!white}\bfseries]{^#2^}
\end{verbatim}

\texttt{\texttt{The next example uses \texttt{\lstinline} from the \texttt{listings} package to typeset the verbatim content.}}

\begin{verbatim}
% \usepackage{listings} or \texttt{tcbuselibrary{listings}}
\DeclareTotalTCBox\{commandbox\}{ s v }
{verbatim,colupper=white,colback=black!75!white,colframe=black}
{\IfBooleanTF{#1}{\textcolor{red}{\ttfamily\bfseries > }}{}}
\lstinline[language=command.com,keywordstyle=\color{blue!35!white}\bfseries]{^#2^}
\end{verbatim}

\texttt{\texttt{The next example uses \texttt{\lstinline} from the \texttt{listings} package to typeset the verbatim content.}}

\begin{verbatim}
% \usepackage{listings} or \texttt{tcbuselibrary{listings}}
\DeclareTotalTCBox\{commandbox\}{ s v }
{verbatim,colupper=white,colback=black!75!white,colframe=black}
{\IfBooleanTF{#1}{\textcolor{red}{\ttfamily\bfseries > }}{}}
\lstinline[language=command.com,keywordstyle=\color{blue!35!white}\bfseries]{^#2^}
\end{verbatim}

\texttt{\texttt{The next example uses \texttt{\lstinline} from the \texttt{listings} package to typeset the verbatim content.}}

\begin{verbatim}
% \usepackage{listings} or \texttt{tcbuselibrary{listings}}
\DeclareTotalTCBox\{commandbox\}{ s v }
{verbatim,colupper=white,colback=black!75!white,colframe=black}
{\IfBooleanTF{#1}{\textcolor{red}{\ttfamily\bfseries > }}{}}
\lstinline[language=command.com,keywordstyle=\color{blue!35!white}\bfseries]{^#2^}
\end{verbatim}

\texttt{\texttt{The next example uses \texttt{\lstinline} from the \texttt{listings} package to typeset the verbatim content.}}

\begin{verbatim}
% \usepackage{listings} or \texttt{tcbuselibrary{listings}}
\DeclareTotalTCBox\{commandbox\}{ s v }
{verbatim,colupper=white,colback=black!75!white,colframe=black}
{\IfBooleanTF{#1}{\textcolor{red}{\ttfamily\bfseries > }}{}}
\lstinline[language=command.com,keywordstyle=\color{blue!35!white}\bfseries]{^#2^}
\end{verbatim}

\texttt{\texttt{The next example uses \texttt{\lstinline} from the \texttt{listings} package to typeset the verbatim content.}}

\begin{verbatim}
% \usepackage{listings} or \texttt{tcbuselibrary{listings}}
\DeclareTotalTCBox\{commandbox\}{ s v }
{verbatim,colupper=white,colback=black!75!white,colframe=black}
{\IfBooleanTF{#1}{\textcolor{red}{\ttfamily\bfseries > }}{}}
\lstinline[language=command.com,keywordstyle=\color{blue!35!white}\bfseries]{^#2^}
\end{verbatim}

\texttt{\texttt{The next example uses \texttt{\lstinline} from the \texttt{listings} package to typeset the verbatim content.}}
\NewTotalTCBox\texttt{(init options)}\{\texttt{name}\}\{\texttt{(specification)}\}\{\texttt{(options)}\}\{\texttt{(content)}\}

Operates like \texttt{\DeclareTotalTCBox} \texttt{P.449}, but based on \texttt{\NewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An error is issued if \texttt{\langle name\rangle} has already been defined.

\RenewTotalTCBox\texttt{(init options)}\{\texttt{name}\}\{\texttt{(specification)}\}\{\texttt{(options)}\}\{\texttt{(content)}\}

Operates like \texttt{\DeclareTotalTCBox} \texttt{P.449}, but based on \texttt{\RenewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An existing command is redefined.

\ProvideTotalTCBox\texttt{(init options)}\{\texttt{name}\}\{\texttt{(specification)}\}\{\texttt{(options)}\}\{\texttt{(content)}\}

Operates like \texttt{\DeclareTotalTCBox} \texttt{P.449}, but based on \texttt{\ProvideDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. The command \texttt{\langle name\rangle} is only created if it is not already defined.

\texttt{\tcboxverb}\texttt{(options)}\{\texttt{(verbatim box content)}\}

Creates a colored box based on \texttt{\tcbox} \texttt{P.14} which is fitted to the width of the given \texttt{(verbatim box content)}. The underlying \texttt{\tcbox} \texttt{P.14} is styled with \texttt{/tcb/verbatim} \texttt{P.443} plus the given \texttt{(options)}. The difference to \texttt{\tcbox} \texttt{P.14} is that the \texttt{(verbatim box content)} is interpreted verbatim. Therefore, \texttt{\tcboxverb} acts similar to \texttt{\verb}.

\begin{verbatim}
\tcboxverb{\LaTeX}, \tcboxverb[colback=blue!10!white,colupper=blue]{\LaTeX},
\tcboxverb[blank,fuzzy halo]{\LaTeX}, \tcboxverb[beamer]{\LaTeX},
\tcboxverb[enhanced,skin=enhancedmiddle jigsaw,colframe=red]{\LaTeX}.
\end{verbatim}

\texttt{\LaTeX}, \texttt{\LaTeX}, \texttt{\LaTeX}, \texttt{\LaTeX}.
23.4 Producing tcblisting Environments

Besides \texttt{xparse}, the following commands also need the \texttt{listings} library to be included.

\begin{verbatim}
\DeclareTCBListing{⟨init options⟩}{⟨name⟩}{⟨specification⟩}{⟨options⟩}
\end{verbatim}

Creates a new environment \texttt{⟨name⟩} based on \texttt{tcblisting}. 

Basically, \texttt{\DeclareTCBListing} operates like \texttt{\DeclareDocumentEnvironment}. This means, the new environment \texttt{⟨name⟩} is constructed with the given argument \texttt{⟨specification⟩}. The \texttt{⟨options⟩} are given to the underlying \texttt{tcblisting}.

Note that \texttt{/tcb/savedelimiter} is set to the given \texttt{⟨name⟩} automatically.

The \texttt{⟨init options⟩} allow setting up automatic numbering, see Section 5 from page 110.

The new environment is always created, irrespective of an already existing environment with the same name.

\begin{verbatim}
\DeclareTCBListing{mybox}{ s O{} m }{%
colback=red!5!white,\nlframe=red!75!black,\nfonttitle=\bfseries,\nIfBooleanTF={#1}{\{listing side text\}}{\{text side listing\}},\ntitle=\#3,\#2}
\end{verbatim}

\begin{verbatim}
\begin{mybox}{Listing Box}
This is my \LaTeX box.
\end{mybox}
\begin{mybox}{Listing Box}
This is my \LaTeX box.
\end{mybox}
\begin{mybox}{Listing Box}
This is my \LaTeX box.
\end{mybox}
\end{verbatim}

\begin{verbatim}
\NewTCBListing{⟨init options⟩}{⟨name⟩}{⟨specification⟩}{⟨options⟩}
\end{verbatim}

Operates like \texttt{\DeclareTCBListing}, but based on \texttt{\NewDocumentEnvironment} instead of \texttt{\DeclareDocumentEnvironment}. An error is issued if \texttt{⟨name⟩} has already been defined.

\begin{verbatim}
\RenewTCBListing{⟨init options⟩}{⟨name⟩}{⟨specification⟩}{⟨options⟩}
\end{verbatim}

Operates like \texttt{\DeclareTCBListing}, but based on \texttt{\RenewDocumentEnvironment} instead of \texttt{\DeclareDocumentEnvironment}. An existing environment is redefined.

\begin{verbatim}
\ProvideTCBListing{⟨init options⟩}{⟨name⟩}{⟨specification⟩}{⟨options⟩}
\end{verbatim}

Operates like \texttt{\DeclareTCBListing}, but based on \texttt{\ProvideDocumentEnvironment} instead of \texttt{\DeclareDocumentEnvironment}. The environment \texttt{⟨name⟩} is only created if it is not already defined.
With date of 2018-05-12, the \texttt{xparse} \cite{xparse} package changed the argument collection process. Now, spaces are ignored which leads to a serious change for listing environments ending with an optional argument like \texttt{O{}}. The former behaviour of respecting spaces can be preserved by adding a \texttt{!} now.

- For older \texttt{xparse} versions, the following code is correct when using \texttt{O{}}.
- For \texttt{xparse} of 2018-05-12, only the first two examples of the following code using \texttt{O{}} are really «good» – all others do not work.
- For \texttt{xparse} of 2018-05-12 and later, the following code is correct when using \texttt{!O{}}.

\begin{itemize}
  \item For older \texttt{xparse} versions, the following code is correct when using \texttt{O{}}.
  \item For \texttt{xparse} of 2018-05-12, only the first two examples of the following code using \texttt{O{}} are really «good» – all others do not work.
  \item For \texttt{xparse} of 2018-05-12 and later, the following code is correct when using \texttt{!O{}}.
\end{itemize}

\begin{example}
\begin{mybox}[colframe=red]
good
\end{mybox}
\begin{mybox}[colframe=red] \good\end{mybox}
\begin{mybox}
good
\end{mybox}
\begin{mybox} \good\end{mybox}
\begin{mybox} \bad!\end{mybox}
\begin{mybox} [\good]\end{mybox}
\begin{mybox} \[\bad!]\end{mybox}
\end{example}
23.5 Producing \texttt{tcbinputlisting} Commands

The following commands need the \texttt{listings} library to be included.

\begin{verbatim}
\DeclareTCBInputListing[(init options)]{(name)}{(specification)}{(options)}

Creates a new command \texttt{(name)} based on \texttt{tcbinputlisting} \textsuperscript{P.311}. Basically, \texttt{\DeclareTCBInputListing} operates like \texttt{\DeclareDocumentCommand}. This means, the new command \texttt{(name)} is constructed with the given argument \texttt{(specification)}. The \texttt{(options)} are given to the underlying \texttt{tcbinputlisting} \textsuperscript{P.311}. The \texttt{(init options)} allow setting up automatic numbering, see Section 5 from page 110. The new command is always created, irrespective of an already existing command with the same name.

\% counter from previous example
\DeclareTCBInputListing[use counter from=pabox]{\mylisting}{ 0}{ 0{red} m }{%
  listing file={#3},title=Listing-\thetcbcounter,
  colback=#2!5!white,colframe=#2!50!black,colbacktitle=#2!75!black,
  fontsize=\bfseries,listing only,#1}
\mylisting[before upper=\textit{This is the included file content:}]
{blue}{\jobname.tcbtemp}
\end{verbatim}

\begin{description}
\item[Listing 23.10] This is the included file content:
\% counter from previous example
\begin{verbatim}
\DeclareTCBInputListing[use counter from=pabox]{\mylisting}{ 0}{ 0{red} m }{%
  listing file={#3},title=Listing-\thetcbcounter,
  colback=#2!5!white,colframe=#2!50!black,colbacktitle=#2!75!black,
  fontsize=\bfseries,listing only,#1}
\end{verbatim}
\end{description}

\begin{verbatim}
\NewTCBInputListing[(init options)]{(name)}{(specification)}{(options)}

Operates like \texttt{\DeclareTCBInputListing}, but based on \texttt{\NewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An error is issued if \texttt{(name)} has already been defined.

\RenewTCBInputListing[(init options)]{(name)}{(specification)}{(options)}

Operates like \texttt{\DeclareTCBInputListing}, but based on \texttt{\RenewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An existing command is redefined.

\ProvideTCBInputListing[(init options)]{(name)}{(specification)}{(options)}

Operates like \texttt{\DeclareTCBInputListing}, but based on \texttt{\ProvideDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. The command \texttt{(name)} is only created if it is not already defined.
\end{verbatim}
23.6 Producing 	exttt{tboxfit} Commands

The following commands need the \texttt{fitting} library to be included.

\begin{verbatim}
\DeclareTCBoxFit[\{init options\}]{\{name\}}{\{specification\}}{\{options\}}
\end{verbatim}

Creates a new command \texttt{\{name\}} based on \texttt{tcbboxfit} \textsuperscript{P.421}. Basically, \texttt{\DeclareTCBoxFit} operates like \texttt{\DeclareDocumentCommand}. This means, the new command \texttt{\{name\}} is constructed with the given argument \texttt{\{specification\}}. The \texttt{\{options\}} are given to the underlying \texttt{tcbboxfit} \textsuperscript{P.421}. Note that \texttt{/tcb/savedelimiter} \textsuperscript{P.26} is set to the given \texttt{\{name\}} automatically. The \texttt{\{init options\}} allow setting up automatic numbering, see Section 5 from page 110. The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
% \usepackage{lipsum}
\DeclareTCBoxFit\{mybox\}{ O{} m !o }
{colback=red!5!white, colframe=red!75!black,
 width=#2,height=#2/3*2,
 IfValueTF={#3}{height=#3}{},
 #1}
\mybox[colback=yellow]{5cm} \( \{\texttt{lipsum}[2]\}\)
\mybox[colback=yellow]{5cm}{4cm}{\\texttt{lipsum}[2]}
\end{verbatim}

\begin{verbatim}
\NewTCBoxFit[\{init options\}]{\{name\}}{\{specification\}}{\{options\}}
\end{verbatim}

Operates like \texttt{\DeclareTCBoxFit}, but based on \texttt{\NewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An error is issued if \texttt{\{name\}} has already been defined.

\begin{verbatim}
\RenewTCBoxFit[\{init options\}]{\{name\}}{\{specification\}}{\{options\}}
\end{verbatim}

Operates like \texttt{\DeclareTCBoxFit}, but based on \texttt{\RenewDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. An existing command is redefined.

\begin{verbatim}
\ProvideTCBoxFit[\{init options\}]{\{name\}}{\{specification\}}{\{options\}}
\end{verbatim}

Operates like \texttt{\DeclareTCBoxFit}, but based on \texttt{\ProvideDocumentCommand} instead of \texttt{\DeclareDocumentCommand}. The command \texttt{\{name\}} is only created if it is not already defined.
\DeclareTotalTCBoxFit[(\textit{init options})]{\texttt{(name)}}{\texttt{(specification)}}{\texttt{(options)}}{\texttt{(content)}}

Creates a new command \texttt{(name)} based on \texttt{\tcbboxfit}. In contrast to \texttt{\DeclareTCBoxFit}, also the \texttt{(content)} of the \texttt{tcbboxfit} is specified.

Basically, \texttt{\DeclareTotalTCBoxFit} operates like \texttt{\DeclareDocumentCommand}. This means, the new command \texttt{(name)} is constructed with the given argument \texttt{(specification)}. The \texttt{(options)} are given to the underlying \texttt{\tcbboxfit} which is filled with the specified \texttt{(content)}.

Note that /\texttt{tcb/savedelimiter} is set to the given \texttt{(name)} automatically.

The \texttt{(init options)} allow setting up automatic numbering, see Section 5 from page 110.

The new command is always created, irrespective of an already existing command with the same name.

\begin{verbatim}
% \usepackage{lipsum}
\DeclareTotalTCBoxFit{\multibox}{ 0\{} m {0\{} 10 m } 
{\nobeforeafter, colback=red!5!white, colframe=red!75!black, width=#2/3*2, valign=center, #1} 
{\foreach \n in {1,...,\#3} { #4} }
\multibox{5cm}{I shall not repeat.}
\multibox[colframe=blue!75!white]{5cm}[20]{I shall not repeat.}"
\multibox[colback=yellow, height=5cm]{14cm}[100]{I shall not repeat.}
\end{verbatim}
The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{external}

The purpose of this library is to support externalization of document snippets like graphics or boxes which can be compiled stand-alone. These snippets are written to external files, compiled and the resulting pdf files are included to the main document as images. The whole procedure saves compilation time, if such a snippet is costly to compile but needs to compile just once or very seldom.

There are very good alternatives to this library. One should consider the standalone package or the TikZ externalization library instead. The \texttt{LIB external} library is something in between and can be seen as poor man variant of the TikZ externalization library.

The main differences between TikZ externalization and \texttt{external} are:

- TikZ \texttt{external} compiles the whole original document in a sophisticated way while \texttt{LIB external} uses only the preamble or a part of the preamble of the original document.
- TikZ \texttt{external} can automatically externalize all \texttt{tikzpicture} environments while \texttt{LIB external} externalizes marked snippets only.
- Code snippets to be externalized by \texttt{LIB external} are not restricted to \texttt{tikzpicture} environments. But these snippets have to be stand-alone without dependencies to the rest of the document.

Why should somebody use \texttt{LIB external} instead of the more powerful TikZ \texttt{external}? One reason could be compilation speed, but the main reason for creating the library at all was that TikZ \texttt{external} tends to choke on complicated documents where the sophisticated mechanism stumbles. Since \texttt{LIB external} does not use the original document body for compilation, this cannot happen.

Source snippets are compiled, if their md5 checksum has changed. They are not compiled automatically, if option settings are changed or anything outside the snippet is changed. Use \texttt{/tcb/external/force remake} to force compilation in this case or simply delete the externalized pdf oder md5 files.

To use the externalization options, the compiler has to be called with the \texttt{-shell-escape} permission to authorize potentially dangerous system calls. Be warned that this is a security risk.
24.1 Preparation of a Document for Externalization

The preamble of the main document has to contain the \texttt{\textbackslash tcbEXTERNALIZE} command. Without this command, no externalization operation will be executed.

```
\documentclass[a4paper]{book} \% for example
\usepackage{...} \% anything
\% Typically, all or the very most settings for the document.
\texttt{\textbackslash tcbEXTERNALIZE} \% Typically, just before \texttt{\begin{document}}
\% Additional settings which are ABSOLUTELY irrelevant for the
\% stand-alone snippets.
\% \begin{document}
\% The document.
\% This also contains the marked snippets for externalization.
\end{document}
```

During compilation, a \texttt{\textbackslash tcb/external/runner} file is dynamically created (several times). This is the actual main file for compiling an externalized snippet.

```
\texttt{\textbackslash tcb/external/runner}=(\textit{file name}) \% (no default, initially \texttt{\jobname\_run.tex})
```

Sets the \textit{(file name)} for dynamically created \texttt{runner} file. This is the actual main file for a document snippet. Typically, the initial setting is not needed to be changed.

```
\texttt{\textbackslash tcbset\{external/runner=myrunner.tex\}}
```

```
\texttt{\textbackslash tcb/external/prefix}=(\textit{text}) \% (no default, initially \texttt{external/})
```

The \textit{(text)} is prefixed to any \texttt{\textbackslash tcb/external/name} P.459 for an externalization snippet. The initial setting implies saving all snippets into an \texttt{external/} subdirectory. Depending on the operation system, the subdirectory may have to be created manually once.

```
\% Use a 'real' prefix instead of writing into a subdirectory:
\texttt{\textbackslash tcbset\{external/prefix=ext\_}}
```

```
\texttt{\textbackslash tcb/external/externalize}=(true|false) \% (default true, initially true)
```

If set to \texttt{true}, the marked snippets are compiled if necessary. If set to \texttt{false}, the marked snippets are not compiled but included as text. \texttt{\textbackslash tcb/external/externalize} can only be used after \texttt{\textbackslash tcbEXTERNALIZE}.

```
\texttt{\textbackslash tcb/external/force remake}=(true|false) \% (default true, initially false)
```

If set to \texttt{true}, the marked snippets are always compiled. If set to \texttt{true}, the marked snippets are compiled only if necessary. The necessity is given, if a compiled pdf file is missing or the \texttt{md5} checksum of the source snippet has changed.

```
\texttt{\textbackslash tcb/external/!} \% (style)
```

Shortcut for setting \texttt{\textbackslash tcb/external/force remake} to \texttt{true}.

```
\texttt{\textbackslash tcb/external/-} \% (style)
```

Shortcut for setting \texttt{\textbackslash tcb/external/externalize} to \texttt{false}.
24.2 Marking Externalization Snippets

\begin{tcbexternal}{example_tikzpicture}
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
  \path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);\end{tikzpicture}
\end{tcbexternal}

Marks the environment content as a snippet for externalization. Typically, the content is a \texttt{tikzpicture} or something similar. It is important to note that the snippet should not have any dependencies with the rest of the document, e.g. referencing counters or setting counters is not possible. The \langle \textit{name} \rangle is automatically prefixed with \texttt{/tcb/external/prefix}. In combination, this has to be a unique file name. It is advised to not use spaces or umlauts for the name. The \langle \textit{options} \rangle are keys from the \texttt{/tcb/external/} key tree.

If a \texttt{tcolorbox} is externalized, one should use \texttt{/tcb/nobeforeafter} for the box. Indentation and distances to the text before and after have to be given separately outside the \texttt{tcbexternal} environment.

\begin{tcbexternal}{example_tcolorbox}
\begin{tcolorbox}[nobeforeafter,enhanced,fonttitle=\bfseries,title=Externalized Box,colframe=red!50!black,drop fuzzy shadow,interior style={fill overzoom image=goldshade.png}]
This complete \texttt{tcolorbox} is externalized. One cannot use numbered boxes here. Note the \texttt{minipage} option which tells the current line width to the external snippet.\end{tcolorbox}
\end{tcbexternal}

Externalized Box

This complete \texttt{tcolorbox} is externalized. One cannot use numbered boxes here. Note the \texttt{minipage} option which tells the current line width to the external snippet.
\begin{tcolorbox}[nobeforeafter,enhanced,
  fonttitle=\bfseries,title=Externalized Box,
  colframe=blue!50!black,
  interior style={fill overzoom image=blueshade.png}]
\begin{tcbexternal}[minipage]{example_tcolorbox2}
\color{white}
\%  
The interior of the tcolorbox is externalized. 
One can use numbered boxes without problems. 
Note that the text color has to be set for the text manually 
since it is converted into an image.
\end{tcbexternal}
\end{tcolorbox}

\begin{tcbexternal}[minipage]{example_tabularx}
\newcolumntype{Y}{>{\raggedleft\arraybackslash}X}  
\begin{tabularx}{\linewidth}{|l||Y|Y|Y|Y||Y|}
\hline
Group & One & Two & Three & Four & Sum \\
\hline
Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00 \\
\hline
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00 \\
\hline
Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00 \\
\hline
Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00 \\
\hline
\end{tabularx}
\end{tcbexternal}

\textbf{Externalized Box}

The interior of the tcolorbox is externalized. One can use numbered boxes without problems. Note that the text color has to be set for the text manually since it is converted into an image.

\textbf{N 2015-03-11}
\texttt{/tcb/external/name=\langle name\rangle}

(no default, initially unnamed)

The \textit{\langle name\rangle} is automatically prefixed with \texttt{/tcb/external/prefix} \textsuperscript{P.457}. In combination, this has to be a unique file name for externalization. Typically, this key is not used directly but is set indirectly as mandatory parameter, see \texttt{tcbexternal} \textsuperscript{P.458}.
This is an externalized version of \tcolorbox created using \newtcbexternalizetcolorbox:

\begin{extcolorbox}{example_extcolorbox}
\[ enhanced,colframe=red!50!black,colback=yellow!10,\
  fonttitle=\bfseries,drop fuzzy shadow,\
  title=My external box \]

This box is completely externalized.

\begin{tcolorbox}[colframe=blue,colback=blue!5,before skip=6pt]
Inner box.
\end{tcolorbox}

\end{extcolorbox}

My external box

This box is completely externalized.

Inner box.

• \textbf{Never} externalize numbered boxes.
• \textbf{Never} externalize boxes which contain references to other things, e.g. using \ref or \cite.
• \textbf{Never} externalize breakable boxes.
This is an externalized version of `tikzpicture` created using `\newtcbexternalizeenvironment`:\cite{P465}:

\begin{center}
\begin{extikzpicture}
\begin{axis}[3d box=background,grid=major,
xlabel=$x$, ylabel=$y$, zlabel=$z$, view/h=40,
mesh/interior colormap name=hot,
colormap/blackwhite,
z buffer=sort,domain=0:90,y domain=0:60,
zmin=0,zmax=2,z post scale=1.2,
]
\addplot3[surf,mesh/interior colormap name=blackwhite,
colormap/hot,] ( {cos(x)},{sin(x)}, {2*sin(y)} );
\addplot3[surf] ( {2*cos(x)*cos(y)},{2*sin(x)*cos(y)}, {2*sin(y)} );
\end{axis}
\end{extikzpicture}
\end{center}
The text content of a `tcblisting` is externalized with the given `<name>`. Note that the listing part is not externalized.

\begin{tcblisting}{externalize listing=example_listing, bicolor,colback=yellow!10,colframe=yellow!50!black, colbacklower=white,center lower}
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
\end{tcblisting}

The text content of a `dispExample*` is externalized with the given `<name>`. Note that the listing part is not externalized.

\begin{dispExample*}{sidebyside,externalize example=example_example}
\tikz\path[shading=ball, ball color=red] circle (7mm);
\end{dispExample*}

Combination of `/tcb/externalize listing` and `/tcb/external/force remake`.

Combination of `/tcb/externalize example` and `/tcb/external/force remake`.

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24.3 Customization

\begin{tcbexternal}[minipage,runs=2]{example_raster}
\begin{tcbitemize}[raster equal height, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem \Huge Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}
\end{tcbexternal}

One Two Three Four

/tcb/external/safety=⟨length⟩ (no default, initially 2mm)

The snippet box is surrounded with a safety border with a thickness of ⟨length⟩. This border is automatically trimmed during picture inclusion. The reason for this mechanism is to catch box content which extrudes over the bounding box. For example, shadows of a \textcolorbox are painted outside the bounding box and would be lost otherwise.

/tcb/external/environment=⟨env⟩ (no default, initially unset)

Surrounds the exported snippet text with an environment ⟨env⟩ without parameters. Note that this option is ignored for /tcb/externalize listing \footnote{P.462}.

/tcb/external/environment with percent=true|false (default true, initially true)

If set to true, the \begin and \end code of /tcb/external/environment is appended with a percent sign. For verbatim environments, this option typically has to be set to false.

/tcb/external/minipage=⟨length⟩ (default \linewidth, initially unset)

Surrounds the exported snippet text with a minipage. The optional ⟨length⟩ parameter sets the width of the minipage. Note that the default width is the current line width of the main document. See tcbexternal \footnote{P.458} for examples. Note that this option is ignored for /tcb/externalize listing \footnote{P.462}.

/tcb/external/plain (no value, initially set)

Removes any text which was set to surround the snippet. This removes the setting of /tcb/external/minipage, but is independent of /tcb/external/safety.

/tcb/external/compiler=⟨text⟩ (no default, initially \texttt{pdflatex})

Sets the name of the compiler for the snippets. Note that this compiler has to support the \texttt{pdfmdfivesum} primitive e.g. using the \texttt{pdftexcmds} package. This should work for \texttt{xelatex} and \texttt{lualatex}.

/tcb/external/runs=⟨number⟩ (no default, initially 1)

Sets the number of compiler runs for the snippet.

\begin{tcbexternal}[minipage,runs=2]{example_raster}
\begin{tcbitemize}[raster equal height, size=small,colframe=red!50!black,colback=red!10!white]
\tcbitem One
\tcbitem \Huge Two
\tcbitem Three
\tcbitem Four
\end{tcbitemize}
\end{tcbexternal}

One Two Three Four

/tcb/external/input source on error=true|false (default true, initially true)

If set to true, the source code of the snippet is loaded instead of the failed pdf picture. Typically, this will lead to an error stop at the faulty place of the source and such helps detecting the cause. If the source input compiles without error, the document setup may be incorrect, see Section 24.1 on page 457. Maybe, the external/ subdirectory has to be created manually in this case, see /tcb/external/prefix \footnote{P.457}.

If the option is set to false, the compilation stops immediately on an error. The log file of the external snippet has to be consulted for error messages in this case.
The given \texttt{code} is added before the snippet document. Typically, this means before \texttt{documentclass}. This is not used for compilation of the main document.

The given \texttt{options} are passed to the given \texttt{package} for the snippet document. This is a shortcut for using \texttt{/tcb/external/preclass} with \texttt{\PassOptionsToPackage}. This not used for compilation of the main document.

The given \texttt{options} are passed to the given \texttt{class} for the snippet document. This is a shortcut for using \texttt{/tcb/external/preclass} with \texttt{\PassOptionsToClass}. This not used for compilation of the main document.

Removes all additional \texttt{/tcb/external/preclass} settings.

The given \texttt{code} is added to the preamble of the snippet document. This is not used for compilation of the main document.

The given \texttt{options} are added as parameter for \texttt{\tcbset} \textsuperscript{P.13} to the preamble of the snippet document. This are not used for compilation of the main document.

Removes all additional \texttt{/tcb/external/preamble} settings.

Expands to \texttt{true}, if executed during snippet compilation, and to \texttt{false}, if executed during main document compilation. This can be used before \texttt{\tcbEXTERNALIZE} \textsuperscript{P.457} to give different setting to snippet and main document.
\newtcbexternalizeenvironment{(newenv)\{(env)\{(options)\{(begin)\{(end)\}

Creates a new environment \langle newenv \rangle which is based on \texttt{tcbexternal} \textsuperscript{-P.458}. This environment takes \emph{at least} one optional parameter and one mandatory parameter. These two parameters are passed to \texttt{tcbexternal} \textsuperscript{-P.458}. Further, the given \langle options \rangle are always added to the option list of \texttt{tcbexternal} \textsuperscript{-P.458}.

The environment content is externalized and the external snippet is surrounded by an environment \langle env \rangle. All further parameters of \langle newenv \rangle are given to \langle env \rangle as parameters. The included image is prepended by \langle begin \rangle and appended by \langle end \rangle.

\texttt{extikzpicture} \textsuperscript{-P.461} is an example application for \texttt{\newtcbexternalizeenvironment}.

\begin{extabular}{example_tabular}{|l|p{6cm}|r|}
\hline
A & B & C\
\hline
a & This table is externalized as snippet. Obviously, this only makes sense for highly complex tables. & b\
\hline
\end{extabular}

\renewtcbexternalizeenvironment{(newenv)\{(env)\{(options)\{(begin)\{(end)\}

Identical to \texttt{\newtcbexternalizeenvironment}, but the environment \langle newenv \rangle is created by \texttt{\renewenvironment} instead of \texttt{\newenvironment}.

\newtcbexternalizetcolorbox{(newenv)\{(env)\{(options)\{(begin end options)\}

Creates a new environment \langle newenv \rangle which is based on \texttt{tcbexternal} \textsuperscript{-P.458}. This environment takes \emph{at least} one optional parameter and one mandatory parameter. These two parameters are passed to \texttt{tcbexternal} \textsuperscript{-P.458}. Further, the given \langle options \rangle are always added to the option list of \texttt{tcbexternal} \textsuperscript{-P.458}.

The environment content is externalized and the external snippet is surrounded by an environment \langle env \rangle. All further parameters of \langle newenv \rangle are given to \langle env \rangle as parameters. \textbf{In contrast to \texttt{\newtcbexternalizeenvironment}, the environment \langle env \rangle is intended to be based on \texttt{tcolorbox} \textsuperscript{-P.12} or \texttt{tcblisting} \textsuperscript{-P.309}.}

The \langle begin end options \rangle are options for settings the space before and after the included image using \texttt{/tcb/before} \textsuperscript{-P.80}, \texttt{/tcb/before skip} \textsuperscript{-P.82}, \texttt{/tcb/after} \textsuperscript{-P.80}, or \texttt{/tcb/after skip} \textsuperscript{-P.82}.

\texttt{extcolorbox} \textsuperscript{-P.460} is an example application for \texttt{\newtcbexternalizetcolorbox}.

\textbf{Definition in the preamble:}

\begin{verbatim}
\newtcblisting[myownlisting][2][
    enhanced,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
    colbacktitle=red!50!yellow,before skip=6pt,after skip=6pt,
    title={#2},#1]
\end{verbatim}

\begin{verbatim}
\newtcbexternalizetcolorbox[exmyownlisting][myownlisting][minipage]
{before skip=6pt,after skip=6pt} same values as for mylisting
\end{verbatim}
This is my \LaTeX box.

\begin{example_mylisting}
\MyExternalizedExampleBox
\end{example_mylisting}

This is my \LaTeX box.

\MyExternalizedExampleBox
This is my \LaTeX box.

Identical to \newtcbexternalizetcolorbox \textsuperscript{P.465}, but the environment \newenv is created by \renewenvironment instead of \newenvironment.

This is a low-level macro which is internally used. The MD5 digest of a \source file is compared with a stored MD5 digest from an auxiliary \md5file. If they are not equal, the auxiliary \md5file is updated to store the current MD5 digest. Further,

- if \condition equals 0, \true is executed.
- if \condition equals 1:
  - If the current and stored MD5 digests were different, \true is executed.
  - Otherwise, if the \target file is not existing, \true is executed.
  - Otherwise, if the \target file is older than the \md5file, \true is executed.
  - Otherwise, \false is executed.
- if \condition equals 2, \false is executed.

The intended processing purpose of the \true code is to produce a \target file from the given \source file.
24.4 Troubleshooting and FAQ

• I use the default settings, but the external subdirectory is not created.
  Depending on operating system and compiler, an external subdirectory is automatically created or not. If not, create such a directory manually or add the following to your document:

\ShellEscape{mkdir external}

or

\ShellEscape{mkdir -p external}

If the combination of /tcb/external/prefix and chosen snippet name points to another subdirectory than external, this has to be adapted.

• I use the minted package and I get a cache directory for every externalized snippet.
  To avoid this problem, there are several ways.

  – If you do not need minted inside the snippet code, you may use \usepackage{minted} after \tcbEXTERNALIZE or use \tcbifexternal to switch minted off for the external code. If minted is already included by another package, add the following to your preamble:

\tcbset{external/PassOptionsToPackage={draft}{minted}}

  – If minted is needed for the snippet code, caching can be switched off by adding the following to your preamble:

\tcbset{external/PassOptionsToPackage={cache=false}{minted}}

Alternatively, the cachedir option of minted may be used to redirect the cache.

\footnote{The shellesc package is loaded automatically by the library.}
This library has the single purpose to support \LaTeX package documentations like this one. Actually, the visual nature follows the approach from Till Tantau’s pgf [22] documentation. Typically, this library is assumed to be used in conjunction with the class ltxdoc or alike.

The library is loaded by a package option or inside the preamble by:

\tcbuselibrary{documentation}

This also loads the library \texttt{listings}, see Section 16 on page 308, the library \texttt{skins}, see Section 10 on page 151, the library \texttt{xparse}, see Section 23 on page 443, and a bunch of packages, namely \texttt{pifont}, \texttt{marvosym}, \texttt{makeidx}, \texttt{marginnote}, \texttt{refcount}, and \texttt{hyperref}.

\begin{itemize}
  \item The package \texttt{makeidx} is loaded only, if \texttt{printindex} is not already defined. Therefore, one can include an alternative to \texttt{makeidx} like \texttt{imakeidx} before the library \texttt{documentation} is used.
  \item The package \texttt{marginnote} is loaded only, if \texttt{marginnote} is not already defined.
  \item In contrast to other \texttt{tcolorbox} options, the option settings for \texttt{documentation} are typically not getting reset by \texttt{/tcb/reset\textsuperscript{P.108}}, i.e. they keep their values for embedded boxes.
  \item In combination with DocStrip, \texttt{/tcb/verbatim ignore percent\textsuperscript{P.129}} may be helpful.
\end{itemize}

For UTF-8 support load (ignore this when using Xe\LaTeX):

\tcbuselibrary{listingsutf8,documentation}

For \texttt{minted} [12] support, load:

\tcbuselibrary{documentation,minted}
\tcbset{listing engine=minted}

\section{Macros of the Library}

\begin{docCommand}{(options)}{(name)}{(parameters)}
  (command description)
\end{docCommand}

Documents a \LaTeX macro with given \texttt{(name)} where \texttt{(name)} is written without backslash. The given \texttt{(options)} are set with \texttt{/tcbset\textsuperscript{P.13}}. This macro takes mandatory or optional \texttt{(parameters)}. It is automatically indexed and can be referenced with \texttt{\refCom\textsuperscript{P.475}\{\texttt{name}\}}.

\begin{docCommand}{foomakedocSubKey}{\texttt{\marg\{name\}\marg\{key path\}}}
  Creates a new environment \texttt{\meta\{name\}} based on \texttt{\refEnv\{docKey\}} for the documentation of keys with the given \texttt{\meta\{key path\}}.
\end{docCommand}

\begin{docCommand}{foomakedocSubKey}{\texttt{(\texttt{name}\}\{\texttt{key path}\)}}
  Creates a new environment \texttt{(\texttt{name}\}} based on \texttt{docKey\textsuperscript{P.470}} for the documentation of keys with the given \texttt{(\texttt{key path}\}}.
\end{docCommand}
\begin{docCommand}{color definition=blue}{foomakedocSubKey*}\%\
\marg(name)\marg(key path)\
Creates a new environment \meta{name} based on \refEnv{docKey} for the documentation of keys with the given \meta{key path}.
\end{docCommand}

\foomakedocSubKey*\{(name)\}{(key path)}\
Creates a new environment \langle name \rangle based on docKey\textsuperscript{P.470} for the documentation of keys with the given \langle key path \rangle.

\begin{docCommand*}{(options)\}{(name)\}{(parameters)\}
(command description)\
\end{docCommand*}

Identical to \texttt{docCommand}\textsuperscript{P.468}, but without index entry.

\begin{docEnvironment*}{(options)\}{(name)\}{(parameters)\}
(environment description)\
\end{docEnvironment*}

Documents a \LaTeX\ environment with given \langle name \rangle. The given \langle options \rangle are set with \texttt{\tcbset}\textsuperscript{P.13}. This environment takes mandatory or optional \langle parameters \rangle. It is automatically indexed and can be referenced with \refEnv{docKey}\textsuperscript{P.475}\langle name \rangle.

\begin{docEnvironment}{foocolorbox}\{\oarg{options}\}
This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.
\end{docEnvironment}

\begin{foocolorbox}{(options)\}
(\textit{environment description})\end{foocolorbox}

This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.

\begin{docEnvironment}\%
[doclang/environment content=My content text]\%
\foocolorbox*\{\oarg{options}\}
This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.
\end{docEnvironment}

\begin{foocolorbox*}{(options)\}
(My content text)\end{foocolorbox*}

This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.

\begin{docEnvironment*}{(options)\}{(name)\}{(parameters)\}
(environment description)\end{docEnvironment*}

Identical to \texttt{docEnvironment}, but without index entry.
\begin{docKey}[⟨key path⟩][{⟨options⟩}]{⟨name⟩}{⟨parameters⟩}{⟨description⟩}

(key description)
\end{docKey}

Documents a key with given ⟨name⟩ and an optional ⟨key path⟩. The given ⟨options⟩ are set with \texttt{\textbackslash tcbset} \textsuperscript{\texttt{P.13}}. This key takes mandatory or optional ⟨parameters⟩ as value with a short ⟨description⟩. It is automatically indexed and can be referenced with \texttt{\textbackslash refKey} \textsuperscript{\texttt{P.476}}{⟨name⟩}.

\begin{verbatim}
\begin{docKey}[foo]{footitle}{=\meta{text}}{no default, initially empty}
  Creates a heading line with \meta{text} as content.
\end{docKey}

/foo/footitle={⟨text⟩} (no default, initially empty)
  Creates a heading line with ⟨text⟩ as content.
\end{verbatim}

\begin{docKey*}[⟨key path⟩][{⟨options⟩}]{⟨name⟩}{⟨parameters⟩}{⟨description⟩}

(key description)
\end{docKey*}

Identical to \texttt{docKey}, but without index entry.

\begin{docValue}{⟨name⟩}

Documents a value with given ⟨name⟩. Typically, this is a value for a key. This value is automatically indexed.

A feasible value for \texttt{\textbackslash refKey}/foo/footitle is \texttt{\textbackslash docValue}foovalue.

A feasible value for /foo/footitle is foovalue.
\end{docValue}

\begin{docValue*}{⟨name⟩}

Identical to \texttt{docValue}, but without index entry.
\end{docValue*}

\begin{docAuxCommand}{⟨name⟩}

Documents an auxiliary or minor \LaTeX macro with given ⟨name⟩ where ⟨name⟩ is written without backslash. This macro is automatically indexed.

The macro \texttt{\textbackslash docAuxCommand}fooaux holds some interesting data.

The macro \texttt{fooaux} holds some interesting data.
\end{docAuxCommand}

\begin{docAuxCommand*}{⟨name⟩}

Identical to \texttt{docAuxCommand}, but without index entry.
\end{docAuxCommand*}

\begin{docAuxEnvironment}{⟨name⟩}

Documents an auxiliary or minor \LaTeX environment with given ⟨name⟩. This macro is automatically indexed.

The environment \texttt{\textbackslash docAuxEnvironment}fooauxenv holds some interesting data.

The environment \texttt{fooauxenv} holds some interesting data.
\end{docAuxEnvironment}

\begin{docAuxEnvironment*}[[⟨key path⟩]]{⟨name⟩}

Identical to \texttt{docAuxEnvironment}, but without index entry.
\end{docAuxEnvironment*}
\texttt{\textbackslash docAuxKey[(key path)]\{name\}}
Documents an auxiliary key with given \texttt{(name)} and an optional \texttt{(key path)}. It is automatically indexed.

The key \texttt{\textbackslash docAuxKey[foo]{fooaux}} holds some interesting data.

The key \texttt{/foo/fooaux} holds some interesting data.

\texttt{\textbackslash docAuxKey\*[key path]\{name\}}
Identical to \texttt{\textbackslash docAuxKey}, but without index entry.

\texttt{\textbackslash docCounter\{name\}}
Documents a counter with given \texttt{(name)}. The counter is automatically indexed.

The counter \texttt{\textbackslash docCounter[foocounter]} can be used for computation.

The counter \texttt{foocounter} can be used for computation.

\texttt{\textbackslash docCounter\*[name]}  
Identical to \texttt{\textbackslash docCounter}, but without index entry.

\texttt{\textbackslash docLength\{name\}}
Documents a counter with given \texttt{(name)}. The counter is automatically indexed.

The length \texttt{\textbackslash docLength[foolength]} can be used for computation.

The length \texttt{foolength} can be used for computation.

\texttt{\textbackslash docLength\*[name]} 
Identical to \texttt{\textbackslash docLength}, but without index entry.

\texttt{\textbackslash docColor\{name\}}
Documents a color with given \texttt{(name)}. The color is automatically indexed.

The color \texttt{\textbackslash docColor[foocolor]} is available.

The color \texttt{foocolor} is available.

\texttt{\textbackslash docColor\*[name]} 
Identical to \texttt{\textbackslash docColor}, but without index entry.
\cs{⟨name⟩}
Macro from \texttt{ltxdoc} [3] to typeset a command word \texttt{⟨name⟩} where the backslash is prefixed. The library overwrites the original macro.

This is a \cs{foocommand}.

This is a \foocommand.

\meta{⟨text⟩}
Macro from \texttt{doc} [8] to typeset a meta \texttt{⟨text⟩}. The library overwrites the original macro.

This is a \meta{text}.

This is a \text.

\marg{⟨text⟩}
Macro from \texttt{ltxdoc} [3] to typeset a \texttt{⟨text⟩} with curly brackets as a mandatory argument. The library overwrites the original macro.

This is a mandatory \marg{argument}.

This is a mandatory \{argument\}.

\oarg{⟨text⟩}
Macro from \texttt{ltxdoc} [3] to typeset a \texttt{⟨text⟩} with square brackets as an optional argument. The library overwrites the original macro.

This is an optional \oarg{argument}.

This is an optional \[(argument)].

\brackets{⟨text⟩}
Sets the given \texttt{⟨text⟩} with curly brackets.

Here we use \brackets{some text}.

Here we use \{some text\}.
\begin{dispExample}
\texttt{environment content}
\end{dispExample}

Creates a colored box based on a \texttt{tcolorbox} \textsuperscript{P.12}. It displays the environment content as source code in the upper part and as compiled text in the lower part of the box. The appearance is controlled by \texttt{/tcb/documentation listing style} \textsuperscript{P.478} and the style \texttt{/tcb/docexample} \textsuperscript{P.478}. It may be changed by redefining this style.

\begin{dispExample}
This is a $\LaTeX$ example.
\end{dispExample}

This is a $\LaTeX$ example.

\begin{dispExample*}{sidebyside}
\texttt{environment content}
\end{dispExample*}

The starred version of \texttt{dispExample} takes \texttt{tcolorbox} \textsuperscript{P.12} \texttt{(options)} as parameter. These \texttt{(options)} are executed after \texttt{/tcb/docexample} \textsuperscript{P.478}.

\begin{dispExample*}{sidebyside}
This is a $\LaTeX$ example. This is a $\LaTeX$ example.
\end{dispExample*}
\begin{dispListing}
\begin{tcolorbox}
This is a \LaTeX\ example.
\end{tcolorbox}
\end{dispListing}

Creates a colored box based on a \texttt{tcolorbox} \(^{P.12}\). It displays the environment content as source code. The appearance is controlled by \texttt{/tcb/documentation listing style} \(^{P.478}\) and the style \texttt{/tcb/docexample} \(^{P.478}\). It may be changed by redefining this style.

\begin{dispListing*}{options}
\begin{tcolorbox}[options]
\end{tcolorbox}
\end{dispListing*}

The starred version of \texttt{dispListing} takes \texttt{tcolorbox} \(^{P.12}\) \texttt{(options)} as parameter. These \texttt{(options)} are executed after \texttt{/tcb/docexample} \(^{P.478}\).

\begin{dispListing*}{title=My listing}
\begin{tcolorbox}[title=My listing]
This is a \LaTeX\ example.
\end{tcolorbox}
\end{dispListing*}

\begin{absquote}
|tcolorbox| provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part.
\end{absquote}

\texttt{tcolorbox} provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part.

Used to typeset an abstract as quoted and small text.

\begin{absquote}
|tcolorbox| provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part.
\end{absquote}
\tcbmakedocSubKey\{(name)\}\{(key path)\}

Creates a new environment \textit{(name)} based on \texttt{docKey}\textsuperscript{P.470} for the documentation of keys with the given \textit{(key path)} as default. The new environment \textit{(name)} takes the same parameters as \texttt{docKey}\textsuperscript{P.470} itself. A second starred environment \textit{(name)} is also created, which is identical to \textit{(name)} but without index entry.

\begin{tcbmakedocSubKey}{docFooKey}{foo}
\begin{docFooKey}{foodummy}{=\texttt{\meta{nothing}}}{no default, initially empty}
Some key.
\end{docFooKey}
\begin{docFooKey*}{foo another dummy}{=\texttt{\meta{nothing}}}{no default, initially empty}
Some key (not indexed).
\end{docFooKey*}
\end{tcbmakedocSubKey}

\refCom\{(name)\}

References a documented \LaTeX\ macro with given \textit{(name)} where \textit{(name)} is written without backslash. The page reference is suppressed if it links to the same page.

\begin{refCom}{foomakedocSubKey}
We have created \refCom{foomakedocSubKey} as an example.
\end{refCom}
\begin{refCom}{foomakedocSubKey}\textsuperscript{P.468}
We have created \texttt{foomakedocSubKey} as an example.
\end{refCom}

\refCom*\{(name)\}

References a documented \LaTeX\ macro with given \textit{(name)} where \textit{(name)} is written without backslash. There is no page reference.

\begin{refCom*}{foomakedocSubKey}
We have created \refCom*{foomakedocSubKey} as an example.
\end{refCom*}
\begin{refCom*}{foomakedocSubKey}
We have created \texttt{foomakedocSubKey} as an example.
\end{refCom*}

\refEnv\{(name)\}

References a documented \LaTeX\ environment with given \textit{(name)}. The page reference is suppressed if it links to the same page.

\begin{refEnv}{foocolorbox}
We have created \refEnv{foocolorbox} as an example.
\end{refEnv}
\begin{refEnv}{foocolorbox}\textsuperscript{P.469}
We have created \texttt{foocolorbox} as an example.
\end{refEnv}

\refEnv*\{(name)\}

References a documented \LaTeX\ environment with given \textit{(name)}. There is no page reference.

\begin{refEnv*}{foocolorbox}
We have created \refEnv*{foocolorbox} as an example.
\end{refEnv*}
\begin{refEnv*}{foocolorbox}
We have created \texttt{foocolorbox} as an example.
\end{refEnv*}
\refKey\{\langle \text{name} \rangle \}\n
References a documented key with given \( \langle \text{name} \rangle \) where \( \langle \text{name} \rangle \) is the full path name of the key. The page reference is suppressed if it links to the same page.

<table>
<thead>
<tr>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>We have created \refKey{/foo/footitle} as an example.</td>
</tr>
<tr>
<td>We have created /foo/footitle (^{P.470}) as an example.</td>
</tr>
</tbody>
</table>

\refKey*\{\langle \text{name} \rangle \}\n
References a documented key with given \( \langle \text{name} \rangle \) where \( \langle \text{name} \rangle \) is the full path name of the key. There is no page reference.

<table>
<thead>
<tr>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>We have created \refKey*/{foo/footitle} as an example.</td>
</tr>
<tr>
<td>We have created /foo/footitle as an example.</td>
</tr>
</tbody>
</table>

\refAux\{\langle \text{name} \rangle \}\n
References some auxiliary environment, key, value, or color. The hyperlink color is used, but there is no real link.

<table>
<thead>
<tr>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some pages back, one can see \refAux{/foo/footitle} as an example.</td>
</tr>
<tr>
<td>Some pages back, one can see /foo/footitle as an example.</td>
</tr>
</tbody>
</table>

\refAuxcs\{\langle \text{name} \rangle \}\n
References some auxiliary macro \( \langle \text{name} \rangle \) where \( \langle \text{name} \rangle \) is written without backslash. The hyperlink color is used, but there is no real link.

<table>
<thead>
<tr>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some pages back, one can see \refAuxcs{fooaux} as an example.</td>
</tr>
<tr>
<td>Some pages back, one can see \fooaux as an example.</td>
</tr>
</tbody>
</table>

\colDef\{\langle \text{text} \rangle \}\n
Sets \( \langle \text{text} \rangle \) with the command color, see /tcb/color command \(^{P.480}\).

<table>
<thead>
<tr>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is my \colDef{text}.</td>
</tr>
<tr>
<td>This is my text.</td>
</tr>
</tbody>
</table>

\colOpt\{\langle \text{text} \rangle \}\n
Sets \( \langle \text{text} \rangle \) with the option color, see /tcb/color option \(^{P.480}\).

<table>
<thead>
<tr>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is my \colOpt{text}.</td>
</tr>
<tr>
<td>This is my text.</td>
</tr>
</tbody>
</table>
\verb|\tcbdocmarginnote|(⟨options⟩)⟨text⟩

Creates a \texttt{tcolorbox} note with the given ⟨text⟩ inside the margin using the \texttt{marginnote} package. The style of the \texttt{tcolorbox} is predefined and can be altered by \texttt{/tcb/doc marginnote} \cite{P.485} and the given ⟨options⟩.

\begin{Verbatim}
Some text\tcbdocmarginnote{Note A}
which is commented by a note inside the margin.
Alternatively to \texttt{\tcbdocmarginnote}, you can always use
\texttt{\marginnote} with a \texttt{tcolorbox} directly. \par
This is further text\%\tcbdocmarginnote[\texttt{colframe=blue!50!white, colback=blue!5!white}]{Note B}
with another note.
\end{Verbatim}

\begin{Verbatim}
Some text which is commented by a note inside the margin. Alternatively to \texttt{\tcbdocmarginnote},
you can always use \texttt{\marginnote} with a \texttt{tcolorbox} directly.
This is further text with another note.
\end{Verbatim}

\texttt{\tcbdocnew}(⟨date⟩)

Auxiliary macro which typesets the \texttt{/tcb/doclang/new} \cite{P.481} text with the given ⟨date⟩. It may be redefined for customization.

\begin{Verbatim}
\tcbdocnew{1981-10-29}.\% Next one is displayed in the margin:
\tcbdocmarginnote{\tcbdocnew{1978-02-09}}
\end{Verbatim}

\begin{Verbatim}
\end{Verbatim}

\texttt{\tcbdocupdated}(⟨date⟩)

Auxiliary macro which typesets the \texttt{/tcb/doclang/updated} \cite{P.481} text with the given ⟨date⟩. It may be redefined for customization.

\begin{Verbatim}
\tcbdocupdated{2014-09-19}.
\end{Verbatim}

25.2 Option Keys of the Library

/tcb/docexample (style, no value)

Sets the style for dispExample \(^{\text{P.473}}\) and dispListing \(^{\text{P.474}}\) with the colors ExampleBack and ExampleFrame. To change the appearance of the examples, this style can be redefined.

% Predefined style:
\begin{verbatim}
\tcbset{
  docexample/.style={colframe=ExampleFrame,colback=ExampleBack,
  beforeskip=\medskipamount,after skip=\medskipamount,
  fontlower=\footnotesize}
}\end{verbatim}

/tcb/documentation listing options=(key list) (no default, initially style=tcbdocumentation)

Sets the options from the package listings \([6]\). They are used inside dispExample \(^{\text{P.473}}\) and dispListing \(^{\text{P.474}}\) to typeset the listings. Note that this is not identical to the key /tcb/listing options \(^{\text{P.315}}\) which is used for 'normal' listings. Used for /tcb/listing engine \(^{\text{P.320}}\)=listings only.

/tcb/documentation listing style=(listing style) (no default, initially tcbdocumentation)

Abbreviation for documentation listing options=(style=...). This key sets a (style) for the listings package, see \([6]\). Note that this is not identical to the key /tcb/listing style \(^{\text{P.315}}\) which is used for 'normal' listings. Used for /tcb/listing engine \(^{\text{P.320}}\)=listings only.

/tcb/documentation minted options=(minted style) (no default, initially \text{tabsize}=2,fontsize=\small)

Sets the options from the package minted \([12]\) which are used during typesetting of the listing, if used. Note that this is not identical to the key /tcb/minted options \(^{\text{P.318}}\) which is used for 'normal' listings. Used for /tcb/listing engine \(^{\text{P.320}}\)=minted only.

/tcb/documentation minted style=(key list) (no default, initially unset)

Sets a (style) known to Pygments \([14]\) for the package minted \([12]\), if used. Note that this is not identical to the key /tcb/minted style \(^{\text{P.319}}\) which is used for 'normal' listings. Used for /tcb/listing engine \(^{\text{P.320}}\)=minted only.

/tcb/documentation minted language=(programming language) (no default, initially latex)

Sets a (programming language) known to Pygments \([14]\) for the package minted \([12]\), if used. Note that this is not identical to the key /tcb/minted language \(^{\text{P.318}}\) which is used for 'normal' listings. Used for /tcb/listing engine \(^{\text{P.320}}\)=minted only.

The following two keys are deprecated and without function (v3.50 and above). Use /tcb/before \(^{\text{P.80}}\) and /tcb/after \(^{\text{P.80}}\) with appropriate values instead. Also see /tcb/docexample.

/tcb/before example=(macros) (no default, initially empty)

Sets the (macros) which are executed before dispExample \(^{\text{P.473}}\) and dispListing \(^{\text{P.474}}\) additional to /tcb/before \(^{\text{P.80}}\).

/tcb/after example=(macros) (no default, initially empty)

Sets the (macros) which are executed after dispExample \(^{\text{P.473}}\) and dispListing \(^{\text{P.474}}\) additional to /tcb/after \(^{\text{P.80}}\).
Keyword used in \texttt{docEnvironment} \texttt{\textsuperscript{P.469}}, \texttt{docCommand} \texttt{\textsuperscript{P.468}}, etc. are printed boldface (or not). Since the typewriter font is used, the effect may be invisible with Computer Modern fonts or similar which do not have a bold variant. Note that references to keywords are not printed boldface at all.

\begin{verbatim}
Enter text here...
\end{verbatim}

Replace the internally used \texttt{\textit{index}} macro by the given \texttt{\textit{macro}}. The \texttt{\textit{macro}} has to take one mandatory argument like \texttt{\textit{index}}. This option is mutually exclusive with \texttt{/tcb/index command name}.

\begin{verbatim}
Enter text here...
\end{verbatim}

Replaces the internally used \texttt{\textit{index}} macro by \texttt{\textit{index}[\texttt{\textit{name}}]}, i.e. \texttt{\textit{index}(...) is replaced by \texttt{\textit{index}[\texttt{name}](...)}. This option is intended to be used with \texttt{imakeidx} and is mutually exclusive with \texttt{/tcb/index command}.

\begin{verbatim}
Enter text here...
\end{verbatim}

Determines the basic \texttt{\textit{format}} of the generated index. Feasible values are:

- \texttt{pgfsection}: The index is formatted like in the \texttt{pgf} documentation (as a section).
- \texttt{pgfchapter}: The index is formatted like in the \texttt{pgf} documentation (as a chapter).
- \texttt{pgf}: Alias for \texttt{pgfsection}.
- \texttt{doc}: The index is assumed to be formatted by \texttt{doc} or \texttt{ltxdoc}. The usage of \texttt{makeindex} with \texttt{-s gind.ist} is assumed. The package \texttt{hypdoc} has to be loaded \texttt{before tcolorbox}.
- \texttt{off}: The index is not formatted by \texttt{tcolorbox}. Use this, if the index is formatted by other package like \texttt{imakeidx}.

\begin{verbatim}
Enter text here...
\end{verbatim}

Sets the character for 'actual' in automatic indexing.

\begin{verbatim}
Enter text here...
\end{verbatim}

Sets the character for 'quote' in automatic indexing.

\begin{verbatim}
Enter text here...
\end{verbatim}

Sets the character for 'level' in automatic indexing.

**/tcb/index default settings**

Sets the \texttt{makeindex} default values for \texttt{/tcb/index actual}, \texttt{/tcb/index quote}, and \texttt{/tcb/index level}.

**/tcb/index german settings**

Sets the \texttt{makeindex} values recommended for German language texts. This is identical to setting the following:

\begin{verbatim}
Enter text here...
\end{verbatim}
If set to `true`, the index entries are annotated with short descriptions given by `/tcb/doclang/environment`\textsuperscript{P.481}, `/tcb/doclang/key`\textsuperscript{P.481}, and others.

If set to `true`, the index entries colorized according to the color settings given by `/tcb/color environment`, `/tcb/color key`, and others.

Sets the highlight color used by macro definitions.

Sets the highlight color used by environment definitions.

Sets the highlight color used by key definitions.

Sets the highlight color used by value definitions.

Sets the highlight color used by counter definitions.

Sets the highlight color used by length definitions.

Sets the highlight color used by color definitions.

Sets the highlight color for `/tcb/color command`, `/tcb/color environment`, `/tcb/color key`, `/tcb/color value`, `/tcb/color counter`, `/tcb/color length`, and `/tcb/color color`.

Sets the color used for optional arguments.

Sets the color for all hyper-links, i.e. all internal and external links.
The following keys are provided for language specific settings. The English language is predefined.

/\texttt{tcb/english language} (style, no value)
\textit{Sets all language specific settings to English.}

/\texttt{tcb/doclang/color=(text)} (no default, initially color)
\textit{Text used in the index for colors.}

/\texttt{tcb/doclang/colors=(text)} (no default, initially Colors)
\textit{Heading text in the index for colors.}

/\texttt{tcb/doclang/counter=(text)} (no default, initially counter)
\textit{Text used in the index for counters.}

/\texttt{tcb/doclang/counters=(text)} (no default, initially Counters)
\textit{Heading text in the index for counters.}

/\texttt{tcb/doclang/environment=(text)} (no default, initially environment)
\textit{Text used in the index for environments.}

/\texttt{tcb/doclang/environments=(text)} (no default, initially Environments)
\textit{Heading text in the index for environments.}

/\texttt{tcb/doclang/environment content=(text)} (no default, initially environment content)
\textit{Text used in \texttt{docEnvironment}^\texttt{P.469}.}

/\texttt{tcb/doclang/index=(text)} (no default, initially Index)
\textit{Heading text for the index.}

/\texttt{tcb/doclang/key=(text)} (no default, initially key)
\textit{Text used in the index for keys.}

/\texttt{tcb/doclang/keys=(text)} (no default, initially Keys)
\textit{Heading text used in the index for keys.}

/\texttt{tcb/doclang/length=(text)} (no default, initially length)
\textit{Text used in the index for lengths.}

/\texttt{tcb/doclang/lengths=(text)} (no default, initially Lengths)
\textit{Heading text in the index for lengths.}

/\texttt{tcb/doclang/new=(text)} (no default, initially New)
\textit{Announcement text for new content.}

/\texttt{tcb/doclang/pageshort=(text)} (no default, initially P.)
\textit{Short text for page references.}

/\texttt{tcb/doclang/updated=(text)} (no default, initially Updated)
\textit{Announcement text for updated content.}

/\texttt{tcb/doclang/value=(text)} (no default, initially value)
\textit{Text used in the index for values.}

/\texttt{tcb/doclang/values=(text)} (no default, initially Values)
\textit{Heading text in the index for values.}
/tcb/doc left=(length)  (no default, initially 2em)
Sets the left hand offset of the documentation texts from \texttt{docCommand} P.468, 
\texttt{docEnvironment} P.469, \texttt{docKey} P.470, etc, to \langle length \rangle.

\begin{docCommand*}[doc left=2cm,doc left indent=-2cm]{myCommandA}{\marg{argument}}
This is the documentation of \texttt{refCom[myCommandA]} which takes one \texttt{meta[argument]}.
\texttt{myCommandA} does some funny things with its \texttt{meta[argument]}.
\end{docCommand*}

/myCommandA{⟨argument⟩}  (no default, initially 2em)
This is the documentation of \texttt{myCommandA} which takes one \langle argument \rangle. \texttt{myCommandA} does some funny things with its \langle argument \rangle.

/tcb/doc right=(length)  (no default, initially 0em)
Sets the right hand offset of the documentation texts from \texttt{docCommand} P.468, 
\texttt{docEnvironment} P.469, \texttt{docKey} P.470, etc, to \langle length \rangle.

\begin{docCommand*}[doc right=2cm]{myCommandB}{\marg{argument}}
This is the documentation of \texttt{refCom[myCommandB]} which takes one \texttt{meta[argument]}.
\texttt{myCommandB} does some funny things with its \texttt{meta[argument]}.
\end{docCommand*}

/myCommandB{⟨argument⟩}  (no default, initially 0em)
This is the documentation of \texttt{myCommandB} which takes one \langle argument \rangle. \texttt{myCommandB} does some funny things with its \langle argument \rangle.

/tcb/doc left indent=(length)  (no default, initially -2em)
Sets the left hand indent of documentation heads from \texttt{docCommand} P.468, 
\texttt{docEnvironment} P.469, \texttt{docKey} P.470, etc, to \langle length \rangle.

\begin{docCommand*}[doc left indent=2cm]{myCommandC}{\marg{argument}}
This is the documentation of \texttt{refCom[myCommandC]} which takes one \texttt{meta[argument]}.
\texttt{myCommandC} does some funny things with its \texttt{meta[argument]}.
\end{docCommand*}

/myCommandC{⟨argument⟩}  (no default, initially -2em)
This is the documentation of \texttt{myCommandC} which takes one \langle argument \rangle. \texttt{myCommandC} does some funny things with its \langle argument \rangle.

/tcb/doc right indent=(length)  (no default, initially 0pt)
Sets the right hand indent of documentation heads from \texttt{docCommand} P.468, 
\texttt{docEnvironment} P.469, \texttt{docKey} P.470, etc, to \langle length \rangle.

\begin{docCommand*}[doc right indent=-10mm,doc right=10mm, 
doc description=test value]{myCommandD}{\marg{argument}}
This is the documentation of \texttt{refCom[myCommandD]} which takes one \texttt{meta[argument]}.
\texttt{myCommandD} does some funny things with its \texttt{meta[argument]}.
\end{docCommand*}

/myCommandD{⟨argument⟩}  (test value)
This is the documentation of \texttt{myCommandD} which takes one \langle argument \rangle. \texttt{myCommandD} does some funny things with its \langle argument \rangle.
The head lines of the main documentation environments \texttt{docCommand} \cite{P.468}, \texttt{docEnvironment} \cite{P.469}, \texttt{docKey} \cite{P.470}, etc, are set inside \texttt{tcolorbox}es. Options to these \texttt{tcolorbox}es can be given using the following keys.

\texttt{/tcb/doc head command=\{options\}} \quad \text{(no default, initially empty)}

Sets \{options\} for the head line of \texttt{docCommand} \cite{P.468} and \texttt{docCommand*} \cite{P.469}.

\begin{verbatim}
\tcbspecialize[doc head command=]{
  \{interior style={fill,left color=red!20!white,
                   right color=blue!20!white},
  \begin{docCommand*}{myCommandE}{\marg{argument}}
  This is the documentation of \refCom{myCommandE} which takes one \meta{argument}.
  \refCom{myCommandE} does some funny things with its \meta{argument}.
  \end{docCommand*}

\end{verbatim}

\texttt{/tcb/doc head environment=\{options\}} \quad \text{(no default, initially empty)}

Sets \{options\} for the head line of \texttt{docEnvironment} \cite{P.469} and \texttt{docEnvironment*} \cite{P.469}.

\begin{verbatim}
\tcbspecialize[doc head environment=]{
  \{beamer,boxsep=2pt,arc=2pt,colback=green!20!white,
   after=\par\smallskip},
  \begin{docEnvironment*}{myEnvironment}{\marg{argument}}
  This is the documentation of \refEnv{myEnvironment} which takes one \meta{argument}.
  \refEnv{myEnvironment} does some funny things with its \meta{argument}.
  \end{docEnvironment*}

\end{verbatim}

\texttt{/tcb/doc head key=\{options\}} \quad \text{(no default, initially empty)}

Sets \{options\} for the head line of \texttt{docKey} \cite{P.470} and \texttt{docKey*} \cite{P.470}.

\begin{verbatim}
\tcbspecialize[doc head key=]{
  \{boxsep=4pt,arc=4pt,boxrule=0.6pt,frame style=fill,interior style=fill,colframe=green!50!black},
  \begin{docKey*}{/foo/myKey}{\meta{argument}}{no value}
  This is the documentation of \refKey{/foo/myKey}.
  \end{docKey*}

\end{verbatim}

\texttt{/tcb/doc head=\{options\}} \quad \text{(no default, initially empty)}

Shortcut for setting the same \{options\} for \texttt{tcb/doc head command}, \texttt{tcb/doc head environment}, and \texttt{tcb/doc head key}.
The description texts of the main documentation environments docCommand[^P.468], docEnvironment[^P.469], docKey[^P.470], etc, are set in a compact form without indentation and parskip=0pt. This settings can overruled by using the following keys to insert code before (or after) the description texts.

```
\begin{docCommand*}{myCommandG}{\marg{argument}}
This is the documentation of \refCom{myCommandG} which takes one \meta{argument}. \refCom{myCommandG} does some funny things with its \meta{argument}.
\end{docCommand*}
```

\myCommandG{⟨argument⟩} (no default, initially empty)
This is the documentation of \myCommandG which takes one ⟨argument⟩. \myCommandG does some funny things with its ⟨argument⟩.

```
\begin{docCommand*}{myCommandH}{\marg{argument}}
This is the documentation of \refCom{myCommandH} which takes one \meta{argument}. \refCom{myCommandH} does some funny things with its \meta{argument}.
\end{docCommand*}
```

\myCommandH{⟨argument⟩} (no default, initially empty)
This is the documentation of \myCommandH which takes one ⟨argument⟩. \myCommandH does some funny things with its ⟨argument⟩.

```
\begin{docEnvironment*}{myEnvironmentG}{\marg{argument}}
This is the documentation of \refCom{myEnvironmentG} which takes one \meta{argument}. \refCom{myEnvironmentG} does some funny things with its \meta{argument}.
\end{docEnvironment*}
```

\myEnvironmentG{⟨argument⟩} (no default, initially empty)
This is the documentation of \myEnvironmentG which takes one ⟨argument⟩. \myEnvironmentG does some funny things with its ⟨argument⟩.

```
\begin{docEnvironment*}{myEnvironmentH}{\marg{argument}}
This is the documentation of \refCom{myEnvironmentH} which takes one \meta{argument}. \refCom{myEnvironmentH} does some funny things with its \meta{argument}.
\end{docEnvironment*}
```

\myEnvironmentH{⟨argument⟩} (no default, initially empty)
This is the documentation of \myEnvironmentH which takes one ⟨argument⟩. \myEnvironmentH does some funny things with its ⟨argument⟩.

```
\begin{docKey*}{myKeyG}{\marg{argument}}
This is the documentation of \refCom{myKeyG} which takes one \meta{argument}. \refCom{myKeyG} does some funny things with its \meta{argument}.
\end{docKey*}
```

\myKeyG{⟨argument⟩} (no default, initially empty)
This is the documentation of \myKeyG which takes one ⟨argument⟩. \myKeyG does some funny things with its ⟨argument⟩.

```
\begin{docKey*}{myKeyH}{\marg{argument}}
This is the documentation of \refCom{myKeyH} which takes one \meta{argument}. \refCom{myKeyH} does some funny things with its \meta{argument}.
\end{docKey*}
```

\myKeyH{⟨argument⟩} (no default, initially empty)
This is the documentation of \myKeyH which takes one ⟨argument⟩. \myKeyH does some funny things with its ⟨argument⟩.

```
\begin{tcb}{before doc body command}{⟨code⟩}
Executes ⟨code⟩ before the description texts of docCommand[^P.468] and docCommand[^P.469].
```

/\texttt{tcb/before doc body command}=⟨\texttt{code}⟩ (no default, initially empty)
Executes ⟨code⟩ before the description texts of docCommand[^P.468] and docCommand[^P.469].

```
\begin{tcb}{after doc body command}{⟨code⟩}
Executes ⟨code⟩ after the description texts of docCommand[^P.468] and docCommand[^P.469].
```

/\texttt{tcb/after doc body command}=⟨\texttt{code}⟩ (no default, initially empty)
Executes ⟨code⟩ after the description texts of docCommand[^P.468] and docCommand[^P.469].

```
\begin{tcb}{before doc body environment}{⟨code⟩}
Executes ⟨code⟩ before the description texts of docEnvironment[^P.469] and docEnvironment[^P.469].
```

/\texttt{tcb/before doc body environment}=⟨\texttt{code}⟩ (no default, initially empty)
Executes ⟨code⟩ before the description texts of docEnvironment[^P.469] and docEnvironment[^P.469].

```
\begin{tcb}{after doc body environment}{⟨code⟩}
Executes ⟨code⟩ after the description texts of docEnvironment[^P.469] and docEnvironment[^P.469].
```

/\texttt{tcb/after doc body environment}=⟨\texttt{code}⟩ (no default, initially empty)
Executes ⟨code⟩ after the description texts of docEnvironment[^P.469] and docEnvironment[^P.469].

```
\begin{tcb}{before doc body key}{⟨code⟩}
Executes ⟨code⟩ before the description texts of docKey[^P.470] and docKey[^P.470].
```

/\texttt{tcb/before doc body key}=⟨\texttt{code}⟩ (no default, initially empty)
Executes ⟨code⟩ before the description texts of docKey[^P.470] and docKey[^P.470].

```
\begin{tcb}{after doc body key}{⟨code⟩}
Executes ⟨code⟩ after the description texts of docKey[^P.470] and docKey[^P.470].
```

/\texttt{tcb/after doc body key}=⟨\texttt{code}⟩ (no default, initially empty)
Executes ⟨code⟩ after the description texts of docKey[^P.470] and docKey[^P.470].

```
\begin{tcb}{before doc body}{⟨options⟩}
Shortcut for setting the same ⟨options⟩ for \texttt{/tcb/before doc body command}, \texttt{/tcb/before doc body environment}, and \texttt{/tcb/before doc body key}.
```

/\texttt{tcb/before doc body}=⟨\texttt{options}⟩ (no default, initially empty)
Shortcut for setting the same ⟨options⟩ for \texttt{/tcb/after doc body command}, \texttt{/tcb/after doc body environment}, and \texttt{/tcb/after doc body key}.

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Sets a (short!) additional description \langle text \rangle for \texttt{docCommand} \textsuperscript{+P.468} or \texttt{docEnvironment} \textsuperscript{+P.469}. Such a description is mandatory for \texttt{docKey} \textsuperscript{+P.470}.

\begin{docCommand}[\texttt{doc description=my description}]{myCommandF}{\marg{argument}}
This is the documentation of \texttt{\refCom[myCommandF]} which takes one \texttt{\meta{argument}}. \texttt{\refCom[myCommandF]} does some funny things with its \texttt{\meta{argument}}.
\end{docCommand}

\begin{docCommand*}[\texttt{doc description=my description}]{myCommandF}{\marg{argument}}
This is the documentation of \texttt{\myCommandF} which takes one \texttt{\argument}. \texttt{\myCommandF} does some funny things with its \texttt{\argument}.
\end{docCommand*}

Note that the description \langle text \rangle may overlap with the text on the left hand side if too long. Linebreaks can be used inside the \langle text \rangle.

\texttt{doc into index=true|false}  \textsuperscript{(default \texttt{true}, initially \texttt{true})}
If set to \texttt{false}, no index entries are written for the main documentation environments. The same effect is achieved by using e.g. \texttt{docCommand*} \textsuperscript{+P.469} instead of \texttt{docCommand} \textsuperscript{+P.468}.  

\texttt{doc marginnote=\langle options \rangle}  \textsuperscript{(no default, initially empty)}
Sets style \langle options \rangle for the displayed box of the \texttt{\tcbdocmarginnote} \textsuperscript{+P.477} command.

\begin{tcbset}{doc marginnote={\colframe=blue!50!white,\colback=blue!5!white}}
This is some text \texttt{\tcbdocmarginnote[Note A]} which is commented by a note inside the margin.
\end{tcbset}

This is some text which is commented by a note inside the margin.

\texttt{doc new=\langle date \rangle}  \textsuperscript{(style, no default)}
Adds a a marginnote with a 'New: \langle data \rangle' message at the beginning of the upper box part. The intended use is inside the option list of \texttt{docCommand} \textsuperscript{+P.468}, \texttt{docEnvironment} \textsuperscript{+P.469}, etc.

\begin{docCommand}[\texttt{doc new=2000-01-01}]{foosomething}{\marg{text}}
Some command for something.
\end{docCommand}

\begin{docCommand}{\texttt{\begin{docCommand*}[\texttt{doc new=2000-01-01}]{foosomething}{\marg{text}}}
Some command for something.
\end{docCommand*}}{(style, no default)}

\texttt{doc updated=\langle date \rangle}  \textsuperscript{(style, no default)}
Adds a marginnote with a 'Updated: \langle data \rangle' message at the beginning of the upper box part. See \texttt{/tcb/doc new}.

\texttt{doc new and updated=\langle new date \rangle \& \langle update date \rangle}  \textsuperscript{(style, no default)}
Adds a marginnote with 'New: \langle new date \rangle' and 'Updated: \langle update data \rangle' messages at the beginning of the upper box part. See \texttt{/tcb/doc new}.

\subsection{25.3 Predefined Colors of the Library}
The following colors are predefined. They are used as default colors in some library commands.

\begin{itemize}
\item \texttt{\begin{tcbhighlight}{Option}{Definition}{ExampleFrame}{ExampleBack}{Hyperlink}}
\end{tcbhighlight}
\end{itemize}
A Picture Credits

The following pictures were used inside this documentation.

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- **goldshade.png**
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