1 Introduction

The abraces\textsuperscript{1} package provides a character key-driven interface to supplement new constructions of the traditional \texttt{\overbrace} and \texttt{\underbrace} pairs in an asymmetric or arbitrary way.

2 User interface

abraces defines two counterparts to the existing braces:

\begin{verbatim}
\aoverbrace[\langle spec \rangle]{\langle stuff \rangle}
\aunderbrace[\langle spec \rangle]{\langle stuff \rangle}
\end{verbatim}

These create an overbrace and underbrace where \langle spec \rangle defines a construction pattern based on the elements in Table 1.

The provided interface is based on a ratio-principle, allowing one to put a larger share of “filler” (the horizontal rule) at any location within the brace construction. The traditional \texttt{\overbrace} and \texttt{\underbrace} pairs have a 1:1 share between the left and right side (either side of the tip/cust of the brace). Using a 1:2 ratio would place the brace cusp one third (from the left) into the brace. Similarly a 3:2 ratio would place the cusp 40\% (or two fifths) from the right edge of the brace.

Other, more complex construction – by means of the optional \langle spec \rangle argument – can also be made by mixing the elements presented in Table 1.

\begin{verbatim}
\newbracespec\langle char \rangle\{\langle spec \rangle\}
\end{verbatim}

This allows the user to define a new brace specification \langle char \rangle the results in the (possibly complex) construction \langle spec \rangle. The usage is similar to that of a \texttt{\newcolumntype} construction provided by the array\textsuperscript{2} package.

\textsuperscript{1}The abraces package: \url{http://ctan.org/pkg/abraces}
\textsuperscript{2}The array package: \url{http://ctan.org/pkg/array}
### Table 1: Character specifications ⟨spec⟩ used to construct braces.

<table>
<thead>
<tr>
<th>⟨spec⟩ character</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>(single) Empty fill</td>
</tr>
<tr>
<td>1, ..., 9</td>
<td>Copies of regular fill</td>
</tr>
<tr>
<td>@⟨stuff⟩</td>
<td>Places ⟨stuff⟩ into brace</td>
</tr>
<tr>
<td>!⟨len⟩</td>
<td>Regular fill of length ⟨len⟩</td>
</tr>
<tr>
<td>*⟨num⟩⟨stuff⟩</td>
<td>Repeat ⟨stuff⟩ a total of ⟨num⟩ times</td>
</tr>
</tbody>
</table>

\texttt{\textbackslash bracescript}\{⟨spec⟩\}

Since the brace cusps may not fall directly at the horizontal centre of the construction, \texttt{\textbackslash bracescript} is provided that takes a similar construction-style interface to that of ⟨spec⟩ in \texttt{\textbackslash aoverbrace} and \texttt{\textbackslash underbrace}. This allows the user to position the scripted text at the location(s) best-suited for presentation.

If the package is loaded with the \texttt{overload} option

\texttt{\usepackage[overload]{abraces}}

the traditional \texttt{\overbrace} and \texttt{\underbrace} pairs are redefined to be equivalent to \texttt{\aoverbrace} and \texttt{\underbrace}, respectively, via a straight-forward \texttt{\let}:

\texttt{\let\overbrace\aoverbrace}
\texttt{\let\underbrace\underbrace}

### 3 Examples

Some examples of the types of braces that can be constructed using \texttt{abraces}:

\texttt{\newcommand{\foxanddog}{\%}}
\texttt{\textrm{The quick brown fox jumped over the lazy dog}}

- \texttt{\aoverbrace{\foxanddog}} (traditional \texttt{\overbrace}): The quick brown fox jumped over the lazy dog

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• \underbrace{\foxanddog} (traditional \underbrace):
The quick brown fox jumped over the lazy dog

• \overbrace[L3U1R]{\foxanddog}:
The quick brown fox jumped over the lazy dog

• \overbrace[L1D1r]{\foxanddog}:
The quick brown fox jumped over the lazy dog

• \underbrace[12D7r]{\foxanddog}:
The quick brown fox jumped over the lazy dog

• \underbrace[11D2U2D1r]{\foxanddog}:
The quick brown fox jumped over the lazy dog

• \underbrace[l1D2U2D1r]{\foxanddog}:
The quick brown fox jumped over the lazy dog

• \underbrace[l6R0l3D3r0L6r]{\foxanddog}:
The quick brown fox jumped over the lazy dog

• \underbrace[l1@{\hspace{5em}}2D2@{\hspace{3em}}1r]{\foxanddog}:
The quick brown fox jumped over the lazy dog

• \underbrace[l1R@{\color{red!80!white}}L1r]{\foxanddog}:
The quick brown fox jumped over the lazy dog

The next question might be how to add content to the brace cusps. Here's a possible way to insert text at the appropriate ratio, using the above construction techniques:

left \hspace{5em} right
The quick brown fox jumped over the lazy dog
Another usage might include “breaking” a brace across lines to indicate a continuous grouping of objects. The following example constructs two open-ended \aoverbrace\ which “spans” multiple lines:

\begin{multline*}
\left. \begin{array}{l}
\begin{array}{l}
\mbox{some text}
\end{array}
\end{array} \right\}
\begin{array}{l}
\overbrace{a_3 x^3 + a_4 x^4 + \cdots + a_{i-1} x^{i-1}}
\end{array}^\text{some text}
\begin{array}{l}
\begin{array}{l}
a_ix^i + a_{i+1} x^{i+1}
\end{array}
\end{array}
\end{array} + \cdots + a_{n-1} x^{n-1}
\end{multline*}

As a final example, consider a brace that should include a dashed component. Using \newbracespec one can define your own dashed component:

\newbracespec{d}{%5@{\hspace{4pt}}1@{\hspace{4pt}}!{2em}@{\hspace{4pt}}1@{\hspace{4pt}}5%}

and then use

\begin{align*}
\aunderbrace[l*{3}{d}D*{3}{d}r]{\foxanddog}_&
\{\text{What happened to the cat?}\}
\end{align*}

\[%3\text{Taken from the question }\overbrace{split\text{ across multiple lines}}\text{ on the TeX StackExchange network.}
4 Terms of reference

This package originated from a question on the TeX StackExchange network called Asymmetric overbrace. Some code was taken from the mathtools\textsuperscript{4} package.

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\textsuperscript{4}The mathtools package: \url{http://ctan.org/pkg/mathtools}