Page Layout in \LaTeX\xspace

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One of the most frequently asked questions about \LaTeX\xspace is "How can I change the layout of a page?" The answer is really not that difficult if one knows how the page is designed in the first place. Let me point out here that the author of \LaTeX\xspace, Leslie Lamport, will be the first to point out that \LaTeX\xspace is supposed to relieve the author of formatting concerns. However, there are cases where none of the styles defined for \LaTeX\xspace will satisfy everyone's needs.

So, let's start with the basic layout of a page that is typeset using the \texttt{article} style in \texttt{10pt} type. See Figure 1. The first thing to note is that \LaTeX\xspace assumes the page starts one inch down and one inch from the left as indicated by the dashed lines in Figure 1. The boxes that are identified as "Header," "Body," "Footer," and "Margin Notes" are where any text you write gets placed on the page. The issue, then, is to adjust the appropriate parameters so that the page layout is changed to the desired format.

Let's look at each of the page layout parameters individually. Again, refer to Figure 1.

1. \texttt{\hoffset}: This is initially set to 0 points. This corresponds to a 1 inch horizontal offset.
2. \texttt{\voffset}: This is initially set to 0 points. This corresponds to a 1 inch vertical offset.
3. \texttt{\oddsidemargin}: This is the additional space that is added for the left margin, i.e. the true left margin is equal to \texttt{\oddsidemargin} plus one inch. This parameter can be negative. For example, if \texttt{\oddsidemargin} is set equal to \texttt{-5in}, then the body will start \texttt{1/2} inch to the left of the dashed line.
4. \texttt{\topmargin}: This is the additional space that is added for the top margin, i.e. the true top margin is equal to \texttt{\topmargin} plus one inch. This parameter can also be negative with the same relative effect as \texttt{\oddsidemargin}.
5. \texttt{\headheight}: This is the height of the box containing any header information.
6. \texttt{\headsep}: This is the distance between the header box and the body of the page.
7. \texttt{\textheight}: This is the height of the body of the page.
8. \texttt{\textwidth}: This is the width of the body of the page.
9. \texttt{\marginparsep}: This is the distance between the right edge of the body and the marginal notes box.
10. \texttt{\marginparwidth}: This is the width of the box containing marginal notes.
11. \texttt{\footskip}: This is the distance between the baseline of the last line in the body and the baseline of the footer box.
12. \texttt{\footskip}: This is the height of the box containing footer information.

With this in mind, I have designed a substyle option that will graphically show the layout of a page based on the page layout parameters discussed above.
For example, if your test looked like
\documentstyle[layout]{article}
\begin{document}
\layout
\end{document}
you would get a page that looks like Figure 2.

Now, let's assume you want to make the body wider so that you can get more text printed per page. The obvious parameter to modify is \textwidth. The not-so-obvious parameters would be \oddsidemargin and possibly \marginparwidth. Let's say you want to make the body 6 inches wide with a 1 inch margin on both sides. If you set \textwidth to 6 inches without changing anything else, you would get what is shown in Figure 3. As you can see from Figure 3, the body has the same left margin and simply extends 6 inches to the right causing the margin notes box to be pushed partly off the page.

You can also reset \oddsidemargin and decrease the size of the margin notes box. For example (remembering that 1 inch \approx 72pt), with
\documentstyle[layout]{article}
\setlength{\textwidth}{433pt}
\setlength{\oddsidemargin}{0pt}
\setlength{\marginparwidth}{72pt}
\begin{document}
\layout
\end{document}
you would get a page that looks like Figure 4.

Another useful idea is to see the layout of existing \LaTeX document styles. For example, the layout of the book style is shown in Figure 5.

In summary, when you want to change the layout of a page in \LaTeX, remember the following:
First, do you really need to change the layout? After all, if it is simply a matter of trying to make something look "prettier," I would say don't do it.

Secondly, if it is necessary to change the page layout, remember to place all \setlength commands prior to the \begin{document} command.

Thirdly, don’t forget to adjust the not-so-obvious parameters.

Lastly, when in doubt, use the \layout command to display the layout of a page as shown in the examples.

The following file must be placed in the TEX$INPUTS directory.

\begin{figure}
\centering
\includegraphics{example4a.png}
\caption{Properly adjusted page layout}
\end{figure}

\begin{figure}
\centering
\includegraphics{example5a.png}
\caption{Page layout of 10-point book style.}
\end{figure}

\section{LAYOUT.STY}

% This file should be called LAYOUT.STY and should be placed in the TEX_INPUTS directory.
%
% Define \bs if it is undefined, redefine it if it is already defined.
%
% $@ifundefined{bs}{\newcommand{\bs}{\char'134}}%
% {\renewcommand{\bs}{\char'134}}$
% $@ifundefined{lb}{\newcommand{\lb}{\char'173}}%
% {\renewcommand{\lb}{\char'173}}$
% $@ifundefined{rb}{\newcommand{\rb}{\char'175}}%
% {\renewcommand{\rb}{\char'175}}$
% $\newcount{\hoffset}$
% $\newcount{\voffset}$
% $\newcount{\href}$
% $\newcount{\vref}$
\newcount\omargin
\newcount\omarginref
\newcount\emargin
\newcount\emarginref
\newcount\htmargin
\newcount\htmarginref
\newcount\htheight
\newcount\hspace
\newcount\htheight
\newcount\twidth
\newcount\mparsep
\newcount\mparwidth
\newcount\fskip
\newcount\fheight
\newcount\hdef
\newcount\bodyref
\newcount\footref
\newcount\margnoteref
\newcount\oneinch
\newcount\eighthalfinch
\newcount\teninch
\newcount\eleveninch

\% Constants
\%
\oneinch=72
\eighthalfinch=615
\teninch=723
\eleveninch=795
\%
\% Define the calculations macro
\%
\def\layout{
   \%
   \% Convert dimensions to scalar values
   \% for use in the picture environment
   \%
   \hoffset=\hoffset
   \divide\hoffset by 65536
   \hdef=\hdef
   \advance\hdef by \oneinch
   \voffset=\voffset
   \divide\voffset by 65536
   \vdef=\voffset
   \vset=\teninch
   \advance\vset by -\vdef
   \%
   \tmargin=\topmargin
   \divide\tmargin by 65536
   \%
   \hheight=\headheight
   \divide\hheight by 65536
   \headref=\teninch
   \advance\headref by -\vdef
   \%
   \headwidth=\textwidth
   \divide\headwidth by 65536
   \%
   \headheight=\textheight
   \divide\headheight by 65536
   \%
   \hdef=\hdef
   \advance\hdef by \htmargin
   \%
   \fheight=\fheight
   \divide\fheight by 65536
   \%
   \footwidth=\footwidth
   \divide\footwidth by 65536
   \%
   \advance\footref by \fskip
   \%
   \emargin=\evenside\emargin
   \divide\emargin by 65536
   \%
   \advance\emarginref by \oneinch
   \%
   \advance\emarginref by \hdef
   \%
   \twidth=\textwidth
   \divide\twidth by 65536
   \%
   \mparsep=\marginparsep
   \divide\mparsep by 65536
   \%
   \mparwidth=\marginparwidth
   \divide\mparwidth by 65536
   \%
   \if@twoside
      \ifodd\countz\relax
      \%
      \Twosided, odd page
      \%
      \typeout{Two-sided document style, odd page.}
      \margnoteref=\oneinch
      \advance\margnoteref by \hdef
      \advance\margnoteref by \omargin
Dashed lines represent \( (\text{hoffset}) \) and \( (\text{voffset}) \). Define the picture to be drawn
\[
\begin{picture}(\text{eighthalfinch}, \text{eleveninch})
\centering
\thicklines
\put(0,0){\framebox(\text{eighthalfinch}, \text{eleveninch}){\mbox{}}}
\put(0,\text{voffset}){\dashbox(10)}
\put(\text{hoffset},0){\dashbox(10)0, \text{eleveninch}}{\mbox{}}
\end{picture}
\]
\% Page box and reference lines
\%
\put(0,0){\framebox(\text{eighthalfinch}, \text{eleveninch}){\mbox{}}}
\put(0,\text{voffset}){\dashbox(10)}
\put(\text{hoffset},0){\dashbox(10)0, \text{eleveninch}}{\mbox{}}
\% Header
\%
\put(\text{marginref}, \text{headref}){\framebox(\text{width}, \text{height})}{\footnotesize \text{Header}}
\]