Page Layout in LaTeX

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One of the most frequently asked questions about LaTeX 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, Leslie Lamport, will be the first to point out that LaTeX is supposed to relieve the author of formatting concerns. However, there are cases where none of the styles defined for LaTeX will satisfy everyone's needs.

So, let's start with the basic layout of a page that is typeset using the **article** style in 10pt type. See Figure 1. The first thing to note is that LaTeX 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. \hoffset: This is initially set to 0 points. This corresponds to a 1 inch horizontal offset.

2. \voffset: This is initially set to 0 points. This corresponds to a 1 inch vertical offset.

3. \oddsidemargin: This is the *additional* space that is added for the left margin, i.e. the true left margin is equal to \oddsidemargin plus one inch. This parameter can be negative. For example, if \oddsidemargin is set equal to −.5in, then the body will start ½ inch to the left of the dashed line.

4. \topmargin: This is the *additional* space that is added for the top margin, i.e. the true top margin is equal to \topmargin plus one inch. This parameter can also be negative with the same relative effect as \oddsidemargin.

5. \headheight: This is the height of the box containing any header information.

6. \headsep: This is the distance between the header box and the body of the page.

7. \textheight: This is the height of the body of the page.

8. \textwidth: This is the width of the body of the page.
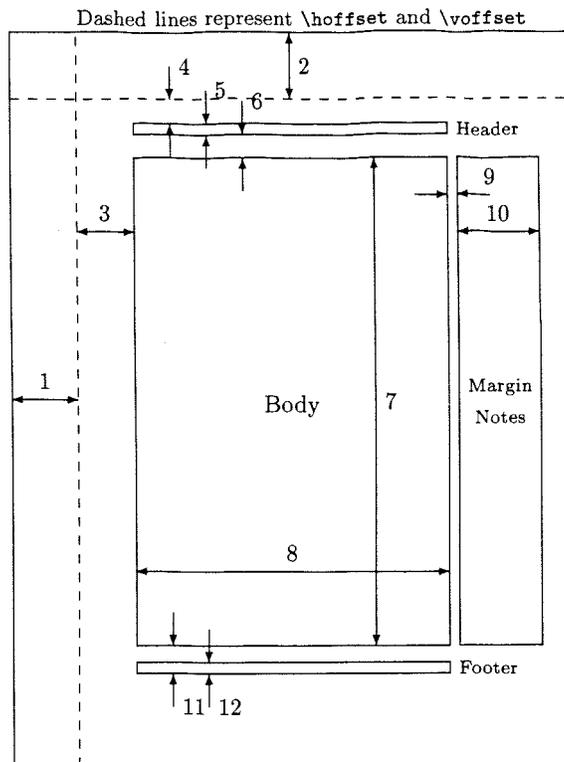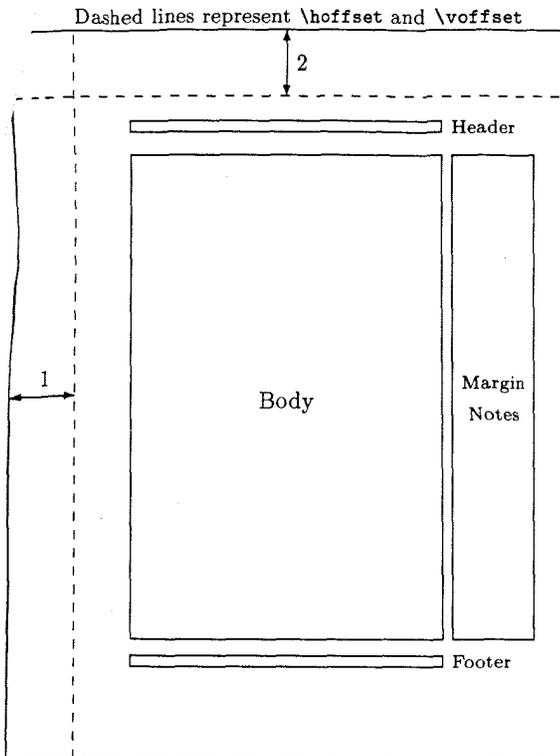
1 \hoffset = 0pt   2 \voffset = 0pt
3 \oddsidemargin = 63pt   4 \topmargin = 27pt
5 \headheight = 12pt   6 \headsep = 25pt
7 \textheight = 528pt   8 \textwidth = 345pt
9 \marginparsep = 11pt   10 \marginparwidth = 90pt
11 \footskip = 30pt   12 \footheight = 12pt

Figure 1: Sample LaTeX page layout

9. \marginparsep: This is the distance between the right edge of the body and the marginal notes box.

10. \marginparwidth: This is the width of the box containing marginal notes.

11. \footskip: This is the distance between the baseline of the last line in the body and the baseline of the footer box.

12. \footheight: This is the height of the box containing footer information.
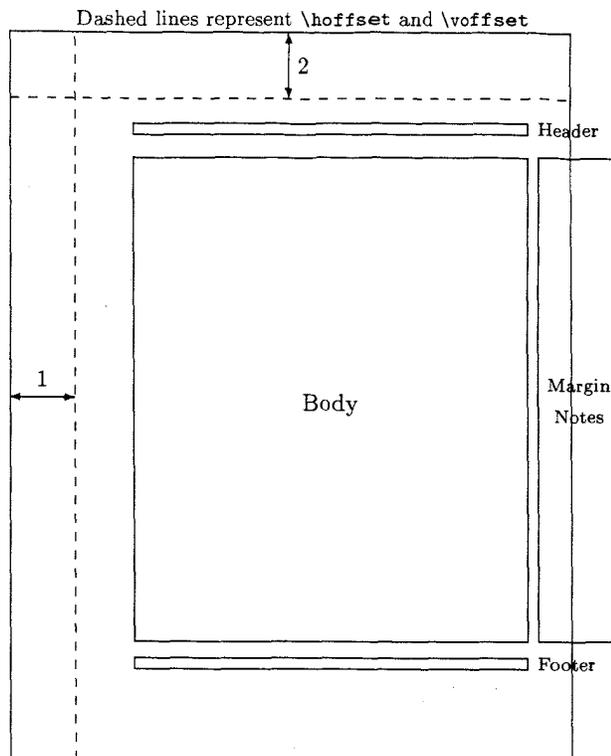
With this in mind, I have designed a substyle option that will graphically show the layout of a page based on the page layout parameters discussed above.

Dashed lines represent \hoffset and \voffset

Header

1

Body

Margin
Notes

Footer

1 \hoffset = 0pt	2 \voffset = 0pt
3 \oddsidemargin = 63pt	4 \topmargin = 27pt
5 \headheight = 12pt	6 \headsep = 25pt
7 \textheight = 528pt	8 \textwidth = 345pt
9 \marginparsep = 11pt	10 \marginparwidth = 90pt
11 \footskip = 30pt	12 \footheight = 12pt

Figure 2: Sample output from \layout
command

Dashed lines represent \hoffset and \voffset

Header

1

Body

Margin
Notes

Footer

1 \hoffset = 0pt	2 \voffset = 0pt
3 \oddsidemargin = 63pt	4 \topmargin = 27pt
5 \headheight = 12pt	6 \headsep = 25pt
7 \textheight = 528pt	8 \textwidth = 433pt
9 \marginparsep = 11pt	10 \marginparwidth = 90pt
11 \footskip = 30pt	12 \footheight = 12pt

Figure 3: Page layout with \textwidth increased
to 6 inches

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, lets 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 ≈ 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:

Dashed lines represent \hoffset and \voffset
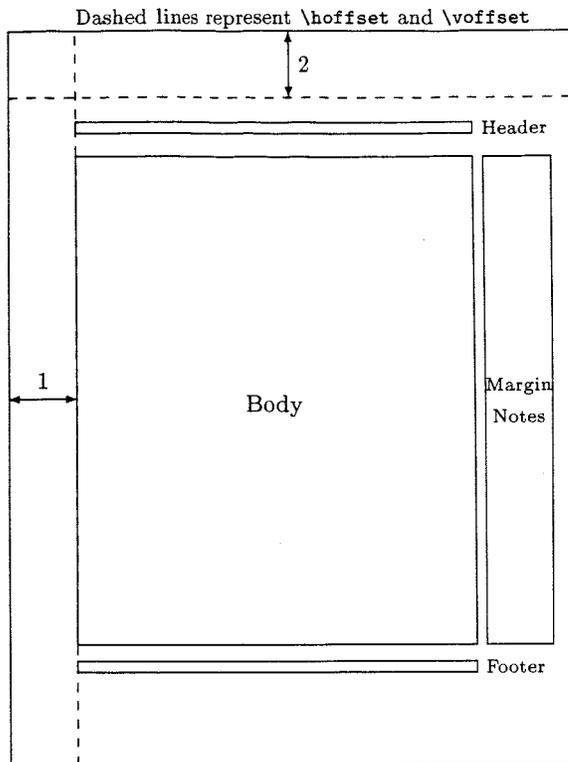
1 \hoffset = 0pt	2 \voffset = 0pt
3 \oddsidemargin = 0pt	4 \topmargin = 27pt
5 \headheight = 12pt	6 \headsep = 25pt
7 \textheight = 528pt	8 \textwidth = 433pt
9 \marginparsep = 11pt	10 \marginparwidth = 72pt
11 \footskip = 30pt	12 \footheight = 12pt

Figure 4: Properly adjusted page layout

Dashed lines represent \hoffset and \voffset
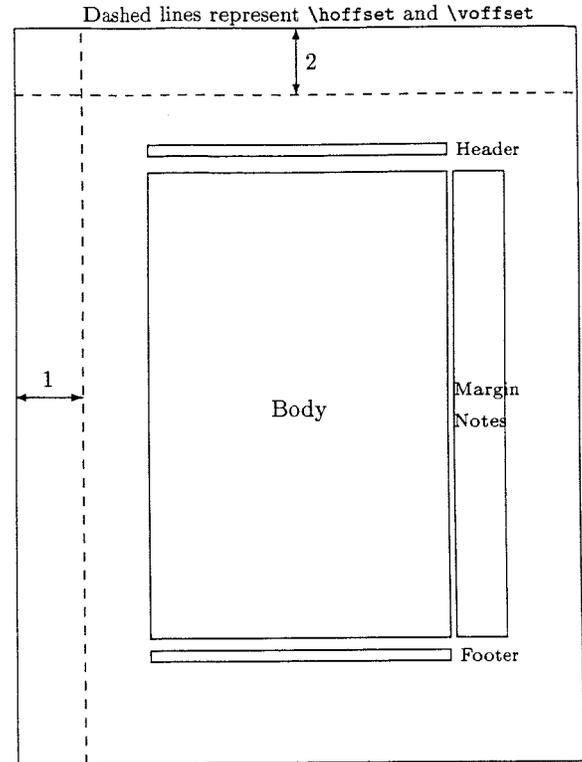
1 \hoffset = 0pt	2 \voffset = 0pt
3 \oddsidemargin = 74pt	4 \topmargin = 54pt
5 \headheight = 12pt	6 \headsep = 18pt
7 \textheight = 504pt	8 \textwidth = 325pt
9 \marginparsep = 7pt	10 \marginparwidth = 54pt
11 \footskip = 25pt	12 \footheight = 12pt

Figure 5: Page layout of 10-point book style.

- 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.

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\hofset
\newcount\vofset
\newcount\hofref
\newcount\vofref
```

```
\newcount\omargin
\newcount\omarginref
\newcount\emargin
\newcount\emarginref
\newcount\marginref
\newcount\tmargin
\newcount\hheight
\newcount\hsep
\newcount\theight
\newcount\twidth
\newcount\mparsep
\newcount\mparwidth
\newcount\fskip
\newcount\fheight
\newcount\headref
\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
%
\hofset=\hoffset
  \divide\hofset by 65536
\hofref=\hofset
\advance\hofset by \oneinch
\vofset=\voffset
  \divide\vofset by 65536
\vofref=\vofset
\vofset=\teninch
  \advance\vofset by -\vofref
%
\tmargin=\topmargin
  \divide\tmargin    by 65536
%
\hheight=\headheight
  \divide\hheight    by 65536
\headref=\teninch
  \advance\headref by -\vofref
```

```
\advance\headref by -\tmargin
  \advance\headref by -\hheight
%
\hsep=\headsep
  \divide\hsep        by 65536
%
\theight=\textheight
  \divide\theight    by 65536
\bodyref=\headref
  \advance\bodyref by -\hsep
  \advance\bodyref by -\theight
%
\fskip=\footskip
  \divide\fskip      by 65536
%
\fheight=\footheight
  \divide\fheight    by 65536
\footref=\bodyref
  \advance\footref by -\fskip
%
\omargin=\oddsidemargin
  \divide\omargin by 65536
%\omarginref=\omargin
  \advance\omarginref by \oneinch
%\advance\omarginref by \hofref
%
\emargin=\evensidemargin
  \divide\emargin    by 65536
%\emarginref=\emargin
  \advance\emarginref by \oneinch
%\advance\emarginref by \hofset
%
\twidth=\textwidth
  \divide\twidth      by 65536
%
\mparsep=\marginparsep
  \divide\mparsep     by 65536
%
\mparwidth=\marginparwidth
  \divide\mparwidth by 65536
%
\if@twoside
    \ifodd\count\z@
%
% Twosided, odd page
%
  \typeout{Two-sided document
    style, odd page.}
  \margnoteref=\oneinch
    \advance\margnoteref by \hofref
  \advance\margnoteref by \omargin
```

```
\marginref\margnoteref
\advance\margnoteref by \twidth
\advance\margnoteref by \mparsep

  \else
%
% Twosided, even page
%
  \typeout{Two-sided document
    style, even page.}
  \margnoteref=\oneinch
    \advance\margnoteref by \hofref
  \advance\margnoteref by \emargin
  \marginref\margnoteref
  \advance\margnoteref by -\mparsep
  \advance\margnoteref by -\mparwidth

    \fi
\else
%
% Not twosided, do odd page
%
\typeout{One-sided document style.}
\margnoteref=\oneinch
    \advance\margnoteref by \hofref
\advance\margnoteref by \omargin
\marginref\margnoteref
\advance\margnoteref by \twidth
\advance\margnoteref by \mparsep
\fi
Dashed lines represent
{\tt \bs hoffset} and
{\tt \bs voffset}.
\medskip
%
% Define the picture to be drawn
%
\setlength{\unitlength}{.5pt}
\begin{picture}(\eighthalfinch,\eleveninch)
\centering
\thicklines
%
% Page box and reference lines
%
\put(0,0){\framebox(\eighthalfinch,
    \eleveninch){\mbox{}}}
\put(0,\vofset){\dashbox{10}
    (\eighthalfinch,0){\mbox{}}}
\put(\hofset,0){\dashbox{10}(0,
    \eleveninch){\mbox{}}}
%
% Header
%
\put(\marginref,\headref){\framebox
    (\twidth,\hheight){\footnotesize Header}}
```

```
%
% Body
%
\put(\marginref,\bodyref){\framebox
  (\twidth,\theight){Body}}
%
% Footer
%
\put(\marginref,\footref){\framebox
(\twidth,\fheight){\footnotesize Footer}}
%
% Marginal notes
%
\put(\margnoteref,\bodyref){\framebox
  (\mparwidth,\theight)%
{\footnotesize
\shortstack{Margin\\Notes}}}
\end{picture}

\medskip
%
% Display the settings used to make
% the picture.   Note: fractional
% points are truncated, i.e.,
% 72.27pt is displayed as 72pt
%
{\tt
\begin{tabular}{l@{\hspace{20pt}}l}
\bs hoffset = \number\hofref pt &
\bs voffset = \number\vofref pt \\
\bs
    \if@twoside
      \ifodd\count\z@ oddsidemargin
      \else evensidemargin
      \fi
    \else oddsidemargin
    \fi
= \number
    \if@twoside
      \ifodd\count\z@ \omargin
      \else \emargin
      \fi
    \else \omargin
    \fi
pt & \bs topmargin = \number\tmargin pt \\
\bs headheight = \number\hheight pt &
  \bs headsep = \number\hsep pt \\
\bs textheight = \number\theight pt &
  \bs textwidth = \number\twidth pt \\
\bs marginparsep = \number\mparsep pt &
\bs footskip = \number\fskip pt &
\bs footheight = \number\fheight pt \\ [10pt]
\multicolumn{2}{c}{72pt $\approx$ 1 inch}
\end{tabular}}
}  % end of \def\layout
```