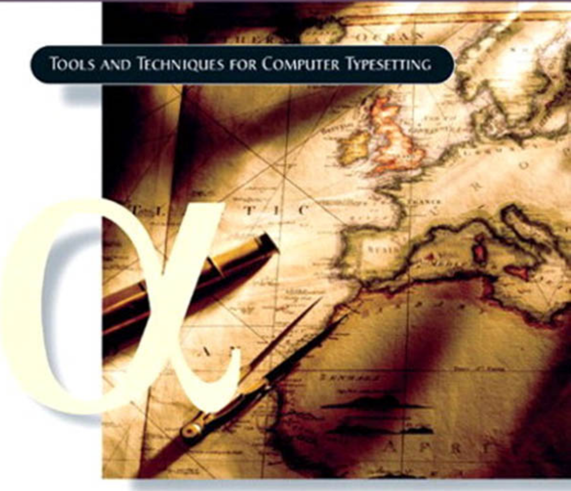
Guide to LaTeX

Fourth Edition



Tools and Techniques for Computer Typesetting

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Guide to LaTeX

Fourth Edition

When any one of `\clearpage`, `\cleardoublepage`, or `\end{document}` is given, all floats that have not yet been output will be printed on a separate page or column regardless of their placement arguments.

Package: `afterpage`

Sometimes LaTeX gets stuck on a float that holds up the entire queue until the end of the document. One way to clear the queue is to issue `\clearpage` right after the troublesome float. However, that would insert a new page at that point, something that may not be desired. The package `afterpage` in the tools collection (Section B.5.4) provides the command `\afterpage` that executes its argument at the end of the current page. Thus `\afterpage{\clearpage}` solves this problem by delaying the `\clearpage` command until the actual page break.

9.2 Postponing floats

Occasionally one wants to prevent floats from appearing on a certain page, for example, at the top of a title page. (LaTeX automatically corrects that case.) However, there are other situations in which a float should be suppressed temporarily. One might want it at the top of a page, but not before the start of the section that refers to it. The command

```
\suppressfloats[loc]
```

sees to it that *for the current page only* no further floats of the specified placement *loc* should appear. If the optional *loc* is omitted, all floats are suppressed; otherwise *loc* may be either `t` or `b`, but not both.

Note that `\suppressfloats` does not suppress all floats for the current page, but only *further* ones that come between the issuing of this command and the end of the page. Thus it is still possible for floats from a previous section to appear on the page.

Package: `flafter`

Alternatively, the package `flafter` (Section B.5.3) may be loaded to ensure that *all* floats appear only after their position in the text.

The command `\suppressfloats` and the location parameter `!` are attempts to give the author more control over the sometimes capricious actions of float placement.

9.3 Style parameters for floats

!

A number of style parameters influence the placement of floats, which may be altered by the user as desired.

`topnumber`
: The maximum number of floats that may appear at the top of a page.

`bottomnumber`
: The maximum number of floats that may appear at the bottom of a page.

`totalnumber`
: The maximum number of floats that may appear on any page regardless of position.

`dbltopnumber`
: The same as `topnumber` but for floats that extend over both columns in two-column page format.

The above parameters are all *counters* and may be reset to new values with the command `\setcounter{`*ctr*`}{`*num*`}`, where *ctr* is the name of the counter and *num* the new value that it is to take on.

`\topfraction`
: A decimal number that specifies what fraction of the page may be used for floats at the top.

`\bottomfraction`
: A decimal number that specifies what fraction of the page may be used for floats at the bottom.

`\textfraction`
: The fraction of a page that must be filled with text. This is a minimum, so that the fraction available for floats, whether top or bottom, can never be more than 1−`\textfraction`.

`\floatpagefraction`
: The smallest fraction of a float page that is to be filled with floats before a new page is called.

`\dbltopfraction`
: The same as `\topfraction` but for double-column floats in two-column page format.

`\dblfloatpagefraction`
: The same as `\floatpagefraction` but for double-column floats in two-column page format.

These style parameters are altered with `\renewcommand{`*cmd*`}{`*frac*`}` where *cmd* stands for the parameter name and *frac* for the new decimal value, which in every case must be less than 1.

`\floatsep`
: The vertical spacing between floats appearing either at the top or at the bottom of a page.

`\textfloatsep`
: The vertical spacing between floats and text, for both top and bottom floats.

`\intextsep`
: The vertical spacing above and below a float that appears in the middle of a text page with the `h` placement argument.

`\dblfloatsep`
: The same as `\floatsep` but for double-column floats in two-column page format.

`\dbltextfloatsep`
: The same as `\textfloatsep` but for double-column floats in two-column page format.

This group of style declarations are rubber lengths that may be changed with the `\setlength` command (Section 2.4.2).

`\topfigrule`
: A command that is executed after a float at the top of a page. It may be used to add a rule to separate the float from the main text. Whatever it adds must have zero height.

`\botfigrule`
: Similar to `\topfigrule`, but is executed before a float that appears at the bottom of a page.

`\dblfigrule`
: Similar to `\topfigrule`, but for double-column floats.

These three commands normally do nothing, but they may be redefined if necessary. For example, to add a rule of thickness 0.4 pt below a top float,

```
\renewcommand{\topfigrule}{\vspace*{-3pt}
  \rule{\columnwidth}{0.4pt}\vspace{2.6pt} }
```

Because of the negative argument in `\vspace*`, the total vertical spacing is zero, as required.

All the one-column style parameters also function within the two-column page format, but they apply only to floats that fill up one column.

If the style parameters are set to new values within the preamble, they apply from the first page onwards. However, if they are changed within a document, they do not take effect until the next page.

9.4 Float captions

A figure caption or table title is produced with the command

`\caption[`*short_title*`]{`*caption_text*`}`

inside the `figure` or `table` environment. The *caption_text* is the text that is printed with the float and may be fairly long. The *short_title* is optional and is the text that appears in the list of figures or tables (Section 3.4.4). If it is missing, it is set equal to *caption_text*. The *short_title* should be given if the *caption_text* is longer than about 300 characters or if it is more than one line long.

In the `table` environment, the `\caption` command generates a title of the form 'Table *n*: *caption_text*', and in the `figure` environment 'Figure *n*: *caption_text*', where *n* is a sequential number that is automatically incremented. In document class `article`, the figures and tables are numbered from 1 through to the end of the document. For the `report` and `book` classes, they are numbered within each chapter in the form *c.n*, where *c* is the current chapter number and *n* is the sequential number reset to 1 at the start of each chapter. Figures and tables are numbered independently of one another.

The `\caption` command may be omitted if numbering is unwanted, since any text included in the *float* environment will accompany the contents. The advantages of `\caption` over simple text are the automatic numbering and entries in the lists of figures and tables. However, a manual entry in these lists may be made as described in Section 3.4.4 using

`\addcontentsline` and `\addtocontents`

A *title*, or *headline*, is produced with `\caption` when the command comes at the beginning of the material in the *float* environment: The number and text are printed above the table or figure. A *caption* is added below the object if the command comes

Table 9.1: Computer Center Budget for 2004

Nr.	Item	51505	52201	53998	Total
1.1	Maintenance	130 000		15 000	145 000
1.2	Network costs	5 000		23 000	28 000
1.3	Repairs	25 000	6 000		31 000
1.4	Expendables		68 000		68 000
1.	Total	160 000	74 000	38 000	272 000

after all the other float commands. In other words, the `\caption` is just another item within the float, and whether its text appears at the top (as *title*) or below (as *caption*) depends on how the user places it.

The *caption_text* will be centered if it is shorter than one line, otherwise it is set as a normal paragraph. The total width may be adjusted to that of the table or figure by placing the command inside a parbox or minipage. For example,

```
    \parbox{width}{\caption{caption_text}}
```

The following demonstrations contain further examples of how text, table, and picture commands may be combined in floats.

9.5 Float examples

The first two tables are produced with the following texts:

```
\begin{table} \caption{Computer Center Budget for 2004}
  \begin{tabular}{|l|l||r|r|r|r|} ... ...  \end{tabular}
\end{table}
```

(This text was typed in before the last paragraph of the previous section. The second table is entered here in the current text.)

```
\begin{table}
  \caption{\textbf{Estimates for 2004} \emph{A continuation...}}
  \begin{tabular}{|l|l||r|r|r|r|} ... ... ... \end{tabular}
\end{table}
```

Because the placement argument is missing from the `table` environments, the standard values `tbp` are used. The first was placed at the top of this page because it was typed in early enough (during the last section) for there still to be room for it there. Then the command `\suppressfloats` (Section 9.2) was issued to prevent any more floats appearing on the same page. The second table is therefore forced to float to the top of the next page.

Narrow figures or tables may be set beside each other, as shown in the following example (which appears at the bottom of the next page). (The `picture` environment is explained in Chapter 16.)

Table 9.2: Estimates for 2004. *A continuation of the previous budget is no longer practical since, with the installation of the new computing system in 2003, the operating conditions have been completely overhauled.*

Nr.	Item	51505	52201	53998	Total
1.1	Maintenance	240 000			240 000
1.2	Line costs	12 000	8 000	36 000	56 000
1.3	Training			50 000	50 000
1.4	Expansion	80 000	3 000		83 000
1.5	Expendables		42 000		42 000
1.	Total	332 000	53 000	86 000	471 000

```
\begin{figure}[b]
\setlength{\unitlength}{1cm}
\begin{minipage}[t]{5.0cm}
\begin{picture}(5.0,2.5) ... ... \end{picture}\par
\caption{Left}
\end{minipage}
\hfill
\begin{minipage}[t]{6.0cm}
\begin{picture}(6.0,3.0) ... ... \end{picture}\par
\caption{Right}
\end{minipage}
\end{figure}
```

The two figures along with their captions are each set in a `minipage` environment of widths 5 and 6 cm. The minipages are separated from one another by an `\hfill` space. The positioning argument `t` has the effect that the minipages are aligned along their first lines (Section 5.1.3). The entire structure within the `figure` environment floats as a single entity.

The question might now arise as to why, since the two figures have unequal heights and are supposedly aligned vertically along their top lines, their bottom edges are at the same level. The explanation is that a `picture` environment establishes an LR box (Section 5.1.1) to contain all the picture commands, and that is viewed by LaTeX

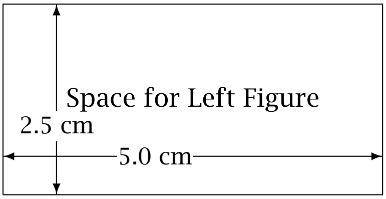


Figure 9.1: Left

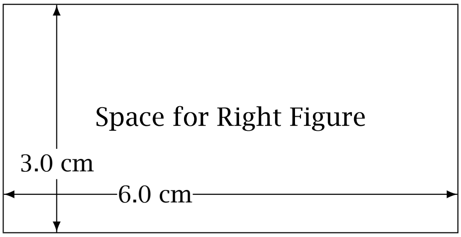


Figure 9.2: Right

as a single line of output text with the baseline at the bottom edge of the picture. In both minipages, the `picture` environment is the first entry and is therefore the first logical line of text. These baselines are taken for the vertical alignment of the minipages.

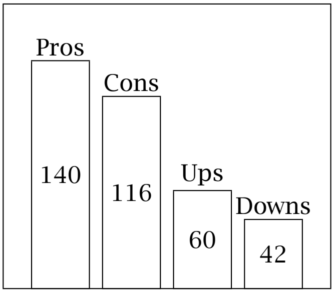
If the two pictures were to be aligned along their top edges, it would be necessary to include a dummy first line (Section 5.1.4) in each minipage before the `picture` environments. This could be something like `\mbox{}`, for example.

The application of box commands within a float permits completely free positioning. If the caption text is to appear, say, beside the table or figure, instead of above or below it, the objects may be put into minipages or parboxes with suitable alignment arguments. Here is an example:

```
\begin{table}[b]
  \centerline{\bfseries Results and Seat Distribution of the...}
  \mbox{\small
  \begin{minipage}[b]{7.7cm}
    \begin{minipage}[t]{4.4cm}
      \mbox{}\\ \setlength{\unitlength}{0.75cm}
      \begin{picture}(5.75,5.0) ... ... ... \end{picture}
    \end{minipage} \hfill
    \parbox[t]{3.2cm}{\makebox[0cm]{}\\{\bfseries Seat ...} ...}
  \end{minipage}
  \hspace{-3cm}
  \begin{minipage}[b]{7cm}
    \parbox[b]{2.5cm}{{\bfseries Results:}\\ General Election..}
    \hfill
    \begin{tabular}[b]{|l||r|r|} ... ... \end{tabular}
  \end{minipage} }
\end{table}
```

Here the vertical boxes are nested inside one another. The left side, consisting of graphics and a title at the upper right, is contained in a minipage of width 7.7 cm, in which the picture is in another minipage of width 4.4 cm while the text is in a parbox of width 3.2 cm. Both are aligned with the top lines. A dummy line containing `\mbox{}` (Section 5.1.4) is added before the first `picture` to provide a top line with which the second parbox can be aligned.

Results and Seat Distribution of the 2003 General Election



Seat Distribution
in the Assembly of
2004–2006

Results:
2003 General
Election

Party	Votes	%
Pros	15 031 287	37.7
Cons	12 637 418	31.7
Ups	6 499 210	16.3
Downs	4 486 514	11.3
Others	1 201 078	3.0