



LaTeX

Introduction

LaTeX is a word processing (or, more accurately, a typesetting) program. It typesets a file of text using the TeX program and the LaTeX Macro package for TeX. To be more specific, it processes an input file containing the text of a document with interspersed commands that describe how the text should be formatted.

Unlike many word processing programs, which concentrate on formatting material on the page (often called WYSIWYG, for "what you see is what you get"), LaTeX tries to concentrate on "content." LaTeX is a Generalized Mark-up Language macro package for the TeX typesetting program. That is, one specifies the structure: sections, title, appendix, authors' names, etc., which bear little relation to how this will look on a page.

TeX/LaTeX produces as output a Device Independent (*.dvi) file that contains commands that can be translated into commands for a variety of output devices. It also produces a transcript or log (*.log) file that contains summary information and diagnostic messages for any errors discovered in the input file and an auxiliary (*.aux) file which contains cross reference information for Tables, citations, etc. It is sometimes necessary to run LaTeX twice so that it has correct cross reference information, especially when modifications have changed the numbering.

Version and Compatibility

The current versions available here at USC are LaTeX 2e and TeX 3.14159. Documents written in earlier versions of LaTeX are compatible with the current release. Documents that use specific style packages for earlier releases may not be available much longer (e.g., fancy headings, a4wide etc.). To use these older styles type the following command at the UNIX prompt:

```
% setenv TEXINPUTS ./usr/usc/tex/  
phase-out:/usr/usc/tex/unsupp
```

You can also add this command to your .login file so that it gets executed every time you log in.

Starting a Document

LaTeX will change text into a formatted document, if the text document is outfitted with the proper tags (also called commands) that frames the content of the document. The text documents should be prepared in a text editor, such as Pico or Emacs, and be saved with a .tex extension.

```
\documentclass{article}  
<insert preamble>  
\begin{document}  
<insert the document body>  
\end{document}
```

The document class type (in the example above, article) affords different, pre-formatted options based on the type of document you wish to prepare. Other possible document class types include: letter, book, and report.

The preamble is used to specify global settings for the current document (e.g., paper size, margins, etc.) and the main content your document fits within the document body.

The document body is the location where text is entered so that it can be formatted. This is also the location where you can include several preformatted sections within your document, called environments.

Processing

After the text file is prepared and saved, it has to be processed into a Device Independent File (DVI). A DVI file is a representation of the formatted text where the type and position of each character is specified independent of any specific hardware characteristics. To process the text file, at the UNIX prompt, type **latex <file>.tex**, where <file> is the name you gave to the text file.

This will produce at least two files. One is the DVI file called <file>.dvi and the other is a log file called <file>.log. Other files can be produced as well, with extensions such as .toc for table of contents, .lof for list of figures, and .lot for list of tables. The most important file produced is the .dvi file as the DVI file is required for printing.

Printing

To print LaTeX documents, a DVI file is required (see previous section). Before the document can be printed it has to be converted into a PostScript file. Type `dvips <file>.dvi -o <file>.ps` at a UNIX prompt. This will generate a Postscript file called `<file>.ps`. This file can now be sent to any Postscript printer. Available Postscript printers can be found by using the `printers` command. To print, type `lpr -P<printername> <file>.ps` at a UNIX prompt. For more information about PostScript printing from the Unix prompt, please see <http://www.usc.edu/isd/doc/os/unix/commands/print.html>.

Previewing

Sometimes, you may want to preview the document before sending it to the printer. This is easily accomplished and again requires the DVI file. Additionally, you must be working in a windowing environment such as XWindows or OpenWindows. To view the document, type `xdvi <file>.dvi` at the UNIX prompt.

You can also preview the document using GhostView or Ghostscript Previewer with the PostScript file generated by the `dvips` command. Please refer to the man pages on `gv` or `gspreview` for more information.

Including Encapsulated Postscript Files

LaTeX 2e allows Encapsulated Postscript (EPS) files to be included within a LaTeX document. There is one prerequisite before this can be done. The `\usepackage{graphics}` command has to be declared in the preamble. Once that is included, the command `\includegraphics` can be placed anywhere within the current document's body. For example, the following LaTeX file could be used to include the EPS file, `<file>.eps`, in the current document:

```
\documentclass{article}
\usepackage{graphics}
\begin{document}
This is a sample text and image.
\includegraphics{<file>.eps}
\end{document}
```

Using American Mathematical Society (AMS) Extensions

The AMS extension to LaTeX is called `amstex` and is

available together with the LaTeX distribution. To use this package add the extension as a package in the preamble (between the `documentclass` and the `begin` commands):

```
\documentclass{article}
\usepackage{amstex}
\begin{document}
```

Including Figures in LaTeX Documents

To create a figure in a LaTeX document, use the `\begin{figure}` and `\end{figure}` command anywhere in the document body. All figures are automatically numbered within the document and you are allowed to place anything as a figure including pictures, images, equations, text etc.

Itemizing and Enumerating

Itemizing and enumerating are both examples of environments, as introduced in the "Starting a Document" section above.

To itemize a list using bullets, use the `\begin{itemize}` and `\end{itemize}` commands. To produce a numbered list, use `\begin{enumerate}` and `\end{enumerate}`. For example:

```
\begin{itemize}
\item Item 1
\item Item 2
\item Item 3
\end{itemize}
```

In the above entry, your output would be a bulleted list with three items (Item 1, Item 2, Item 3), where each bullet corresponds to `\item`.

Getting Help

If you plan to do a significant amount of work using LaTeX, you should consider purchasing a book. Here are a couple of suggestions:

LaTeX User's Guide and Reference Manual by Leslie Lamport

The LaTeX Companion by Goossens, Mittelbach & Samarin

If you have further questions, call the Customer Support Center at (213) 740-5555 or e-mail consult@usc.edu.