

A Brief Introduction to LaTeX

Marie desJardins
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LaTeX is a text processing system that uses an embedded command language in plain text to generate a formatted document. LaTeX has excellent support for mathematical formulas and references, and is usually easy to use for people who are comfortable with programming languages. LaTeX is *not* a WYSIWYG (“What You See Is What You Get”) word processor. However, it is (in my opinion) much more powerful and flexible than most WYSIWYG systems, including Microsoft Word. In particular, it is much easier to typeset mathematical equations and to position figures in LaTeX than in Word (although LaTeX does have its own idiosyncracies when it comes to figures). It is also the standard word processing system for publishing in most computer science conferences and journals. Many conferences provide only latex templates for producing formatted papers. LaTeX also works in conjunction with BibTeX, which automatically selects and formats bibliographic references, and produces in-line citations from your own database file of references. (We’ll get to BibTeX a bit later in the semester.)

You are not required to use LaTeX for all of your 601 assignments, but certain of the longer assignments must be done in LaTeX using specific styles. I **highly** recommend that you use LaTeX as often as possible, so that you become comfortable with it. You will be glad you learned LaTeX later.

1 Running LaTeX

LaTeX runs (at least) on the cs and gl linux machines. You can also find freeware versions of latex for both Windows and Mac platforms. The easiest way to create a latex file is to use emacs (or any other text editor—though if you don’t already know emacs, that’s also worth investing some time to learn). There is a very simple sample file on the class website, in the file `sample.tex`. Here’s how you produce a typeset document from this file (after copying it into your own directory). (`pdflatex` is a program that produces a PDF file directly from the latex source. This is much easier to use than the previous method, which involved running latex to produce a `.dvi` file, then `dvips` to produce a postscript file, and possibly `ps2pdf` if you wanted a final pdf file. Some freeware installations may operate differently.)

```
% pdflatex sample
% acroread sample.pdf
```

The most difficult part of LaTeX is getting it to include figures properly. There are several packages, but I usually use `graphics` and `graphicx`, which support several file formats, including encapsulated postscript and `jpg`.

2 Example Files

Here's what the `sample.tex` file looks like:

```
\documentclass{article}

\title{Title of My Document}
\author{My Name Goes Here}

\begin{document}
\maketitle

Hello, world!

{\em Hello, world!}

{\bf Hello, world!}

{\Large \bf Hello, world!!!}
\end{document}
```

The `\documentclass{article}` command on the first line of the file tells LaTeX that this is in fact a LaTeX document, of class “article.” (There are other document classes, such as `report` and `book`, but typically you’ll use the `article` class.)

The lines after the `\documentclass` command and before the beginning of the document are called the *preamble*. The preamble includes any initialization commands and general specifications for the document style. In this file, the preamble just contains the title and author commands, on the next two lines. You can also specify, in the preamble, the date you want to appear on the document, using the command `\date{Your Preferred Date}`, or leave the date blank using `\date{}`; if no date is specified, LaTeX will use today’s date.

Now the body of the document starts; this is signaled to LaTeX by the `\begin{document}` command. The first command within the document body is `\maketitle`, which uses the title and author defined in the preamble to create a title section in the output file.

After the title is the rest of the document: in this case, four paragraphs (which are delineated by blank lines), each greeting the world in a different style: normal, emphasized (i.e., italic), boldface, and large boldface. Note that the font-changing commands and text to be changed are enclosed in curly braces `{}`; these delineate the scope of the font-changing commands.

The last line of the file, `\end{document}`, tells LaTeX that the body of the document is complete.

That’s it!

This file (that is, the one you're reading now) is also on the website, in `latex.tex`.

3 Resources

The standard LaTeX reference book is *LaTeX: A Document Preparation System, 2/e*, Leslie Lamport, Addison-Wesley, 1994, ISBN 0-201-52983-1.

Here are several useful websites.

- LaTeX Project home page:
<http://www.latex-project.org/>
 - LaTeX Project FAQ:
<http://www.tex.ac.uk/cgi-bin/texfaq2html?introduction=yes>
- CTAN: the Comprehensive TeX Archive Network:
<http://www.ctan.org/>
- Peter Flynn's "Formatting Information" (guide to basic LaTeX):
<http://latex.silmaril.ie/formattinginformation/>
- The AMS "Short Math Guide for LaTeX," which includes every mathematical symbol you ever wanted to produce, and more:
<ftp://ftp.ams.org/pub/tex/doc/amsmath/short-math-guide.pdf>
- "Simplified LaTeX," a beginner's guide with a nice tutorial section at the beginning:
<http://tug.ctan.org/get/info/simplified-latex/simplified-intro.ps>
- "LaTeX/Important Graphics," an introduction to the `graphicx` package in LaTeX:
http://en.wikibooks.org/wiki/LaTeX/Importing_Graphics