A Brief Introduction to LaTeX

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LaTeXis a text processing system that uses an embedded command language in plain text to generate a formatted document. LaTeXhas excellent support for mathematical formulas and references, and is usually easy to use for people who are comfortable with programming languages. LaTeXis *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.

1 Running LaTeX

LaTeXruns (at least) on the gl linux machines and should run on the cs machines. The easiest way to create a LaTeXfile is to use emacs (you may use any other text editor, but emacs is very LaTeXfriendly). 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).

```
% latex sample
% xdvi sample
% dvips -P pdf -G0 -t letter -o sample.ps sample.dvi
% ghostview sample.ps
```

The command `latex` processes the input `.tex` file, producing an output `.dvi` file. You can view this file on your screen using `xdvi`. If it looks the way you want it to, you can convert it to a PostScript file using the `dvips` command, with the switches shown in the script above. Now take a look at the PostScript file using `ghostview`. You may also convert a `.ps` file to an Adobe Acrobat file (`.pdf`) by:

```
% ps2pdf sample.ps sample.pdf
```

If the document (either `.ps` or `.pdf`) looks the way you want it, you may print it out using the respective viewer or simply use `lpr` on the `.ps` file.

```
% lpr sample.eps
```

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!!}

{\tiny \bf Hello, world!!!}

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

The `\documentclass{article}` command on the first line of the file tells LaTeXthat this is in fact a LaTeXdocument, 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, LaTeXwill use today's date. To not include a date, you can use the command `\nodate`.

Now the body of the document starts; this is signaled to LaTeXby 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, five paragraphs (which are delineated by blank lines), each greeting the world in a different style: normal, emphasized (i.e., italic), boldface, small 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 LaTeXthat the body of the document is complete.

That's it!

All exams for this course are formatted in LaTeX. Along with the first assignment, the `ex1.tex` source, which contains solutions to the examples discussed in the first lecture, will be available for download. You may use this template for formatting your homework assignments or create any template you would like.

Strictly speaking, you are not required to format your problem set solutions in LaTeX(although you are required for Problem Set 1), but as far as I can tell, LaTeXis the best available system for generating mathematical and technical documents. If you cannot tell by now, I highly recommend using LaTeXfor CMSC 203 and future mathematically oriented courses (e.g., CMSC 441, CMSC 471). **You are required to typeset your problem set solutions, so if you choose not to use LaTeXyou assume all responsibility for poorly formatted mathematical notation that may be subject to grade reductions**. Your solutions must be typeset, printed on 8.5×11 white paper, and turned in in hard copy format at the beginning of class on their due date.

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

3 Resources

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

Here are several useful websites. I will post these on the course resource page.

- LaTeXProject home page:
  `http://www.latex-project.org/`
  - LaTeXProject FAQ:
    `http://www.tex.ac.uk/cgi-bin/texfaq2html?introduction=yes`
- CTAN: the Comprehensive TeX Archive Network:
  `http://www.ctan.org/`
- Peter Flynn's "Beginner's LaTeX" guide to basic LaTeX:
  `http://www.silmaril.ie/downloads/documents/beginlatex.pdf`
- The AMS maintains several widely used extensions of LaTeX. The `amsmath` part provides just about every math symbol you can imagine, and more:
  `http://www.ams.org/tex/amslatex.html`
- "Simplified LaTeX," a beginner's guide with a nice tutorial section at the beginning:
  `http://www.ctan.org/tex-archive/info/simplified-latex/`

- In order to run LaTeXon your own computer, you will need to install TeX and LaTeX. I haven't tried to download it, but a number of freeware and shareware implementations are available. You can look through the CTAN or LaTeXProject websites above for pointers. If you're running Windows, you might want to try this TeX/LaTeXimplementation, which looks promising: `http://www.miktex.org/` .

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