Administrivia

- Readings for last week, and Homework 5, on Web. Homework 5 due April 11.
- FYI: Answers to non-opinion minute essay questions available in notes on Web.

What are \TeX and \LaTeX?

- \TeX — program for typesetting mathematics, developed by Knuth (1978) for his book *The Art of Computer Programming* and made freely available.
- \LaTeX — extensive set of macros for \TeX written by Lamport (1985), that provide functionality needed for scholarly papers. Extended over the years by many people.
- These are “text formatters” not “word processors”, and as such don’t include a built-in editor.
- Basic idea — you write “source code” for your document (text and markup) with a text editor, then use \TeX or \LaTeX to turn it into a formatted document.
- Both available in zero-cost form for many platforms. Included in complete Linux distributions (as far as I know).
Basics (Under Unix)

- You write “source” (foo.tex) with a text editor — includes your text plus “logical markup” — e.g., \section{A Section Heading}.

  (What about checking spelling? Use a separate tool — “each program should do one thing, and do it well.” ispell and aspell are common ones.)

- You use the command latex to generate a .dvi file, then dvips to generate PostScript, then (if desired) convert to PDF with ps2pdf.

  (Supposedly you can also go directly to PDF with pdflatex. I haven’t tried it.)

- There are also several tools to convert to HTML. I use latex2html, but there are others.

Isn’t That a Lot of Trouble?

- In some ways, yes — there is a learning curve, and there are many “gotchas”.

- For some jobs (where visual layout matters more than logical structure), LATEX is probably the wrong tool.

- But if you persevere ...
Why It Might Be Worth the Trouble

- Output looks good — math in particular.
- Logical structure of document is clearly spelled out. (You can do this with, e.g., MS Word, but it’s less transparent.)
- Cross-referencing, bibliographic references, footnotes, tables of contents, indexing, etc., “just works”.
- Documents are stable — only way to “corrupt” a document is to mess up with your text editor. Very old documents usually still compile, and if they don’t the content is still accessible.
- Once you figure out how to do a particular trick, it’s there in the .tex source for future reference.

Basics, Continued

- LaTeX provides a small set of “document classes” — article, report, book, etc. These classes group definitions for section headers, lists, etc., in a way that everything looks good together. Also can have “packages” that group together related customizations, provide extra features.
- Basic document structure (look at example):
  - \documentclass[options]{foo}
  - Additional global definitions, packages, etc.
  - \begin{document}
  - Your text. “Paragraphs” continue until first blank line.
  - \end{document}
Some Features

- “Sectioning commands” provide consistent layout and automatic numbering. Also allows collecting info to make table of contents.
- “Environments” provide support for lists (bulleted and numbered), tables, centered text, “verbatim” (equivalent of HTML preformatted text), etc.
- Macros provide simple markup, e.g., \textit{foo}.
- Math — a bit cryptic, but IMO not worse than point-and-click equation editor. Support for (automatically) numbered equations.

More Features

- Graphics in EPS form can be included (and scaled nicely). I use xfig to draw pictures — old, but nice integration with \LaTeX. There are other tools.
- Figures and tables can “float” (\LaTeX will put them where they fit). Also footnotes.
- Lots of cross-referencing features — declare symbolic label (for section, figure, etc.) with \label{foo}, reference with \ref{foo}.
- Support for bibliography / list of references — usually use companion package Bib\LaTeX.
- Support for indexes. (Also glossaries, through add-on packages.)
- Facilities to define your own “commands” and “environments”. Makes it easy to get consistent formatting; also allows shorthand.
Gotchas

- Some characters have special meaning and must be “escaped”: backslash, brackets, #, %, <, >, |, caret (^), underscore (_), tilde (~).
- Quotation marks should be entered as "foo". Dashes should be entered as -- or ---.

Advice For Getting Started

- Get hold of an example that looks somewhat similar to what you want to produce, plus some sort of documentation — a guide from online or a book.
- Tinker with the example, putting in your prose and other stuff.
- When something doesn’t work, ask a local expert.
- (How many of you have tried \LaTeX? What did you like/dislike?)
Minute Essay

- What do you currently use to produce formatted documents? What do you like/dislike about it?
- How are you finding the homework so far? easy / difficult? useful? interesting?
- Reminder: Homeworks 1 and 2 due today at 5pm. Homeworks 3 and 4 due next Monday.