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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.

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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).

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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.

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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 . . .

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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.

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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}`

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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.

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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 BibTeX.
- 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.

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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 `---`.

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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?)

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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.