

### Administrivia

- Reminder: Homework 5 due today.
- Homeworks 6 and 7 on Web; due next Monday and Wednesday respectively.

Slide 1

### What are T<sub>E</sub>X and L<sup>A</sup>T<sub>E</sub>X?

- T<sub>E</sub>X — program for typesetting mathematics, developed by Knuth (1978) for his book *The Art of Computer Programming* and made freely available.
- L<sup>A</sup>T<sub>E</sub>X — extensive set of macros for T<sub>E</sub>X 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 T<sub>E</sub>X or L<sup>A</sup>T<sub>E</sub>X 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).

Slide 2

### Basics (Under UNIX)

Slide 3

- 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`.  
(You can also go directly to PDF with `pdflatex`.)

### Isn't That a Lot of Trouble?

Slide 4

- 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),  $\text{\LaTeX}$  is probably the wrong tool.
- But if you persevere . . .

### Why It Might Be Worth the Trouble

Slide 5

- 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

Slide 6

- $\LaTeX$  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

Slide 7

- “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.
- Graphics in EPS form can be included (and scaled nicely). I use `xfig` to draw pictures — old, but nice integration with  $\text{\LaTeX}$ . There are other tools. (EPS is traditional, but `pdflatex` prefers other formats.)

### More Features

Slide 8

- Figures and tables can “float” ( $\text{\LaTeX}$  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.

### More Features / Add-Ons / Tools

Slide 9

- Tools to convert  $\LaTeX$  source to HTML. (I use `latex2html`; there are others.)
- Document classes for producing “slides”. (I use `seminar`; there are others.)
- Tools for editing  $\LaTeX$  source. Support in both `emacs` and `vim` (`auctex` and `vimlatex` respectively). Also GUI frontends. See “useful links” page.

### Gotchas

Slide 10

- Some characters have special meaning and must be “escaped”: backslash, brackets, `#`, `%`, `<`, `>`, `|`, caret (`^`), underscore (`_`), tilde (`~`).
- Quotation marks should be entered as `` ` f o o ''`. Dashes should be entered as `--` (“en dash”, suitable for connecting numbers, e.g., 1–100) or `---` (“em dash” — between words).

### 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  $\text{\LaTeX}$ ? What did you like/dislike?)

Slide 11

### Minute Essay

- What do you currently use to produce formatted documents? What do you like/dislike about it?

Slide 12