Super-quick LaTeX Intro for CS109

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1 Intro

LaTeX is a very powerful typesetting system. It's like a word-processor on steroids. It produces *beautiful* looking type, and does so in an elegant way. Learn more about it over at `http://www.latex-project.org/` and `http://en.wikibooks.org/wiki/LaTeX`. The basic idea is that you work on documents like you would a program; that is, you work on *source*, and then "compile" it into a multitude of formats (pdf, html, etc.). It is also *the* way CS research papers are written these days.

For the CS student, it poses many advantages over other type-setting systems, including the old pen and paper. In my opinion, some big bonuses are:

1. it looks very professional (and awesome)

2. Writing things out is messy: pencil and ink very quickly turn into mush.

3. Changing answers is easy, no need to erase everything and start over.

4. Its code! Problem Sets are much friendlier when they compile!

5. You can Version Control it.

6. If you already type things out, LaTeX will make your life easier, by separating view from content, letting you focus on (super-portable) content.

I could go on and on, but you'll likely find more convincing, better arguments about it on the web.

Be warned, however, that LaTeX is a bit complicated to use, and it has a learning curve. So if you definitely want to try it out, allot some time to learning it and actually typing things out. Get your LaTeXenvironment setup now, and try it out with the first problems. Then you can decide whether you'll stick with it for the rest of the problem set or not.

To help you get started, we've provided the source to this intro and the first problem set questions. The next sub-section gives some pointers for installation. The rest of this intro tries to give you basic examples of how to mark up various things.

1.1 Installing LaTeX

1.1.1 Linux/BSD

LaTeX is most-likely available in your favorite package manager. For Debian/Ubuntu:

```
sudo apt-get install texlive
```

1.1.2 Mac

Install MacTex. MacText is a *huge* package, but you only really need a subset of it. Go over to the Smaller Packages (`http://www.tug.org/mactex/morepackages.html`) section, and download BasicTeX. Your workflow will look like:

1. Write things into a `file.tex`

2. compile into a pdf from a shell with: `pdflatex file.tex`

3. view `file.pdf` with Preview! (you can keep it open, it updates when changed)

1.1.3 Windows

I don't have good pointers, but check out `http://stackoverflow.com/questions/270121/best-latex-editor-for-windows`

2   Sections!

The rest of this intro just displays some simple constructs. Check out the source to see how to do it!

2.1   Subsection

blah blah blah blah blah blah blah blah blah blah blah blah blah

2.1.1   sub-subsection

blah blah blah blah blah blah blah blah blah blah blah blah blah

3   Paragraphs

some text some text some text some text some text some text some text some text some text some text some text some text some text some text some text some text some text.

With a heading   some text some text some text some text some text some text some text some text some text some text some text some text some text some text some text some text some text.

4   Lists

4.1   Bulletted

- item
- item
- sub list:
  - item
  - item

4.2   Enumerated

1. item
2. item
3. sub list:
   (a) item
   (b) item

4.3   Mixed

- item

- item

- sub list:

  1. item
  2. item

5   Math

5.1   math mode

LATEXuses "math mode" to insert mathematical equations or symbols. For mathematical expressions inlined, use \$ ... \$: $5a + 3b = 65$. For mathematical expressions in their own line:

$$5a + 3b = 65$$

For multiple-lined (aligned) mathematical expressions use:

$$A = 5A + 5 + 5 + 10$$
$$6A = 20$$
$$A = \frac{20}{6}$$

5.2   useful symbols

- Sums: $\sum_{i=0}^{n} i$ and $\displaystyle\sum_{i=0}^{n} i^2$ (displaystyle essentially makes it larger)

- Product: $\prod_{i=0}^{n} i$ and $\displaystyle\prod_{i=0}^{n} i^2$

- Choose: $\binom{n}{k}$ and $\displaystyle\binom{n}{k}$

- big fractions: $\dfrac{\sum_{i=0}^{n} abcdefghi}{\prod_{j=0}^{n} j^2}$