LaTeX: A Radically New Way to Type a Thesis

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Until the 1980s, it was customary for each graduate student to hire a typist to type the final version of his or her thesis. Nowadays, most students do their own typing, usually with software designed for typing business letters, and often with surprisingly messy results.

There is a better way. TeX (pronounced "tekh"; the X is actually a greek chi) is a computer typesetting system designed by Donald Knuth of Stanford University; LaTeX ("lay-tekh") is a layout system that runs on top of TeX. LaTeX is based on the following key ideas:

- **The author's job is separate from the typist's.** The author supplies words, paragraphs, chapters, etc.; the typist arranges the material on the page in a standard format. Authors shouldn't have to count lines or measure margins.

- **The typist's job is done by a computer program.** In LaTeX, a program called a *style sheet* determines the layout to be used for any particular document. For instance, this paper was printed with the `article` style sheet with `12pt`, `twocolumn`, and `fullpage` options. At the top, I typed

```
\title{\LaTeX: A Radically
New Way to Type a Thesis}
```

and LaTeX automatically centered the title in the standard way. If I had been using the `report` style sheet, I would have gotten a title page.

The University distributes a style sheet, `uga.sty`, that makes LaTeX automatically follow the prescribed format for University of Georgia theses.

- **Printed output is *perfect,* equal to the best printed books.** That is, your printouts will not look like the output of a cheap word processor. Indeed, the book industry uses LaTeX extensively. If you are typing things like

$$\frac{\aleph_{25}}{\Lambda} = \frac{\int_a^b f(x_\gamma)dx}{\sum_{i=a}^b g(i_\gamma)}$$

you will probably find that nothing but LaTeX will do the job.

- **LaTeX is *free, portable,* and *stable.*** That is, you can get it free of charge; it has been ported to numerous kinds of computers (PC, Macintosh, Sun) and runs identically on all of them, producing exactly the same output; and you

are not expected to get a new version every few months.

Portability and stability are important because:

- The effort you invest in learning LaTeX will not become obsolete;

- You can do long-term research projects without having to change word processors or file formats;

- You can share files with people all over the world and submit articles and books to major scientific publishers in LaTeX.

Contrast that with Microsoft Word, which comes out with a new (incompatible) version every year or so; files are not even compatible between Word 95 and Word 97.

Right now, the LaTeX community is making a gradual transition from LaTeX 2.09 to LaTeX 2_ε, which are the only two versions that have ever been distributed. Eventually there will be a LaTeX 3, but not very soon.

On the negative side, **LaTeX is not very user-friendly**; it's designed for people who are already computer-literate. This is partly because it's portable (so it can't rely very heavily on windowing or anything else that is specific to one kind of computer) and partly because the developers have put all their effort into improving the performance rather than making the product superficially attractive. LaTeX is a power tool, and like all power tools, you have to make a commitment to learn how to use it. It's somewhat like learning a programming language.

Crucially, **you have to buy the book.** Specifically, you need the book *LaTeX: A Document Preparation System,* by Leslie Lamport. This is the official LaTeX manual; although there are other books about LaTeX, they mostly discuss add-ons and special techniques rather than giving you the basics.

To work with LaTeX on a PC, you generally use four pieces of software:

- A text editor to type in your text. This can be Windows Notepad or any word processor (saving in ASCII text mode); I prefer Programmer's File Editor (PFE), a popular freeware program.

- `latex`, which translates your input into a `dvi` (device-independent) intermediate file.

- `dvips`, which translates your `dvi` file into PostScript, inserting pictures and special fonts.

- GhostView, which lets you view your PostScript file and print it on non-PostScript printers.

The process is similar on other systems.

Although designed for the mathematical sciences, LaTeX is suitable for all subjects. It hyphenates English perfectly. Extensions are available for typing phonetics and numerous foreign scripts, including Devanagari and Klingon. LaTeX documents can contain pictures exported as .EPS (encapsulated PostScript) from any drawing program.

To obtain the software and other current information about LaTeX, follow the links on my web page (address above). To avoid long downloads, Windows 95 users can borrow an installation CD-ROM from me. LaTeX is also being made available in UCNS PC labs.

You can ask questions about LaTeX in the newsgroups `comp.text.tex` (international) and `uga.tex-latex` (on campus). The `uga.sty` thesis style sheet is available from `ftp.ai.uga.edu`. Finally, I am glad to assist students who have difficulties, but please try other sources of information first.