Introduction

Introduction to LaTeX

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This Presentation

- Look at the conceptual purpose of LaTeX.
- Etymology of LaTeX.
- Formatting versus Logical Design.
- History of LaTeX.

What is LaTeX

- An open-source typesetting program designed for preparing documents on PC or Mac.
- Free to use and easy to modify the source code for desired output.
- We will just focus on preparing documents for research papers and short assignments.
- Can also prepare books, slides, letters, and resume's.
- A sample document is on the webpage, snippets of code are later in the slide.

What's in the Name?

- LaTeX is pronounced "Lay-tech."
- The name is actually a combination of two names:
  - TeX is the legacy typesetting program developed by Donald Knuth.
  - "La" is derived from Leslie Lamport, the creator of LaTeX.
- TeX stands for Tau-Epsilon-Chi.
- More on the etymology and history of LaTeX and their creators later in this presentation.

Why LaTeX?

- Microsoft Word, Corel Wordperfect, and OpenOffice are already word processing programs, why use LaTeX?
- LaTeX is a typesetting program.
  - Logical Design versus Word Processing
- Much better at quickly typing mathematical equations.
  - Math environment versus Equation Editor
- Powerful enumerating, bibliography, indexing, table of contents tool
  - Automatically generates and lists a bibliography at the end of the document.
- Easily outputs to PostScript and PDF, which are both standards.

The Downside

- Word, Wordperfect, OpenOffice are WYSIWYG (What you see is what you get) programs.
  - The layout of the screen roughly matches what is printed out.
- LaTeX resembles HTML or linear programming—which means there is a learning curve to use it.
- LaTeX must be installed on the computer to *prepare* documents.
- We will begin to focus on the design of documents.

Logical Design vs Formatting

- Word, Wordperfect, OpenOffice are WYSIWYG (What you see is what you get) programs.
  - What appears on the screen is what appears on the printout.
- To create titles, sections, or table of contents we must bold, italicize, or underline text.
  - This process is known as *formatting*.
- Traditionally, we are use to these programs; however, formatting can be lengthy individual steps.

Formatting

- Let's look at the process of formatting:

Walraisian Auctioneer in Asymmetric Markets
David E. Smith
February 19, 2004

- In the prior paragraph those lines would require the author to **bold** the title, *italicize* the name, and change it back to normal for the date.
- This may seem trite for a few lines, but can be time consuming for larger documents.

Logical Design

- The following is the header written in LaTeX

```
\documentclass{article}
\begin{document}
\textbf{Walraisian Auctioneer in
Asymmetric Markets}
\TEXTIT{DAVID E. SMITH}
February 19, 2004
```

Math Equations

- Using mathematical notation in a WYSIWYG system is very time-consuming.
- Typesetting math equations are easy since LaTeX uses commands.
- For instance, below is an example of the proper notation for the derivative of a logarithm.
  `\frac{dy}{dx}=\frac{1}{x}`
- The output is shown on the next slide.

Math Equations and Enumerating

- Many papers also require that math equations are numbered.

  ex. The derivative of a log is

$$\frac{dy}{dx} = \frac{1}{x} \tag{1}$$

- It's easy to imagine where we need to insert another equation before (1).
- LaTeXautomatically enumerates equations so we don't have to manually change the sequence.
- If we have referenced equation (1) in the text, it will also renumber the references too.

History of LaTeX

- Donald Knuth was researching for the fourth volume of the *The Art of Computer Programming*.
- Upon reviewing the pre-prints for his manuscripts, he was disappointed in the typesetting.
- His initial reaction was “bleech!”, which is phonically similar to TeX.
- He stopped submitting papers to the American Mathematical Society (AMS).

History of LaTeX(con't)

- In 1977 instead of researching in South America, he spend his time creating a new typesetting program at Stanford.
- The result was two programs: TeX and METAFONT.
- The current version of TeX is commonly known as TeX82.
- Official development of TeX was frozen by Mr. Knuth (Addison-Wesley also owns TeX).
- The version number is 3.14159 and converges to π.
- METAFONT is at 2.718 and converges to *e*.

History of LaTeX (con't)

- Donald Knuth encourages development of extensions to the TeX program.
- Although he is widely known for TeX and his book, *The Art of Computer Programming*, he is also widely known for giving money who find errors in the TeX source code or his books.
- $2.56 per previously unknown mistake, although many people just save the checks.
  - His website lists the current errata list.

Creation of LaTeX

- Leslie Lamport developed a TeX macro designed for easier document creation—she named it LaTeX.
- During the 80's several version of LaTeX were released. Many were incompatible with each other.
  - Each version had its own specialty (e.g. math, slides, PDF generation)
- In June 1994 LaTeX 2_ε was released with the purpose of unifying the multitude of LaTeX programs.
- Next version of LaTeX is LaTeX3.

Conclusions

- LaTeX is a typesetting program designed to create documents using logical design.
- It can output to PostScript and PDF, even on Windows.
- It can automatically enumerate equations and section headers.
- NEXT: We will look at the broad process of how LaTeX documents are created.
- LATER: We will show what is needed to install LaTeX and create a simple document.