CSCE 222
Discrete Structures for Computing
LaTeX
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Based on slides by Andreas Klappenecker
Late 70’s: Don Knuth invents TeX

2 Features

Both TeX and \LaTeX allow for \`a\c\`e\`n\^ts, and excel at typesetting mathematical equations, in-line or displayed on a line by itself. For instance, an article on quadratics may need

\[ ax^2 + bx + c = 0 \implies x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}, \]

or an article on complex analysis may include \( e^{i\theta} = \cos \theta + i \sin \theta. \)
1984: LaTeX

In 1984, Leslie Lamport writes the markup language LaTeX that makes TeX particularly easy to use.

Key feature: The document is organized according to its structure (e.g. Title, Chapter, Sections, etc.)

The language is easy to learn

Available on virtually all computing platforms
Computer programmers will feel right at home: The document is produced by a program.

The language can be customized with macros.

Typesetting of formulas is easy: Once you understand the main features, most formulas are quickly written in LaTeX.

Much faster than any formula editor.
Structure of a LaTeX Document

\documentclass{article}
% macro definitions
\begin{document}
% text comes here
\end{document}

Comments begin with \%

Commands start with \"
LaTeX Example

\documentclass[12pt]{article}
\usepackage{amsmath}
\title{LaTeX}
\date{}
\begin{document}
\maketitle
LaTeX is a document preparation system for the \TeX typesetting program. It offers programmable desktop publishing features and extensive facilities for automating most aspects of typesetting and desktop publishing, including numbering and cross-referencing, tables and figures, page layout, bibliographies, and much more. \LaTeX was originally written in 1984 by Leslie Lamport and has become the dominant method for using \TeX; few people write in plain \TeX anymore. The current version is \LaTeXe.

\begin{align}
E &= mc^2 \\
\quad m &= \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}} 
\end{align}

§ This is a comment; it will not be shown in the final output.
§ The following shows a little of the typesetting power of \LaTeX:
\begin{align}
E &\equiv mc^2 \\
\quad m &\equiv \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}
\end{align}
\end{document}
This is a \textbf{bold} text
This is a \textit{text} in italics
This is a \textsl{slanted} text

This is a **bold** text
This is a *text* in italics
This is a *slanted* text
Inline Mathematics

You can write a text and within the text you can have inline mathematical formulas, such as $\sqrt{x^2+1}$, that are simply enclosed in single dollar signs.

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Important equations can be set in double dollar signs, for example
$$ y = \sqrt{x^2+1}, $$
and will be displayed as a centered equation.

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$$ y = \sqrt{x^2+1}, $$
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Numbering Equations

A numbered equation
\begin{equation}\label{eqn}
z^2 = x^2 + y^2.
\end{equation}

It follows from equation (\ref{eqn}) that ...

A numbered equation

\begin{equation}
z^2 = x^2 + y^2.
\end{equation}

It follows from equation (??) that ...

Run LaTeX twice to resolve references
Suppose you have written a LaTeX document, say homework.tex.

Compiling the document, typesetting, and creating a pdf file:
\texttt{pdflatex homework.tex}

View your document homework.pdf with some pdf viewer (e.g., ghostview homework.pdf, preview homework.pdf, ...)

Compiling LaTeX Documents
LaTeX Distributions

- Windows: MikTeX
- Mac: MacTeX
- Unix: Tex Live

Further information: http://www.ctan.org/

Already installed on unix.cs.tamu.edu