Latex and Tex

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1 History
   • History of TeX
   • History of LaTeX

2 Basic Concepts
   • Markup Language
   • Generate Documents

3 The real beef

4 There is a package for that
   • Some easy ones
   • Some eye-opening ones

5 Jumpstart
Outline

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First there was just Gutenberg, and everything was fine.
A Brief History of \TeX

- First there was just Gutenberg, and everything was fine.
- Then there was computers and bad typesettings.

Figure: From www.stormerbrooks.com
A Brief History of TEX

- First there was just Gutenberg, and everything was fine.
- Then there was computers and bad typesettings.
- Then here comes the God.

Figure: From www.xoolive.org
A Brief History of \TeX

- First there was just Gutenberg, and everything was fine.
- Then there was computers and bad typesettings.
- Then here comes the God.
- Then we have beautiful books.

\LaTeX

\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 \LaTeX\ 2c.

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

\textbf{Figure:} From jonfucius.wordpress.com
Features of \TeX

- Attractive math and texts

\begin{align*}
\int_0^3 9x^2 + 2x + 4 \, dx &= 3x^3 + x^2 + 4x + C \bigg|_0^3 = 102 \\
\exp^{x+iy} &= \exp^x (\cos y + i \sin y) \\
x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\end{align*}

**Figure:** From wikipedia
Features of \TeX

- Attractive math and texts
- Consistent output

In our research group, we write proposals collaboratively on four platforms, all outputs are guaranteed to be the same.
Features of \TeX

- Attractive math and texts
- Consistent output
- Turing-completeness and powerful macro systems

Figure: From www.ecs.syr.edu
TEX Trivia

- The name

TEX is \( \tau \varepsilon \chi \). Pronounce the \( \chi \) as a Greek chi, not an x.

A master of TEX is a TEXnician, not a TEXpert. 😊
The name

The implementation

\text{\LaTeX} is of superior quality – 432 modifications since first release [1]

Literate Programming
The name
The implementation
Version $\pi$

The absolute final change.
All bugs will become features.
Motivation

- Plain \TeX{} is too ... plain ...
Motivation

- Plain TeX is too ... plain ...
- Typographical vs. logical markups

Let us say you want to write

1. Introduction

You should use \texttt{\textbackslash section\{Introduction\}} instead of \texttt{\textbf{1. Introduction}}
Motivation

- Plain \TeX{} is too ... plain ...
- Typographical vs. logical markups
- \LaTeX{}, a higher level macro package for \TeX{}
LaTeX, Then and Now

- Started as a macro system
LaTeX, Then and Now

- Started as a macro system
- Now a system with 1000+ packages
\textbf{LaTeX, Then and Now}

- Started as a macro system
- Now a system with 1000+ packages
- The most popular document preparation system in academia
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   • History of \LaTeX

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Similar to HTML, you can not see the final result while editing.

Instead of click **B** button and see the result, you have to write `{\bf text}` and recompile the whole document (unless you use LyX)
Similar to HTML, you can not see the final result while editing.

You can however have multiple outputs on a single output

Changing the layout and style is as easy as changing just one markup
Similar to HTML, you cannot see the final result while editing.
You can however have multiple outputs on a single output
You have extension powers

We will see more examples later
\LaTeX{} files as source codes, \TeX{} and \LaTeX{} as compilers
\LaTeX{} files as source codes, \TeX{} and \LaTeX{} as compilers

You can use Makefile and svn to manage your files
\LaTeX{} files as source codes, \TeX{} and \LaTeX{} as compilers

Both compilers and results are platform independent
\LaTeX\ files as source codes, \TeX\ and \LaTeX\ as compilers

Both compilers and results are platform independent
\LaTeX Files as Programs

- \LaTeX files as source codes, \TeX and \LaTeX as compilers
- Both compilers and results are platform independent
- Out of the box
\LaTeX Files as Programs

- \LaTeX files as source codes, \TeX and \LaTeX as compilers
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\LaTeX2html, reStructured Text
Existing \LaTeX\ Distributions

- LyX
- tetex
- miktex
- texlive
- texshop

```
sudo apt-get install tetex-base tetex-bin tetex-extra
```
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ftp://tug.ctan.org/pub/tex-archive/systems/knuth/dist/errata/tex82.bug