LaTeX

A Short Introduction

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Libraries

2020 January 16

Overview

Introduction

What is LaTeX?

A typesetting program: *content* $\rightarrow$ *a document*

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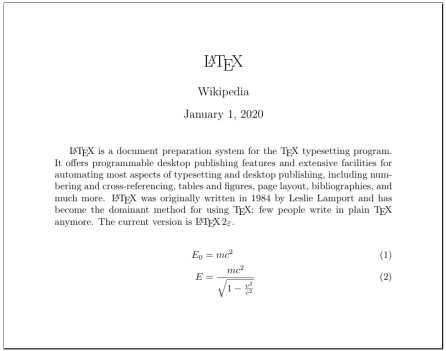
input: `filename.tex` LaTeX output: `filename.pdf`

```latex
\documentclass{article}
\usepackage{amsmath}
\title{\LaTeX}
\author{Wikipedia}
\date{January 1, 2020}

\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 Lanport and has become the
  dominant method for using \TeX; few people write in plain \TeX{}
  anymore. The current version is \LaTeXe.

  % This is a comment, not shown in final output.
  % The followlng shows typesetting  power of LaTeX:
  \begin{align}
    E_0 &= mc^2 \\
    E &= \frac{mc^2}{\sqrt{1-\frac{v^2}{c^2}}}
  \end{align}
\end{document}
```



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January 1, 2020

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 2_ε.

$$E_0 = mc^2 \tag{1}$$

$$E = \frac{mc^2}{\sqrt{1 - \frac{v^2}{c^2}}} \tag{2}$$

Advantages of LaTeX

- separate content and formatting
- automatic numbering, cross-references, ... everything
- beautiful math
- commands and syntax control
- no version compatibility issues
- it's free

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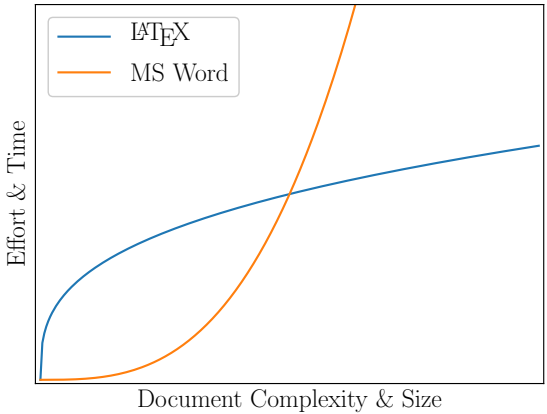
LaTeX vs MS Word



How does LaTeX Work?

Three layers:

1. "primitives" – e.g. `\def\pi{3.14}` defines a macro `\pi` to contain "3.14"
   + "kernel" – e.g. tools to combine primitives
2. "classes" – e.g. an article, which should have: title, author, sections, etc.
   + "packages" – e.g. modify or extend a basic class
3. "document" – e.g. this specific article (including content!)

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Getting Started

Your First Document

```
\documentclass{article}
% document header
\begin{document}
  % document content
  Hello World
\end{document}
```

But first: Overleaf → “New Project”

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- title, author, date
- sections
- math
- floats: figures & tables
- cross-references & table of contents
- citations & bibliography
- appendices & code

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Examples

Putting it all Together

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- e.g. thesis: `examples/thesis/main.pdf`
- e.g. CV: `examples/cv/main.pdf`
- e.g. article: `examples/article/main.pdf`
- e.g. article: `examples/poster/main.pdf`

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Helpful Resources

- Overleaf – online LaTeX writing application
- LaTeX Install Guide – to install LaTeX on your computer (offline)
- TeXstudio – great editor for composing LaTeX "code" (offline)
- TeX Stack Exchange – Q & A style how-to and debugging help
- LaTeX Cheat Sheet – a really nice reference for common commands
- Github Repository – example documents: article, thesis, CV, poster, slides