LaTeX

- It is not a word-processor.
\LaTeX

- It is not a word-processor.
- \LaTeX\ is a macro package of typesetting commands that uses the \TeX\ typesetting engine to produce typeset documents.
It is not a word-processor.

\LaTeX{} is a macro package of typesetting commands that uses the \TeX{} typesetting engine to produce typeset documents.

\TeX{} comes from \(\tau \varepsilon \chi\), the Greek letters short for “technical” or “technique”. As such, it is pronounced to rhyme with “blech”, not like the cowboy (Tex). \LaTeX{} is either “la-tek” or “lay-tek”.

In the late 1970s Donald Knuth was writing the second volume of *The Art of Computer Programming*, was unhappy with the way it looked, and \TeX{} was born. And we’re still waiting for the 4th (of 5 planned) volume of TAoCP.
History

- In the late 1970s Donald Knuth was writing the second volume of *The Art of Computer Programming*, was unhappy with the way it looked, and TEX was born. And we’re still waiting for the 4th (of 5 planned) volume of TAoCP.

- And DVI, and MetaFont, and the Computer Modern fonts, and most of the research in computerized typesetting and hyphenation.
History

- In the late 1970s Donald Knuth was writing the second volume of *The Art of Computer Programming*, was unhappy with the way it looked, and TeX was born. And we’re still waiting for the 4th (of 5 planned) volume of TAoCP.

- And DVI, and MetaFont, and the Computer Modern fonts, and most of the research in computerized typesetting and hyphenation.

- In the 1980s Leslie Lamport at DEC decided TeX was too hard for secretaries (other than Knuth’s) to use... and thus LaTeX was born.
Advantages

- Text files. You can always read them.
- Papers from 1994 still are readable and ‘compile-able’
Advantages

- Text files. You can always read them.
  - Papers from 1994 still are readable and ‘compile-able’
- Free. Not open source, just free.
  - Owned by Knuth, if it’s \TeX, it’s his, if it does the same thing, but isn’t free, it’s not \TeX.
Advantages

- Text files. You can always read them.
  - Papers from 1994 still are readable and ‘compile-able’
- Free. Not open source, just free.
  - Owned by Knuth, if it’s \TeX, it’s his, if it does the same thing, but isn’t free, it’s not \TeX.
- Portable. Runs on everything.
  - Unix, Windows, Mac, OpenVMS, AtariST, Amiga, OS/2
Advantages

- Text files. You can always read them.
  - Papers from 1994 still are readable and ‘compile-able’
- Free. Not open source, just free.
  - Owned by Knuth, if it’s \TeX{}, it’s his, if it does the same thing, but isn’t free, it’s not \TeX{}.
- Portable. Runs on everything.
  - Unix, Windows, Mac, OpenVMS, AtariST, Amiga, OS/2
- No bugs. Really.
  - OK, in \TeX{}, but really.
Advantages

\[-\frac{d}{dx} D(x) \frac{d}{dx} \phi_e(x) + \Sigma_a \phi_e(x) = \frac{1}{k} \nu \Sigma_f \phi_e(x)\]

\[\frac{-d}{dx} D(x) \]
\[\frac{d}{dx} \phi_{\text{e}}(x) + \Sigma_a \phi_{\text{e}}(x) = \ldots\]

\[
\begin{bmatrix}
B & 2C \\
A & B & C \\
\vdots & \vdots & \vdots \\
A & B & C \\
2A & B
\end{bmatrix}
\]

\[\rightarrow \phi_l = \frac{1}{k_l} \rightarrow \phi_l\]
Advantages

- Easy numbered references to tables, formulas, figures.
Advantages

- Easy numbered references to tables, formulas, figures.
- Automatic tables of contents, list of figures, list of tables, etc.
Advantages

- Easy numbered references to tables, formulas, figures.
- Automatic tables of contents, list of figures, list of tables, etc.
- Robust bibliography management.
Advantages

- Easy numbered references to tables, formulas, figures.
- Automatic tables of contents, list of figures, list of tables, etc.
- Robust bibliography management.
- PDF output (even on Windows), PDF input.
Advantages

- Easy numbered references to tables, formulas, figures.
- Automatic tables of contents, list of figures, list of tables, etc.
- Robust bibliography management.
- PDF output (even on Windows), PDF input.
- Good integration into revision control systems (CVS, Subversion).
Advantages

- Easy numbered references to tables, formulas, figures.
- Automatic tables of contents, list of figures, list of tables, etc.
- Robust bibliography management.
- PDF output (even on Windows), PDF input.
- Good integration into revision control systems (CVS, Subversion).
- Almost endlessly configurable and extensible.
Disadvantages

- No OLE.
Disadvantages

- No OLE.
- Very hard to force it into a page-layout program.
Disadvantages

- No OLE.
- Very hard to force it into a page-layout program.
- Not widely used; for collaboration, MS Word is the standard.
Disadvantages

- No OLE.
- Very hard to force it into a page-layout program.
- Not widely used; for collaboration, MS Word is the standard.
- Steeper learning curve than graphical tools, closer to programming.
Usage

- Create an input file ending in `.tex`.
- Process that file with `latex` a couple of times; `\LaTeX` is a single-pass compiler that saves its state in auxiliary files.
- — or — process the file with `pdflatex`
- `\LaTeX` output is a device independent (DVI) file; this can be converted to PostScript or PDF, among other things.

\documentclass[12pt]{article}
\usepackage{graphicx}
\title{My Summer Vacation}
\author{Andy Caird}
\begin{document}
\maketitle
\tableofcontents
\section{Driving to Akron}
In the first paragraph, we packed up the car, see Figure \ref{FirstFigure}.
\begin{figure}
\includegraphics[width=4in]{car-packed.ps}
\caption{Our packed car}
\end{figure}

In the second paragraph, we got on the highway.

\section{Eating at IHOP}
As mentioned in section \ref{driving} we were on the highway, and dad said ```Who’s hungry?’’
\end{document}
TEX-like Alternatives

- **Lyx**
  - Somewhat graphical input, nice \LaTeX output
  - Uses \LaTeX in the background, but files are Lyx files
TEX-like Alternatives

- Lyx
  - Somewhat graphical input, nice LaTeX output
  - Uses LaTeX in the background, but files are Lyx files
- Jade / OpenJade
  - An implementation of “Document Style Semantics and Specification Language” (DSSSL)
  - XML document preparation
  - Backends for RTF (Word) and TEX
  - Paul uses this; I don’t
Resources

- *\LaTeX*: A Document Preparation System (2nd Edition) by Leslie Lamport
- *The \LaTeX* Companion by Mittelbach et al.
- *Math Into \LaTeX* by George Gratzer
- *The (Not So) Short Introduction to \LaTeX2e* by Tobias Oetiker (⇐ free!)
- Comprehensive \TeX* Archive Network: \url{http://www.ctan.org}
- \TeX* Users Group: \url{http://www.tug.org}
- Lyx: \url{http://www.lyx.org}
- Usenet (aka Google Groups): \texttt{comp.text.tex}
Serious Resources

- *The TeXbook* by Donald Knuth
- *The METAFONT book* by Donald Knuth
- *Computers & Typesetting* by Donald Knuth
Questions

http://www-personal.engin.umich.edu/~acaird