Writing your papers and thesis more effectively

LaTeX, vector graphics, reference management and version control

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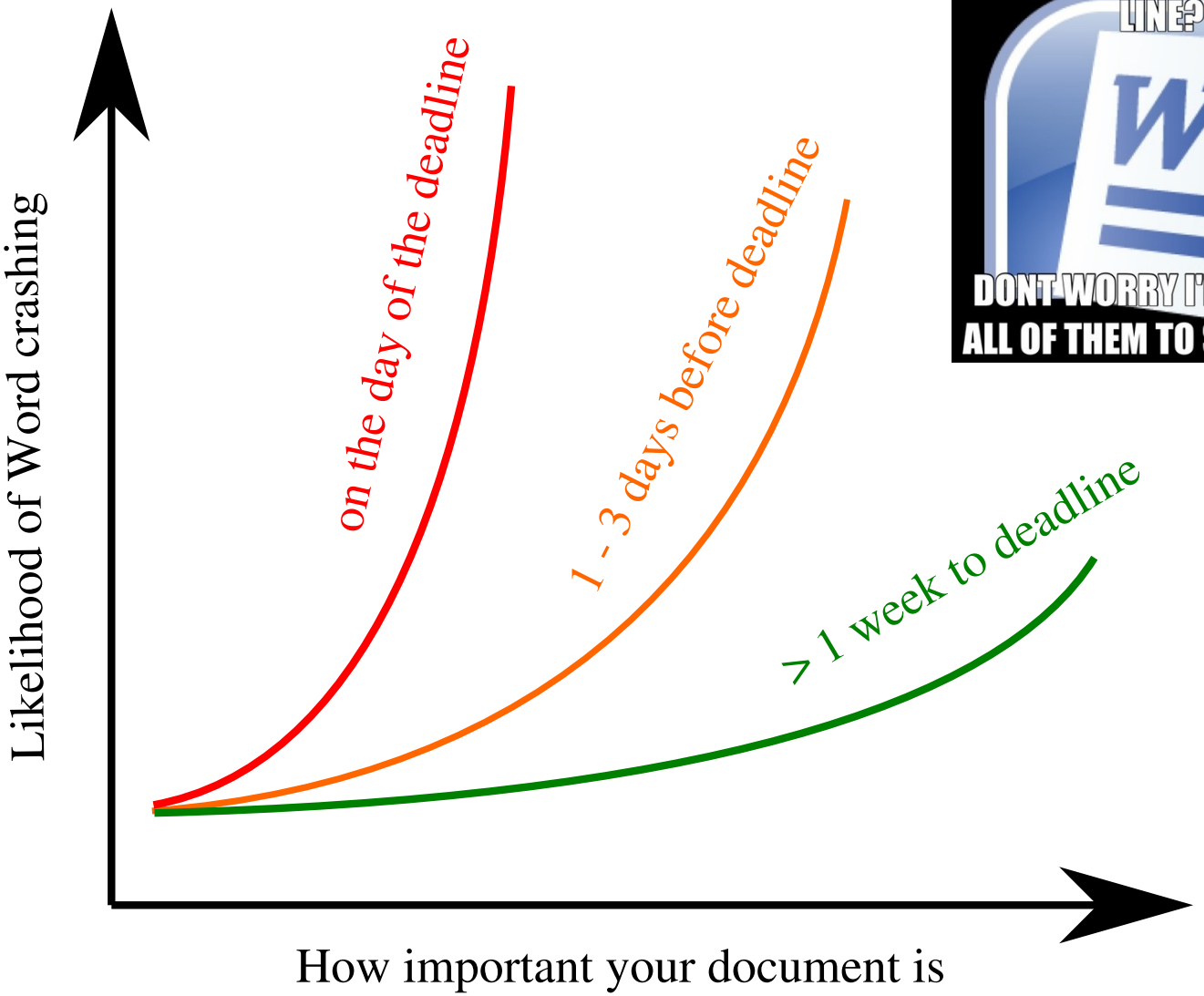
Outline

1. Why not to use WYSIWYG
2. Introduction to LaTeX2e
   - Title and Abstract
   - Sections
3. Structure

Likelyhood of Word crashing



Can you see beyond the WYSIWYG bubble?

mouth; whenever it is a damp, drizzly November in my soul; whenever I find myself involuntarily pausing before coffin warehouses, and bringing up the rear of every funeral I meet; and especially whenever my hypos get such an upper hand of me, that it requires a strong moral principle to prevent me from deliberately stepping into the street, and methodically knocking people's hats off – then, I account it high time to get to sea as soon as I can. This is my substitute for pistol and ball. With a philosophical flourish Cato throws himself upon his sword; I quietly take to the ship. There is nothing surprising in this. If they but knew it, almost all men in their degree, some time or

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Word vs InDesign vs LaTeX

Ligatures, smallcaps, kerning

grafiet efficiënt fles souffleur fjord

grafiet efficiënt fles souffleur fjord

Ligatures

AAa BB CC DD

AAa BB CC DD

Smallcaps

Tafel AVA *AVA*

Tafel AVA *AVA*

Kerning

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What is LaTeX?

- LaTeXis a document preparation system for the TeXtypesetting program.
- Programmable desktop publishing, which automates most of the typesetting.
- LaTeXproduce beautiful documents, especially mathematics

$$i\hbar\frac{\partial}{\partial t}\Psi(r,t) = \left[\frac{-\hbar^2}{2\mu}\nabla^2 + V(r,t)\right]\Psi(r,t)$$

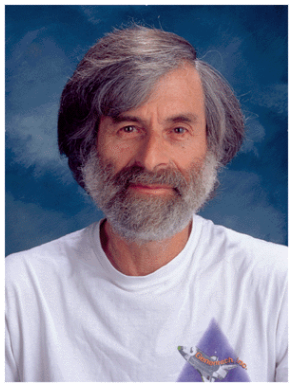
$$E^2 = (pc)^2 + (m_0c^2)^2$$

- LaTeXis WYSIWYM (What You See is What You Mean)

History

It all started with Donald Knuth and "The Art of Computer Programming"

- Donald Knuth, 1977, TEX- a computer language used for typesetting math and other technical material



- Leslie Lamport, LATEX- a higher-level method of accessing the power of TEX

LaTeX Pros and Cons

Pros

- It's free and works on Macs, Windows, Unix/Linux.
- LaTeX files are ASCII and are portable.
- The typesetting is better, especially the maths.
- Style changes are neater in LaTeX.

Cons

- Special/Modern Font selection is difficult, but one can use XeTeX.
- LaTeX encourages (almost insists on) structured writing and the separation of style from content. This is not the way that many people (especially non-programmers) are used to working.
- Without a WYSIWYG front end, it's not always easy to find out how to do things.

Gerring started with LaTeX

- **Typesetting**
  - TeXLive - full version
  - MiKTeX- Windows (Basic installer)
- **Off-line editors**
  - TeXStudio
  - TeXMakerX
- **Online editors**
  - Overleaf (formerly WriteLaTeX)
  - ShareLaTeX

How LaTeXworks? - The Magic

- You write your document in `plain text` with `commands` that describe its structure and meaning.
- The LaTeXprogram processes your text and commands to produce a beautifully formatted document.

More examples of commands and their output. . .

```
\begin{itemize}
\item Despicable Me
\item Wall-E
\item Tangled
\end{itemize}
```

- Despicable Me
- Wall-E
- Tangled

```
\begin{figure}
\includegraphics{figs/minion}
\end{figure}
```

```
\begin{equation}
\alpha = \beta + 1
\end{equation}
```

$$\alpha = \beta + 1 \qquad (1)$$

Getting Started

- A minimal LaTeX document:
- Commands start with a *backslash* `\`
- Every document starts with a `\documentclass` command.
- The *argument* in curly braces `{` `}` tells LaTeXwhat kind of document we are creating: an `article`.
- A percent sign `%` starts a *comment* — LaTeXwill ignore the rest of the line.

Declarations and Environments

Declaration and commands...

- Are stated once
- Take effect until further notice
- Can optionally be constrained

Eg., `\documentclass` or `\includegraphics`

Environments...

- Have matching begin and end declarations
- Must be constrained

Eg., `\begin{document}` ... `\end{document}`

Arguments

Required arguments...

- Are contained in curly braces
- Must be provided

Eg., `\documentclass{article}`

Optional arguments...

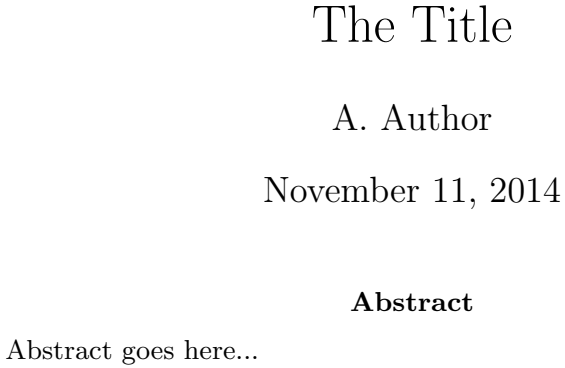
- Are contained in square bracket
- Can be left out, in which case default value is assumed
- Give you more control over the commands

Eg., `\documentclass[12pt]{article}`

Title and Abstract

- Tell LaTeX the \title and \author names in the preamble.
- Then use \maketitle in the document to actually create the title.
- Use the abstract environment to make an abstract.

```
\documentclass{article}

\title{The Title}

\author{A. Author}

\date{\today}

\begin{document}
\maketitle

\begin{abstract}
Abstract goes here...
\end{abstract}

\end{document}
```



Sections

```
\documentclass{article}
\begin{document}

\section{Introduction}

The problem of \ldots

\section{Method}

We investigate \ldots

\subsection{Sample Preparation}

\subsection{Data Collection}

\section{Results}

\section{Conclusion}

\end{document}
```

1 Introduction

The problem of . . .

2 Method

We investigate . . .

2.1 Sample Preparation

2.2 Data Collection

3 Results

4 Conclusion

Let's try that . . .

- writeLaTeX is a website for writing documents in LaTeX.
- It 'compiles' your LaTeX automatically to show you the results.

Click here to open the example document in **writeLaTeX**

Or go to this URL: `https://www.overleaf.com/docs/1778557gcvcyt/clone`
For best results, please use Google Chrome or a recent FireFox.

- If you would like to try out the exercise on your machine. Go to `Exercise / paper.tex`

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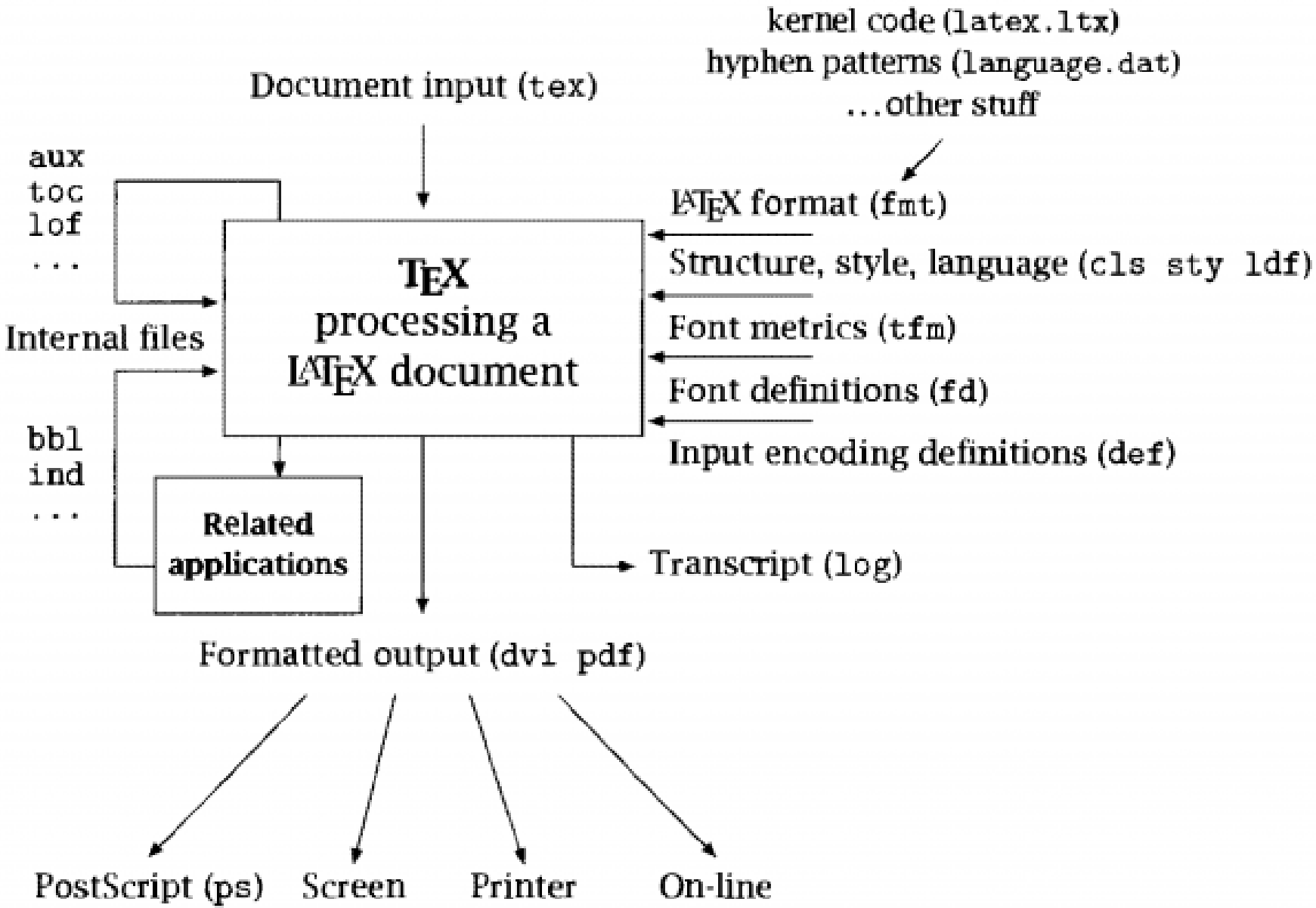
LaTeX Structure - The Magic



\documentclass{}

minimal	Is as small as it can get. For debugging purposes.
letter	For writing letters.
article	articles in journals, documentation, invitations, ...
proc	A class for proceedings based on the article class.
report	For longer reports containing several chapters ...
book	For real books.
memoir	For advanced book style.
beamer	For writing presentations

Typesetting Caveats

- Quotation marks are a bit tricky: use a backtick `` ` `` on the left and an apostrophe `´` on the right.

```
Single quotes: `text'.

Double quotes: ``text''.
```

Single quotes: ‘text’.

Double quotes: “text”.

- Some common characters have special meanings in LaTeX:

`%`	percent sign (comment)
`#`	hash sign (macro parameter #1)
`&`	ampersand (align)
`$`	dollar sign (in-line math)

- If you just type these, you'll get an error. If you want one to appear in the output, you have to *escape* it by preceding it with a backslash.

```
\$\%\&\#
```

$%&#

Packages

Packages allow you to further customize LaTeX

The command:

```
\usepackage{amsmath}
```

Common packages

Environment	Packages
Maths	amsmath, amsfonts, amssymb
Maths Times Font	mathptx
Figures	graphicx, epsfig
Table	tabularx, booktabs
Pagelayout	geometry
Hyperlinks	hyperref
Algorithms and code	algpseudocode, algorithm, listings
Color	color, xcolor

Acknowlegements

This LaTeXfor Beginners course is loosely based on and examples from:

- John Miller's An interactive introduction to LaTeX: https://www.writelatex.com/blog/7
- WikiBook on LaTeX: https://en.wikibooks.org/wiki/LaTeX
- ShareLaTeXLearn: https://www.sharelatex.com/learn
- CUED Textprocessing: http://www.eng.cam.ac.uk/help/tpl/textprocessing/
- UCS Course on LaTeX 2_{ε}: http://www.ucs.cam.ac.uk/docs/course-notes/unix-courses/earlier/latex