

How to L^AT_EX

not Tom Almeida

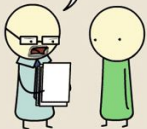
not UWA — Programming Competition Society

not September 2019



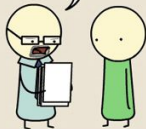
PYTHON

THIS IS PLAGIARISM.
YOU CAN'T JUST "IMPORT" ESSAY."



JAVA

I'M TWO PAGES IN AND I STILL
HAVE NO IDEA WHAT YOU'RE SAYING.



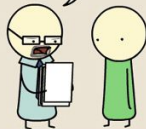
C++

I ASKED FOR ONE COPY,
NOT FOUR HUNDRED.



UNIX SHELL

I DON'T HAVE PERMISSION TO
READ THIS.



ASSEMBLY

DID YOU REALLY HAVE TO REDEFINE EVERY
WORD IN THE ENGLISH LANGUAGE?



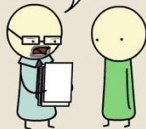
C

THIS IS GREAT, BUT YOU FORGOT TO ADD
A NULL TERMINATOR. NOW I'M JUST READING
GARBAGE.



LATEX

YOUR PAPER MAKES NO GODDAMN SENSE,
BUT IT'S THE MOST BEAUTIFUL THING
I HAVE EVER LAD EYES ON.



HTML

THIS IS A FLOWER POT.



Why use \LaTeX ?

- ▶ Really nicely formatted text.

Why use L^AT_EX?

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- ▶ Really *really* nicely formatted text.

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- ▶ Really good mathematics.
- ▶ Very powerful and extensible.

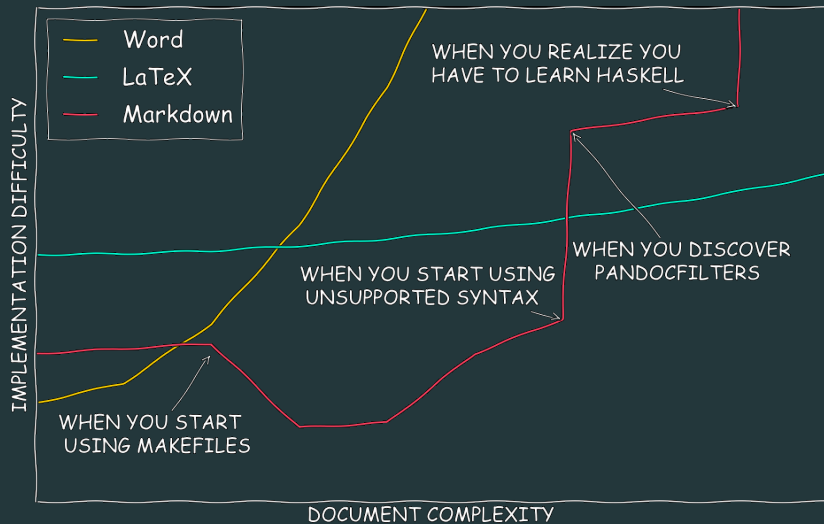
Why use L^AT_EX?

- ▶ Really nicely formatted text.
- ▶ Really *really* nicely formatted text.
- ▶ Nicely done bibliographies.
- ▶ Really good mathematics.
- ▶ Very powerful and extensible.
- ▶ Flexible.

Flexible

- ▶ make documents.
- ▶ make spreadsheets.
- ▶ make graphs.
- ▶ make presentations!
- ▶ (and more)

Scales Well



Who Uses It?

Aside from the obvious (Math, CS, Eng. . .), take a look at “What professions use T_EX/L^AT_EX besides CS?” on [tex.stackexchange](https://tex.stackexchange.com) and find:

- ▶ Accountant
- ▶ Book Writer
- ▶ Contract Attorney
- ▶ Gemanwings, a German low-cost airline
- ▶ Video game producer
- ▶ Bible publishing
- ▶ Earth Sciences
- ▶ Chemist
- ▶ Philologists
- ▶ Art Historian
- ▶ Psychology
- ▶ Product Catalogues
- ▶ Linguists
- ▶ Economics

How does it work?

- ▶ write in plain text with some **commands** that describe its structure and meaning.
- ▶ \LaTeX processes your text and commands to produce a document.

Mandy makes marshmallows `\emph{mostly}` on Mondays.



Mandy makes marshmallows *mostly* on Mondays.

Other examples

```
\begin{itemize}
  \item Geese
  \item Parades
  \item Bad ideas
\end{itemize}
```

- ▶ Geese
- ▶ Parades
- ▶ Bad ideas

```
\begin{equation}
  \alpha + e^2 - 1
\end{equation}
```

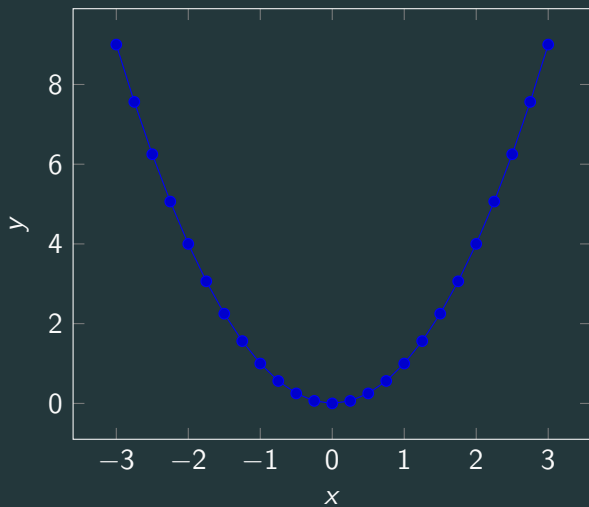
$$\alpha + e^2 - 1 \quad (1)$$

Other examples

```
\begin{tikzpicture}
\begin{axis}[title={$y=x^2$},
            domain=-3:3,
            xlabel={$x$},
            ylabel={$y$}]
    \addplot {x^2};
\end{axis}
\end{tikzpicture}
```

Other examples

$$y = x^2$$



Other examples

```
\[
\lim_{x\to 0}{\frac{e^x-1}{2x}}
\overset{\left[\frac{0}{0}\right]}{\underset{\mathrm{H}}{=}}
\lim_{x\to 0}{\frac{e^x}{2}}={\frac{1}{2}}
\]
```


Other examples

$$\lim_{x \rightarrow 0} \frac{e^x - 1}{2x} \stackrel{\left[\frac{0}{0} \right]}{=} \lim_{x \rightarrow 0} \frac{e^x}{2} = \frac{1}{2}$$

Other examples: THE IMPORTANT ONE

There is this really cool paper on honey bees

↪ learning

how to navigate a maze `\cite{Zhang200}`

you should check it out.

While you are there be sure to notice

↪ `\cite{Neftci2019}`

`\bibliographystyle{unsrt}`


`\bibliography{references}`

Other examples: THE IMPORTANT ONE


```
@article{Neftci2019,  
  author={Neftci, Emre O. and Averbek, Bruno B.},  
  title={Reinforcement learning in artificial and  
  ↪ biological systems},  
  journal={Nature Machine Intelligence},  
  year={2019},  
  volume={1}, number={3}, pages={133-143},  
  doi={10.1038/s42256-019-0025-4},  
  url={https://doi.org/10.1038/s42256-019-0025-4}  
}  
  
@article{Zhang200,  
  author={Shaowu Zhang, Akiko Mizutani, and Mandyam V.  
  ↪ Srinivasan},  
  year={2000},  
  title={Research Maze Navigation by Honeybees: Learning  
  ↪ Path Regularity},  
  publisher={Australian National University},  
  journal={Learning & Memory}  
}
```

Other examples: THE IMPORTANT ONE

There is this really cool paper on honey bees learning how to navigate a maze [1] you should check it out. While you are there be sure to notice [2]

 Akiko Mizutani Shaowu Zhang and Mandyam V. Srinivasan.
Research maze navigation by honeybees: Learning path regularity.

Learning & Memory, 2000.

 Emre O. Neftci and Bruno B. Averbeck.
Reinforcement learning in artificial and biological systems.

Nature Machine Intelligence, 1(3):133–143, 2019.

Attitude adjustment

- ▶ Your commands describe “what it is” not “how it looks”.
- ▶ Focus on your content.

The structure of a command

- ▶ Commands in \LaTeX start with `\`, followed by their name.
 - ▶ e.g. `\newpage`
- ▶ They have required arguments in curly braces (`{}`)
 - ▶ e.g. `\section{Introduction}`
- ▶ Optional arguments are in square braces (`[]`)
 - ▶ e.g. `\includegraphics[scale=0.5]{file}`

Environments

- ▶ Environments are commands that started with `\begin` and finished with `\end`.
- ▶ Environments allow you to use commands you wouldn't otherwise have access to.

A minimal L^AT_EX document

```
\documentclass{article} % What type of document?  
% Preamble  
\begin{document}  
Hello World! % Rest of your content...  
\end{document}
```


Typesetting Text

Just type your text.

\\

Spaces don't matter.

\\

`single' ``double''

\\

\\\$\\#\\%\\&\\textbackslash!

Just type your text.

Spaces don't matter.

'single' "double"

\$#%&\\!

Typesetting Math

- ▶ To let latex know you want to make things pretty math style you must enclose text with

```
\( x^2+\frac{1}{2} \)
```

This produces $x^2 + \frac{1}{2}$

- ▶ or for a single centered line (not inline)

```
\[ x^2+\frac{1}{2} \]
```

This produces

$$x^2 + \frac{1}{2}$$

Typesetting Math examples

symbols can become nice $\backslash(xyz\backslash)$

$\backslash\backslash$

access to cool symbols $\backslash(X\in$

$\hookrightarrow Y\backslash)$

$\backslash\backslash$

notation

$\hookrightarrow \backslash(\sum_{k=0}^{\infty} x\backslash)$

symbols can become
nice xyz

access to cool symbols

$X \in Y$

notation $\sum_{k=0}^{\infty} x$

Programmers Are Lazy

Programmers are lazy. Programmers create IDEs to make their life easier. IDEs often support extensions. Extensions exist for \LaTeX . . .

- ▶ Autocompletion
- ▶ Snippets
- ▶ Keybindings
- ▶ and more. . .

How to get \LaTeX

How to get L^AT_EX

- ▶ Overleaf
- ▶ MikTeX
- ▶ MacTeX
- ▶ TeXLive (`sudo apt install texlive-full`)