

A presentation in L^AT_EX Beamer on T_EX/L^AT_EX

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24 September 2015

The Name of the Game

From the TeXbook

English words like ‘technology’ stem from a Greek root beginning with the letters $\tau\epsilon\chi\dots$; and this same Greek word means *art* as well as technology...

Insiders pronounce the χ of TeX as a Greek chi, not as an ‘x’, so that TeX rhymes with the word blecchhh... When you say it correctly to your computer, the terminal may become slightly moist.

The Name of the Game

From L^AT_EX: A Document Preparation System

One of the hardest things about L^AT_EX is deciding how to pronounce it. This is also one of the few things I'm not going to tell you about L^AT_EX, since pronunciation is best determined by usage, not fiat. T_EX is usually pronounced teck, making lah-teck, and lay-teck the logical choices.

Typesetting vs. Ordinary Typing

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- Ligatures appear in professional typesetting, such as in the word find (rather than find)
- Typesetting can involve complex mathematics, of which T_EX handles quite well

$$\sum_{n=0}^{\infty} a_n z^n \quad \text{converges if} \quad |z| < \left(\limsup_{n \rightarrow \infty} \sqrt[n]{|a_n|} \right)^{-1}.$$

Trying to Math in Word

LATEX

$$-\int_0^{2\pi} \frac{kQ d\theta}{2\pi(a^2 + x^2)^{3/2}} (a \sin \theta \hat{j}) = 0$$

Word

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Structure of a L^AT_EX Document

```
Preamble { \documentclass[12pt]{article}
            \usepackage[margin=25mm]{geometry}
            \begin{document}
                Hello World from \LaTeX !
                \begin{equation}
                    \sum_{n = 0}^{\infty} \frac{x^n}{n!} = e^x
                \end{equation}
            \end{document}
```

Structure of a L^AT_EX Document

Preamble { \documentclass[12pt]{article}
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 \begin{document}

Body { Hello World from L^AT_EX !
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 \sum_{n = 0}^{\infty} \frac{x^n}{n!} = e^x
 \end{equation}
 \end{document}

Output

Hello World from L^AT_EX!

$$\sum_{n=0}^{\infty} \frac{x^n}{n!} = e^x \quad (1)$$

Control Sequences

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- Example: ‘\input MS’ causes T_EX to begin reading a file called ‘MS.tex’.

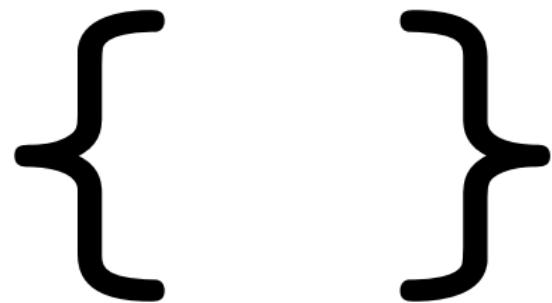
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- Example: T_EX converts
‘George P\’olya and Gabor Szeg\”o’ to ‘George P\'olya and Gabor Szeg\"o.’
- A space after a control word is ignored, to fix this, escape the space after a control word when required.
\\T_EX\\ ignores spaces after control words.

Grouping



Fonts of Type in L^AT_EX

\textrm{This} This produces roman typeface output.
\textsl{This} This produces slanted typeface output.
\textit{This} This produces italics typeface output.
\textbf{This} This produces bold typeface output.
\texttt{This} This produces typewriter typeface output.
\textsf{This} This produces sans typeface output.

Installing TEX Live

Arch Linux:

```
# pacman -S texlive-most
```

Debian/Ubuntu/Mint:

```
# apt-get install texlive-full
```

Fedora:

```
# yum install texlive
```

Windows/OS X:

Follow instructions at <http://tug.org>

Running T_EX



Running L^AT_EX

When you start `pdflatex`, you will see the following:

```
This is pdfTeX, Version 3.14159265-2.6-1.40.16
(TeX Live 2015) (preloaded format=pdflatex)
**
```

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To use T_EX in a REPL like manner, type ‘\relax’ at the prompt for a filename. This is T_EX’s NoOp command, in this case you are using it to tell T_EX to expect nothing after an ‘\input’.

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pdfT_EX will produce a PDF file.

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You can also specify options like this:

```
\documentclass[12pt,a4paper,titlepage]{article}
```

Environments

environment {
 ...
 \begin{itemize}
 \item An item
 \item Another item
 \end{itemize}
 ...
}

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 \item An item
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 \end{itemize}
... }

Output

- An item
- Another item

Environments

environment {
 ...
 \begin{enumerate}
 \item An item
 \item Another item
 \end{enumerate}
 ...
}

Output

- 1 An item
- 2 Another item

Mathematics in L^AT_EX

Use the `equation` environment for basic equation displays:

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TEX also categorizes your characters. There are 16 categories as follows:

<i>Cat</i>	<i>Meaning</i>	<i>Default</i>	<i>Cat</i>	<i>Meaning</i>	<i>Default</i>
0	Escape character	\	8	Subscript	-
1	Begin group	{	9	Ignored character	⟨null⟩
2	End group	}	10	Space	⟨space⟩
3	Math shift	\$	11	Letter	A-Z,a-z
4	Alignment tab	&	12	Other character	
5	End of line	⟨return⟩	13	Active character	~
6	Parameter	#	14	Comment character	%
7	Superscript	^	15	Invalid character	⟨delete⟩

Don't worry too much about this. All this means is that you will have to escape a few special characters.

Line Breaking

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- When a line is perfect in spacing between words and no hyphenation, the badness will be zero.
- As words get too tight or too narrow, the badness increases.
- Hyphenation in words adds a lot of badness!
- \TeX then optimises the badness of each line, trying to get it as low as possible.

Sectioning

Use the commands:

```
\part{Part I} % only in the book class  
\chapter{Awesome Chapter} % only in book, report  
\section{Optimal Awesome}  
\subsection{Here It Is}
```

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```

Then you can generate your table of contents using:

```
\tableofcontents
```

Graphics

In your preamble, include the `graphicx` package:

```
\usepackage{graphicx}
```

Then in your body: (arguments and file extension optional)

```
\includegraphics[width=4cm]{coolpix.png}
```

Tables

‘&’ acts as an alignment character in the `tabular` environment,
‘\\’ acts as a newline:

```
\begin{tabular}{ |l|l| }
  \hline
  stuff & stuff \\
  stuff & stuff \\
  \hline
\end{tabular}
```

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\end{tabular}
```

Output

stuff	stuff
stuff	stuff

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Output

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Also take a look at the excellent `tabu` package.

Automagically Numbered Floating Figures and Tables

```
\begin{figure}
  \centering
  \includegraphics[width=4cm]{coolpix}
  \caption{This is a really cool picture}
\end{figure}
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\begin{table}
  \centering
  \caption{Important Data About Stuff}
  \begin{tabular}{ | l | l | l | c | }
    ...
  \end{tabular}
\end{table}
```

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\begin{table}
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  \caption{Important Data About Stuff}
  \begin{tabular}{ | l | l | l | c | }
    ...
  \end{tabular}
\end{table}
```

You can also generate a List of Figures and a List of Tables:

```
\listoffigures
\listoftables
```

Presentations

Use the `beamer` class, slides are in the `frame` environment.

```
\documentclass{beamer}
\begin{document}
\begin{frame}
    \frametitle{Relevant Title}
    Hello World!
    \pause % Advance slide to continue
    This won't show till you click.
    \begin{block}{Cool Information}
        This shows in a fancy blue block
    \end{block}
\end{frame}
\end{document}
```

Relevant Title

Hello World!

Relevant Title

Hello World! This won't show till you click.

Cool Information

This shows in a fancy blue block

Cool Tricks

Using TikZ...



Comprehensive TeX Archive Network (CTAN)

CTAN

is a great site that has all of the
TeX and L^AT_EX packages and sources.
<http://ctan.org>



Resources and Recommended Reading

- The *TEXbook*, Donald E. Knuth

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Getting Help



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You likely haven't found a bug in \TeX . Knuth pays 0x\$80.00 for every bug found in the current stable versions of \TeX and METAFONT .

- \TeX Stack Exchange
- `texhax` mailing list
- Come to LUG!