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- ▶ Document markup language & document preparation system for T_EX
- ▶ Essentially a collection of macros for T_EX
- ▶ Awesome for scientific and mathematical papers
- ▶ “Lets authors focus on the content and not the visual presentation”

(<http://en.wikipedia.org/wiki/LaTeX>)

L^AT_EX: Features

- ▶ Typesetting journal articles, technical reports, books, and slide presentations.
- ▶ Control over large documents containing sectioning, cross-references, tables and figures.
- ▶ Typesetting of complex mathematical formulas.
- ▶ Advanced typesetting of mathematics with AMS-LaTeX.
- ▶ Automatic generation of bibliographies and indexes.
- ▶ Multi-lingual typesetting.
- ▶ Inclusion of artwork, and process or spot color.
- ▶ Using Postscript or Metafont fonts.

(<http://www.latex-project.org/intro.html>)

T_EX & L^AT_EX: History

T_EX:

- ▶ A computer program
- ▶ Created by Donald E. Knuth
- ▶ For typesetting text and mathematical formula
- ▶ Knuth started writing the T_EX typesetting engine in 1977

L^AT_EX:

- ▶ Originally written by Leslie Lamport in the early 1980s
- ▶ Pronounced “Lah-tech” or “Lay-tech”

(The Not So Short Introduction to L^AT_EX 2_ε by Tobias Oetiker)

L^AT_EX: Background

Writing a book . . .

- ▶ Author: Writes the contents
- ▶ Book Designer: Decides the layout
- ▶ Typesetter: Typesets the book

L^AT_EX: Background

Writing a book . . .

- ▶ Author: Writes the contents (You!)
- ▶ Book Designer: Decides the layout
- ▶ Typesetter: Typesets the book

L^AT_EX: Background

Writing a book . . .

- ▶ Author: Writes the contents (You!)
- ▶ Book Designer: Decides the layout (L^AT_EX)
- ▶ Typesetter: Typesets the book

L^AT_EX: Background

Writing a book ...

- ▶ Author: Writes the contents (You!)
- ▶ Book Designer: Decides the layout (L^AT_EX)
- ▶ Typesetter: Typesets the book (T_EX)

L^AT_EX: Simple Example

simpleExample.tex:

```
1 \documentclass{article}
2 \begin{document}
3 Hello world!
4 \end{document}
```

Output:

Hello world!

L^AT_EX: Simple Example2

simpleExample2.tex:

```
1 \documentclass{article}
2 \begin{document}
3 H\ '{e}llo      {\bf world!}
4     \\\
5     We're\\ {\tt
6         typesetting}\\
7     with      \LaTeX!
8 \end{document}
```

Notice:

- ▶ Whitespace
- ▶ Accent
- ▶ newlines with \\

Output:

Hélló world!
We're
typesetting
with L^AT_EX!

L^AT_EX: Simple Example

simpleTitleExample.tex:

```
1 \documentclass{article}
2 \title{Cartesian Closed
   Categories}
3 \author{Muhammad Smith}
4 \date{September 2011}
5 \begin{document}
6   \maketitle
7   Hello world!
8 \end{document}
```

Other options:

```
1 \author{Jane Doe \and
   John Doe}
2 \date{\today} % the
   default
3 \date{} % no date
```

Output:

Cartesian Closed Categories

Muhammad Smith

September 2011

Hello world!

L^AT_EX: documentclasses

```
\documentclass[options]{}
```

- ▶ `article`: for articles in scientific journals, presentations, short reports, program documentation, invitations, ...
- ▶ `IEEEtran`: for articles with the IEEE Transactions format.
- ▶ `proc`: a class for proceedings based on the article class.
- ▶ `minimal`: is as small as it can get. It only sets a page size and a base font. It is mainly used for debugging purposes.
- ▶ `report`: for longer reports containing several chapters, small books, thesis, ...
- ▶ `book`: for real books
- ▶ `slides`: for slides. The class uses big sans serif letters.
- ▶ `memoir`: for changing sensibly the output of the document. It is based on the book class, but you can create any kind of document with it
- ▶ `letter`: for writing letters.
- ▶ `beamer`: for writing presentations (see LaTeX/Presentations)

(<http://en.wikibooks.org/wiki/LaTeX/Basics>)

L^AT_EX: documentclasses

```
\documentclass[options]{}
```

Most popular:

- ▶ book
- ▶ article
- ▶ report
- ▶ letter

Command	Level	Comment
<code>\part{part}</code>	-1	not in letters
<code>\chapter{chapter}</code>	0	only books and reports
<code>\section{section}</code>	1	not in letters
<code>\subsection{subsection}</code>	2	not in letters
<code>\subsubsection{subsubsection}</code>	3	not in letters
<code>\paragraph{paragraph}</code>	4	not in letters
<code>\subparagraph{subparagraph}</code>	5	not in letters

simpleStructures.tex:

```
1 \documentclass{article}
2 \begin{document}
3
4   Itemized list:
5   \begin{itemize}
6     \item Item one
7     \item Item two
8   \end{itemize}
9
10  Enumerated list:
11  \begin{enumerate}
12    \item Item one
13    \item Item two
14  \end{enumerate}
15
16 \end{document}
```

Output:

Itemized list:

- Item one
- Item two

Enumerated list:

1. Item one
2. Item two

L^AT_EX:

Centering

```
1 \begin{center}  
2   This text is centered! \\  
3   As is this line.  
4 \end{center}
```

Output:

This text is centered!
As is this line.


```
1 \begin{verbatim}  
2   code snippet  
3   \LaTeX commands  
4 \end{verbatim}
```

Note: For a single line, use
`\verb`

Output:

```
code snippet  
\LaTeX commands
```

L^AT_EX: Equations

Equations

- ▶ One of the most popular reasons to use L^AT_EX
- ▶ Use `\begin{equation} ... \end{equation}` or `$... $`

L^AT_EX: Equations

```
\begin{equation}
  F = P \left(1 + \frac{r}{n}\right)^{nt}
\end{equation}
```

$$F = P \left(1 + \frac{r}{n}\right)^{nt} \quad (1)$$

or

```
$ F = P \left(1 + \frac{r}{n}\right)^{nt} $
```

$$F = P \left(1 + \frac{r}{n}\right)^{nt}$$

L^AT_EX: Images

```
\includegraphics[height=.7\textheight]{fam}
```



Photo Credit: Ivan Syzonenko

L^AT_EX: Figures

```
\begin{figure}  
  \begin{center}  
    \includegraphics[height=.25\textheight]{fam}  
  \end{center}  
  \caption{Family Photo: July 5, 2013; Credit: Ivan Syzonenko}  
\end{figure}
```



Figure : Family Photo: July 5, 2013; Credit: Ivan Syzonenko

L^AT_EX: Tables

```
1 \begin{tabular}{lr}  
2   Student & Class \\  
3   \hline  
4   Student001 & Aug 25 \\  
5   Student002 & Aug 30 \\  
6   Student003 & Sep 1 \\  
7   Student004 & Sep 6 \\  
8   Student005 & Sep 8 \\  
9   Student006 & Sep 13 \\  
10 \end{tabular}
```

Output:

Student	Class
Student001	Aug 25
Student002	Aug 30
Student003	Sep 1
Student004	Sep 6
Student005	Sep 8
Student006	Sep 13

Quotes in L^AT_EX

“LaTeX uses 2 back-ticks to start the quote and 2 single ticks to end the quote.”

instead of

” LaTeX uses 2 back-ticks to start the quote and 2 single ticks to end the quote.”

Generating Output

- ▶ `latex lecture02.tex; dvips lecture02.dvi;`
- ▶ Produces `lecture02.dvi`, then `lecture02.ps`

or

- ▶ `pdflatex lecture02.tex`
- ▶ Produces `lecture02.pdf`
- ▶ Many advantages over postscript: bookmarks of the table of contents, hyperlinks to the figures, tables, bibliography references, or web site links

Good intro book:

The Not So Short Introduction to L^AT_EX 2_ε:

Or L^AT_EX 2_ε in 157 minutes

<http://tobi.oetiker.ch/lshort/lshort.pdf>