

Using T_EX and L^AT_EX

Lesson 2

T_EX and L^AT_EX

- Ⓐ T_EX is a system for *typesetting* documents, especially documents that use mathematical notation.
- Ⓑ Typing mathematics using a word processor is clumsy.
- Ⓒ Leslie Lamport created L^AT_EX, an add-on to T_EX.
- Ⓓ T_EX allows the author to focus on *content* and less on *appearance*.
- Ⓔ This document was typeset using L^AT_EX.

“Thinking doesn’t guarantee that we won’t make mistakes. But not thinking guarantees that we will.” LESLIE LAMPORT

Preamble

- a) The start of a \LaTeX file has commands that control the typeface, font, spacing, and more.
- b) This part of a \LaTeX file is called the *preamble*.
- c) For the most part, you do not need to fiddle with the preamble—just use the preamble of the problem set.
- d) In the preamble, you can define your own commands.

Text

- a) Following the preamble, the text goes in between

```
\begin{document}
```

```
\end{document}
```

- b) Words spacing is handled for you:

Example

Once processed, the text

```
Every      function that is a derivative has  
the  intermediate value property.
```

typesets as

Every function that is a derivative has the intermediate value property.

- c) To start a new paragraph, leave a blank line.

Problem sets

For a problem set, type your answer following the question, surrounded by a *solution environment*

Example

```
\question [3] Write the statement \emph{For  
every positive real number  $x$ }, there is a  
positive real number  $y$  such that  $y < x$  }  
in symbolic form.
```

```
\begin{solution}  
  This is my answer, and I'm sticking to it.  
\end{solution}
```

Finish what you start

If you start an environment, such as

```
\begin{solution}
```

be sure to terminate it with

```
\end{solution}
```

If you don't properly end an environment, you'll get errors that might be difficult to understand.

The math environment

Within text, put mathematics between `\(` and `\)`. For example

Example

```
Define \(\ F = x \ \text{in} \ \text{\texttt{\textbackslashreals}}\} \mapsto x^2 \ \text{\texttt{\textbackslashcos}}(x)\)
```

Typeset, this is: Define $F = x \in \mathbb{R} \mapsto x^2 \cos(x)$

- Ⓐ The command `\reals` is defined in the preamble of our problem sets. We use it to typeset \mathbb{R} .
- Ⓑ Function names that have two or more characters should be in a non-italic font.
- Ⓒ To typeset the cosine function, use the command `\cos`, not `cos`.

The math environment

To put mathematics on a separate line, use the `\[` `\]` environment; for example

Example

We have shown that

```
\[
  E = m c^2 .
\]
```

Typeset: We have shown that

$$E = mc^2.$$

Alignments

Example

$$\begin{aligned} 0 < a < 1 &\implies 0 < a^2 < 1, \\ &\implies 0 < 1 - a^2, \\ &\equiv 1 - a^2 > 0. \end{aligned}$$

enter

```
\begin{align*}
  0 < a < 1 & \&\implies 0 < a^2 < 1, \\
               & \&\implies 0 < 1 - a^2, \\
               & \&\equiv 1 - a^2 > 0.
\end{align*}
```

To start a new line, terminate with a double slash; to align on a symbol, put an ampersand before the symbol.

Mistakes? Me, never

- a If an environment isn't closed, your file will not process and you will get an error message.
- b The error message might indicate where the error is located.
- c If you have trouble finding the location of an error, try placing hunks of text inside a `\begin{comment}` environment. \LaTeX ignores text in a comment environment.
- d To use the comment environment, the preamble needs the command `\usepackage{comment}`.
- e When the error vanishes, you know it is inside a comment environment.

Help

- Ⓐ I sometimes forget how to do something using \LaTeX , but
- Ⓑ almost surely, the answer can be found with a web search.
- Ⓒ **Beware:** A web search that includes the word “latex” might result in some not particularly safe for class items.

Further study



Overleaf

<https://www.overleaf.com/learn>



Overleaf

https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes



YouTube

<https://www.youtube.com/watch?v=g8Ejj0T0yG4>



YouTube

<https://www.youtube.com/watch?v=P5EWoPOnZTU>



Latex Cheat Sheet

http://joshua.smcvt.edu/undergradmath/undergradmath_0.png



Latex Cheat Sheet

http://joshua.smcvt.edu/undergradmath/undergradmath_1.png



Symbol Cheat Sheet

https://oeis.org/wiki/List_of_LaTeX_mathematical_symbols