

A Sample L^AT_EX Document

Math 300

October 29, 2019

1 Typing Text

Since L^AT_EX is a markup language, any text we type appears on the page, unless it contains one of the nine reserved characters of L^AT_EX, listed below.

`\ { } & _ ^ % ~ #`

If we want those characters to appear on the page, we must precede them by a backslash, or, in the special case of the backslash itself, we must use the command `\verb`. In math mode, we can use the command `\backslash`.

Note that there are three kinds of dash-objects. Hyphens are very short, and are typed the way you would expect, using `"-`. Dashes, as in the range `1-2`, are wider, and are typed using `--`. If you feel a need for a wide—dash, you can use `---`.

2 Units

Lengths in L^AT_EX can be given in a number of Units.

| | |
|----|--|
| cm | Centimeters |
| em | The width of the letter M in the current font |
| ex | The height of the letter x in the current font |
| in | Inches |
| pc | Picas (1pc = 12pt) |
| pt | Points (1in = 72pt) |
| mm | Millimeters |

3 Space

The most direct way to make spaces is simply to use the `\hspace` and `\vspace` commands, for horizontal and vertical space, respectively. Each takes one argument: a distance specification for the size of the space. The width or height of the space can be positive *or* negative. Note that `\vspace` can only be used in vertical mode; that is, when you are starting a new paragraph or starting a float or doing something else that shifts text vertically. It will not work in a line.

L^AT_EX also has a number of predefined spaces. To produce a space with fixed width, and which cannot be used as a line break, you may use the `~` character. This would typically be used to separate initials of an author, or in other situations where we don't want to have a single letter or initial ending a line. More often, we don't mind a line break, and want the space to shrink or grow according to the justification requirements on the line. In that case we make a standard space using `\ ;` backslash-space.

There are wider stretchy spaces available to us: `\quad` and `\qquad`. There is also a “thin space”: `\,`. The following words are separated by a thin space, a standard space, a quad, and a qquad, respectively.

space space space space space

There are also predefined vertical spaces: `\smallskip`, `\medskip`, and `\bigskip`, that behave as their names imply.

There are also some exceptionally stretchy spaces that we can use to push text around. For example, the following line is set using the command `text\hfill text`. The line below it was set using `text\hfill text\hfill text`.

text text
text text text

You get the idea: `\hfill` makes enough space to fill the line in question completely. If more than one `\hfill` appears on a line, then the two negotiate over how much space they each get.

4 Lines and Boxes

There are a variety of ways to make lines and boxes in L^AT_EX. The most basic is to make a horizontal rule using `\hrule`.

`\hrule` makes a new line, and fills it up with a horizontal line. If you don't want an entire line, you can use `\hrulefill`, as in `_____`. This command works like `\hfill`, but instead of filling with space, it uses a horizontal rule to fill the line.

To make a box around some content, you can use the `\framebox` command. The `framebox` command puts a box around its argument, so that `\framebox{text}` looks like text. It takes optional width and position arguments, so that `\framebox[3in][1]{text}` appears as text.

5 Margins

This section is mistitled. \LaTeX does not really do margins, so much as it places text. It uses several variables in placing the text, which we can set. For example, to make the left margin on all even-numbered pages 0.5 inches wider than the default (which is 1 inch), we would define `\evensidemargin=0.5in`.

A list of the variables we can set and their default values follows.

```
\evensidemargin
\oddsidemargin
\topmargin
\textwidth
\textheight
\parskip
\baselineskip
```

6 Tables

Sometimes we need to typeset tables. For example, consider Table 1. Any resemblance of the numbers in Table 1 to those from any authentic poll is purely coincidental.

7 Figures

We can also put figures into our latex documents. For example, the image in Figure 1 is found at <http://www.math.wsu.edu/kcooper/M300/sniper.jpg>,

Table 1: Results from a poll that probably never happened.

| <i>What is your favorite animal?</i> | |
|--------------------------------------|---------------------------|
| Animal | Percentage of respondents |
| Dog | 43% |
| Cat | 44% |
| Schwarzenegger | 9% |
| We kill animals | 4% |

but must be converted to encapsulated postscript before it can be included in this document.

8 Homemade commands

It was the best of ideas. It was the worst of ideas. L^AT_EX was conceived as a programming language. This is what makes it harder to process using a wysiwyg interface, but it also allows us to make our own shortcuts. If you know that a particular expression will appear repeatedly in your document, you can make an abbreviation for it, or even a command that allows you to specify arguments. In our case, the sequence “It was the best of *fill in the blank*. It was the worst of *fill in the blank*.” is to appear many times in this section, so we created a command as follows:

```
\newcommand{\dickens}[1]{It was the best of #1.  
It was the worst of #1.}
```

This command takes one argument, which appears wherever a #1 appears in the text for the command. Thus, to typeset “It was the best of examples. It was the worst of examples.”, we need only to type `\dickens{examples}`.

9 Citations and References

In technical documents there are many references to typographical objects from the document, and citations of materials from outside the document. T_EX [1] and L^AT_EX [2] lets us keep track of those citations by name, rather than number. Using the “thebibliography” environment gives us automatic



Figure 1: Cats take vengeance on 4% of respondents [3].

numbering of our references, while associating those numbers with names, so that we can refer to the references using the `\cite` command. Likewise, for internal references, such as those to Figure 1, we can assign labels to a counter using the `\label` command, and refer to them using the `\ref` command.

References

- [1] Knuth, D., **The T_EXbook**, Addison-Wesley, Reading, 1984.
- [2] Lamport, L., **L^AT_EX: A Document Preparation System**, Addison-Wesley, Reading, 1986.
- [3] Watterson, B., **Homicidal Psycho Jungle Cat**, Andrews McMeel, New Jersey, 1994.