A Sample LaTeX Document

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Important Stuff
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This is a document produced by the LaTeX software, and generated by the source file `sample.tex`. Compare the source text file (left-hand sides) with the document it produces using LaTeX (right-hand sides).

1 Ordinary Text

1.1 Spacing in the source text

The ends of words and sentences are marked by spaces. It doesn't matter how many spaces you type; one is as good as 100. The end of a line counts as a space.

One or more blank lines denote the end of a paragraph.

Since any number of consecutive spaces are treated like a single one, the formatting of the input file makes no difference to TeX, but it makes a difference to you. When you use LaTeX, making your input file as easy to read as possible will be a great help as you write your document and when you change it. Keep typed lines **short** in length, and use `% comments`.

Because printing is different from typewriting, there are a number of things that you have to do differently when preparing an input file than if you were just typing the document directly. Quotation marks like "this" have to be handled specially.

1.2 Special characters

Dashes come in three sizes: an intra-word dash, a medium dash for number ranges like 1–2, and a punctuation dash—like this.

TEX interprets some common characters as commands, so you must type special commands to generate them. These characters include the following: $ & % # { and }.

1.3 Fonts

In printing, text is emphasized by using an *italic* type style. *A long segment of text can also be emphasized in this way. Text within such a segment given additional emphasis with* Roman *type. Italic type loses its ability to emphasize and become simply distracting when used excessively.*

Other font types are available:

Bold face type,

`typewriter style type,`

sans-serif type,

slanted type,

ALL CAPS TYPE.

Formulae and other mathematical expressions are given their own "math mode" font.

2 Spacing

A sentence-ending space should be larger than the space between words within a sentence. You sometimes have to type special commands in conjunction with punctuation characters to get this right, as in the following sentence. Gnats, gnus, etc. all begin with G. Generating an ellipsis ... with the right spacing around the periods requires a special command.

It is sometimes necessary to prevent TEX from breaking a line where it might otherwise do so. This may be at a space, as between the "Mr." and "Jones" in "Mr. Jones", or within a word—especially when the word is a symbol like *itemnum* that makes little sense when hyphenated across lines.

In math mode, TEX ignores the spaces you type and formats the formula the way it thinks is best. Some authors feel that TEX cramps formulae, and they want to add more space; however, TEX knows more about typesetting formulae than do many authors. Adding extra space usually makes a formula

prettier but harder to read, because it visually fractures the formula into separate units.

Though fiddling with the spacing is dangerous, you sometimes have to do it to make a formula look just right. One reason is that TEX may not understand the formula's logical structure, interpreting (for example) $\mathbf{y\,dx}$ as the product of three quantities rather than as y times the differential dx, so that it doesn't add the little extra space after the y. You can define your own commands to take care of such cases, or use these special spacing commands:

`\,`	thin space	(any mode)
`\:`	medium space	(math mode only)
`\;`	thick space	(math mode only)
`\!`	thin backspace	(math mode only)

A most precise spacing command can be used in either math or paragraph modes; the `\kern` command. Use it with the unit "em", which is the width of a capital M. Example: to print 'R' over an 'I' you might use the command `I\kern-0.27emR` to produce "IR".

3 Displayed Text

Text is displayed by indenting it from the left margin. Quotations are commonly displayed. There are short quotations

> This is a short a quotation. It consists of a single paragraph of text. There is no paragraph indentation.

and longer ones.

> This is a longer quotation. It consists of two paragraphs of text. The beginning of each paragraph is indicated by an extra indentation.
>
> This is the second paragraph of the quotation. It is just as dull as the first paragraph.

Footnotes[1] pose no problem. Likewise, bibliographic references [**?**] are handled with ease. ¡TEX can gènérate almöst all the accents and speçial

[1] This is an example of a footnote.

symbols used in Western [?] långuages! Likewise, its arsenal of mathematical symβols, introduced below, is formidable.

Another frequently-displayed structure is a list. The following is an example of an *itemized* list.

- This is the first item of an itemized list. Each item in the list is marked with a "tick". The document style determines what kind of tick mark is used.
- This is the second item of the list. Need there be more?

4 Mathematical Formulae

TEX is good at typesetting mathematical formulas like $x - 3y = 7$ or $y_{i+1} = x_i^{2n} - \sqrt{5}x_i^n + 1$. Remember that a letter like x is a formula when it denotes a mathematical symbol, and should be treated as one.

Mathematical formulas may also be *displayed*. A displayed formula is one-line long; multiline formulas require special formatting instructions. The following formulae demonstrate many constructions you might find useful. Refer to equation (??), which is probably true, while equations (??-??) are silly. Note that the `equation` and `eqnarray` environments number the equations, but `eqnarray*` doesn't.

$$x_{i+1} \;=\; N^{i+1}(x_0) \;=\; N(x_i) \;=\; x_i - \frac{f(x_i)}{f'(x_i)}$$

$$\frac{\partial u}{\partial t} + \nabla^4 u + \nabla^2 u + \frac{1}{2}|\nabla u|^2 \;=\; c^2$$

$$a^p + b^p \neq c^p \quad \text{for } p > 2 \;\; \text{(see proof in margin)} \tag{1}$$

$$\lim_{n\to\infty} x_n \geq \pi$$

$$\forall x \in \mathcal{O} \;\; \exists \delta \quad \text{such that} \quad |y - x| < \delta \;\Rightarrow\; y \in \mathcal{O}$$

$$\Psi' = \frac{d}{d\phi}\begin{pmatrix} \phi_2 \\ \phi_3 \\ 1 - \phi_2 - \phi_1^2/2 \end{pmatrix} \qquad \Theta = \begin{pmatrix} 0 & 1 & 0 \\ -\theta_1\psi_1 - \psi_2 & 0 & \psi_3 \\ -\phi_1 & -1 & 0 \end{pmatrix}$$

$$\int_0^\infty e^{-x^2}\,dx = e^{-\left(\int_0^\infty x\,dx\right)^2} \quad (2)$$

$$= e^{-\infty} \qquad \text{(bogus)} \quad (3)$$

$$= 0.38 - 1.7i \qquad \text{(not!)} \quad (4)$$

$$\begin{aligned}\sum_{n=1}^{k} \frac{1}{n} &\approx \ln k + \gamma \\ &= (\ln 10)(\log_{10} k) + \gamma \\ &\approx 2.3026 \log_{10} k + 0.57772\end{aligned}$$

k	x_1^k	x_2^k	x_3^k
0	-0.30000000	0.60000000	0.70000000
1	0.47102965	0.04883157	-0.53345964
2	0.49988691	0.00228830	-0.52246185
3	0.49999976	0.00005380	-0.52365600
4	0.50000000	0.00000307	-0.52359743
5	0.50000000	0.00000007	-0.52359885
6	0.50000000	0.00000000	-0.52359877
7	0.50000000	0.00000000	-0.52359878

Unary operators "plus" and "minus" – just use exponentiation:

$^{+}0.168$ or $^{-}1.168$

$\| \diamond \star \|$ ♣♢♡♠ ♯♭♮ $\cap \cup \pm \mp$ $\prod \alpha\beta\gamma$ $\oint_C f(z)dz$ $\Gamma_{\sqrt{7}}^{v,v}$ $V \bigoplus W$

References

[1] Lamport, Leslie. LaTeX: A Document Preparation System.
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[2] Schlœffo̩nfflo͡oægën, Lärs. Silly Typography.
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