An Introduction to $\LaTeX$

Ravi Mukkamala
Department of Computer Science
Old Dominion University

Julie McClean
Department of Oceanography
Old Dominion University

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Abstract
An Introduction to $\LaTeX$ is presented. Sufficient information is provided to enable a user to prepare a scientific paper.
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1 Sections, Subsections and Paragraphs

\LaTeX{} automatically generates section numbers. Blank lines before or after a sectioning command have no effect.

A paragraph is recognized by a blank line separating two pieces of text. Observe the indentation.

This paragraph has no indentation.

1.1 Subsections and Subsubsections

The section can be subdivided into subsections and subsubsections.

No Section Numbers

Hint: If you do not want section numbers place an asterisk before the braces.

2 New Environments

One way to start a new environment is to enclose it within left and right braces. i.e. \{........\}.

A simpler way is to use a \begin{name} \ldots \end{name}

3 Type Styles and Sizes

Roman type style is the default type style

This is emphasized

This is bold type
This is slanted
This size is LARGE
This size is tiny This is huge
This is large type writer style

Hint: When specifying both a type style and a size put the size first. If you want the entire document to be in a particular style or size, put the command i.e. \tt, after the \maketitle command.

4 Lists

• This item will have the default bullet in front of it.

al The label is explicitly defined here

• Points can be numbered within an item.

1. With the default numbers

bl With specified numbers or letters

5 Mathematical Formulae

\LaTeX has a very powerful math environment. Lowercase Greek letters are obtained by adding a \ to the name of the letter i.e. $\alpha$, $\nu$, $\lambda$, $\Pi$, $\tau$. Other symbols such as symbols such as $\pm$, $\div$, and $\leq$ are available.

Summation and integration symbols are $\sum_{i=d}^{n}$ and $\int_{z_{j+l}}^{z_{j}}$, respectively. There are assignment symbols such as the left arrow ($\leftarrow$) and $\Delta x$. 

4
5.1 Arrays

Equations or text can be displayed in an array by using the "array" environment of \LaTeX. It automatically assumes a math environment.

\[
\begin{array}{cccc}
  a^2 + \sqrt{a + b} & \sin b \cdot \cos \ln a & b_1 + c_1 & 1 \\
  v^n & m & a^2 & a + b \\
  123 & 345678 & 5678 \\
\end{array}
\]

5.2 Superscripts and Subscripts

^ is used for superscripts i.e. $a^2$ or $ms^{-1}$. The underscore (_) is used for subscripts i.e. $a_1$, $x_j$.

5.3 Numbering Equations

\[
fu = -\frac{1}{\rho} \frac{\partial p}{\partial y} \quad (1)
\]
\[
f v = \frac{1}{\rho} \frac{\partial p}{\partial x} \quad (2)
\]
\[
\frac{\partial p}{\partial z} = -\rho g \quad (3)
\]

Hint: The & symbol aligns the equations.

If there is only one equation to write use the "equation" environment.

\[
\beta M_y = \text{curl}_z \tau_\eta \quad (4)
\]

Finally, if you do not wish to number the equations

\[
E = mc^2
\]
### Table 1: This is just an Illustration of a table

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Columns 2 &amp; 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>123451111111</td>
<td>bmvnfhghjkgh</td>
</tr>
<tr>
<td>1</td>
<td>bbbbbbbbbbbbbb</td>
</tr>
<tr>
<td>hgfhhghhhghh</td>
<td>123</td>
</tr>
</tbody>
</table>

#### 5.4 Left and Right Delimiters

Many times delimiters are required around a given set of expressions. For example, a matrix is surrounded (on left and right sides) by square brackets ([ ]). Similarly, a set is delimited by braces ({, }). In fact, the size of the delimiters are dictated by the contents that they enclose.

For example,

$$
\begin{bmatrix}
  x & y \\
  p & q \\
  a & b
\end{bmatrix}
$$

$$
x = \begin{cases}
y & \text{if } y < 0 \\
\sqrt{y} & \text{otherwise}
\end{cases}
$$

### 6 How to Create Tables

\LaTeX{} has a very powerful and simple mechanism to create tables.

### 7 Verbatim – Just Print What We Type

Confusion can arise when printing characters that are understood differently by \LaTeX{}. Use the "verbatim" environment to avoid this problem.

I hope this $ is not understood as math environment by \LaTeX{}. If
this facility did not exist \em is interpreted as emphasis, and \today as today’s date.

If you want to use it as part of a text, then use "verb". For example,

will this be understood as a \em symbol or as emphasis command?

8 How to Begin a L\TeX Document

Always begin with:

\documentstyle{article}

---- declarations --
\begin{document}

-- type the text -

There are several other options that you can specify with the documentstyle command. Some these are font size (12pt, 11pt), book, report, letter, two column, etc..

9 How to End a L\TeX Document

The command \end{document} ends the \TeX document. Every \TeX file is to be prefixed by .tex. This file is called sample.tex.

10 How to Run a L\TeX Document

Type the following commands:
latex filename.tex dvips filename

Note: NO suffix To view on the screen: xdvi filename

The first command creates a log file (file.log) and a device independent file (file.dvi).

References