Word Processing Using LaTeX

rwp tpl

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1 Using LaTeX on the HP Teaching System

All the icons you need for text processing can be brought out by typing

```
desktop latex
```

once you have logged in. LaTeX is a friendly way of using the TeX text formatting system. The LaTeX program converts a text file containing special formatting commands into a DVI (DeVice Independent) file with suffix '.dvi' which can be previewed or printed out.

To use LaTeX on the teaching system all you have to do is create a normal text file with your text in it, along with a few special formatting commands. It is wise to give the filename a .tex suffix. So, for example you might create a file called essay.tex and drop it on the Edit icon to begin editing it using Emacs. When you are editing text it's a good idea to put Emacs into 'auto-fill-mode'. To do this you should:

- Hold down the <Extend char> key and press the 'x' key.
- Type the command auto-fill-mode (remember the hyphens).
- Press the <Return> key.

Once you are in this mode, Emacs will put in new lines automatically as your typing reaches the right hand side of the screen. The line breaks introduced have no connection to the line breaks which will eventually by generated when the 'latex' program processes your document, they simply make it easier to type in.

1.1 Producing a Simple Document

It is very easy to use LaTeX to produce simple documents containing text with occasional headings. You put

```
\documentstyle[12pt,a4]{article}
\begin{document}
```

at the top and

```
\end{document}
```

at the end. If you want to have headings in the text or at the top of the document you use the command

```
\section*{This is the Text of the Heading}
```

The text of the document is just typed in as normal except that each time you want to start a new paragraph you should leave a blank line.

There are a small number of characters which have special meanings in LaTeX so if you need to use them they will need to be entered specially into your file. The characters are:

```
& $ # % _ { } ^ ~ \
```

If you really need any of the first seven of these they can be inserted by typing the two character combinations shown below.

```
\& \$ \# \% \_ \{ \}
```

The '`\`' character is used in each case to tell LaTeX that the character that comes next should not have its special meaning in this case. When you are happy with the document, save it. There's no need to shut down the editor.

1.2 The LaTeX Icon

Next, your document needs to be processed. Drop the file you have created on the `LaTeX` icon. A window will come up with a number of buttons. Initially, the `latex` button will be highlighted. Click on the `ok` button to begin processing your document.

If an error occurs, details will be given of the line in which the error was detected. If this information isn't enough, select the `log` option and click `ok`.

Try to correct the error in your Editor window. You may need to refer to the LaTeX book or ask the Programming Advisor for help. When you have corrected the error, save the file, select the `latex` button and click on `ok` again.

When LaTeX has processed your document successfully you will be left with a number of new files, all with the same base name as your original, but having different suffices. The one we are interested in is the '`.dvi`' file. This file shouldn't be viewed using emacs, but can be looked at using the `view` option. Clicking on `ok` will preview your document. You can use the mouse to magnify bits of the window. Just press a mouse button over the part of the text you want to see in more detail. The middle button works the scroll bars. Click on the buttons to the right of the window to move around the document.

To print out a hard copy of your document select the `print` option.

If you would rather process your document using commands in a terminal window, use the man command to consult the unix manual entries for

detex - this removes the LaTeX constructions from a file.

wc - to do word counts.

spell - a spell checker.

xdvi - a DVI file previewer.

latex - the LaTeX program.

dviselect - to pick out pages from a `DVI` file.

dvilp - to send `DVI` files to the default laser printer.

2 An Example Document

Sooner or later you may want to produce more complicated documents using LaTeX. There are many other handouts available. Click on the `handouts` icon in the Utilities section of the Toolbox for more details. Advanced features are documented in

> "LaTeX users guide and reference manual." Leslie Lamport. Addison-Wesley 1986.

which provides a comprehensive reference for almost everything which can be done with LaTeX. This book refers to two commented sample files which you may like to copy and experiment with. They are `/usr/local/lib/tex/small.tex` and `/usr/local/lib/tex/sample.tex`.

Another book that may be useful is

> "The TeXbook." Donald Knuth. Addison-Wesley 1986.

To introduce a few more of the more commonly used techniques we now present an example of the source file of a LaTeX document followed by what it really looks like when it has been processed by the `latex` program.

```
\documentstyle[12pt,a4]{article}
\begin{document}
\section*{Excitement and Hard Maths}

Quotation marks are inserted into text using ` for open quotes, and '
for close quotes.  If double quotes are needed you just type two
single quotes --- ``This is a quotation,'' he said.  Notice that you
can produce different length dashes by typing one, two and three
hyphens.  Between hyphenated words use just one inter-word hyphen.
Two hyphens are often used for number ranges (23--45).  Three hyphens
are used a bit like semicolons --- you know the sort of thing.

\LaTeX\ always puts extra space after a full stop like this.  If the
To prevent the extra gap occuring in the middle of a name you insert
a tie like this (Mr.~Jones).

This is a bit of prose which is gently building up to the excitement
of an equation.
\begin{eqnarray}
y&=&ax^{2}+bx+c \nonumber\\
E&=&mc^2 \nonumber\\
{\delta y \over \delta x} &=& {{a\over b}\over c}
\end{eqnarray}

\noindent
now wasn't that fun.  Don't worry too much about that if it looks
complicated, the main purpose was to give an {\em idea\/} of the
quality of maths which \LaTeX\ can produce.  Let's look at a rather
simpler formula.  Subscripts are written \( x_{2y} \) and superscripts
are written \( x^{2y} \).  These are both in-line formulae.

\section*{Conclusions}

This example illustrates a number of \LaTeX\ features.  By looking
through the original and the processed text you should be able to see
\begin{enumerate}
\item How to open and close both single and double quotes.
\item How to produce dashes and what they look like.
\item How to typeset Ms.~Smith.
\item How to produce subscripts and superscripts.
\item How to emphasize a section of text {\em like this}.
\item How to produce a numbered list of things.
\end{enumerate}
\end{document}
```

comes out like this:

Excitement and Hard Maths

Quotation marks are inserted into text using ‘ for open quotes, and ’ for close quotes. If double quotes are needed you just type two single quotes — “This is a quotation,” he said. Notice that you can produce different length dashes by typing one, two and three hyphens. Between hyphenated words use just one inter-word hyphen. Two hyphens are often used for number ranges (23–45). Three hyphens are used a bit like semicolons — you know the sort of thing.

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$$\begin{aligned} y &= ax^2 + bx + c \\ E &= mc^2 \\ \frac{\delta y}{\delta x} &= \frac{\frac{a}{b}}{c} \qquad (1) \end{aligned}$$

now wasn’t that fun. Don’t worry too much about that if it looks complicated, the main purpose was to give an *idea* of the quality of maths which LaTeX can produce. Let’s look at a rather simpler formula. Subscripts are written x_{2y} and superscripts are written x^{2y}. These are both in-line formulae.

Conclusions

This example illustrates a number of LaTeX features. By looking through the original and the processed text you should be able to see

1. How to open and close both single and double quotes.
2. How to produce dashes and what they look like.
3. How to typeset Ms. Smith.
4. How to produce subscripts and superscripts.
5. How to emphasize a section of text *like this*.
6. How to produce a numbered list of things.