University of Manchester
School of Computer Science
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My Wonderful Creation and other Gismos

Author: A. Student

Supervisor: Dr. A. Lecturer

Abstract

My Wonderful Creation
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The aim of the project is to investigate the performance of Gismos and to design and construct a super multi-functional Gismo.
The novel aspects of the new Gismo are described. The abstract should perhaps be about half a page long.
The results of testing, which show the abject failure of the Gismo, are presented.
In the conclusions proposals for rectifying the deficiences are outlined.

Supervisor: Dr. A. Lecturer

Acknowledgements

I would like to thank my parents, my school teachers, my friends, my absolutely wonderful supervisor, the guy down the chip shop and all my wonderful fellow students for their unswerving support during my project. Without your help none of this would have been possible.

I love you all.

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Chapter 1

Introduction

1.1 How to read this document

This document attempts to do two things

- Provide a starting point from which you can construct your report.
- Explain how one or two useful LaTeX tricks work.

This means that you actually need to read it in two ways

- Read a printed, or previewed version to see *what* can be done.
- Read the source to see *how* it's done.

If you have any comments on this document, please email `graham.gough@manchester.ac.uk`

1.2 Aim

The aim of the project is to create a wonderful gismo.

A blank line is used to separate paragraphs. The chapters, sections and subsections are numbered and added to the table of contents automatically.

1.3 Driving Latex

LaTeX is not a WYSIWYG system. You first prepare source files, report.tex etc., similar to the ones here, using your favourite text editor.

The UNIX commands you need to drive LaTeX are:

1. `latex`. Output from `latex` can be previewed on the screen with `xdvi` or `gsprev` (under X), and printed on the laserprinter using `dvips`. `latex` produces .dvi files which are used by `xdvi` or `gsprev` and `dvipr`. To get all the cross references and the table of contents correct you sometimes need to run this command twice in succession. Keep on re-running until the advice to rerun at the end of the output goes away.

   Many people now use `pdflatex` instead of `latex` to produce `pdf` files directly.

2. `xdvi` or a pdf viewer such as `xpdf`, `evince` or `Preview` (Mac OS X). Previews the document on the screen, again the parameter is report (or `report.pdf`).

3. `dvips`. This is used to print dvi files on the laserprinter. The parameter is again `report`. Most pdf previewers provide their own printing interface.

4. `xfig`. Can be used to produce diagrams, see section 2.3.

There are on-line manual pages for each of the commands described above.

The set of files used to produce this document is in /opt/info/doc/latex (in one of the sub-directories 3rd-yr or MU-Thesis). They are also on the web at `http://studentnet.cs.manchester.ac.uk/resources/latex/MUThesis/`.

You will find that for more detailed points you will need to refer to Lamport's 'LaTeX a document preparation system' [Lam94] (Copies in the library in Blackwell's). This example has been written using the most recent version of LaTeX(LaTeX2e), which is described in the *2nd edition* of Lamport's book. Buying a cheap copy of the 1st edition is probably not a good investment. An alternative to Lamport's book, which some people prefer, is 'A guide to LaTeX 2ε' by Kopka and Daly [KD95]. The older 'A guide to LaTeX' [KD93] by the same authors is now obsolete. There is also plenty of support material for LaTeX on the web.

1.4 Software Environment

1.4.1 Occam

Here is some more example text, showing various LaTeX facilities you may need. The project was mostly programmed in **Occam** [DD87]. (A citation has been created here to an entry in the bibliography at the end of the report. See chapter 3 for more details on how to do this).

Note the way of getting boldface, *textit* is used for italic. *emph* is used for emphasis and is the same as italic except when already in italic. Note the cross reference to the bibliography. This is how you create a footnote: DMA[1].

Here is a reference to a figure. See figure 1.1. The picture in this figure was created the hard

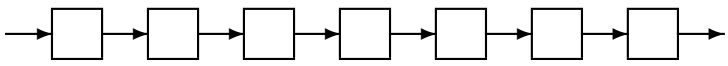


Figure 1.1: A Pipeline of processors

way using the picture facility of LaTeX. It is *much* easier to use `xfig`, as described in section 2.3. Whatever its contents, a figure 'floats' to a 'suitable' point in the text and is never split across a page boundary. (LaTeX's idea of what constitutes a suitable point may not coincide with yours)

Now we have a verbatim environment; this is a useful way of including snippits of program, printed in a fixed width font exactly as typed:

```
{{{ An example of some folds
...  This is some folded code
```

[1]Direct Memory Access. Footnotes can stretch over more than one line if you have a lot to say, but be careful not to overdo them.

```
  {{{ This is another fold
  This is text within the fold that has now been
  opened so that the text can be read.
  }}}
}}}
```

Chapter 2

This chapter has a very long title that would be too long for using in headers and table of contents

2.1 Image processing

Because Image processing is such a large topic no attempt will be made here to describe the entire subject here but only areas directly relevant to the project as a whole. Note how we can cross reference sections of the document such as section 2.2

2.2 Low level operations

Here is an example of a list with bullets:

- *Mean* Take the mean value of the neighbourhood.
- *Median Filter* Take the median value of the neighbourhood.

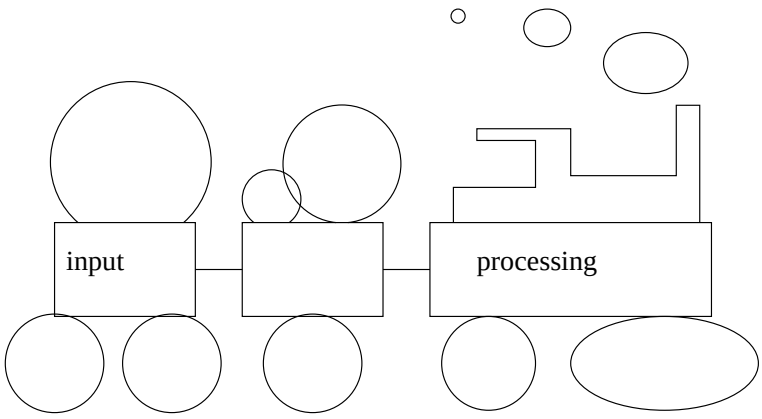
Here are a couple of mathematical formulae:

$$\Delta_1 = I(x,y) - I(x+1,y+1)$$
$$(x-a)^2 + (y-b)^2 = R^2$$

A table is just like a figure. Table 2.1 uses the tabular environment. Environments such as tabular can be used in ordinary text as well.

place	1991	1992	1993
CS Dept	1	99	199
Owens Park	1876	22	0
Academy	0	0	99999

Table 2.1: Distribution of Wombats in Greater Manchester



A caption for the picture

Figure 2.1: Final version of the system

2.3 Creating Diagrams

Figure 2.1 is a figure previously prepared using the `xfig` interactive drawing package. With the latest version of `xfig` it is quite easy to incorporate `xfig` diagrams. The `xfig` package is menu driven and reasonably self explanatory.

Use the *Export* menu option to save an encapsulated PostScript version of your figure, which can then be included in the document using the `\includegraphics` command. Choose the *Portrait* orientation option. For example, if the figure is in the file figure1.fig, the exporting process will create a file figure1.eps, which can then be included, scaled to whatever height or width you want.

Note that, if you want to use such graphics facilities in some other document, which does not use either the `third-rep` or `muthesis` document class, you will need to put the command `\usepackage{graphicx}` after the `\documentclass....` command in the main file.

2.4 Screen Dumps

Screen dumps can often enhance the appearance and clarity of a report, although care should be taken not to overuse them. When using screen dumps it is useful to make use of LaTeX's capability for using compressed PostScript files, as in the example shown in figure 2.2.

The image is first captured using, for example, `xv`, and saved in a file, e.g. `screen.ps`. Next, extract the bounding box information from the head of this file. In this case it is

```
%%BoundingBox: -100 -16 697 860
```

and create a file with name given by adding `.bb` to the original file name (in this case the name is `screen.ps.bb`) which contains just this bounding box. You can now compress the original file, using `gzip`. The command `\includegraphics[width=12cm]{screen}` will look for either screen.ps or screen.ps.gz, so you can compress or uncompress the ps file without changing the latex source.

Alternatively, save as `.png` if using `pdflatex`.

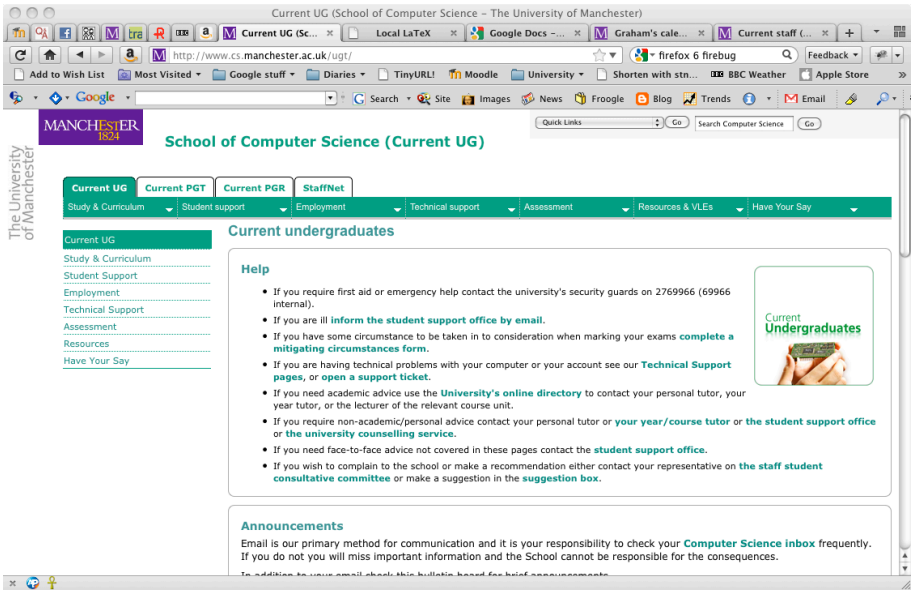


Figure 2.2: A screen dump

The `draft` option can be used to exclude the actual figure, but leave an appropriate amount of space.

You may not be able to see the screen dump if you are viewing this file from WWW. This is due to an unfortunate 'feature' of the previewer xdvi. If you view the files directly from `/opt/info/doc/latex/3rd-yr`, things should work properly.

Chapter 3

Making a bibliography

Whenever you wish to refer to books or articles relevant to your report you should use a citation such as [Lam94]. You can also force entries to appear in the bibliography without a citation appearing in the document, by using `\nocite`.

Each document cited must have an entry in a .bib file. For this document we have only one, called refs.bib. These files are listed in the `\bibliography` command at the end of report.tex. Note that the .bib files can (and often do) contain many more entries than are actually cited in a partcular document; the only ones that appear in the bibliography are those that have been referenced using `\cite` or `\nocite`.

In order to generate the appropriate reference entries, you will need to run `bibtex` after `latex` has been run, using the command `bibtex report`. This will generate a file report.bbl, which contains the bibliography entries. Once that file is there, you do not need to run `bibtex` again unless you add new citations, but you will probably have to run `latex` twice after running `bibtex` the first time.

The TEX FAQ ([Tea12]) gives tips on how to cite URLs.

The file refs.bib provides an example of what can be done with BibTEX. You can find much more information in any book on LATEX, for example [Lam94, GMS94, KD95]

Bibliography

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[Lam94] Leslie Lamport. *LaTeX – A document preparation system*. Addison-Wesley, 2nd edition, 1994.

[Tea12] LaTeX Team. URLs in BibTeX bibliographies. `http://www.tex.ac.uk/cgi-bin/texfaq2html?label=citeURL`, 2012.

Appendix A

Example of operation

An appendix is just like any other chapter, except that it comes after the appendix command in the master file.

One use of an appendix is to include an example of input to the system and the corresponding output.

One way to do this is to include, unformatted, an existing input file. You can do this using `\verbatiminput`. In this appendix we include a copy of the C file hello.c and its output file hello.out. If you use this facility you should make sure that the file which you input does not contain `TAB` characters, since LaTeX treats each `TAB` as a single space; you can use the Unix command `expand` (see manual page) to expand tabs into the appropriate number of spaces.

A.1 Example input and output

A.1.1 Input

(Actually, this isn't input, it's the source code, but it will do as an example)

```
/* Hello world program */

#include <stdio.h>

int main(void)
{
    printf("Hello World!\n") ;
    return 0 ;
}
```

A.1.2 Output

```
Hello World!
```

A.1.3 Another way to include code

You can also use the capabilities of the `listings` package to include sections of code, it does some keyword highlighting.

```c
/* Hello world program */

#include <stdio.h>

int main(void)
{
    printf("Hello World!\n") ;
    return 0 ;
}
```