A SAMPLE PAPER

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Abstract. This is a template for doing a paper using LaTeX.

I want to start off with some of the basics. You can get a better idea of how to use LaTeX by reading IS_guide.pdf.

1. In the beginning: Knuth said "Let there be TeX"

"So how do I use LaTeX?" Well let's start with some basic things. First, how is a document structured in LaTeX?

A *document* for LaTeX is all the stuff that comes between the `\begin{document}` and `\end{document}` tags. The `paper.tex` file has the `\begin{document}` and `\end{document}` tags. I should also mention that the % symbol is used for comments. The `paper.tex` file has a number of comments that are intended for you and try to explain what is happening. Oh, and if you need a % symbol enter `\%`.

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2. An example of making a new section and giving it a short name

The subsection command works in exactly the same manner. Each new section must have `\section[short name]{section name}` as its first line.

"Hey, wait a minute. What if I need to refer to that section? How can I do that?" It's actually as simple as adding`\label{labelname}` at the end of the section command like`\section[My new section]{An example of making a new section and giving it a short name}\label{sec:newsec}`. Now I can refer to Section 2 by typing `\ref{sec:newsec}`. You can label just about anything and refer to the label to get an automatically generated number for the item. This means that you need to come up with a labeling scheme before you start writing and stick with it.

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For example I can use `emph` or `textit` to italicize text. To italicize homework I would enter `\emph{homework}` or `\textit{homework}` to produce *homework*. To obtain **bold** text you would use the `textbf` command. And what about lists?

There are several kinds of lists (enumerated, itemized, and descriptive) and each has its own place and environment. An enumerated list is good for outlining or ordered lists:

```
\begin{enumerate}
\item First main idea
\begin{enumerate}
\item First subpoint
\item\label{enum:1b} Second subpoint
\end{enumerate}
\item Second main idea
\end{enumerate}
```

1. First main idea
    a. First subpoint
    b. Second subpoint
2. Second main idea

The itemized list is good for unordered lists or bullet points:

```
\begin{itemize}
\item Idea
\item Idea
\item Idea
\item Idea
\end{itemize}
```

- Idea
- Idea
- Idea
- Idea

And the descriptive list is good for definitions; however, `amsthm` already has a definition environment, and you will most likely not need the description environment. In any event, here is an example:

```
\begin{description}
\item[First item:] Idea
\item[Second item:] Idea
\item[Third item:] Idea
\end{description}
```

First item:: Idea
Second item:: Idea
Third item:: Idea

Notice the use of brackets in the last example. The brackets are optional and the text in the brackets is used as the label for the item. You should also note that you can label an item for later reference see 1b. There are several options for changing the format of the list environments and a package, `paralist`, for customizing lists which are described in section 3.3 of Mittelbach et al. [8].

3. Theorems, definitions, examples, oh my!

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4. Putting code in the main body of the thesis

There is one last textual item which Computer Science majors and probably some Mathematics majors will need to incorporate, pseudocode. Below is an example set up for the `listings` package.

```
\lstset{
        language =Pascal, % pick a language style
        emph={return,natural, numbers, integers, increasing},
        emphstyle={\bfseries},% choose other keywords and a format
        linewidth=.95{\textwidth}, breaklines=true,commentstyle=\textit,
        stringstyle=\upshape,showspaces=false,numbers=left,
        numberstyle=\tiny,basicstyle=\small,xleftmargin=30pt,
        breakautoindent=true,captionpos=b
        }
```

The listing in Listing 4.1 gives an algorithm for finding the largest even integer in a given list of n integers. I have used the `mathescape` option to be able to incorporate mathematics in the listing. The actual code put in the thesis is given first and the formatted output follows.

```
\begin{lstlisting}[mathescape, caption= Find the location
of the largest even integer in a list,label=largesteven]
procedure $largestevenlocation$($a_1, a_2, \ldots, a_n$: integers)
$k$:=0
$largest$:=-$\infty$
for $i$:=1 to $n$
  if ($a_i$ is even and $a_i>largest$) then
  begin
    $k$:=$i$
    $largest$:=$a_i$
  end
end
return $k$
\end{lstlisting}
```

```
1  procedure largestevenlocation(a_1,a_2,...,a_n: integers)
2  k:=0
3  largest:=-∞
4  for i:=1 to n
5     if (a_i is even and a_i > largest) then
6     begin
7        k:=i
8        largest:=a_i
9     end
10 end
11 return k
```

Listing 4.1. Find the location of the largest even integer in a list

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5. Working with figures and tables

5.1. **Getting a simple figure in the document.** In this chapter we want to talk about including figures and tables in the document. To insert a simple figure you can enter something like

```
\begin{figure}[!ht]
\begin{center}
\woopic{picture3}{.8}
\end{center}
\caption{Our first
 picture}\label{first}
\end{figure}
```

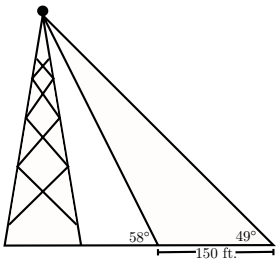

Figure 5.1. Our first picture

The `!ht` tell LaTeX to try and place the figure here no matter what or at the top of the next page. The `\woopic` command takes the name of the picture as the first argument and the scaling factor as the second argument. The scaling factor must be between zero and one and the figure name must have *no spaces*. Your figures can be in one of three formats: jpg, tif, or pdf. Captions are placed below the figure and your label should be placed after the caption.

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5.2. **Tables.** Tables are fairly easy to set up. Here is a simple table

```
\begin{table}[!ht]
\begin{center}
\begin{tabular}{c c}
  $\underline{\textnormal{District}}$ &
  $\underline{\textnormal{Population}}$\\
   Applewood & 8280 \\
   Boxwood & 4600  \\
   Central & 5220
   \end{tabular}\caption{Our first table}
   \end{center}
\end{table}
```

District	Population
Applewood	8280
Boxwood	4600
Central	5220

Table 5.1. Our first table

In `\begin{tabular}{c c}` the two "c"s indicate that we have two columns with centered entries and no lines dividing cells or around the table. I can make the table look more like a spreadsheet by doing

```
\begin{table}[!ht]
\begin{center}
\begin{tabular}{|c|c|}
\hline
  {\textnormal{District}} &
  {\textnormal{Population}}\\ \hline
   Applewood & 8280 \\ \hline
   Boxwood & 4600  \\ \hline
   Central & 5220\\ \hline
   \end{tabular}\caption{Our first table again}
   \end{center}
\end{table}
```

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District	Population
Applewood	8280
Boxwood	4600
Central	5220

Table 5.2. Our first table again

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Please refer to Chapter 6 of Kopka and Daly [7] for a complete discussion of tables and tabular environments.

6. Working with bibliographies and indicies

I would highly recommend that you use BibTEX to create your bibliography. BibTEX processes a special .bib file. The .bib file is where you enter your bibliographic information. A sample entry looks something like

```
@article{feu02,
author= {Thomas~Feuerstack},
title= {Introduction to pdf{\TeX{}}},
journal= {TUGboat},
volume= {23},
pages= {329--334},
number= {3/4},
url= {http://www.tug.org/TUGboat/Articles/tb23-3-4/tb75feu.pdf},
year= 2002}
```

or

```
@book{mgbcr04,
author= {Frank~Mittelbach and Michel~Goossens and
Johannes~Braams and David~Carlisle and Chris~Rowley},
title= {The \LaTeX\ Companion},
publisher= {Addison Wesley Professional},
edition= {2nd},
address= {New York},
year= 2004}
```

For a Web site I would recommend the following

```
@misc{brei04,
author =  {Jon~Breitenbucher},
title =  {{W}ooster related {L}a{T}e{X} files},
url =  {http://jbreitenbuch.wooster.edu/~jonb/latex/},
howpublished= {World Wide Web},
year= 2004,
note =  {Accessed on 03/11/2004}}
```

You can make a reference by typing `\citet{mgbcr04}` to produce Mittelbach et al. [8]. Other forms for citation include `\citep{mgbcr04}` or `\citeauthor {mgbcr04}` to produce [8] or Mittelbach et al. respectively. You can consult Kopka and Daly [7] or Mittelbach et al. [8] to find out how to format entries in the .bib file and what options each reference type has.

References

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11. Simon Singh. *The Code Book*. Anchor Books, New York, 1999.

12. Wade Trappe and Lawrence C. Washington. *Introduction to Cryptography with Coding Theory*. Prentice Hall, Upper Saddle River, NJ, 2002.