

# Typesetting a Thesis/ Dissertation Using Mateti's L<sup>A</sup>T<sub>E</sub>X Example

(For *this* document, the following is NOT true.)

A thesis submitted in partial fulfilment  
of the requirements for the degree of  
Master of Science in Computer Engineering

By

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I HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER MY SUPERVISION BY Sripriya Subramanian ENTITLED Sniffing the Ethernet with High Quality Tools BE ACCEPTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF Master of Science in Computer Science.

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## ABSTRACT

Subramanian, Sripriya. M.S. Department of Computer Science and Engineering, Wright State University, 2003. Sniffing the Ethernet with High Quality Tools.

[This document is an example collection of files intended to help my students in using LaTeX as they prepare their theses. An abstract is typically about one page. The following is an example of an abstract of a thesis.]

This thesis is a study of software quality in the limited context of a class of network software tools called *sniffers*. Sniffers are network monitoring tools used in the administration of network security. We analyzed five of the hundreds of the existing sniffers to determine the causes of poor quality and the methods to eliminate the problems. We subjected the five selected sniffers to both manual analysis and analysis by software quality assessment tools. We classify the 1000+ errors so discovered in these sniffers. Based on these results, we designed and implemented a new sniffer that is intended as a model of high quality sniffer. The methods applied to analyze and enhance the quality of software are studied.

Quality assessment software tools fall into two categories: 1) Static checkers and 2) Dynamic checkers. Static checkers analyze the source code. Dynamic checkers stand as guards during runtime. We have collected and used exhaustively the checker tools that are in the open source archives. In the course of our use, the quality of the software quality tools is itself analyzed.

This thesis contributes several case studies of open source software projects. It also contributes a new distributed sniffer to the open source. The distributed sniffer can monitor multiple networks and output desired packet details. We designed our sniffer to include a MySQL based collector program, packet capture programs and viewer programs. Our sniffer supports multiple capture and viewer programs. We applied software engineering methods to eliminate the quality issues associated with software. We use the results of our analysis of existing sniffers in avoiding poor quality in our sniffer. We prepared our sniffer for manual audit using documentation tools. This new sniffer is an example of *literate programming* that is worthy of study by software engineering students.

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## ACKNOWLEDGEMENTS

It is typical to acknowledge a few people who helped in the thesis work. Include Acknowledgements here.

# 1

## Introduction

I want all my students to typeset their work using  $\text{\LaTeX}$ . To reduce their effort in doing this, I give this article and the accompanying  $\text{\LaTeX}$  files as an example to learn from. The details of  $\text{\LaTeX}$  as used in these example files is sufficient to most of their documents.

### 1.1 Advice

“Down with MS Word. Long live  $\text{\LaTeX}$ .”

This is the underlying sentiment in this article.

I recommend various things below without justifying them. This keeps the article short.

### 1.2 “I say so.”

Besides, I have some dictatorial powers over my students “;-)”. And, these are CS students. They are supposed to be able to learn new languages and tools fast! No?

## 2

# Mateti's L<sup>A</sup>T<sub>E</sub>X Thesis Example

Download link: <http://www.cs.wright.edu/~pmateti/GradStudents/thesisExample.tbz> I recommend that you use my collection of thesis files that you can download from here. My own contribution here is not original. It is in pulling together various needed pieces in trying to reduce the LaTeX-learning time for my students.

### 2.1 Contents of the tar File

The downloaded file is a tar archive compressed with bzip2. You can untar it as in

```
tar xvfj thesis.tbz
```

Your current directory will then have a new subdirectory called Thesis/ with the following files and subdirectories in it.

```
% ls -l Thesis
total 36
drwxr-xr-x  2 pmateti  pmateti   4096 May 24 13:07 Chapters/
drwxr-xr-x  2 pmateti  pmateti   4096 May 24 11:44 Figures/
drwxr-xr-x  2 pmateti  pmateti   4096 May 24 11:44 LaTeX/
-rw-r--r--  1 pmateti  pmateti    713 May 24 11:47 Makefile
drwxr-xr-x  2 pmateti  pmateti   4096 May 24 13:09 Tables/
-rw-r--r--  1 pmateti  pmateti   8513 May 24 11:44 thesis.bib
-rw-r--r--  1 pmateti  pmateti   1158 May 24 11:47 thesis.tex
drwxr-xr-x  2 pmateti  pmateti   4096 May 24 11:44 WSU/
```

## 2.2 Your Use of these Files

The files in the directory LaTeX are to be left as they are; edit these only if you are fluent in LaTeX. Edit the files in the WSU directory to insert your own name etc. Replace all the files in the Chapters/ Figures/ Tables/ directories with yours. Edit the thesis.tex to input the files in the Chapters/ Figures/ Tables/ directories.

Use the given Makefile as a template and adjust.

# 3

## Technical Report Writing

A thesis is a technical report. Read and follow a good style book (e.g., Chicago) on technical report writing. It is a good exercise to mark *this* article up! Additionally, every university has guidelines regarding layouts and required pages such as a title page an approval page.

(This article is itself poorly and hastily written. Think of it as a collection of notes. “Do as I say, not as I do! ;-)” )

### 3.1 Structure

When you are moving from one depth to a deeper one there is always an introductory paragraph. E.g., going from a chapter heading to its first section, and from a section heading to its first subsection.

Sometimes we like to write a paragraph at the end of a chapter that does not belong to the last section. This is often done by introducing a vertical white space after the end of the last section that is longer than the typical spacing between consecutive sections.

There are no particular size requirements. But, a one page chapter and a two line section do look silly.

### 3.2 URLs

URLs are now common in CS theses. Older style guides do not cover these. Include a URL inside `\url{}`. Example: `http://www.google.com/search?q=latex+eepic+pstricks+tikz`

### 3.3 Acronyms

Acronyms are written in all-upper case. Examples: GNU, BCPL, KDE.

Linux, Unix, Pascal, Ada, Java, ... are not acronyms. LINUX -i Linux, no boldface, L in caps, the rest in lower case.

### 3.4 References

The file named `thesis.bib` should contain the references you collected in the BibTeX syntax. I have included a few references to illustrate this syntax; you can leave them in this file. In general, it can contain many more references than what you cite in the body of your thesis. The `bibtex` program examines the actual citations made, and pulls together the cited references into the text file named `thesis.bbl`.

Bibliographic citations are done in many ways. I require my students to use the `acmtrans.bst` style. Other acceptable choices are those that include author(s) last name and year of publication in the body of the text that cites, and the end of the article list of references are sorted alphabetically by the first author's last name. Styles that produce a bracketed number, as in [5], are not acceptable to me.

When using <http://scholar.google.com/>, set Bibliography Manager to use BibTeX in the preferences. Then, the references found can be saved in BiBTeX format. Visit also <http://www.bibsonomy.org/>.

# 4

## Typewriting Conventions

You will be working with the source files of LaTeX for several months. So, it is almost as important how the text is laid out in these files as how good the printed result looks.

Don't let any line be longer than around 70 chars. Learn the “auto-fill” and LaTeX modes, and “fill-paragraph” function of Emacs.

Sentences are separated by two blanks. Emacs can then do sentence-level editing.

Separate the paragraphs with an empty line.

Section headings should appear by themselves on a line. Leave a blank line above and below these.

The following are special characters in TeX — : `#&_%[]{}|`. If you must use them, you have to enclose them in either in the verbatim mode as in `\verb|#&_%[]{}|` or provide escape sequences listed below.

In programming opening and closing quotes are the same. In LaTeX, open quotes are ‘ or ‘‘ and the corresponding closing quotes are ’ or ’’.

It is a good idea to end each of your files with the line  
`%-eof-`.

# 5

## Routine Use of L<sup>A</sup>T<sub>E</sub>X

Most documents contain forward references to `\labels`. So, often we must latex the files twice.

### 5.1 Document Structure

The macros `\chapter` are self-explanatory. These also introduce a line in the table of contents (`.toc`) file. The `.toc` file is generated at the end of LaTeX processing. So, to include a table of contents properly at the beginning of the document, we must latex the files twice.

The depth of sections that show up in the TOC is set in the `pmthesis.cls` file to 3. You can change this, to say 9, by including the line `\setcounter{secnumbookdepth}{9}` in `thesis.tex`.

### 5.2 Lists

LaTeX has three kinds of lists. Description list is often better than `enumerate` which is better than `itemize`.

**Braces** `\item {...}` The braces are not nec.

**Brackets** `\item []` The brackets not nec.

### 5.3 Figures

Figures and tables float, often ending up at the top of a page, or even at the end of the document. To control this, learn the `!htb` options of the `figure` environment. Figures should be no more than a single page; rework them if they are not.

Figure 5.1 was interactively drawn using `xfig` and then exported as a `.tex` file from it. Typically, we `\label` the figures so we can reference it, as we did it here with the label `trie`, in the text of the document.

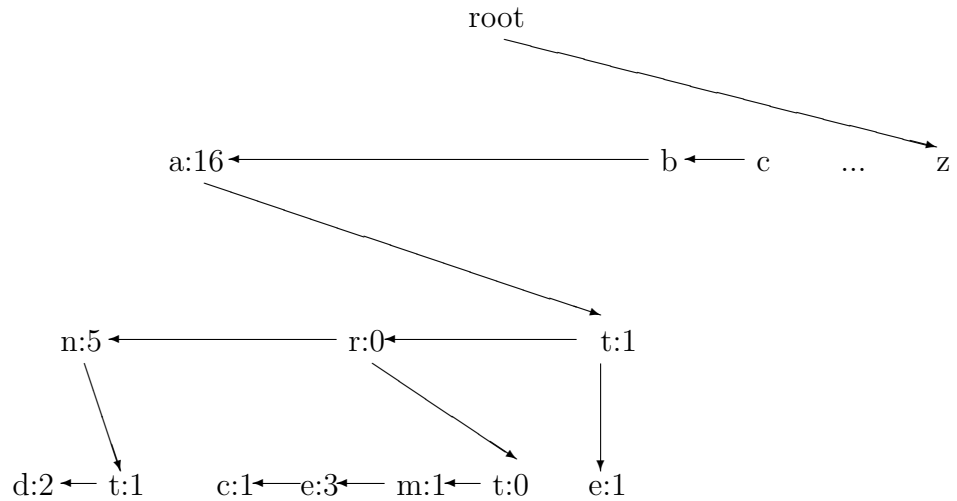


Figure 5.1: The `trie.tex`

You can include an `eps` or `pdf` file generated by any drawing tool.

Each of the  $\text{T}_{\text{E}}\text{X}$ / $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$  specific packages `eepic`, `pstricks`, `graphicx`, and `tikz` is capable of producing intricate drawings, but the learning curve is steep.

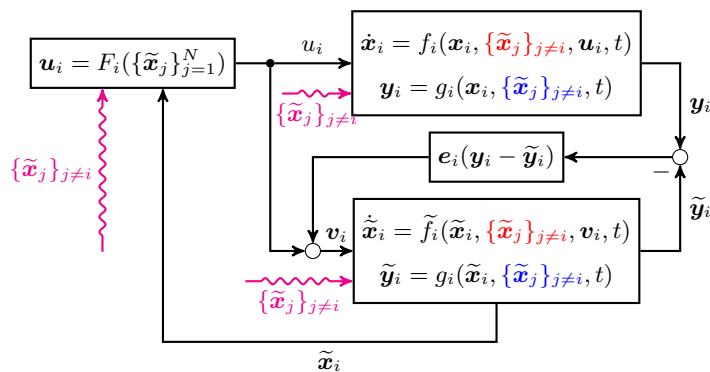


Figure 5.2: Observer/Estimator drawn with TikZ [[www.texample.net](http://www.texample.net)].

## 5.4 Tables

Tables should generally be no more than a single page. But, if you must have long tables, look up the packages named `tabularx`, `longtable` and `ltxtable`.

CATEGORY	TCPDUMP	SNIFFIT	HUNT	DSNIFF	ETHERREAL
Word Count	218455	30938	45568	66599	1352372
Lines of Code	36085	3005	8817	9680	280068
Binary Size (Kb)	488	53	384	482	500
Cyclomatic complexity	5392	610	2029	1517	na

Table 5.1: Size Summaries of the Selected Sniffers

## 5.5 Inclusion of Source Code of a PL

Source code can be included in the verbatim mode. In this mode, the special characters of  $\text{T\textsubscript{E}X}$  are produced as-is. However, the TAB characters are ignored. Indentation should therefore use just blanks.

```
#!/bin/bash
# kppp does not correctly set the PPP up. Here is the fix.
#
fix-ppp() {
    route del -net 0.0.0.0
    route add default gw 130.108.108.8
    route -n
}
```

Consider “doing” literate programming [Knuth 1992].

# 6

## Learning T<sub>E</sub>X and L<sup>A</sup>T<sub>E</sub>X

Of course, you *should* learn T<sub>E</sub>X and L<sup>A</sup>T<sub>E</sub>X! But, more importantly you should produce a well-written thesis in the time you have.

The files of `thesis.tbz` should be enough if you can learn via examples.

There are many tutorials of varying length, from a few pages to hundred of pages, on the web; e.g., [WikiBooks 2010]. The authoritative books are by [Knuth 1984] and [Lamport 1994]. “The Comprehensive TeX Archive Network is the authoritative collection of materials related to the TeX typesetting system.” <http://www.ctan.org/>

# 7

## Recommended Software Tools

Only open-source tools are mentioned in this section. Only a few links are given below because they have been changing too rapidly. Search the web.

**tetex** There are multiple distributions of TeX and LaTeX for Linux. The distribution known as the tetex is recommended.

**MiKTeX** is a complete T<sub>E</sub>X distribution for Windows.

**lyx** and **kile** are frontends to L<sup>A</sup>T<sub>E</sub>X giving a WYSIWIG view. You might like them.

**emacs** is excellent for editing TeX files. There are style files for TeX. Make sure they are loading when you begin editing a file with the extension .tex. Visit <http://www.emacswiki.org/>.

**pdflatex** directly produces .pdf files. However, often it is more convenient to produce .dvi, then .ps, and finally .pdf. DVI-to-PS is by dvips, PS to PDF is by ps2pdf.

**xfig** is a GUI tool for vector-based drawing. It can export into L<sup>A</sup>T<sub>E</sub>X, eps and other formats.

**OpenOffice** and **Inkscape** have vector drawing components that are quite good. They can export into eps or pdf.

**metapost**, **asymptote** are programming languages for meticulous drawing.

**graphviz** is a layout tool for graph theoretic graphs.

**tth** generates HTML files from your LaTeX files. The **tex2page** is better but requires the programming language Scheme.

**kdvi** xdvi, xpdf and okular are for previewing.

# 8

## American English

The following are collected from the theses drafts of my students.

I strongly urge you to read and apply the book [Strunk and White 1999]

### 8.1 Spelling

We use American spelling. Watch for: -ise in verbs (should be -ize). Spell checking LaTeX files can be awkward, but you must. Doing it from within Emacs is considerably better.

### 8.2 Misused Words and phrases

- E.g., a comma (almost) always follows the e.g., whose Latin expansion means “for example”. The other common abbreviation that we often use is “i.e.” whose Latin expansion means “that is.” Do not use i.e. where e.g. is appropriate.
- The following words are almost always unnecessary: “mainly”, “basically”, “very”. Grep for each occurrence and remove.
- The word “like” should be replaced with “such as”.
- “Softwares” – software is itself plural.
- Data is both singular and plural.
- “Very less” versus “very few”: Less is used for “amorphous” quantities (i.e., real numbers), few is used for discrete items (i.e., integers).
- “From the top of head” actually means unthinking.

- “Implemented” does not mean “used” or “installed”.
- Latter == the second one, whereas later == (time wise, or ...) afterwards.

# References

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