Metathesis: A LaTeX Template to Typeset Your Thesis for Submission to the School of Graduate Studies

by

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A thesis submitted

in partial fulfilment of the

requirements for the degree of

Master of Technology

in

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Thesis Certificate

This is to certify that the thesis titled **Metathesis: A LaTeX Template to Typeset Your Thesis for Submission to the School of Graduate Studies** submitted to the International Institute of Information Technology, Bangalore, for the award of the degree of **Master of Technology** is a bona fide record of the research work done by **John Doe John Doe (MT2010xxx)** under my supervision. The contents of this thesis, in full or in parts, have not been submitted to any other Institute or University for the award of any degree or diploma.

_____

Prof. Jane Doe

_____

Prof. Jane Doe

IIIT-Bangalore,

The 25th of June, 2012.

Abstract

This document provides information on how to write your thesis using the LaTeX document preparation system. You can use these files as a template for your own thesis, just replace the content, as necessary. You should put your real abstract here, of course.

"The purpose of the abstract, which should not exceed 150 words for a Masters' thesis or 350 words for a Doctoral thesis, is to provide sufficient information to allow potential readers to decide on relevance of the thesis. Abstracts listed in Dissertation Abstracts International or Masters' Abstracts International should contain appropriate key words and phrases designed to assist electronic searches."

— MUN School of Graduate Studies

Acknowledgements

Put your acknowledgements here...

"Intellectual and practical assistance, advice, encouragement and sources of monetary support should be acknowledged. It is appropriate to acknowledge the prior publication of any material included in the thesis either in this section or in the introductory chapter of the thesis."

— MUN School of Graduate Studies

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Chapter 1

Introduction

This chapter gives a brief overview of getting started, using `Makefile`, chapter layout, customized quote and footnote environments, equations, cross referencing, and miscellaneous information.

1.1 Getting Started

The file to be first edited is the `thesis.tex`. Here the arguments for thesis title, author name, degree, and date of thesis preparation have to be changed for the following commands: `\thesistitle`, `\authorname`, `\mydegree`, `\mydate` and `\advisorname`.

- Thesis title should be in a single line.
- Argument for `\authorname` should be the student's name as per the IIIT-Bangalore administrative records.
- Argument for `\mydegree` should be 1, 2, or 3, for M.Tech., M.S. by research, or Ph.D. degrees, respectively.

- Arguments for `\mydate` should be the month number and year of thesis submission. The month number is an integer between 1 and 12 and the year should be in the 4-digit format, e.g., for January 2012, the arguments would be 1 and 2012, and the LaTeXcommand would be:

  ```
  \renewcommand{\mydate}{\monthyear{1}{2012}}
  ```

- Argument for `\advisorname` should include the title "Prof.".

1.2 The `Makefile`

You can use `make` to "build" your thesis on the Linux command line and generate a pdf file named `thesis.pdf`. This will automatically run the `bibtex` program to create your bibliography and will also re-run `pdflatex` as necessary to ensure that all references are resolved. If you are using this template in another environment other than the Linux command line, then the `Makefile` will probably not be useful to you. Ensure that your Linux system has `pdflatex` installed.

- To generate a PDF copy of your thesis, run at the command prompt:

  ```
  $ make
  ```

- To remove all the files generated by `bibtex` and `latex`, run at the command prompt:

  ```
  $ make clean
  ```

- To remove all the files generated by `bibtex` and `latex` including `thesis.pdf`, run at the command prompt:

  ```
  $ make clobber
  ```

`Makefile` need not be changed for any addition or removal of figures, chapters, or appendices to your thesis.

1.3 Chapters

The thesis should contain an abstract, acknowledgments, chapters, and bibliography. Appendices are optional. The chapters should include an introducted, related work (or literature survey), background, hypothesis, implementation, results, and conclusions.

Contents of chapters can be added as a separately in .tex file and added using the `\include` command in the file, `thesis.tex`.

Maintain the following subdirectories from the parent directory without deleting them: `Chapters`, `Images`, and `Chapters/Appendix`.

1.4 Customized Environments

This section will give you some ideas on how to use some of environments in LaTeX [1], which are specifically customized for our thesis requirements, to typeset your document.

Here is a sample quote using the `\munquote` environment:

> *"LaTeX is a system for typesetting documents. Its first widely available version, mysteriously numbered 2.09, appeared in 1985. LaTeX is now extremely popular in the scientific and academic communities, and it is used extensively in industry. It has become a* lingua franca *of the scientific world; scientists send their papers electronically to colleagues around the world in the form of LaTeX input." [1]*

The citation at the end is optional — if you don't need it, then use `\munquote` without any arguments:

> *"Here is a quote that does not have an associated citation after it. You can specify the citation before or after the quote manually."*

By default, all text is double spaced, however, quotes and footnotes must be singled spaced.[1] The left margin is slightly wider than the right margin. This is to compensate for binding.

1.5 Equations

An example mathematical formulae is show in Equation 1.1.

$$\sum_{i=0}^{n} i^2 \tag{1.1}$$

A slightly more complicated equation is given in Equation 1.2: [2]

$$i\hbar\frac{\partial}{\partial t}\Psi(x,\, t) = -\frac{\hbar^2}{2m}\nabla^2\Psi(x,\, t) + V(x)\Psi(x,\, t) \tag{1.2}$$

1.6 Cross References

In addition to using `\ref` to refer to equations, you can also use it (in conjunction with the `\label` command) to refer to sections and chapters without hard coding the numbers themselves. For example, this is Section 1.6 of Chapter 1. You can also refer

[1] This is a single spaced footnote. SGS requires that footnotes be singled spaced and this can be done with the `\munfootnote` command.

[2] Equation taken from the *Schrödinger equation* entry on *Wikipedia*

to Appendix A, Subsection 1.9.1.1 below or any other place that has a `\label`. You can also use labels to refer to a page. For example, Chapter 2 starts on page 7.

1.7 Changing Fonts

Change fonts: Large, `verbatim ~@#$%^&*(){}[]`, Small Caps, *slanted text*, *emphasized text*, `typewriter text`.

1.8 Accents and Ligatures

Some accents: é è ô ü ç ï í ñ ā ă ă

Some ligatures: flæffi

1.9 Some Lists

Here is a nested enumeration:

1. An enumerated list of items.
   (a) which can
   (b) nest
      i. to arbitrary
      ii. levels
2. More items
3. in the top

4. level list.

Another enumeration:

1. (a) Main 1 part 1

   (b) Main 1 part 2

2. (a) Main 2 part 1

   (b) Main 2 part 2

1.9.1 Subsection

1.9.1.1 Subsubsection

This section is referred to by Section 1.6.

1.9.1.2 Subsubsection

<Empty subsection>

Chapter 2

Figures and Tables

This chapter will give some suggestions on how to handle figures and tables.

2.1 Figures

Figures to be included in the thesis document should be of the following image formats: `.pdf`, `.png`. If the image is not already in an acceptable format, on the Linux command line, use the `convert` program to convert the image from other formats to the acceptable formats, e.g., to convert `myfig.eps` to `myfig.pdf`, do the following:

```
$ convert myfig.eps myfig.pdf
```

Figures 2.1 and 2.2 show a Petri net created using the `xfig` program [1] which has very good support for LaTeX. Figure 2.1 has been reduced to 40% of its original size, which is maintained within the width of `columnwidth` in Figure 2.2.

[1] `http://www.xfig.org/`

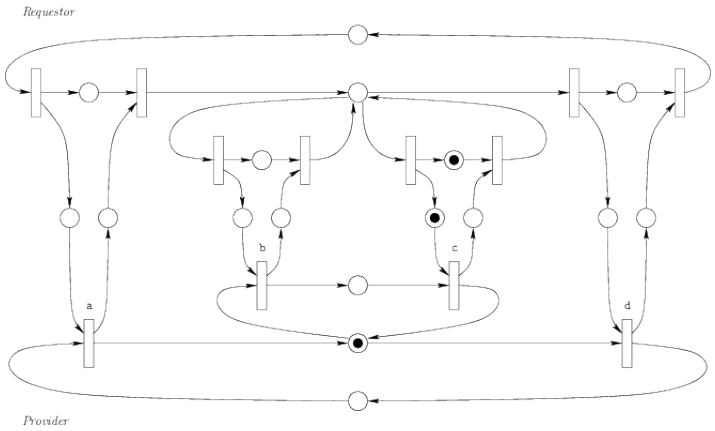

Figure 2.1: Image of a deadlocked Petri net at 40% scaling.

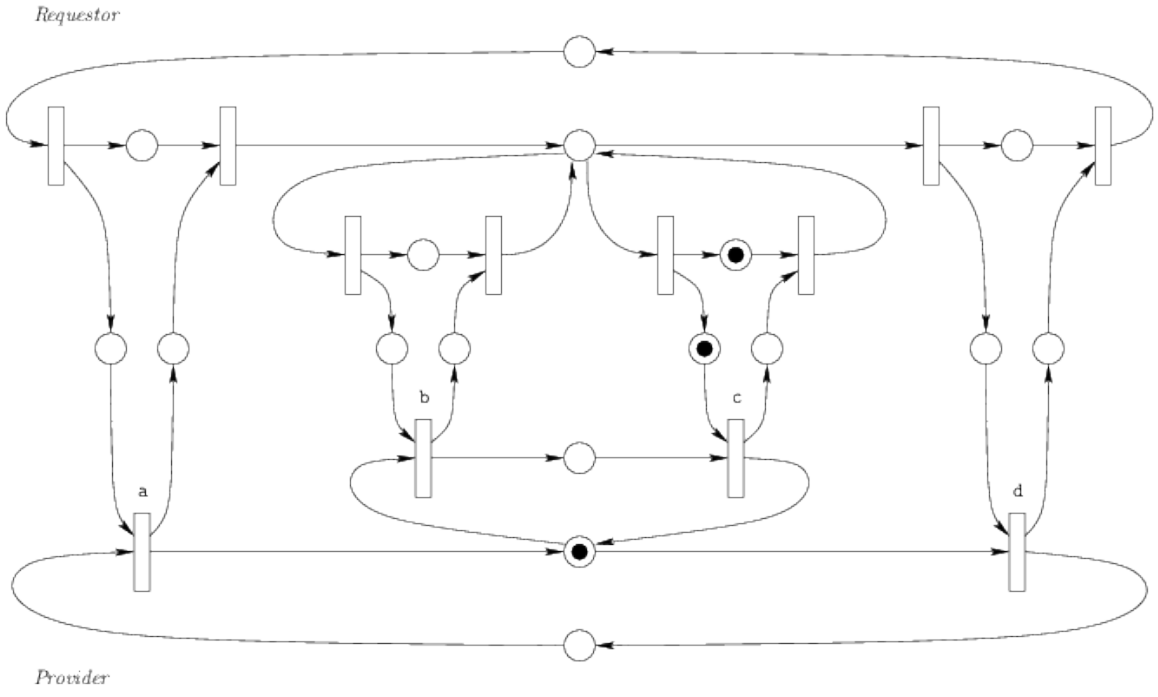

Figure 2.2: Image of a deadlocked Petri net scaled within the size of column in the current format.

We can also create tables, as seen by Table 2.1. Note that, as required by SGS guidelines, the caption for a table appears above the table whereas figure captions appear below the figures. Tables and figures can "float" — they may not appear on the page on which they are mentioned. LaTeX tries to handle figure and table placement intelligently, but if if you have a lot of them without a reasonable amount of surrounding textual content, the figures and tables can accumulate towards the end of the chapter. Generally speaking, if there is sufficient text explaining the tables and figures or if the tables/figures are relatively small, this may not be a problem. However, if you have a lot of tables or figures, it may be a good idea to put them in an appendix and refer to them as the need arises.

Table 2.1: Fall Semester Enrollment

	Undergraduate			Graduate		
	F/T	P/T	Total	F/T	P/T	Total
2004	13,191	2,223	15,414	1,308	879	2,187
2005	13,184	2,143	15,327	1,375	920	2,295
2006	12,809	2,224	15,033	1,373	899	2,272
2007	12,634	2,155	14,789	1,403	899	2,302
2008	12,269	2,208	14,477	1,410	1,005	2,415
2009	12,382	2,323	14,705	1,567	1,106	2,673

Table 2.2 shows a different table in landscape mode.[2] This is useful if your table is too wide for the page. Tables are double-spaced by default. To single-space a table,

[2]This data was also taken from the *Memorial University of Newfoundland — Fact Book 2009.*

change the `\baselinestretch` before beginning the table environment. Remember to restore it after the environment has ended.

Table 2.2: Masters Degrees Conferred by Convocation Session — 1950 to 2009

	2009		2008		2007		2006		2006		1950–2004	Total
	May	Oct	May	Oct	May	Oct	May	Oct	May	Oct		
Degrees												
Master of Applied Science	14	2	15	8	28	1	21	3	3	1	98	194
Master of Applied Social Psychology	1	5	2	5	1	4	0	4	0	4	28	54
Master of Applied Statistics	0	0	3	1	0	0	1	0	0	0	19	24
Master of Arts	37	49	26	43	14	42	14	56	13	44	994	1,332
Master of Business Administration	14	16	23	6	33	12	33	11	33	8	818	1,007
Master of Education	107	87	120	55	147	74	108	76	113	75	2,603	3,565
Master of Employment Relations	8	9	5	7	7	14	4	9	3	5	12	83
Master of Engineering	20	19	20	10	16	10	15	13	4	19	440	586
Master of Environmental Science	3	3	3	1	0	1	7	1	3	1	66	89
Master of Marine Studies	2	0	0	1	0	2	2	2	1	2	26	38
Master of Music	4	1	5	0	3	0	3	0	3	0	7	26
Master of Nursing	7	8	10	4	17	4	23	7	6	1	116	203
Master of Oil and Gas Studies	0	0	2	0	0	0	0	2	4	0	0	8
Master of Philosophy	5	4	2	1	5	2	5	3	2	0	112	141
Master of Physical Education	0	2	3	0	5	4	3	0	4	4	84	109
Master of Public Health	0	8	0	0	0	0	0	0	0	0	0	8
Master of Science	40	32	41	19	29	25	35	29	32	23	1,653	1,958
Master of Science (Kinesiology)	1	0	4	2	1	2	2	6	4	3	0	25
Master of Science (Medicine)	18	7	11	8	10	5	9	9	8	4	0	89
Master of Science (Pharmacy)	0	0	1	1	0	0	0	0	1	0	16	19
Master of Social Work	4	11	4	5	4	9	9	5	4	10	257	322
Master of Women's Studies	2	0	2	0	1	1	2	3	2	0	20	33
Total Masters	287	263	302	177	321	212	296	239	243	204	7,369	9,913

Chapter 3

Dealing with Errors

LaTeX can produce cryptic error messages at times. However, with some experience, it is usually not too difficult to determine what the problem is and how to fix it.

As mentioned earlier, appropriate search terms in Google may help you fix these error messages.

Chapter 4

Lorem Ipsum

Now, for your reading pleasure, some *Lorem ipsum*, courtesy of:

<http://www.lipsum.com/>

This gives a good view of the margins — note that the left margin is a bit wider than the right margin to accommodate binding.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Etiam odio elit, viverra eu tempor non, pulvinar ac nisi. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Sed adipiscing, dui quis viverra facilisis, quam libero adipiscing justo, vitae dictum libero mauris ac magna. Aenean sem ligula, vulputate at vestibulum eu, pellentesque in justo. Sed et eros mauris, sed placerat nulla. Maecenas nulla velit, facilisis et rutrum nec, volutpat id lorem. Duis vestibulum odio velit, id elementum tortor. Sed pellentesque leo ac nibh iaculis at fermentum orci lobortis. Suspendisse arcu magna, porta nec pretium non, feugiat vitae orci. Vivamus at enim arcu, at sagittis nisl. Vestibulum at mi enim, vel malesuada justo. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos.

Nullam sed nunc at enim posuere sagittis. Vivamus augue turpis, mattis a blandit non, sollicitudin non nisl. Integer vestibulum, est vitae cursus adipiscing, elit libero pretium leo, in scelerisque augue felis volutpat nisl. Donec commodo posuere arcu, eget feugiat dui ornare nec. Nullam eros mi, condimentum ac ultricies ac, euismod lobortis nibh. Cras ac ligula pharetra risus elementum pharetra vel in quam. Fusce ac augue vulputate nibh imperdiet convallis sit amet et quam. Integer porttitor dictum fermentum.

Nullam id ante arcu. Nulla facilisi. Vestibulum sodales, mi sodales ultricies pulvinar, orci leo dictum diam, quis imperdiet turpis lacus ut sem. Nulla rutrum odio sit amet elit aliquam blandit gravida nunc placerat. Aenean et neque ut leo condimentum vehicula. Fusce quis orci vitae enim dapibus tincidunt in vel ipsum. Phasellus auctor neque ac eros egestas sit amet ultricies erat vestibulum. Ut erat ligula, pharetra vel hendrerit vitae, mattis ac turpis. Ut malesuada diam vitae lacus vestibulum a tempus nisl posuere. Ut nisi sem, dictum eu laoreet sed, commodo eget enim. Morbi vel lacus neque, tempus fringilla tellus. Nunc id egestas felis. Nullam eu mollis neque. Ut non mauris malesuada eros sagittis congue. Cras vitae felis ut nisl mollis semper ut quis risus. Sed eu arcu urna, et commodo sapien. Donec vestibulum, libero sit amet ultrices blandit, erat lorem volutpat lectus, sed feugiat leo elit in orci. Aliquam vitae leo tellus, placerat pulvinar massa. Nulla at sapien hendrerit diam varius vehicula.

Curabitur et orci nulla. Phasellus euismod, massa non hendrerit dictum, dolor enim imperdiet sapien, vitae commodo lorem tellus eu quam. Duis egestas felis velit. Sed in orci nec nulla rutrum posuere. Suspendisse potenti. Nunc vel quam nisi. In at molestie libero. Aenean hendrerit vestibulum orci, ut hendrerit nulla volutpat lacinia. Vestibulum sit amet sapien vitae lectus gravida vehicula. Suspendisse ac purus sit

amet est congue auctor.

Morbi pellentesque, quam vel mattis molestie, augue purus vestibulum lorem, nec consequat enim eros eu augue. In odio dolor, scelerisque a lobortis porttitor, commodo ut lacus. Maecenas sit amet diam nec tellus accumsan bibendum. Praesent in turpis velit, malesuada commodo sapien. Nunc ornare urna enim. Sed at diam non metus porttitor suscipit. Aliquam erat volutpat. Duis aliquet magna in mauris semper placerat. Ut eget quam orci. Ut egestas, dolor at dapibus accumsan, leo nibh egestas urna, ac consectetur dui odio quis eros. Nam libero dolor, lacinia eget imperdiet non, malesuada vehicula diam. Etiam id ipsum eget turpis consectetur tristique id at ante. Vivamus blandit nunc eu nisl varius sed accumsan odio molestie.

Chapter 5

Handling Citations

BibTEX can be used to handle all your bibliographic needs. Simply add references to the file `ref.bib` and BibTEX will take care of the rest. An example of a BibTEX book, conference paper and journal article are given in the sample `ref.bib` file. Many online journals have links to BibTEX citations that you can download and incorporate into the `ref.bib` file. *Do not change the name of the file* `ref.bib`.

The order of the fields is unimportant. BibTEX will display them in the correct order when constructing your bibliography. Also note that you can specify information about a reference that may not even be included in the actual bibliography. For example, the ISBN field is not required by the bibliography, but you can, if you want, put the ISBN to the BibTEX entry.

We can cite a journal article [3] and a conference paper [2] in the same way as a book citation. More information can be found in [1].

Chapter 6

Conclusions

That's all folks!

Bibliography

[1] L. Lamport. *LaTeX: A Document Preparation System*. Addison-Wesley Publishing Company, second edition, 1994.

[2] F. LastName, F. I. LastName, and F. LastName Jr. Conference paper MUN title. In *Proceedings of the Conference of Sample Conferences*, pages 100–110, Apr. 1996.

[3] F. name Last-name and S. Guy. Journal article SWGC title. *Journal of Sample Journals*, 1(12):1000–1024, 2002.

Appendix A

Appendix: How to Add an Appendix

This is Appendix A.

You can have additional appendices too, (*e.g.*, `apdxb.tex`, `apdxc.tex`, *etc.*). These files need to be included in `thesis.tex`.

If you don't need any appendices, delete the appendix related lines from `thesis.tex`.

Appendix B

Appendix: How to Add Another One

This is Appendix B.