

A Sample UBC Thesis

With a Subtitle

by

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Abstract

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Acknowledgements

This is the place to thank professional colleagues and people who have given you the most help during the course of your graduate work.

Dedication

The dedication is usually quite short, and is a personal rather than an academic recognition. The *Dedication* does not have to be titled, but it must appear in the table of contents. If you want to skip the chapter title but still enter it into the Table of Contents, use this command `\chapter[Dedication]{}`.

Statement of Co-Authorship

If any part of your thesis was co-written, you must include a Co-Authorship statement which gives details of your contribution to the following areas:

- identification and design of research program
- performing the research
- data analyses
- manuscript preparation

Note that this section is the last of the preliminary pages (with lowercase Roman numeral page numbers). It must be placed *before* the `\mainmatter` command. After that, Arabic numbered pages will begin.

Chapter 1

This is a Chapter

1.1 A Section

Here is a section with some text. Equations look like this $y = x$.¹

This is an example of a second paragraph in a section so you can see how much it is indented by.

1.1.1 This is a Subsection

Here is an example of a citation: [1]. The actual form of the citation is governed by the `bibliographystyle`. These citations are maintained in a BIBTeX file `sample.bib`. You could type these directly into the file. For an example of the format to use look at the file `ubcsample.bbl` after you compile this file.²

This is an example of a second paragraph in a subsection so you can see how much it is indented by.

This is a Subsubsection

Here are some more citations [2, 3, 4]. If you use the `natbib` package with the `sort&compress` option, then the following citation will look the same as the first citation in this section: [2, 3, 4].

This is an example of a second paragraph in a subsubsection so you can see how much it is indented by.

This is a Paragraph Paragraphs and subparagraphs are the smallest units of text. There is no subsubsubsection etc.

This is a Subparagraph This is the last level of organisation. If you need more than this, you should consider reorganizing your work...

¹Here is a footnote.

²Here is another footnote.

1.2 Quote

This is a small poem,
a little poem, a Haiku,
to show you how to.
—Michael McNeil Forbes.

This small poem shows several features:

- The use of the `quote` and `center` environments.
- The `\newpage` command has been used to force a page break. (Sections do not usually start on a new page.)
- The `pagestyle` has been set to suppress the headers using the command `\thispagestyle{plain}`. Note that using `\pagestyle{plain}` would have affected all of the subsequent pages.

1.3 Programs

Here we give an example of a new float as defined using the `float` package. In the preamble we have use the commands

```
\floatstyle{ruled}  
\newfloat{Program}{htbp}{lop}[chapter]
```

This creates a “Program” environment that may be use for program fragments. A sample `python` program is show as Program 1.1. (Note that Python places a fairly restrictive limit on recursion so trying to call this with a large n before building up the cache is likely to fail unless you increase the recursion depth.) Instead of using a `verbatim` environment for your program chunks, you might like to `include` them within an `alltt` environment by including the `\usepackage{alltt}` package (see page 187 of the `LATEX` book). Another useful package is the `\usepackage{listings}` which can pretty-print many different types of source code.

Program 1.1 Python program that computes the n^{th} Fibonacci number using memoization.

```
def fib(n, _cache={}):
    if n < 2:
        return 1
    if n in _cache:
        return _cache[n]
    else:
        result = fib(n-1)+fib(n-2)
        _cache[n] = result
    return result
```

Chapter 2

Another Chapter with a Very Long Chapter-name that will Probably Cause Problems

This chapter name is very long and does not display properly in the running headers or in the table of contents. To deal with this, we provide a shorter version of the title as the optional argument to the `\chapter[]{}` command.

For example, this chapter's title and associated table of contents heading and running header was created with `\chapter[Another Chapter\ldots]{Another Chapter with a Very Long Chapter-name that will Probably Cause Problems}`.

Note that, according to the thesis regulations, the heading included in the table of contents must be a truncation of the actual heading.

2.1 Another Section

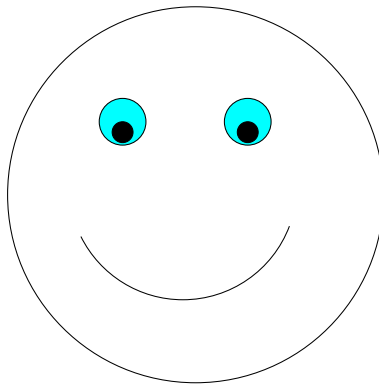
Another bunch of text to demonstrate what this file does. You might want a list for example:³

- An item in a list.
- Another item in a list.

An Unnumbered Section That is Not Included in the Table of Contents

Here is an example of a figure environment. Perhaps I should say that the example of a figure can be seen in Figure 2.1. Figure placement can be tricky

³Here is a footnote in a different chapter. Footnotes should come after punctuation.



π makes me happy!

Figure 2.1: This is a figure of a happy face with a `psfrag` replacement. The original figure (drawn in `xfig` and exported to a `.eps` file) has the text “pie makes me happy!”. The `psfrag` package replaces this with “ π makes me happy!”. Note that we have used the optional argument for the caption command so that only a short version of this caption occurs in the list of figures.

with \LaTeX because figures and tables are treated as “floats”: text can flow around them, but if there is not enough space, they will appear later. To prevent figures from going too far, the `\afterpage{\clearpage}` command can be used. This makes sure that the figure appears on the following page.

The `\clearpage` forces a page break so that the figure can be placed, but without the `\afterpage{}` command, the page would be broken too early (at the `\clearpage` statement). The `\afterpage{}` command tells \LaTeX to issue the command after the present page has been rendered.

Figures can make a document more enjoyable as demonstrated by Figure 2.1.

2.2 Tables

We have already included one table: 1.1. Another table is plopped right here. Well, actually, as with Figure 2.1, the table does not necessarily appear

	Singular		Plural	
	English	Gaeilge	English	Gaeilge
1st Person	at me	agam	at us	againn
2nd Person	at you	agat	at you	agaibh
3rd Person	at him	aige	at them	acu
	at her	aici		

Table 2.1: Another table.

right “here” because tables are also “floats”. \LaTeX puts them where it can. Because of this, one should refer to floats by their labels rather than by their location. This example is demonstrated by Table 2.1. This one is pretty close, however.

Another useful package is `\usepackage{longtable}` which provides the `longtable` environment. This is nice because it allows tables to span multiple pages. Table 2.2 has been formatted this way.

Table 2.2: Feasible triples for highly variable Grid

Time (s)	Triple chosen	Other feasible triples
0	(1, 11, 13725)	(1, 12, 10980), (1, 13, 8235), (2, 2, 0), (3, 1, 0)
274	(1, 12, 10980)	(1, 13, 8235), (2, 2, 0), (2, 3, 0), (3, 1, 0)
Continued on next page		

2.2. Tables

Table 2.2 – continued from previous page

Time (s)	Triple chosen	Other feasible triples
5490	(1, 12, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
8235	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
10980	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
13725	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
16470	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
19215	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
21960	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
24705	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
27450	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
30195	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
32940	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
35685	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
38430	(1, 13, 10980)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
41175	(1, 12, 13725)	(1, 13, 10980), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
43920	(1, 13, 10980)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
46665	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
49410	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
52155	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
54900	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
57645	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
60390	(1, 12, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
63135	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
65880	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
68625	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
71370	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
74115	(1, 12, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
76860	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
79605	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
82350	(1, 12, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
85095	(1, 12, 13725)	(1, 13, 10980), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
87840	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
90585	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
93330	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
96075	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
98820	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
101565	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)

Continued on next page

Table 2.2 – continued from previous page

Time (s)	Triple chosen	Other feasible triples
104310	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
107055	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
109800	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
112545	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
115290	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
118035	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
120780	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
123525	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
126270	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
129015	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
131760	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
134505	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
137250	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
139995	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
142740	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
145485	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
148230	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
150975	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
153720	(1, 12, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
156465	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
159210	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
161955	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
164700	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)

An Unnumbered Subsection

Note that if you use subsections or further divisions under an unnumbered section, then you should make them unnumbered as well otherwise you will end up with zeros in the section numbering.

Chapter 3

Landscape Mode

The landscape mode allows you to rotate a page through 90 degrees. It is generally not a good idea to make the chapter heading landscape, but it can be useful for long tables etc.

This text should appear rotated, allowing for formatting of very wide tables etc. Note that this might only work after you convert the dvi file to a postscript (ps) or pdf file using dvips or dvi2pdf etc.

Bibliography

- [1] Michael McNeil Forbes and Ariel R. Zhitnitsky. Dark antimatter as a galactic heater: X-rays from the core of our galaxy. *JCAP*, 0801:023, 2008.
- [2] L. D. Landau and E. M. Lifshitz. *Quantum Mechanics: Non-relativistic theory*, volume 3 of *Course of Theoretical Physics*. Pergamon Press, Oxford; New York, third edition, 1989, c1977.
- [3] R. D. Peccei. Special topics: The strong CP problem. In C. Jarlskog, editor, *CP violation*. World Scientific, Singapore, January 1989.
- [4] M. S. Turner. Dark matter, dark energy and fundamental physics. astro-ph/9912211, December 1999.

Appendix A

First Appendix

Here you can have your appendices.

Additional Information

This chapter shows you how to include additional information in your thesis, the removal of which will not affect the submission. Such material should be removed before the thesis is actually submitted.

First, the chapter is unnumbered and not included in the Table of Contents. Second, it is the last section of the thesis, so its removal will not alter any of the page numbering etc. for the previous sections. Do not include any floats, however, as these will appear in the initial lists.

The `ubcthesis` L^AT_EX class has been designed to aid you in producing a thesis that conforms to the requirements of The University of British Columbia Faculty of Graduate Studies (FoGS).

Proper use of this class and sample is highly recommended—and should produce a well formatted document that meets the FoGS requirement. Notwithstanding, complex theses may require additional formatting that may conflict with some of the requirements. We therefore *highly recommend* that you consult one of the FoGS staff for assistance and an assessment of potential problems *before* starting final draft.

While we have attempted to address most of the thesis formatting requirements in these files, they do not constitute an official set of thesis requirements. The official requirements are available at the following section of the FoGS web site:

<http://www.grad.ubc.ca/students/thesis/>

We recommend that you review these instructions carefully.