DEPARTMENT OF TEX ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY MADRAS
CHENNAI – 600036

The Title of the Thesis Will Appear Here if you Set it

A Whatever

Submitted by

FIRSTNAME LASTNAME

For the award of the degree

Of

WHATEVER DEGREE

January 2022

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A quotable quote that is quoted by the quoter

– Quote Author

To whoever, whatever, wherever or whenever, or all of those, or none at all

THESIS CERTIFICATE

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LIST OF PUBLICATIONS

I. REFEREED JOURNALS BASED ON THESIS

whatever

II. REFEREED JOURNALS (OTHERS)

whatever

III. PRESENTATIONS IN CONFERENCES

whatever

IV. PUBLICATIONS IN CONFERENCE PROCEEDINGS

whatever

ACKNOWLEDGEMENTS

Whatever

ABSTRACT

KEYWORDS LaTeX; template; dissertation; thesis; synopsis

This is a short tutorial to the `iitmdissertation` document-class and package. This, however, is not a LaTeX tutorial. It will help a user (moderately) familiar with LaTeX to write his/her dissertation using `iitmdissertation`.

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CHAPTER 1

A QUICKSTART GUIDE

Quite often, one simply wants to get started making the document without fussing about with the details too much. This chapter serves exactly that end. Here you will find a simple introduction along with a minimal document example in listing 1.1 to get you started. Basic familiarity with LaTeX is assumed.

It is strongly recommended to split up your dissertation into logical chunks, each of which lives in its own file. One (natural) way of doing so is by splitting the dissertation into chapters, so that each chapter is in a separate file. Regardless of the manner in which one segments the document, the contents must necessarily fall in one of four categories, each synonymous with a folder:

(I) `prematter/` – this folder contains all material that precede the **first numbered** page of the dissertation, the chapter "Acknowledgements"

(II) `frontmatter/` – this folder contains all material that belong in the pages that **precede theactual technical content** of the dissertation, i.e, the very first chapter

(III) `mainmatter/` – as the name suggests, this folder houses **all the technical material** of the dissertation itself. This folder typically containts two subfolders: `chapters/` and `appendices/`, the latter – containing material for the appendix – being optional.

(IV) `backmatter/` – the **closing material** of the dissertation is placed here, which are a CV and the details of the respective committee members of the author

Another important file that accompanies the dissertation files is `references.bib`. This is a BibTeX file that contains all the requisite references that one will be citing in the textual material. Further, it is recommended to place all images in another folder: `images/`. Of course, one can still use `iitm-dissertation` without such a file structure, but it is **strongly discouraged**.

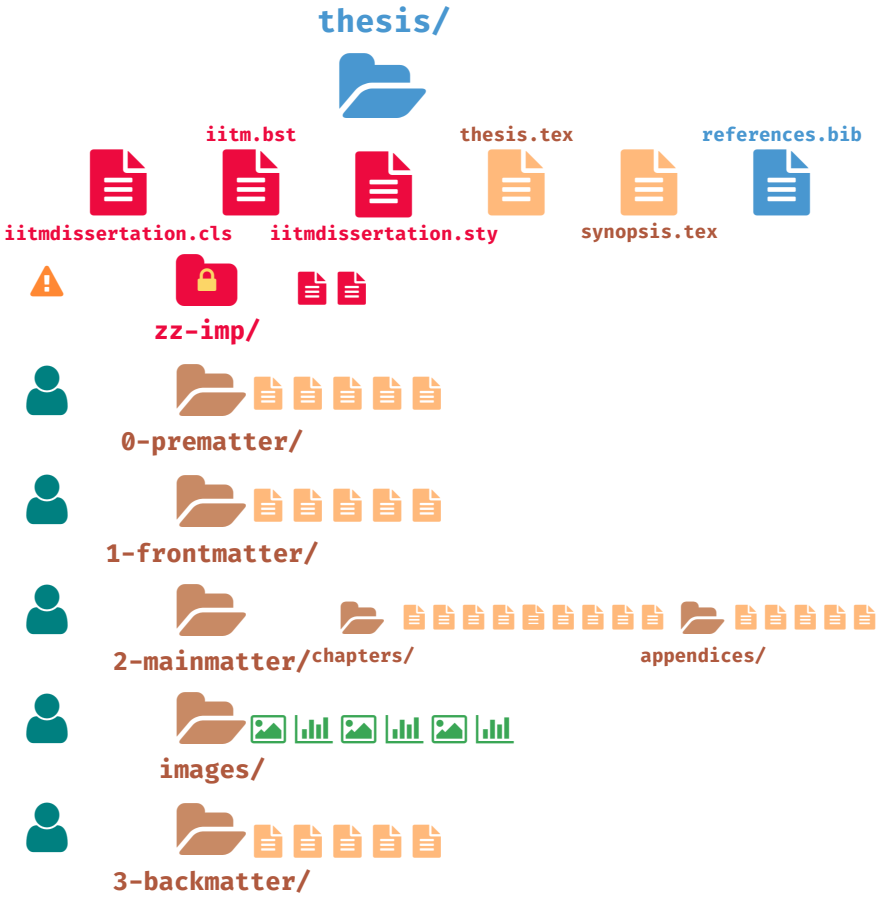
Listing 1.1: A minimal `thesis.tex` file

```
\documentclass                                                  1
    [phd,                                                       2
    % zdraft,                                                   3
     smplmath]                                                  4
    {iitmdissertation}                                          5

\usepackage{multirow}                                           7

\setupGlossaryAbbreviationsDefinitions                          9
\begin{document}                                                10
  \prematter                                                    11
      \input 0-prematter/pre-quote                              12
      \input 0-prematter/pre-dedication                         13
      \printCertificate                                         14
      \input 0-prematter/pre-list-of-publications               15

  \begin{FrontMatter}                                           17
      \printGlossaryAndAbbreviations                            18
      \printNotation                                            19
  \end{FrontMatter}                                             20

  \begin{MainMatter}                                            22
      \input 2-mainmatter/chapters/chap-introduction            23
      \input 2-mainmatter/chapters/chap-lists                   24
      \input 2-mainmatter/chapters/chap-maths                   25
      \input 2-mainmatter/chapters/chap-figures-tables          26

      \appendix                                                 28
      \input 2-mainmatter/appendices/appn-general-notes         29
  \end{MainMatter}                                              30

  \begin{BackMatter}                                            32
      \printBibliographyReferences{references.bib}              33
      \printCV                                                  34
      \printCommittee                                           35
  \end{BackMatter}                                              36
\end{document}                                                  37
```

Of these segments, the institute guidelines mandate that all segments of the dissertation are necessary except for a page for quotes (`pre-quote` in the example above: line #13), and, a "dedication" page (`pre-dedication` in the example above: line #12).

Note: All user-defined macros as well as loading commands for all required packages *must* be placed *above* line #9 in 1.1 above.

Figure 1.1: The project structure for the thesis: The red colored files/folders denote source files which should not meddled with. The beige/brown colored files/folders are user files which the user edits with required material.



1.1 COMPILATION

All development and testing of `iitmdissertation` was done exclusively on a low-end laptop using a Linux-based operating system with th latest distribution of TEXLive. Moreover, testing was also done using Overleaf[1], which is the recommended way to use `iitdissertation`. No testing on other proprietary operating systems was done due to their non-availability. Contributions in this direction are welcome.

[1] Overleaf [https://www.overleaf.com/] is an "open-source online real-time collaborative LATEX editor". As of the time of this writing enrolled members of IITM can avail a "Professional" Overleaf account by signing up with their `smail` accounts

1.2 DEGREE

The institute guidelines specify different cover pages for the various degrees that require a dissertation. Enabling a degree option ensures that the proper "tape color" for the cover page is drawn. Of these, the following are supported :

- `ms` – use this option in to enable the appropriate options for the MS degree

```
\documentclass
    [ms]
    {iitmdissertation}
```

- `phd` – use this option in to enable the appropriate options for the PhD degree

```
\documentclass
    [phd]
    {iitmdissertation}
```

Support for `btech`, `dd`, `mtech` and `mba`, or any other degree for that matter, can be easily made available when the specifications for their cover pages are made available.

In addition to the type of degree of the dissertation, two further options are available – `zdraft`. As the name suggests, this places the document in draft mode which enables colored links for cross-references, citations, URLs, Table of contents and other lists. In addition to activating these links (i.e makes them clickable), the option also inserts PDF bookmarks, thereby enabling easy navigation. This option, enabled in the minimal example in listing 1.1, makes it easier to work with documents while one is working on them.

1.2.1 Synopsis

An additional option of `synopsis` is also available to make setting synopsis documents easy. While the general formatting is largely similar there are structural changes in the synopsis when compared to the actual thesis. `iitmdissertation` takes care of this

automatically when the synopsis option is set

```
\documentclass
    [phd,
     synopsis]
    {iitmdissertation}
```

By default, the cover page has a certain blue-colored tape for the synopsis as mandated by the guidelines. A `yellowtape` option is also provided in addition to thedegree and other options described here. As the name suggests produces a yellow tape color in the cover page that is mandated on approved versions by the institute. Note that enabling this option overrides the default color setting of the degree:

```
\documentclass
    [phd,
     synopsis,
     yellowtape]
    {iitmdissertation}
```

Note: There is an option called `indenttoc` available that indents `section` and `subsection` entries in the table of contents. While, the official guidelines do not recommend that the table of contents be indented, it can be enabled if desired by specifying the option

```
\documentclass
    [phd,
     indenttoc]
    {iitmdissertation}
```

1.3 NAMES AND PARTICULARS

With a view to minimize meddling with source files and to simplify the user-experience, a number of tokens are made available to the user:

Table 1.1: List of tokens for names and particulars. While, a document where these are unset will still compile and produce an output, a useful output is only produced when they are set to the appropriate values.

Token name	Intended Contents
`\dissertationDepartment`	Name of the department
`\dissertationAuthorName`	Name of the author
`\dissertationDateOfBirth`	Date of birth of the author
`\dissertationDegree`	Degree
`\dissertationTitle`	Title of the dissertation
`\dissertationMonth`	Month (on cover page)
`\dissertationYear`	Month (on cover page & certificate)
`\dissertationCertificateDate`	Date (on certificate)
`\dissertationType`	Type of dissertation: Thesis, Project Report, etc
`\dissertationGuides`	Name(s) of the guide(s)
`\dissertationCommitteeName`	General Test Committee, Doctoral Committee, etc
`\dissertationImage`	Filename of image (for cover page)

These tokens are initialized with their desired values in the preamble of `thesis.tex`:

```
\documentclass
    [phd]
    {iitmdissertation}

\dissertationDepartment  {...}
\dissertationAuthorName  {...}
\dissertationDateOfBirth {...}
\dissertationDegree      {...}
\dissertationTitle       {...}
\dissertationDate        {...}
\dissertationType        {...}
\dissertationGuides      {...}
\dissertationImage       {...}
\dissertationCommitteeName {...}
\dissertationCertificateDate {...}

\begin{document} ... \end{document}
```

1.4 POPULATING ESSENTIAL INFORMATION

In addition to setting the above mentioned tokens appropriately, few files must be filled with the relevant information which cannot be automatically supplied. Some of these are mandatory:

Table 1.2: Information to be filled in the pre-matter

Filename	Purpose
`pre-cert-attr`	If the dissertation contains work of others, the institute rules mandate that appropriate attirbutions along with relevant license information be decalred in the certificate. If such material has been used, the user is to fill up the relevant information here. In case no such material has been used **rename or delete** this file.
`pre-cert-guides`	The relevant information regarding the guides is to be filled up in this file
`pre-list-of-publications`	This file is to be populated with the details of the author's publications
`pre-quote`	A page for quotes (optional) – remove line 13 if this is not desired
`pre-dedication`	A page for specifying a dedication (optional) – remove line 12 if this is not desired

Table 1.3: Information to be filled in the back-matter

Filename	Purpose
`back-committee`	A page containing details of all the committee members of the dissertation
`back-cv-education`	Relevant information about the educational qualifications of the author, required for the CV

The following (optional) information is required in order to produce a useful glossary and list of abbreviations with `\printGlossaryAndAbbreviations` and for a list of notations with `\printNotation`. If you don't require them, omit these commands from the `FrontMatter` block

With all the information in this chapter one can easily get started with his/her document.

Table 1.4: Optional information in the front-matter

Filename	Purpose
`front-glossary-abbreviations`	Contains information that belongs in the glossary and list of abbreviations
`front-notation`	Contains information that belongs in the notation reference

Happy writing!

CHAPTER 2

GENERAL DOCUMENT STRUCTURES

This chapter and those that follow discuss features of `iitmdissertation` concerned with the organization of textual matter.

2.1 SECTIONING

Textual material is organized into chapters, sections, subsections, subsubsection. Levels deeper than the subsubsection are discouraged (in the specification as well.) These are automatically numbered and spaced appropriately as per the guidelines. The corresponding commands are `chapter...`, `section...`, `subsection...` and `subsubsection...`, respectively, each taking a single argument, namely the name of that section-level.

2.2 ITEMIZED LISTS

Lists are useful constructs to organize textual matter in a serial fashion, be they numbered or unnumbered. When deployed correctly, lists not only make the material more readable, they also greatly enhance the aesthetics of the document by offering a pleasant contrast between swathes of bulky paragraphs.

The reader would have seen such lists in chapter **??**. Automatic spacing between list entries, spacing before the list itself, and spacing after it are all taken care of by `iitmdissertation`. As expected, lists may also be nested within one another without needing to worry about the spacing: the package should take care of it automatically.

2.2.1 Unnumbered lists

The simplest way to set an unnumbered list is by using the `itemize` block:

```
\begin{itemize}
   \item this is the first item in the list
   \item this is the second item here, and,
   \item this is the last item in the list.
   It so happens that I want to say quite a bit more about
   this last item. In that case, I just continue writing
\end{itemize}
```

Several bullet styles are defined and can be activated by specifying the optional argument to the `itemize` block. For instance to set a list to use a diamond marker, one writes:

```
\begin{itemize}[dmd]
      .
      .
\end{itemize}
```

Table 2.1: The various bullet styles available

Option	Mark style	
`blt`	•	first level default
`dmd`	◇	
`dsh`	–	
`sqr`	□	
`bsq`	■	
`str`	⋆	

Unless explicitly specified, item marks default to a preset defined for their respective level.

2.2.2 Numbered lists

The simplest way to set an unnumbered list is by using the `enumerate` block:

```
\begin{itemize}
   \item this is the first item in this numbered list
   \item this is the second item here, and,
   \item this is the last item in the list.
```

```
    Come to think of it, I don't prefer one type of list or
    the other. However, not all lists need to be numbered.
\end{itemize}
```

In the case of numbered list, sometimes more options are desirable. For instance, one might want to surround the item marks by certain characters, or add prefix and/or postfix to each item mark. This is easily achieved, by simply specifying the optional argument for the desired counter type along with any prefix and/or postfixes.

Table 2.2: The various numbering styles available

Option	Mark	
`1`	Numerals: 1, 2, 3, . . .	first level default
`i`	Lowercase roman numerals: i, ii, iii, . . .	
`I`	Uppercase roman numerals: I, II, III, . . .	
`a`	Lowercase letters: a, b, c, . . .	
`A`	Uppercase letters: A, B, C, . . .	
`rsc`	Small-case roman numerals: i, ii, iii, . . .	

Now, prefixing or suffixing these options with required characters will yield corresponding results in the output. For instance, the option `(1)` produces marks (1), (2), (3), . . . , while the option `1)` produces marks 1), 2), 3), ...

Note: In order to prefix/suffix marks with the flower braces `{` or `}`, one must prefix then with a backslash `\`. On the other hand, to prefix/suffix marks with the square brackets `[` or `]`, one must group them within braces like so `[` and/or `]`. For instance

```
Steps to a nice dissertation:
\begin{enumerate}[{Step rsc{]}},leftmargin=2cm]
    \item reflect over the research done
    \item review ones notes, writings, lab journal and
        research articles
    \item stop overthinking and/or procrastinating
    \item start writing
    \item realize that there is much to do
    \begin{enumerate}[{i\}}]
        \item fear not
```

```
        \item persevere
        \item continue writing
    \end{enumerate}
    \item success!
\end{enumerate}
```

produces the following list

Step I] reflect over the research done

Step II] review ones notes, writings, lab journal and research articles

Step III] stop overthinking and/or procrastinating

Step IV] start writing

Step V] realize that there is much to do

i} fear not

ii} persevere

iii} continue writing

Step VI] success!

Notice that we have set and additional value of `2cm` for `leftmargin` so that our prefix "Step" does not flow out of the page margin.

2.3 QUOTES

Quite often one might want to quote verbatim a few words, sentences, excerpts or entire paragraphs from works of others. In such instances, it is good practice to differentiate the textual material from the quoted one(s). To this end, the recommended and the only supported way of setting quotes is by use of the `csquotes` package :

```
\documentclass
    [phd]
    {iitmdissertation}
```

```
\usepackage{csquotes}

\begin{document}
    .
    .
    .
\end{document}
```

See ?? for a comprehensive reference manual.

The simplest instance of a quote is `\textquote` which can be used inline to quote text from elsewhere (or to simply quote a segment of running text). For instance, the snippet

```
    This is my material. Suddenly I find the need to quote
    an author. He says in his article that \textquote[Dr.
    Spherical Sphere]{some spheres are rounder than others}
```

produces the following output:

> This is my material. Suddenly I find the need to quote an author. He says in his article that "some spheres are rounder than others" (Dr. Spherical Sphere)

An accompanying display style environment is also available `displayquote` with a rich host of options. As a simple example, the following snippet

```
\begin{displayquote}[Dr. Spherical Sphere]
    While all cubes are created equal some spheres are
    rounder than others. This fact, not many people
    readily admit. However, it is more appropriate to
    attribute it to their ignorance rather than malice.
    In this article we prove this fact and lay to
    rest all rumors surrounding this strange
    predicament.
\end{displayquote}
```

produces the following output:

> [Dr. Spherical Sphere] While all cubes are created equal some spheres are rounder than others. This fact, not many people readily admit. However, it is more appropriate to attribute it to their ignorance rather than malice. In this article we prove this fact and lay to rest all rumors surrounding this strange predicament.

`iitmdissertation` has provisions in place to ensure that the quote is appropriately line-spaced itself and with regard to surrounding paragraphs of text.

2.4 FOOTNOTES

A footnote is placed (at the bottom of the page) by placing `\\footnote...` next to the word[1] where a footnote is required.

2.5 SIMPLE GLOSSARY AND ACRONYMS

Entries of common terms/phrases can made in the glossary for easy reference. Any glossary entry might be referred to later in the text by use of the `\gls` command. Similarly, entries of abbreviations, may be recalled later in the text by use of the `\acrshor`, `\acrlong` and `\acrfull` commands among others. Note that a valid use of these commands requires that the glossary and abbrevaiations entries be filled in the relevant file, namely, `front-glossary-abbreviations`. For more details and advanced customization refer to the documentation of the `glossaries` package of Talbot (2021).

[1] This is the footnote that was referred to earlier. Notice that as per the institution's specifications the line spacing in the footnote is automatically a single space. However, large/many footnotes are not advisable.

CHAPTER 3

FLOATS, CROSS-REFERENCES AND BIBLIOGRAPHY

3.1 FLOATS

Floats is a term that is used in the TEX world to refer collectively to components which cannot be broken across pages, i.e. it must be placed entirely on a single page. Commonly occurring floats are `figure` and `table`.

3.1.1 Figures

As is commonly said, a picture is worth several words. Anyway, figures are indispensable quite commonplace in all forms of written material. Figures are handled by the `figure` block along with the `\includegraphics` command. In order to ensure that the figure fit satisfactorily on the page, its width and height must be tuned appropriately. To this end, one sets the `width` and `height` options of `\includegraphics` appropriately. For example, to simply place a figure `tux` one does:

```
\begin{figure}
\centering
\includegraphics[width=0.25\textwidth]{tux}
\caption{Tux is a friendly penguin. Being very sociable,
he has many friends of different kinds across age-
groups. We will shortly meet his friends.}
\end{figure}
```

which yields

Figure 3.1: Tux is a friendly penguin. Being very sociable, he has many friends of different kinds across age-groups. We will shortly meet his friends.

The caption of the figure is appropriately spaced and justified. Text in surrounding paragraphs are spaced appropriately as well. Quite often, one wants to present several related images in an array. As an example, consider the following snippet where we want to place eight images in two rows

Listing 3.1: Tux with friends

```
\begin{figure}[h]
    \subfloat[Tux]{
        \includegraphics[width=0.248\textwidth]{tux}
    }
    \subfloat[Adiumy]{
        \includegraphics[width=0.248\textwidth]{adiumy}
    }
    \subfloat[GNU Head]{
        \includegraphics[width=0.248\textwidth]{gnuhead}
    }
    \subfloat[Emule]{
        \includegraphics[width=0.248\textwidth]{emule}
    }
    \par
    \subfloat[Konqi]{
        \includegraphics[width=0.248\textwidth]{konqi}
    }
    \subfloat[Katie]{
        \includegraphics[width=0.248\textwidth]{katie}
    }
    \subfloat[Wiber]{
        \includegraphics[width=0.248\textwidth]{wiber}
    }
    \subfloat[Camelia]{
```

```
        \includegraphics[width=0.248\textwidth]{camelia}
    }
\caption{Tux with his various friends}
\label{fig:tux-with-friends}
\end{figure}
```

which produces the following array of images:

(a) Tux (b) Adiumy (c) GNU Head (d) Emule

(e) Konqi (f) Katie (g) Wiber (h) Camelia

Figure 3.2: Tux with his various friends

While this is a simple example, more complex layouts are easily achieved by clever resizing of the images along with the use of `\par` and `\hfill` as necessary and patience.

In this example we have used an additional `[h]` option to the `figure` block. This is an optional position specifier and can be used to somewhat influence the position on the page where the image gets placed.

3.2 TABLES

The story of tables is quite similar to that of figures. The snippet

Listing 3.2: Elegant table

```
\begin{table}
   \captionabove{Shown below is a simple elegant table with
      a very
   long caption. Tables are quite helpful in organizing
   information in a presentable manner.}
   \centering
   \begin{tabular}{ll}
      \toprule
      Table & Head \\
      \midrule
      stuff & stuff \\
      stuff & stuff \\
      stuff & stuff \\
      stuff & stuff \\
      stuff & stuff \\
      \bottomrule
   \end{tabular}
\label{tab:elegant-table}
\end{table}
```

produces the following table

Table 3.1: Shown below is a simple elegant table with a very long caption. Tables are quite helpful in organizing information in a presentable manner.

Table	Head
stuff	stuff
stuff	stuff
stuff	stuff
stuff	stuff
stuff	stuff

Note: In tables one must use the `\captionabove` command instead of `\caption` to place captions. Only then will the spacing around the captions be appropriate.

Vertical rules in tables are not only very unpleasant but they are largely unnecessary. If one wants to have vertical rules anyway, one does

```
\begin{table}[h]
    \captionabove{Shown below is a table. Vertical rules
    make make for unappealing tables. Notice that the
    caption is justified and single-spaced}
    \centering
    \allowverticalruleshere
    \begin{tabular}{@{} |l|l| @{}}
        \toprule
        Table & Head \\
        \toprule
        stuff & stuff \\
        stuff & stuff \\
        stuff & stuff \\
        stuff & stuff \\
        stuff & stuff \\
        \bottomrule
    \end{tabular}
\end{table}
```

which yields

Table 3.2: Shown below is a table. Vertical rules make make for unappealing tables. Notice that the caption is justified and single-spaced

Table	Head
stuff	stuff
stuff	stuff
stuff	stuff
stuff	stuff
stuff	stuff

Notice that in order to ensure properly spaced vertical rules the command `\allowverticalruleshere` **must** be placed above the `tabular` block. Tables too, being floats, can be supplied optional arguments of the position specifier(s) as has been done in the foregoing snippet. Far more complex tables are possible as demonstrated in the template file accompanying `iitmdissertation`.

3.3 CROSS-REFERENCES

To refer to previous instances in the document, one uses cross references. Almost all LaTeX blocks which are numbered have provide some mechanism to enable cross-referencing so that they may be referred to from different parts elsewhere in the document. The fundamental way to handle cross-references is by the use of the

- `\label` command to place a reference tag, and, by the use of the
- `\ref` command to refer to the element by said tag.

The keen-eyed reader might have noticed the use of the `\label` commands in listings 3.1 and 3.2. Now, an example to illustrate how we might refer to those elements by using the `\ref` command. The snippet

```
I invite you to look at a photo of Tux with his
friends here in Figure \ref{fig:tux-with-friends}.
While there, you might also want to re-inspect
how one might set an elegant table as in table
\ref{tab:elegant-table}.
```

yields

> I invite you to look at a photo of Tux with his friends here in Figure 3.2. While there, you might also want to re-inspect how one might set an elegant table as in table 3.1.

3.4 BIBLIOGRAPHY

As alluded to earlier, the recommended way to handle bibliography references is by the use of a BibTEX-formatted file containing all the references. `iitmdissertation` uses `natbib` to set the references and citations in the correct format. To cite an item in the bibliography file `references.bib`, one uses the `\cite` command with the key of the entry in the `.bib` file. Thus, on writing

```
this is a very nice paper \cite{Stroock_Varadhan_1971}.
```

we get that this is a very nice paper Stroock and Varadhan (1971). While we are on the topic, let me recommend another classic: Nash (1951). Or perhaps, some of my personal favorites might interest you if you work in related fields: see Chernoff (1972), Wald (2004), Zhang (2014) or Shannon (1948) for a nice selection. I must also mention that the work of Polyanskiy *et al.* (2010) is well regarded. Observe that these links are clickable only in the `draft` mode of `iitmdissertation`. Note that no references to bibliographic entries will be set in the document unless one has

```
\begin{document}
            .
            .
   \placeBibliographyReferences{references.bib}
            .
            .
\end{document}
```

in the main document.

CHAPTER 4

MATHEMATICS

Mathematics – need more be said? `iitmdissertation` loads the `mathtools` package by default. Moreover, predefined environments for Definition, Theorem, Corollary, Lemma and Proofs are provided. Further, the proof environment is customized to use the solid QED symbol by default.

Equation numbering is as per the institute guidelines and so is spacing around math environments. For instance

```
\begin{align}
    e^{i\pi} + 1 &= 0 \\
    e^{i\pi} &= -1
\end{align}
```

produces the following insightful equations

$$e^{i\pi} + 1 = 0 \tag{4.1}$$

$$e^{i\pi} = -1. \tag{4.2}$$

produces correctly numbered and spaced equations. Futher, `iitmdissertation` also enables splitting of align block across multiple pages, i.e, it sets `\allowdisplaybreaks` by default.

The example theorem-proof snippet

```
\begin{theorem}
\label{thm:insightful-thm}
It holds that 1 + 1 = 2.
\end{theorem}
\begin{proof}
```

```
Immediately we see that
\[
1 + 1 = 2.
\]
The proof is complete.
\end{proof}
```

which yields

Theorem 4.1. *It holds that 1 + 1 = 2.*

Proof. Immediately we see that

$$1 + 1 = 2.$$

The proof is complete. ■

Additionally, appropriately styled `definition`, `proposition`, `lemma`, `corollary` and `remark` blocks are also available. More advanced users might find the excellent `thmtools` [Chou (2020)] package of great use for advanced specification of theorem-like environments.

Under the option of `smplmath`, various common math operators for argmax, argmin, expectation $\mathbb{E}[]$, probability measure $\mathbb{P}[]$ delimiters are provided. Additionally various common delimiters such as parentheses, curly braces, square brackets and angle brackets that are automatically resizing are also provided –

$$\left(\frac{1}{x+\left(\frac{1}{x}\right)}\right)\left(\left(\left(\binom{n}{k}\right)\right)\right)\left\langle\frac{1}{1+x^2},\left(\frac{1}{x-\frac{1}{y^n}}\right)\right\rangle$$

No more messing around `\left` and `\right` commands.

These may be enable with the option `smplmath`, which is off by default and can be activated with :

```
\documentclass
```

Table 4.1: Various common math commands that may be useful

Command	Description
`\rdbr`	round brackets (parentheses)
`\flbr`	flower (curly) braces
`\sqbr`	square brackets
`\ceil`	ceiling
`\floor`	floor
`\reci`	reciprocal
`\EX`	expectation operator with square delimiters that resize automatically – takes one optional argument (which is the subscript) and one mandatory argument: `\EX[1]{X}` in math mode produces $\mathbb{E}_1[X]$.
`\PR`	probability operator with square delimiters that resize automatically – takes one optional argument (which is the subscript) and one mandatory argument: `\PR[1]{X}` produces $\mathbb{P}_1[X]$.

```
[phd,
 draft
 smplmath]
{iitmdissertation}
```

Note: Like many things in life, these delimiters and operators are not perfect. They work quite well for the average case. There are indeed cases where they do not function as expected. Hence, they have been placed behind an option, which the user can decide to enable.

APPENDIX A

GENERAL NOTES

The appendix is the place for main text matter that did not make it into any chapter for whatever reasons. Quite often, lengthy detailed explanations, which may otherwise detract from the general flow of a chapter are sometimes placed in an appendix where they may be treated in nice detail. Then, the readers may be referred to the appendix. That way, those who deem it important can still have a look at the fine details while those other readers who do not wish to get into too many details may avoid it. This, of course, is just one of the multitude of possibilities of why one might place material in an appendix. After all, it is the author's choice as to what goes where and in what detail.

In this chapter, we provide further references regarding the building blocks of `iitmdissertation`. We depend on a lot of high-quality LaTeX packages that work in harmony to ensure that the user does not have to worry to much with minute details. In most cases, packages and/or their facilities are customized to ensure compliance with the guidelines laid down by the institute.

Note: Ideally, the end user should not have to customize any of the lower level options as there are already sane defaults in place or they have already been modified to comply with the specification.

A.1 SOURCE FILES

The user must avoid editing the source files as far as possible. Commands do not always do what one expects of them unless of course they are invoked in the right context (and/or situation). `iitmdissertation` has been extensively tested in many scenarious. However, it is very much possible that bugs exist. Most errors in compilation arise

from incorrect use of packages and/or their facilites. Take care to ensure that you follow best practices while using external packages. If you encounter an insurmountable issue despite your best efforts, you are most welcome to contact the author for help.

Ensure that these files are not tampered with at any cost. The accompanying template will not compile (and produce a PDF) if even one of these is missing. These are as follows: `iitm.bst`, `iitmdissertation.cls`, `iitmdissertation.sty` and the folder `zz-imp`.

A.2 PACKAGES

Numerous packages are available to a LaTeX user. Additionally, users might have their own set of macros/commands from previous use. Both, Commands to load these packages, i.e, the `\usepackage` commands and the user-defined macros are placed in the preamble of the document:

```
\documentclass
    [phd]
    {iitmdissertation}

\usepackage{...}
% user-defined macros
\begin{document}
    .
    .
    .
\end{document}
```

For any package, always consult the official package manual and/or reference for specific instructions on how to load them and the range of options available. If you run into strange issues, feel free to ask for send me an email or ask on the PhD or MS mailing lists.

Note: As is the case for many other programming languages, there are lot of LaTeX

code snippets floating around at various forums on the internet. While using these code snippets may (or may not) alleviate issues, it is highly plausible that such code can have undesirable side effects, just from being placed in a document. Further, a single code snippet can, in general, have different effects depending on where it is placed in the document. Therefore, the user is urged to inspect an official manual and/or reference before inserting arbitrary code into the document. The code of `iitmdissertation` largely conforms to the best practices and strictly abides by the documentation of the packages that it loads.

A.2.1 Some useful packages

Quite a few packages are loaded by `iitmdissertation` which are very commonplace in a standard document. In the event that certain customization of one or more of the facilities offered by these packages is required, the user is urged to look at the respective package's documentation.

Table A.1: A list of commonly required (pre-loaded) packages along with links to their documentation

Package(s)	Note(s)
`enumitem`	handles all itemized lists and descriptions [López (2019)]
`booktabs` & `array`	handle all facilities related to tables [Els (2020); Team and Mittelbach (2021)] **Caution:** Although, there are many table-related packages for LaTeX, use of `booktabs` and `array` is the recommended way to handle tabulation
`xcolor`	handles all color related facilities. This package is loaded with the `usenames,svgnames` option for a total of 170 color options. Consult page 43 of the `xcolor` manual for these color names [Team and Kern (2021)] **Caution:** Trying to load `xcolor` with other options might cause issues (i.e, option clashes in LaTeX parlance). If you really must have new color(s) you can define it using the `\definecolor` command.
`subcaption`	This is the recommended package for handling sub-figures and sub-captions. This is loaded by default with correct options to ensure proper spacing around (sub-)captions. [Sommerfeldt (2020)]
`multirow`	This is the recommended package for handling tabular-cells spanning multiple rows. This is not loaded by default, since it is not essential.[van Oostrum (2020)]
`glossaries`	This is the default package used to handle glossaries and the abbreviations in the prematter. `iitmdissertation` provides defaults for a simple glossary customized to match the official guidelines of the institute as can be seen in the template. [Talbot (2021)]
`nomencl`	This is the default package used to handle the notation chapter in the prematter. `iitmdissertation` provides defaults for a simple notations chapter conforming to the guidelines. [Veytsman *et al.* (2021)]

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CURRICULUM VITAE

NAME Firstname Lastname

DATE OF BIRTH 01 January 2022

EDUCATION QUALIFICATIONS

1970 **The first degree**

Institution	Wherever
Specialization	Whatever

2038 **The previous degree**

Institution	Wherever
Specialization	Whatever

Institution	Wherever
Specialization	Whatever
Registration Date	Whenever

COMMITTEE

Chairperson

Dr. Name
Whatever
Wherever

Guide(s)

Dr. Name
Whatever
Wherever

Dr. Name
Whatever
Wherever

Member(s)

Dr. Name
Whatever
Wherever

Dr. Name
Whatever
Wherever

Dr. Name
Whatever
Wherever