

# L<sup>A</sup>T<sub>E</sub>X Seminar Report Title

*A project report submitted in partial fulfilment of the requirements for the degree of*

**MASTER OF SCIENCE  
IN  
COMPUTER SCIENCE**



*Submitted by*

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*Supervised by*

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**DEPARTMENT OF COMPUTER SCIENCE  
GAUHATI UNIVERSITY, ASSAM  
March 13, 2024**

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ASSAM



**CERTIFICATE**

This is to certify that the dissertation entitled **L<sup>A</sup>T<sub>E</sub>X Seminar Report Title** submitted by **Author Name**, for partial fulfilment for the requirement of award of the degree of Master of Science in **COMPUTER SCIENCE**, Gauhati University is a work carried out by him/her under my supervision and guidance of **Your Supervisor's Name**.

Date: March 13, 2024  
Place: Gauhati University

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The project report entitled **LaTeX Seminar Report Title** submitted by **Author Name**, for partial fulfilment for the requirement of award of the degree of Master of Science in **COMPUTER SCIENCE**, Gauhati University has been examined.

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Place: Gauhati University

DEPARTMENT OF COMPUTER SCIENCE  
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**CERTIFICATE**

This is to certify that the project report entitled **L<sup>A</sup>T<sub>E</sub>X Seminar Report Title** submitted by **Author Name**, for partial fulfilment for the requirement of award of the degree of Master of Science in **COMPUTER SCIENCE**, Gauhati University is a work carried out by him under my supervision and guidance.

To the best of my knowledge, the work has not been submitted to any other institute for the award of any other degree or diploma.

Date: March 13, 2024  
Place: Gauhati University

Your Supervisor's Name  
Supervisor  
Department of Computer Science

## DECLARATION

I hereby declare that the seminar report entitled **L<sup>A</sup>T<sub>E</sub>X Seminar Report Title** has been completed by me and submitted in partial fulfilment for the requirement of award of the degree of **Master of Science in COMPUTER SCIENCE**, Gauhati University. I also declare that any or all contents incorporated in the report has not been submitted in any form for the award of any other degree of any other institute or university.

Date: March 13, 2024  
Place: Gauhati University

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Semester: Fourth Semester

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Date: March 13, 2024

Author Name

# Abstract

L<sup>A</sup>T<sub>E</sub>X Seminar Report Title

This project aims to design and develop a custom, high-level language compiler. The compiler will be implemented incrementally, allowing it to accept a significant language subset and generate assembly code for a selected target architecture. The motivation behind this project stems from the need for a compiler that adheres to fundamental software engineering principles while offering concise and expressive concepts.

The development process will follow a step-by-step approach, from designing the language's grammar to adding more complex features. Each stage will yield a fully working compiler for a specific subset of the source language. By adopting this incremental methodology, the project seeks to provide a deep understanding of the different components of a compiler, including lexical analysis, parsing, semantic analysis, and code generation.

The resulting compiler will provide a practical resource for students, researchers, and developers interested in compiler design and contribute to advancing the field. It will demonstrate the application of various concepts and techniques in language implementation, software optimization, and system-level programming.

Additionally, the project acknowledges the importance of considering the target architecture during compilation. The generated assembly code will be tailored to the specific requirements and capabilities of the selected architecture, ensuring optimal performance and compatibility.

This project strives to deliver a well-designed and efficient compiler that bridges the gap between theoretical concepts and practical implementation. The project aims to contribute to language implementation and empower developers to build robust and efficient software systems by combining principles of software engineering, compiler design, and target architecture optimization.

***Keywords:*** *Compiler, Language Design, Programming Languages, Raspberry Pi*

# Contents

Certificate	ii
Certificate	iii
Certificate	iv
Declaration	v
Acknowledgement	vi
Abstract	vii
Contents	viii
List of Figures	x
List of Tables	xi
List of Listings	xii
<b>1 Introduction</b>	<b>1</b>
<b>2 How to use the template</b>	<b>2</b>
2.1 Folders . . . . .	2
2.2 Dissertation.tex . . . . .	3
2.2.1 PACKAGES AND OTHER DOCUMENT CONFIGURATIONS . . . . .	3
2.2.2 ADD YOUR CUSTOM VALUES, COMMANDS AND PACKAGES . . . . .	3
2.2.3 TITLE PAGE . . . . .	3
2.2.4 PREAMBLE PAGES . . . . .	3
2.2.5 LIST OF CONTENTS/FIGURES/TABLES . . . . .	3
2.2.6 THESIS MAIN TEXT . . . . .	3
2.2.7 BIBLIOGRAPHY . . . . .	3
2.2.8 APPENDICES . . . . .	3
2.2.9 Differences between a report version and final version . . . . .	4
<b>3 Figures, tables and images</b>	<b>5</b>
3.1 Figures . . . . .	5
3.2 Tables . . . . .	5



<b>4</b>	<b>Codes, timeline</b>	<b>7</b>
4.1	Codes . . . . .	7
4.2	Timeline . . . . .	9
	<b>Bibliography</b>	<b>10</b>
<b>A</b>	<b>About Appendices</b>	<b>11</b>
<b>B</b>	<b>Script</b>	<b>12</b>



# List of Figures

3.1 Short caption for List of Figures . . . . . 5



# List of Tables

3.1 Short heading for the List of Tables. . . . . 6



# Listings

4.1	My Captions	7
4.2	short caption	7



# Chapter 1

## Introduction



# Chapter 2

## How to use the template

This is a practical guide into how to use this template, by explaining the role of the different folders and files.

If some practices seem like overkill for a 20 page proposal (splitting the content across different files), that is because it probably is, but we built it this way because this thesis template is structured identically. That means that you will be able to incorporate this document into your thesis seamlessly.

### 2.1 Folders

The main folder contains three folders detailed here:

- **Assets.** This folder should contain all the images that you will use in your thesis. It can contain subfolders, for example one for each chapter. To include an image from the main text, use something like `\includegraphics{subfolder/image.jpg}` without worrying about the `Images` path.
- **MainText.** This folder contains a series of `LATEX` files that form the main text: introduction, chapters, conclusion, appendices and published articles. The introduction and conclusion as they are now are not numbered, which creates a few difficulties with the headers of the thesis. Those are solved by including the commands `\unnumberedchapter{}` and `\numberedchapter` before including the files in `xxx_Thesis.tex`. If you want the introduction and conclusion to be numbered, re-write and treat them as regular chapters.
- **Preamble.** This folder contains a series of `LATEX` files with the pages that will appear before the main text. Please write (or copy and paste) your own text in those files and delete the dummy text when appropriate. The files are:
  - `abbreviations.tex` — List of abbreviations. If the list goes over one page, create another table.
  - `abstract.tex` — Abstract. Follow directions in the file.
  - `certificate.tex` — Acknowledgments. Follow directions in the file.
  - `declaration.tex` — Declaration of Original and Sole Authorship. Only modify the last item. This page needs to be signed once printed.
  - `glossary.tex` — Glossary (optional). If the list goes over one page, create another table.

- `physics_bibstyle.bst` — Bibliography style file modified by Jeremie Gillet in 2011 to suit his thesis. Might be suitable for physics. If you want to use another custom bibliography style, include the file in this folder.
- `Thesis_bibliography.bib` — BibTeX file containing your bibliography.
- `report_bib.bib` — BibTeX file containing your bibliography for reports.

## **2.2 Dissertation.tex**

This is the main files, the only one that need to be compiled to build the document. Compile once with  $\text{\LaTeX}$ , once with BibTeX and finally twice with  $\text{\LaTeX}$  to get all the references right.

Let's go through each section and comment them briefly. [1] The last section will emphasize the differences between the two files.[2]

### **2.2.1 PACKAGES AND OTHER DOCUMENT CONFIGURATIONS**

This section contains the minimum number of packages and definitions to compile the thesis. No line should be removed or modified.

### **2.2.2 ADD YOUR CUSTOM VALUES, COMMANDS AND PACKAGES**

This section should not be modified directly. Instead, your packages and definitions should be included in `Preamble/mydefinitions.tex`.

### **2.2.3 TITLE PAGE**

Creates the title page.

### **2.2.4 PREAMBLE PAGES**

Structures the style (header) for the preamble pages and builds them. Do not modify.

### **2.2.5 LIST OF CONTENTS/FIGURES/TABLES**

Creates the list of contents. Do not modify.

### **2.2.6 THESIS MAIN TEXT**

Structures the style for the main text chapters and builds them.

### **2.2.7 BIBLIOGRAPHY**

Builds the bibliography. The style of the bibliography can be defined in `Preamble/mydefinitions.tex`.

### **2.2.8 APPENDICES**

Structures the style for the appendices and builds them. The appendices are numbered with letters but are structured like regular chapters.

### 2.2.9 Differences between a report version and final version

There are two main differences between `\documentclass[report]{dd_dissertation}` and `\documentclass[final]{dd_dissertation}`.

The difference is in the document style: page size, header and line spacing are different. This might create small issues, such as page breaking with large tables, images or captions, when compiling the same content.





# Chapter 3

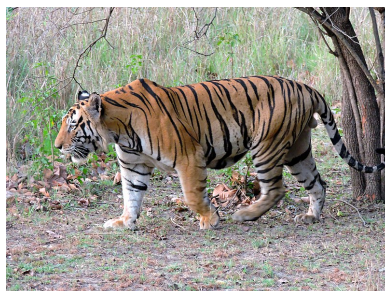
## Figures, tables and images

### 3.1 Figures

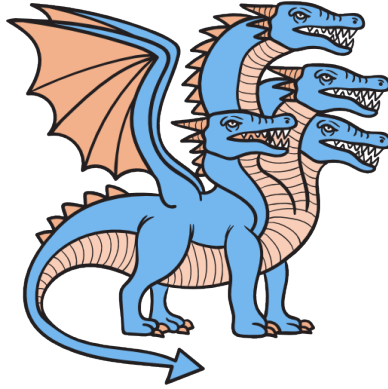
Refer to figure like this: Figure 3.1 or this (Fig. 3.1). If you want to include a list of figure, you can use a short version of the caption as shown in Figure 3.1.

### 3.2 Tables

Refer to tables this this: Table 3.1.



**Figure 3.1:** Short caption (if wanted). Full caption with all the details here.



This secret image won't be numbered and won't appear in the List of Figures because of the \*

**Table 3.1:** Short heading for the List of Tables.

Parameter	Value
$\Delta$	0, 150
$\alpha$	85
$\epsilon$	6
$\kappa$	6.8
$\gamma$	0.2

Full caption with all the details here.

Parameter	Value
$\Delta$	0, 1500
$\alpha$	850
$\epsilon$	60
$\kappa$	68
$\gamma$	2

This secret table won't be numbered and won't appear in the List of Figures because of the \*

# Chapter 4

## Codes, timeline

### 4.1 Codes

$x := -2 + y$

**Listing 4.1:** My Captions

```
int main() {  
    //compound statement #1  
    int a = 1;  
    {  
        //compound statement #2  
        a = 2;  
        if (a) {  
            //compound statement #3  
            a = 4;  
        }  
    }  
}
```

**Listing 4.2:** caption text

For in-text code insertion we can do it like this.

```
// Hello.java
import javax.swing.JApplet;
import java.awt.Graphics;

public class Hello extends JApplet {
    public void paintComponent(Graphics g) {
        g.drawString("Hello, world!", 65, 95);
    }
}
```



## 4.2 Timeline

---

10 Sept 2022	•	Start .
16 Sept 2022	•	Finish Primary Research .
19 Sept 2022	•	Explore Problem Statement .
20 Sept 2022	•	Criteria Selection .
23 Sept 2022	•	Proposed Methodology .
30 Sept 2022	•	Started Working Theoretical solution .
30 Oct 2022	•	Started Working Practical solution .
05 Nov 2022	•	Submitted progress report .
07 Nov 2022	•	Second Seminar .
25 Nov 2022	•	Finalize Literature review, Methodology and the Language Designing .
20 Dec 2022	•	Submit Progress Report to Guide .

---

# Bibliography

- [1] A. W. Appel. *Modern Compiler Implementation in ML*. Cambridge University Press, 1988.
- [2] J. Lee. Ansi c grammar, April 30, 1985. URL <https://www.lysator.liu.se/c/ANSI-C-grammar-1.html>.



# Appendix A

## About Appendices

Appendices are optional and should only be used if necessary.



# Appendix B

## Script

The following file is used, hence can be imported directly from the file.

```
# random_script.py
```

```
import math
# initialize x and n with values
x = 4
n = 3
# approach 1
result_val = x ** n
print("%d raised to the power %d is %d" % (x,n,result_val))
# approach 2
result_val = pow(x,n)
print("%d raised to the power %d is %d" % (x,n,result_val))
# approach 3
result_val = math.pow(x,n)
print("%d raised to the power %d is %5.2f" % (x,n,result_val))
```