

1. Develop a LaTeX script to create a simple document that consists of 2 sections [Section1, Section2], and a paragraph with dummy text in each section. And also include header [title of document] and footer [institute name, page number] in the document.

```
\documentclass{article}

\usepackage{fancyhdr} % Package for header and footer
\usepackage{lipsum} % Package for dummy text

% Define header and footer

\pagestyle{fancy}

\fancyhf{}

\lhead{Title of Document} % Left header
\rfoot{Institute Name \quad \thepage} % Right footer with page number

\begin{document}

% Title

\title{Title of Document}

\author{}

\date{}

\maketitle

% Section 1

\section{Section1}

\lipsum[1] % Dummy text

% Section 2

\section{Section2}

\lipsum[2] % Dummy text

\end{document}
```

# Output:

The screenshot shows the Overleaf LaTeX editor interface. The code editor on the left contains the following LaTeX code:

```
\documentclass{article}
\usepackage{fancyhdr} % Package for header and footer
\usepackage{lipsum} % Package for dummy text
%
% Define header and footer
\pagestyle{fancy}
\fancyhf{}
\head{Title of Document} % Left header
\foot{Institute Name \quad \thepage} % Right footer with page number
%
\begin{document}
%
% Title
\title{Title of Document}
\author{}
\date{}
\maketitle
%
% Section 1
\section{Section1}
\lipsum[1] % Dummy text
%
% Section 2
\section{Section2}
\lipsum[2] % Dummy text
%
\end{document}
```

The file outline on the left shows two sections: Section1 and Section2. The preview pane on the right displays the document's title and two sections of placeholder text.

## 1. Document Class Declaration:

```
\documentclass{article}
```

Explanation: This defines the document class as article, which is commonly used for simple documents, reports, and papers.

## 2. Importing Required Packages:

```
\usepackage{fancyhdr} % Package for header and footer
```

```
\usepackage{lipsum} % Package for dummy text
```

- `\usepackage{fancyhdr}`: This package is used to customize headers and footers.
- `\usepackage{lipsum}`: This package provides dummy text (`lorem ipsum`) for placeholder content.

## 3. Setting Up Header and Footer:

- `\pagestyle{fancy}`: Enables the fancy header/footer style.
- `\fancyhf{}`: Clears any existing header and footer settings.

- `\lhead{Title of Document}`: Sets the **left header** to display "Title of Document".
  - `\rfoot{Institute Name \quad \thepage}`:
    - Institute Name: The footer will display the institute's name.
    - `\quad`: Adds a small space.
    - `\thepage`: Displays the current **page number**.
- 

## 4. Beginning the Document

```
latex
CopyEdit
\begin{document}
```

- This marks the start of the actual content in the document.
- 

## 5. Adding the Title

```
latex
CopyEdit
\title{Title of Document}
\author{}
\date{}
\maketitle
```

- `\title{Title of Document}`: Defines the document title.
  - `\author{}`: Author is left empty, so no name appears.
  - `\date{}`: Date is left empty, so the default date won't be shown.
  - `\maketitle`: Generates and displays the title at the beginning of the document.
- 

## 6. Creating the First Section

```
latex
CopyEdit
\section{Section1}
\lipsum[1] % Dummy text
```

- `\section{Section1}`: Creates a section titled "Section1".
  - `\lipsum[1]`: Generates one paragraph of dummy text.
- 

## 7. Creating the Second Section

```
latex
CopyEdit
\section{Section2}
\lipsum[2] % Dummy text
```

- `\section{Section2}`: Creates a section titled "Section2".
  - `\lipsum[2]`: Generates another paragraph of dummy text.
- 

## 8. Ending the Document

```
latex  
CopyEdit  
\end{document}
```

- Marks the end of the document. Anything written after this will be ignored.

## 2. Develop a LaTeX script to create a document that displays the sample Abstract/Summary.

### PROGRAM:

```
\documentclass{article}  
\usepackage{lipsum}  
  
\title{Sample Abstract/Summary}  
\author{}  
\date{}  
  
\begin{document}  
  
    \maketitle  
  
    \section*{Abstract}  
    \lipsum[1]  
  
    \vspace{0.5cm}  
  
    \lipsum[3]  
  
\end{document}
```

## Output:

The screenshot shows the Overleaf LaTeX editor interface. The top navigation bar includes tabs for "LaTeX document creation" and "Program-2.tex - Online LaTeX Editor". The address bar shows the URL <https://www.overleaf.com/project/67b82b585639bfa8823f11cc>. The main workspace has a "Code Editor" tab selected, displaying the following LaTeX code:

```
1 \documentclass{article}
2 \usepackage{lipsum}
3
4 \title{Sample Abstract/Summary}
5 \author{}
6 \date{}
7
8 \begin{document}
9
10 \maketitle
11
12 \section*{Abstract}
13 \lipsum[1]
14
15 \vspace{0.5cm}
16
17 \lipsum[3]
18
19 \end{document}
```

The "File outline" panel on the left shows a single node labeled "Abstract". The right panel displays the rendered output:

**Abstract**

Sample Abstract/Summary

*Abstract*

... (Lorem ipsum placeholder text)

The Windows taskbar at the bottom shows various pinned apps like File Explorer, Edge, and Mail.

## Explanation:

### 1. Document Class Declaration

```
latex
CopyEdit
\documentclass{article}
```

- Specifies that the document is an `article`, which is a standard class for small documents.

### 2. Importing Required Package

```
latex
CopyEdit
\usepackage{lipsum}
```

- The `lipsum` package generates dummy text ( `Lorem Ipsum`), used for placeholder content.

### 3. Title, Author, and Date (Metadata)

```
latex
CopyEdit
\title{Sample Abstract/Summary}
\author{}
\date{}
```

- o \title{Sample Abstract/Summary}: Defines the document title.
- o \author{}: Left empty, meaning no author name will appear.
- o \date{}: Left empty, so the document won't display a date.

#### 4. Beginning the Document

```
latex
CopyEdit
\begin{document}
```

- o Marks the start of the actual document content.

#### 5. Creating the Title

```
latex
CopyEdit
\maketitle
```

- o Automatically generates and displays the **title** at the top of the document.

#### 6. Abstract Section

```
latex
CopyEdit
\section*{Abstract}
```

- o \section\*{Abstract}: Creates an unnumbered section named "**Abstract**".

#### 7. Adding Dummy Text

```
latex
CopyEdit
\lipsum[1]
```

- o Inserts **dummy text** from the `lipsum` package.

#### 8. Vertical Space

```
latex
CopyEdit
\vspace{0.5cm}
```

- o Adds **0.5 cm** of vertical space before the next paragraph.

#### 9. More Dummy Text

```
latex
CopyEdit
\lipsum[3]
```

- o Inserts another paragraph of **dummy text**.

#### 10. Ending the Document

```
latex
CopyEdit
```

```
\end{document}
```

- Marks the end of the document.
- 

## How It Appears in Overleaf

- The document will display the **title**: "**Sample Abstract/Summary**".
- The **Abstract section** contains two paragraphs of **dummy text**.
- **No author or date** will appear since they are left blank.
- **No section numbering** for "Abstract" (because of `\section*{ }{ }`).

### **Program 3:**

**Develop a LaTeX script to create a simple title page of the VTU project Report [Use suitable Logos and text formatting].**

```
\documentclass[12pt, a4paper]{report} % Document class with font size 12pt and paper size A4
\usepackage{graphicx} % Package to include images
\usepackage{geometry} % Package to customize page layout
\geometry{a4paper, total={170mm, 257mm}, left=20mm, right=20mm, top=30mm, bottom=30mm}
% Customizing page margins
\thispagestyle{empty} % Suppressing page numbers for the title page

\begin{document}

\begin{titlepage} % Starting the title page environment
\begin{center} % Centering content

% University Details
\textbf{\large VISVESVARAYA TECHNOLOGICAL UNIVERSITY}\\
\normalsize Jnana Sangama, Belgaum-590018\\
\vspace{0.3in}
\includegraphics[scale=0.2]{Vtu logo.jpg}\\
\vspace{0.3in}

% Title and Project Details
\textbf{A PROJECT REPORT} \\
ON \\
\vspace{0.2in}
\textbf{\large "Create Report Format Using LaTeX"}\\
\vspace{0.1in}
\small Submitted in partial fulfillment of the requirements for the Fifth
Semester degree of
Bachelor of Engineering in Computer Science Engineering of Visvesvaraya Technological
\end{center}

```

University, Belagavi}\|\|  
  \vspace{0.1in}  
  \textbf{BACHELOR OF ENGINEERING}\|IN\|CSE(CYBER SECURITY}\|\|  
  \vspace{0.2in}

% Student Details  
Submitted by\|\|  
  \vspace{0.08in}  
  \begin{tabular}{ll}  
    \textbf{1IC21CY017} & \textbf{Braham Kumar Sah}\|\|  
    \textbf{1IC21CY015} & \textbf{Shoaib Akhtar}\|\|  
    \textbf{1IC21CY005} & \textbf{Aman Kumar}\|\|  
    \textbf{1IC21CY015} & \textbf{Bikash Kumar Singh}\|\|  
  \end{tabular}  
  \end{tabular}  
  
  \vspace{0.2in}

% Guide Details  
  \textbf{Under the Guidance of}\|\|  
  Dr. Kaipa Sandhya\|\|  
  Assistant Professor, Department of Data Science\|\|  
  
  \vspace{0.2in}

% College Details  
  \includegraphics[scale=0.4]{ICEAS logo.jpg}\|\|  
  \vspace{0.01in}  
  {\small DEPARTMENT OF CSE(CYBER SECURITY)}\|\|  
  \vspace{0.1in}  
  \textbf{IMPACT COLLEGE OF ENGINEERING AND APPLIED SCIENCES}\|\|  
  {\small (Approved By AICTE & Affiliated to VTU), Bengaluru -560092}\|\|

```

\begin{center}
    \vspace{0.1in}
    \small 2023-2024\\
\end{center}
\end{titlepage}
\end{document}

```

## Output:

The screenshot shows the Overleaf LaTeX editor interface. On the left, the file structure includes 'ICEAS logo.jpg', 'main.tex' (which is the active file), and 'Vtu logo.jpg'. The 'File outline' panel indicates no sections or subsections found. The main 'Code Editor' tab displays the LaTeX code for the title page, which includes document class settings, package imports for graphics and geometry, and the title page content. The 'Visual Editor' tab shows the generated PDF output. The PDF is titled 'A PROJECT REPORT ON "Create Report Format Using LaTeX"' and is submitted by students IIC21CY017, IIC21CY015, and IIC21CY005 under the guidance of Dr. Kajal Sandhya. It is a Bachelor of Engineering project in CSE(CYBER SECURITY) from Impact College of Engineering and Applied Sciences, Bengaluru.

```

\documentclass[12pt, a4paper]{report} % Document class with font size 12pt and paper size A4
\usepackage{graphicx} % Package to include images
\usepackage{geometry} % Package to customize page layout
\geometry{a4paper, total={170mm, 257mm}, left=20mm, right=20mm, top=30mm, bottom=30mm} % Customizing page margins
\thispagestyle{empty} % Suppressing page numbers for the title page

\begin{document}

\begin{titlepage} % Starting the title page environment
\begin{center} % Centering content
    % University Details
    \textbf{\large VISVESVARAYA TECHNOLOGICAL UNIVERSITY}\\
    \normalsize Jnana Sangama, Belgaum-590018\\
    \vspace{0.3in}
    \includegraphics[scale=0.2]{vtu_logo.jpg}\\
    \vspace{0.3in}
    % Title and Project Details
    \textbf{\large A PROJECT REPORT} \\
    ON \\
    \vspace{0.2in}
    \textbf{\large "Create Report Format Using LaTeX"} \\
    \vspace{0.1in}
    \small Submitted in partial fulfillment of the requirements \\
    for the Fifth Semester degree of \\
    Bachelor of Engineering in Computer Science Engineering of \\
    Visvesvaraya Technological \\
    University, Belgaum\\
    \vspace{0.1in}
    \textbf{\large BACHELOR OF ENGINEERING\\IN\\CSE(CYBER SECURITY)}\\
    IMPACT COLLEGE OF ENGINEERING AND APPLIED SCIENCES \\
    (Approved By AICTE, Affiliated to VTU), Bengaluru - 560002 \\
    2023-2024
\end{center}
\end{titlepage}

```

### 1. Document Class and Packages

```

latex
CopyEdit
\documentclass[12pt, a4paper]{report}

```

- **report**: Specifies that the document type is a **report**.
- **12pt**: Sets the font size to **12 points**.
- **a4paper**: Defines the paper size as **A4 (210mm × 297mm)**.

```

latex
CopyEdit

```

```
\usepackage{graphicx}
```

- This package is used to **include images** in the document.

```
latex  
CopyEdit  
\usepackage{geometry}
```

- The **geometry** package allows customization of the page layout.

```
latex  
CopyEdit  
\geometry{a4paper, total={170mm, 257mm}, left=20mm, right=20mm, top=30mm,  
bottom=30mm}
```

- Sets the page margins:

- **a4paper**: Ensures A4 paper size.
- **total={170mm, 257mm}**: Defines the total **text area**.
- **left=20mm, right=20mm**: Left and right margins of **20mm**.
- **top=30mm, bottom=30mm**: Top and bottom margins of **30mm**.

```
latex  
CopyEdit  
\thispagestyle{empty}
```

- Removes the page number from the **title page**.

---

## 2. Document Content

```
latex  
CopyEdit  
\begin{document}
```

- This starts the **main content** of the document.

```
latex  
CopyEdit  
\begin{titlepage}
```

- Defines a **title page**.

```
latex  
CopyEdit  
\begin{center}
```

- Centers all the content inside this environment.

---

## 3. University Details

```
latex  
CopyEdit  
\textbf{\large VISVESVARAYA TECHNOLOGICAL UNIVERSITY} \\
```

- `\textbf{ }:` Makes the text **bold**.
- `{\large ...}:` Sets the text to **large** size.
- `\\\:` Moves to the **next line**.

```
latex
CopyEdit
{\normalsize Jnana Sangama, Belgaum-590018}\\
```

- `{\normalsize ...}:` Sets the text to **normal size**.

```
latex
CopyEdit
\vspace{0.3in}
```

- **Adds vertical space of 0.3 inches.**

```
latex
CopyEdit
\includegraphics[scale=0.2]{Vtu logo.jpg}
```

- **Includes an image (VTU logo) and scales it to 20% of its original size.**

#### 4. Project Title and Details

```
latex
CopyEdit
\textbf{A PROJECT REPORT} \\
ON \\
```

- Displays "**A PROJECT REPORT**" in **bold**.
- `\\\` moves to the **next line**.

```
latex
CopyEdit
\textbf{{\large "Create Report Format Using LaTeX"} }\\
```

- `{\large ...}` makes the **project title larger**.

```
latex
CopyEdit
{\small Submitted in partial fulfillment of the requirements for the Fifth
Semester degree of
Bachelor of Engineering in Computer Science Engineering of
Visvesvaraya Technological
University, Belagavi}\\
```

- `{\small ...}:` Uses a **smaller font size**.
- Describes the **purpose of the project**.

```
latex
CopyEdit
\textbf{BACHELOR OF ENGINEERING\IN\CSE(CYBER SECURITY)}\\
```

- Displays the **degree title in bold**.

---

## 5. Student Details

```
latex
CopyEdit
Submitted by\\
\vspace{0.08in}
```

- **Introduces** the list of students.

```
latex
CopyEdit
\begin{tabular}{ll}
\textbf{1IC21CY017} & \textbf{Braham Kumar Sah} \\
\textbf{1IC21CY015} & \textbf{Shoaib Akhtar} \\
\textbf{1IC21CY005} & \textbf{Aman Kumar} \\
\textbf{1IC21CY015} & \textbf{Bikash Kumar Singh} \\
\end{tabular}
```

- Uses a **table environment (tabular)** to align student details:
  - **Two columns:** First column for **roll numbers**, second for **names**.
  - **&:** Separates columns.
  - **\:\:** Moves to the **next row**.

---

## 6. Guide Details

```
latex
CopyEdit
\textbf{Under the Guidance of}\\
Dr. Kaipa Sandhya\\
Assistant Professor, Department of Data Science\\
```

- **Mentions the project guide** and their **designation**.

---

## 7. College Details

```
latex
CopyEdit
\includegraphics[scale=0.4]{ICEAS logo.jpg}
```

- Inserts the **college logo**, scaled to **40%** of its original size.

```
latex
CopyEdit
{\small DEPARTMENT OF CSE (CYBER SECURITY)} \\
```

- Displays the **department name** in **small font**.

```
latex
CopyEdit
\textbf{IMPACT COLLEGE OF ENGINEERING AND APPLIED SCIENCES}\\
```

- Displays the **college name** in **bold**.

```
latex
```

```
CopyEdit
{\small (Approved By AICTE & Affiliated to VTU), Bengaluru -560092} \\
```

- Shows **approval details in small font.**

```
latex
CopyEdit
\vspace{0.1in}
{\small 2023-2024} \\
```

- **Academic year in small font.**
- 

## 8. Ending the Title Page and Document

```
latex
CopyEdit
\end{center}
\end{titlepage}
\end{document}
```

- `\end{center}`: Ends **centering**.
  - `\end{titlepage}`: Ends **title page** formatting.
  - `\end{document}`: **Ends** the document.
- 

## Final Output

This LaTeX code generates a **well-structured project title page** with:

- **University details**
- **Project title**
- **Student and guide information**
- **College name and logos**

## 4. Develop a LaTeX script to create the Certificate Page of the Report [Use suitable commands to leave the blank spaces for user entry].

### PROGRAM:

```
\thispagestyle{empty}

\begin{document}

\begin{titlepage}

\begin{center}
```

\textbf{\large UNIVERSITY}}\\

VISVESVARAYA

TECHNOLOGICAL

{\normalsize Jnana Sangama, Belgaum-590018}\\

\vspace{0.5in}

\includegraphics[scale=0.3]{Vtu logo.jpg}\\

\vspace{0.5in}

\textbf{CERTIFICATE}\\

\vspace{0.3in}

This is to certify that \\

\vspace{0.2in}

\underline{\hspace{10cm}}\\

\vspace{0.2in}

(Name of the student)\\

\vspace{0.2in}

bearing University Seat Number \\

\vspace{0.2in}

\underline{\hspace{10cm}}\\

\vspace{0.2in}

has satisfactorily completed the project work entitled \\

\vspace{0.2in}

\underline{\hspace{10cm}}\\

\vspace{0.2in}

(Title of the project)\\

\vspace{0.2in}

towards the partial fulfillment of the requirements for the award of the  
degree of\\

```

\vspace{0.2in}

\textbf{BACHELOR OF ENGINEERING\\IN\\CSE(CYBER
SECURITY)}\\

\vspace{0.5in}

\textbf{Guide} \hspace{3.5in} \textbf{Head of the Department}\\

\vspace{0.3in}

\underline{\hspace{6cm}} \hspace{1.5in} \underline{\hspace{6cm}}\\

\vspace{0.1in}

\textbf{(Guide's Name)} \hspace{2.7in} \textbf{(HOD's Name)}\\

\vspace{0.1in}

\textbf{(Guide's Designation)} \hspace{2in} \textbf{(HOD's
Designation)}\\

\vspace{0.1in}

\textbf{(Department of CSE(CY))} \hspace{2.1in}\\

\vspace{0.1in}

\textbf{[College Name]}\\

\vspace{0.1in}

\textbf{[Location]}\\

\vspace{0.1in}

\textbf{[Month Year]} % Replace with current month and year

\end{center}

\end{titlepage}

\end{document}

```

## **Output:**

The screenshot shows the Overleaf LaTeX editor interface. On the left, the 'Code Editor' tab is active, displaying the LaTeX code for a title page. The code includes commands like \thispagestyle{empty}, \begin{document}, \begin{titlepage}, \begin{center}, \textbf{, and} \underline{. The right side shows the generated PDF document, which is a certificate from Visvesvaraya Technological University. The PDF contains the university's logo, the title 'CERTIFICATE', and text about the student's completion of a project in CSE(CYBER SECURITY). It also includes fields for the guide and head of the department.

```

5 \thispagestyle{empty}
6
7 \begin{document}
8
9 \begin{titlepage}
10 \begin{center}
11   \textbf{\large VISVESVARAYA TECHNOLOGICAL UNIVERSITY}\\\\
12   \normalsize \nana Sangama, Belgaum-590018\\\\
13   \vspace{0.5in}
14   \includegraphics[scale=0.3]{vtu_logo.jpg}\\\\
15   \vspace{0.5in}
16   \textbf{(CERTIFICATE)}\\\\
17   \vspace{0.3in}
18   This is to certify that \\\\
19   \vspace{0.2in}
20   \underline{\vspace{10cm}}\\\\
21   \vspace{0.2in}
22   (Name of the student)\\\\
23   \vspace{0.2in}
24   bearing University Seat Number \\\\
25   \vspace{0.2in}
26   \underline{\vspace{10cm}}\\\\
27   \vspace{0.2in}
28   has satisfactorily completed the project work entitled \\\\
29   \vspace{0.2in}
30   \underline{\vspace{10cm}}\\\\
31   \vspace{0.2in}
32   (Title of the project)\\\\
33   \vspace{0.2in}
34   towards the partial fulfillment of the requirements for the
award of the degree of \\\\
35   \vspace{0.2in}
36   \textbf{BACHELOR OF ENGINEERING\IN\cse(cyber security)}\\\

```

## Explanation:

### 1. \thispagestyle{empty}

- This command removes headers, footers, and page numbers from the current page (which is the title page).
- 

### 2. \begin{document}

- This marks the beginning of the document content.
- 

### 3. \begin{titlepage} ... \end{titlepage}

- The **titlepage** environment creates a separate title page that is formatted independently of the rest of the document.
- 

### 4. \begin{center} ... \end{center}

- The **center** environment is used to align all content in the middle of the page horizontally.
-

## 5. University Name and Address

```
latex
CopyEdit
\textbf{\large VISVESVARAYA TECHNOLOGICAL UNIVERSITY} \\
\normalsize Jnana Sangama, Belgaum-590018\\
```

- Displays the **university name** in bold (`\textbf{}`) and larger font size (`\large`).
  - The **university address** is written in a normal font size (`\normalsize`).
- 

## 6. University Logo

```
latex
CopyEdit
\includegraphics[scale=0.3]{Vtu logo.jpg}\\
```

- This command inserts an image of the **university logo**.
  - The `scale=0.3` reduces the size of the image to **30%** of its original size.
- 

## 7. Certificate Heading

```
latex
CopyEdit
\textbf{CERTIFICATE}\\
```

- Displays the word "**CERTIFICATE**" in bold (`\textbf{}`).
- 

## 8. Certification Text

```
latex
CopyEdit
This is to certify that \\
\vspace{0.2in}
\underline{\hspace{10cm}}\\
\vspace{0.2in}
(Name of the student)\\
```

- This part contains the text of the certificate.
  - `\underline{\hspace{10cm}}` creates a blank **underlined space** where the student's name will be written.
- 

## 9. Student Details

```
latex
CopyEdit
```

```
bearing University Seat Number \\  
\vspace{0.2in}  
\underline{\hspace{10cm}}\\
```

- The **seat number** is also given a blank underlined space for manual input.
- 

## 10. Project Title

```
latex  
CopyEdit  
has satisfactorily completed the project work entitled \\  
\vspace{0.2in}  
\underline{\hspace{10cm}}\\  
(Title of the project)\\
```

- Another blank underlined space is provided for the **project title**.
- 

## 11. Degree and Department

```
latex  
CopyEdit  
towards the partial fulfillment of the requirements for the award of the  
degree of\\  
\vspace{0.2in}  
\textbf{BACHELOR OF ENGINEERING\IN\CSE (CYBER SECURITY)}\\
```

- States that the project is in **partial fulfillment** of the degree.
  - The degree "**BACHELOR OF ENGINEERING IN CSE (CYBER SECURITY)**" is written in bold.
- 

## 12. Guide and HOD Section

```
latex  
CopyEdit  
\textbf{Guide} \hspace{3.5in} \textbf{Head of the Department}\\  
\vspace{0.3in}  
\underline{\hspace{6cm}} \hspace{1.5in} \underline{\hspace{6cm}}\\  
\vspace{0.1in}  
\textbf{(Guide's Name)} \hspace{2.7in} \textbf{(HOD's Name)}\\  
\vspace{0.1in}  
\textbf{(Guide's Designation)} \hspace{2in} \textbf{(HOD's Designation)}\\
```

- The **Guide's Name and HOD's Name** are aligned properly.
  - Uses **hspace{3.5in}** to add horizontal spacing so that "Guide" and "HOD" are properly aligned.
  - Two **underlined blank spaces** are provided for their signatures.
-

## 13. College Details

```
latex
CopyEdit
\textbf{(Department of CSE(CY))} \hspace{2.1in} \textbf{(Department of
CSE(CY))} \\
\vspace{0.1in}
\textbf{[College Name]} \\
\vspace{0.1in}
\textbf{[Location]} \\
\vspace{0.1in}
\textbf{[Month Year]} % Replace with current month and year
```

- Displays the **department name, college name, location, and date** in bold.
- 

## 14. `\end{titlepage}` and `\end{document}`

- Ends the **title page** and then the **document**.
- 

## Summary of Features

- ✓ **Centered formatting** for a professional look.
- ✓ **University logo** included.
- ✓ **Underlined spaces** for handwritten names/signatures.
- ✓ **HOD and Guide's section** formatted neatly.
- ✓ **No page numbers** on the title page.

5. Develop a LaTeX script to create a document that contains the following table with proper labels.

S.No	USN	Student Name	Marks		
			Subject1	Subject2	Subject3
1	4XX22XX001	Name 1	89	60	90
2	4XX22XX002	Name 2	78	45	98
3	4XX22XX003	Name 3	67	55	59

## PROGRAM:

```
\documentclass{article}
\usepackage{array, booktabs, multicol, multirow} % Load necessary packages
\renewcommand{\arraystretch}{1.2} % Adjust vertical spacing in tables

\begin{document}
\centering
\textbf{\Large{Student Details and Marks}} % Title
\vspace{0.1in}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|c|} % Define table with 6 columns, all centered
\hline
\multirow{2}{*}{\textbf{S.No}} & \multirow{2}{*}{\textbf{USN}} & \multirow{2}{*}{\textbf{Student Name}} & \multicolumn{3}{c}{\textbf{Marks}} \\ % Multirow for headers spanning 2 rows, Multicolumn for header "Marks" spanning 3 columns
\cline{4-6} % Horizontal line from column 4 to 6
& & \textbf{Subject1} & \textbf{Subject2} & \textbf{Subject3} \\ % Sub-headers for marks
\hline
\multicolumn{1}{|c|}{\multicolumn{1}{c}{1}} & \multicolumn{1}{c}{\multicolumn{1}{c}{4XX22XX01}} & & & & \\ % Data rows
\multicolumn{1}{|c|}{\multicolumn{1}{c}{Name 1}} & \multicolumn{1}{c}{\multicolumn{1}{c}{89}} & \multicolumn{1}{c}{\multicolumn{1}{c}{60}} & \multicolumn{1}{c}{\multicolumn{1}{c}{90}} & & \\
\end{tabular}
\end{table}

```

```

\hline
\multicolumn{1}{|c|}{2} & \multicolumn{1}{c|}{4XX22XX02} &
\multicolumn{1}{c|}{Name 2} & 78 & 45 & 98 \\

\hline
\multicolumn{1}{|c|}{3} & \multicolumn{1}{c|}{4XX22XX03} &
\multicolumn{1}{c|}{Name 3} & 67 & 55 & 59 \\

\hline
\end{tabular}

\end{table}

\end{document}

```

### Output:

The screenshot shows the Overleaf LaTeX editor interface. The left panel displays the LaTeX code for a document titled "Program 5.tex". The right panel shows the generated PDF output titled "Student Details and Marks".

**Code Editor:**

```

1 \documentclass[article]
2 \usepackage{array, booktabs, multicol, multirow} % Load necessary packages
3 \renewcommand{\arraystretch}{1.2} % Adjust vertical spacing in tables
4
5+ \begin{document}
6   \centering
7   \textbf{Large Student Details and Marks} % Title
8   \vspace{0.1in}
9
10+ \begin{table}[h]
11   \centering
12   \begin{tabular}{|c|c|c|c|c|} % Define table with 6 columns, all centered
13     \hline
14     \multicolumn{2}{|c|}{\textbf{S.No}} & \multicolumn{2}{c|}{\textbf{USN}} & \multicolumn{2}{c|}{\textbf{Marks}} \\
15     \multicolumn{2}{|c|}{\textbf{Student Name}} & \multicolumn{2}{c|}{\textbf{Marks}} & \multicolumn{2}{c|}{\textbf{Subject}} \\ % Multicolumn for headers spanning 2 rows, Multicolumn for header 'Marks' spanning 3 columns
16     \cline{4-6} % Horizontal line from column 4 to 6
17     & \textbf{Subject1} & \textbf{Subject2} & \textbf{Subject3} & & % Sub-headers for marks
18     \hline
19     \multicolumn{1}{|c|}{1} & \multicolumn{1}{c|}{4XX22XX01} & \multicolumn{1}{c|}{Name 1} & \multicolumn{1}{c|}{89} & \multicolumn{1}{c|}{60} & \multicolumn{1}{c|}{90} \\ % Data rows
20     \hline
21     \multicolumn{1}{|c|}{2} & \multicolumn{1}{c|}{4XX22XX02} & \multicolumn{1}{c|}{Name 2} & \multicolumn{1}{c|}{78} & \multicolumn{1}{c|}{45} & \multicolumn{1}{c|}{98} \\
22     \hline
23     \multicolumn{1}{|c|}{3} & \multicolumn{1}{c|}{4XX22XX03} & \multicolumn{1}{c|}{Name 3} & \multicolumn{1}{c|}{67} & \multicolumn{1}{c|}{55} & \multicolumn{1}{c|}{59} \\
24     \hline
25   \end{tabular}
26
27 \end{document}
28

```

**Output:**

**Student Details and Marks**

S.No	USN	Student Name	Marks		
			Subject1	Subject2	Subject3
1	4XX22XX01	Name 1	89	60	90
2	4XX22XX02	Name 2	78	45	98
3	4XX22XX03	Name 3	67	55	59

**6. Develop a LaTeX script to include the side-by-side graphics/pictures/figures in the document by using the subgraph concept.**

**PROGRAM:**

```
\documentclass{article}
\usepackage{graphicx} % Required for including images
\usepackage{subcaption} % Required for subfigures

\begin{document}

\begin{figure}
    \centering
    \begin{subfigure}{0.46\linewidth} % Subfigure environment for the first image
        \includegraphics[width=\linewidth]{image1.jpg} % Include image1.jpg
        \caption{Caption for image 1} % Caption for the first image
        \label{fig:subfig1} % Label for referencing the first image
    \end{subfigure}
    \hfill % Add horizontal space between subfigures
    \begin{subfigure}{0.44\linewidth} % Subfigure environment for the second image
        \includegraphics[width=\linewidth]{image2.png} % Include image2.png
        \caption{Caption for image 2} % Caption for the second image
        \label{fig:subfig2} % Label for referencing the second image
    \end{subfigure}
    \caption{Combined caption for both images} % Overall caption for the figure
    \label{fig:subfigures} % Label for referencing the entire figure
\end{figure}
\end{document}
```

**7. Develop a LaTeX script to create a document that consists of the following two mathematical equations.**

$$\begin{aligned}
x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} & \varphi_\sigma^\lambda A_t &= \sum_{\pi \in C_t} \text{sgn}(\pi) \varphi_\sigma^\lambda \varphi_\pi^\lambda \\
&= \frac{-2 \pm \sqrt{2^2 - 4 * (1) * (-8)}}{2 * 1} & &= \sum_{\tau \in C_{\sigma t}} \text{sgn}(\sigma^{-1} \tau \sigma) \varphi_\sigma^\lambda \varphi_{\sigma^{-1} \tau \sigma}^\lambda \\
&= \frac{-2 \pm \sqrt{4 + 32}}{2} & &= A_{\sigma t} \varphi_\sigma^\lambda
\end{aligned}$$

## PROGRAM:

```

\documentclass{article}
\usepackage{amsmath} % Required for mathematical environments and commands

\begin{document}

\section*{Equations Set 1} % Section header for the first set of equations

\begin{align} % Begin the align environment for multiple equations
x &= -b \pm \sqrt{b^2 - 4ac} \notag \\ % First equation with \notag to suppress numbering
&= \frac{-b \pm \sqrt{2^2 - 4 * (1) * (-8)}}{2 * 1} = \frac{-b \pm \sqrt{4 + 32}}{2} \notag % Second equation with \notag to suppress numbering
\end{align}
\end{document}

```

```

\section*{Equations Set 2} % Section header for the second set of equations

\begin{align} % Begin the align environment for multiple equations
\varphi_\sigma^\lambda A_t &= \sum_{\pi \in C_t} \text{sgn}(\pi) \varphi_\sigma^\lambda \varphi_\pi^\lambda \notag \\ % First equation with \notag to suppress numbering
&= \sum_{\tau \in C_{\sigma t}} \text{sgn}(\sigma^{-1} \tau \sigma) \varphi_\sigma^\lambda \varphi_{\sigma^{-1} \tau \sigma}^\lambda \notag % Second equation with \notag to suppress numbering
&= A_{\sigma t} \varphi_\sigma^\lambda \notag % Third equation with \notag to suppress numbering
\end{align}

```

---

```
\end{align} % End the align environment
```

```
\end{document}
```

**Output:**

## Equations Set 1

$$x = -b \pm \sqrt[4]{b^2 - 4ac}$$
$$x = \frac{-b \pm \sqrt{22 - 4 \cdot 1 \cdot (-8)}}{2 \cdot 1} = \frac{-b \pm \sqrt{\sqrt{4 + 32}}}{2} = \frac{-b \pm \sqrt{2}}{2}$$

## Equations Set 2

$$\begin{aligned}\varphi_\sigma^\lambda \cdot A_t &= \sum_{\pi \in C_t} \operatorname{sgn}(\pi) \cdot \varphi_\sigma^\lambda \cdot \varphi_\pi^\lambda \\ &= \sum_{\tau \in C_\sigma^t} \operatorname{sgn}(\sigma^{-1} \tau \sigma) \varphi_\sigma^\lambda \varphi_{\sigma^{-1} \tau \sigma}^\lambda \\ &= A_\sigma^t \varphi_\sigma^\lambda\end{aligned}$$

**8. Develop a LaTeX script to demonstrate the presentation of Numbered theorems, definitions, corollaries, and lemmas in the document.**

### **% Basic LaTeX Document with Theorems, Definitions, Corollaries, and Lemmas**

```
\documentclass[a4paper,12pt]{article}
```

#### **% Packages**

```
\usepackage{amsthm} % Provides enhanced theorem environments
```

```
\usepackage{amsmath} % For advanced math formatting
```

```
\usepackage{hyperref} % Adds hyperlinks for easy navigation
```

#### **% Customizing Theorem Styles**

```
\newtheorem{theorem}{Theorem}[section] % Numbered within sections
```

```
\newtheorem{lemma}[theorem]{Lemma} % Shares numbering with theorems
```

```
\newtheorem{corollary}[theorem]{Corollary} % Shares numbering with theorems
```

```
\newtheorem{definition}[theorem]{Definition} % Shares numbering with theorems
```

#### **% Adding an unnumbered theorem environment**

```
\newtheorem*{remark}{Remark} % Unnumbered environment
```

#### **% Document Begins**

```
\begin{document}
```

#### **% Title and Author**

```
\title{Demonstration of Theorem Environments in \LaTeX}
```

```
\author{Your Name}
```

```
\date{\today}
```

```
\maketitle
```

#### **% Table of Contents**

```
\tableofcontents
```

```
\section{Introduction}
```

This document demonstrates how to use and customize theorem-like environments in  $\text{\LaTeX}$ .

```
\section{Main Results}
```

### **% Example of a Theorem**

```
\begin{theorem}[Pythagorean Theorem]
```

In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

```
\begin{equation}
```

$$a^2 + b^2 = c^2$$

```
\end{equation}
```

```
\end{theorem}
```

### **% Example of a Lemma**

```
\begin{lemma}
```

If  $a$  and  $b$  are odd integers, then  $a + b$  is even.

```
\end{lemma}
```

### **% Example of a Corollary**

```
\begin{corollary}
```

If  $n$  is an odd integer, then  $n^2$  is also odd.

```
\end{corollary}
```

### **% Example of a Definition**

```
\begin{definition}[Prime Number]
```

A prime number is a natural number greater than 1 that has no positive divisors other than 1 and itself.

```
\end{definition}
```

### **% Example of an Unnumbered Remark**

```
\begin{remark}
```

This document uses the `\texttt{amsthm}` package for managing theorem environments.

```
\end{remark}
```

```
\section{Conclusion}
```

The `\texttt{amsthm}` package provides flexible options for defining and customizing theorem environments in `\LaTeX`.

## **% Document Ends**

```
\end{document}
```

## **Explanation of the Code:**

1. **Document Class:** Uses the `article` class, suitable for short academic papers.
2. **Package:** `amsthm` enables theorem-like environments.
3. **Environments Defined:**
  - o `\newtheorem{theorem}{Theorem}[section]`: Theorems are numbered within sections.
  - o `\newtheorem{lemma}{Lemma}[theorem]{Lemma}`: Lemmas share the numbering with theorems.
  - o `\newtheorem{corollary}{Corollary}[theorem]{Corollary}`: Corollaries follow the same numbering scheme.
  - o `\theoremstyle{definition}`: Definitions and examples are styled differently.
  - o `\theoremstyle{remark}`: Remarks are formatted in normal text.
4. **Examples Provided:** Each environment is demonstrated with a sample statement.

## **OUTPUT:**

The screenshot shows the Overleaf LaTeX editor interface. On the left, the code editor displays the `main.tex` file with the following content:

```
% Basic LaTeX Document with Theorems, Definitions, Corollaries, and Lemmas
\documentclass[a4paper,12pt]{article}

% Packages
\usepackage{amsthm} % Provides enhanced theorem environments
\usepackage{amsmath} % For advanced math formatting
\usepackage{hyperref} % Adds hyperlinks for easy navigation

% Customizing Theorem Styles
\newtheorem{theorem}{Theorem}[section] % Numbered within sections
\newtheorem{lemma}{Lemma} % Shares numbering with theorems
\newtheorem{corollary}{Corollary}[theorem] % Shares numbering with theorems
\newtheorem{definition}{Definition}[theorem] % Shares numbering with theorems

% Adding an unnumbered theorem environment
\newtheorem*{remark}{Remark} % Unnumbered environment

% Document Begins
\begin{document}

% Title and Author
\title{Demonstration of Theorem Environments in \LaTeX}
\author{Your Name}
\date{\today}
\maketitle

% Table of Contents
\tableofcontents

% Conclusion
\section{Conclusion}
This document demonstrates how to use and customize theorem-like environments in \LaTeX.

\end{document}
```

The right side of the interface shows the rendered output of the LaTeX code. It includes a title page with the title "Demonstration of Theorem Environments in \LaTeX", author "Your Name", and date "March 21, 2025". The main content area contains three sections: "Introduction", "Main Results", and "Conclusion". Each section contains a brief description and some mathematical formulas or statements. The "Conclusion" section ends with a note about the `amsthm` package.

**Exp 9: Develop a LaTeX script to create a document that consists of two paragraphs with a minimum of 10 citations in it and display the reference in the section.**

**PROGRAM:**

```
\documentclass[12pt]{article}
```

```
% Bibliography package
```

```
\usepackage[backend=biber,style=apa]{biblatex}
```

```
\addbibresource{references.bib}
```

```
% Simulate an external .bib file
```

```
\begin{filecontents*}{references.bib}
```

```
@book{knuth1984texbook,
```

```
    title={The TeXbook},
```

```
    author={Knuth, Donald E},
```

```
    year={1984},
```

```
    publisher={Addison-Wesley}
```

```
}
```

```
@article{mikolov2013word2vec,
```

```
    title={Efficient Estimation of Word Representations in Vector Space},
```

```
    author={Mikolov, Tomas and others},
```

```
    journal={arXiv preprint arXiv:1301.3781},
```

```
    year={2013}
```

}

**@book{bishop2006pattern,**  
**title={Pattern Recognition and Machine Learning},**  
**author={Bishop, Christopher M},**  
**year={2006},**  
**publisher={Springer}**  
}

**@article{goodfellow2016deep,**  
**title={Deep Learning},**  
**author={Goodfellow, Ian and Bengio, Yoshua and Courville, Aaron},**  
**journal={MIT Press},**  
**year={2016}**  
}

**@article{vaswani2017attention,**  
**title={Attention is All You Need},**  
**author={Vaswani, Ashish and others},**  
**journal={Advances in neural information processing systems},**  
**year={2017}**  
}

```
@article{brown2020gpt3,  
    title={Language Models are Few-Shot Learners},  
    author={Brown, Tom B and others},  
    journal={NeurIPS},  
    year={2020}  
}
```

```
@article{lecun2015deep,  
    title={Deep Learning},  
    author={LeCun, Yann and others},  
    journal={Nature},  
    year={2015}  
}
```

```
@article{he2016resnet,  
    title={Deep Residual Learning for Image Recognition},  
    author={He, Kaiming and others},  
    journal={CVPR},  
    year={2016}  
}
```

```
@article{devlin2018bert,  
    title={BERT: Pre-training of Deep Bidirectional Transformers},
```

```
author={Devlin, Jacob and others},  
journal={arXiv preprint arXiv:1810.04805},  
year={2018}  
}
```

```
@article{radford2019gpt2,  
title={Language Models are Unsupervised Multitask Learners},  
author={Radford, Alec and others},  
journal={OpenAI Blog},  
year={2019}  
}  
\end{filecontents*}
```

```
\begin{document}  
  
\title{A Brief Overview of AI and NLP Research}  
\author{Your Name}  
\date{\today}  
\maketitle
```

```
\section*{Introduction}
```

Artificial Intelligence (AI) has made tremendous progress in recent years due to the advancements in deep learning \cite{lecun2015deep},

goodfellow2016deep}. Foundational works such as those by Bishop \cite{bishop2006pattern} and Knuth \cite{knuth1984texbook} laid the groundwork for computational approaches. The evolution of transformer-based architectures has significantly boosted the capabilities of Natural Language Processing (NLP) \cite{vaswani2017attention, devlin2018bert}. Innovations like BERT \cite{devlin2018bert} and GPT-3 \cite{brown2020gpt3} demonstrate how scaling models leads to better performance.

## \section\*{Recent Advances}

Recent developments focus heavily on large language models and pre-training techniques. For example, GPT-2 and GPT-3 have shown how models can learn complex language patterns without task-specific tuning \cite{radford2019gpt2, brown2020gpt3}. Earlier representations such as word2vec \cite{mikolov2013word2vec} contributed to better semantic understanding. In computer vision, ResNet provided a similar breakthrough with its deep residual learning approach \cite{he2016resnet}. These innovations reflect a general trend of increasing model complexity and training data size to achieve state-of-the-art results.

## \printbibliography

\end{document}

**OUTPUT:**

← → ⌛ overleaf.com/project/6809ea851e79aacdf54321b

All Bookmarks

Menu Upgrade Program 9.tex Review Share Submit History Layout Chat

Recompile main.tex Add comment

A Brief Overview of AI and NLP Research

Your Name

April 24, 2025

Introduction

Artificial Intelligence (AI) has made tremendous progress in recent years due to the advancements in deep learning Goodfellow et al., 2016; LeCun et al., 2015. Foundational works such as those by Bishop Bishop, 2006 and Knuth Knuth, 1984 laid the groundwork for computational approaches. The evolution of transformer-based architectures has significantly boosted the capabilities of Natural Language Processing (NLP) Devlin et al., 2018; Vaswani et al., 2017. Innovations like BERT Devlin et al., 2018 and GPT-3 Brown et al., 2020 demonstrate how scaling models leads to better performance.

Recent Advances

Recent developments focus heavily on large language models and pre-training techniques. For example, GPT-2 and GPT-3 have shown how models can learn complex language patterns without task-specific tuning Brown et al., 2020; Radford et al., 2019. Earlier representations such as word2vec Mikolov et al., 2013 contributed to better semantic understanding. In computer vision, ResNet provided a similar breakthrough with its deep residual learning approach He et al., 2016. These innovations reflect a general trend of increasing model complexity and training data size to achieve state-of-the-art results.

References

Bishop, C. M. (2006). *Pattern recognition and machine learning*. Springer.

Type here to search

13:20  
32°C Sunny ENG 24-04-2025

**10. Develop a LaTeX script to design a simple tree diagram or hierarchical structure in the document with appropriate labels using the Tikz library.**

## PROGRAM:

```
\documentclass{article}
\usepackage{tikz}
\begin{document}
\centering
% Define styles for nodes
\tikzstyle{level 1}=[level distance=4cm, sibling distance=6cm]
\tikzstyle{level 2}=[level distance=4cm, sibling distance=3cm]
% Begin TikZ picture
\begin{tikzpicture}[grow=down, sloped]
    % Root node
    \node {Root}
        % First child
        child {
            node {Child 1} % First child node
            child {
                node {Subchild 1} % Subchild node
            }
            child {
                node {Subchild 2} % Subchild node
            }
        }
        % Second child
        child {
            node {Child 2} % Second child node
            child {
                node {Subchild 1} % Subchild node
            }
        }

```

```

    child {

        node {Subchild 2} % Subchild node

    }

};

\end{tikzpicture}

\end{document}

```

### OUTPUT:

The screenshot shows the Overleaf LaTeX editor interface. On the left, the code editor displays the LaTeX source code for a tree diagram. The code includes document class, package imports, and TikZ picture environment definitions. On the right, a generated tree diagram is shown. The root node is labeled "Root". It has two children, "Child 1" and "Child 2". "Child 1" has two children: "Subchild 1" and "Subchild 2". "Child 2" also has two children: "Subchild 1" and "Subchild 2". The diagram is rendered in a simple black-and-white style.

```

1 \documentclass{article}
2 \usepackage{tikz}
3 \begin{document}
4 \centering
5 % Define styles for nodes
6 \tikzstyle{level 1}=[level distance=4cm, sibling distance=6cm]
7 \tikzstyle{level 2}=[level distance=4cm, sibling distance=3cm]
8 % Begin TikZ picture
9 \begin{tikzpicture}[grow=down, sloped]
10 % Root node
11 \node {Root};
12 % First child
13 child {
14     node {Child 1} % First child node
15     child {
16         node {Subchild 1} % Subchild node
17     }
18     child {
19         node {Subchild 2} % Subchild node
20     }
21 }
22 % Second child
23 child {
24     node {Child 2} % Second child node
25     child {
26         node {Subchild 1} % Subchild node
27     }
28     child {
29         node {Subchild 2} % Subchild node
30     }
31 \end{tikzpicture}

```

**11. Develop a LaTeX script to present an algorithm in the document using algorithm/ algorithmic/ algorithm2e Library.**

```
\documentclass{article}
\usepackage{algorithm}
\usepackage{algorithmic}
\begin{document}
\begin{algorithm}
\caption{Sample Algorithm (Algorithmic)}
\begin{algorithmic}[1]
\REQUIRE A list of numbers $A$
\ENSURE Sorted list $A$
\FOR{$i = 1$ to $\text{length}(A)$}
\FOR{$j = 1$ to $\text{length}(A) - i$}
\IF{$A[j] > A[j+1]$}
\STATE Swap $A[j]$ and $A[j+1]$
\ENDIF
\ENDFOR
\ENDFOR
\RETURN $A$
\end{algorithmic}
\end{algorithm}
\end{document}
```

## OUTPUT:

The screenshot shows the Overleaf LaTeX editor interface. The main area displays a LaTeX document named `Program 11.tex`. The code is a sorting algorithm:

```
11 \ENSURE Sorted list $A$  
12 \FOR{$i = 1$ to $\text{length}(A)$}  
13   \FOR{$j = 1$ to $\text{length}(A) - i$}  
14     \IF{$A[j] > A[j+1]$}  
15       \STATE Swap $A[j]$ and $A[j+1]$  
16     \ENDIF  
17   \ENDFOR  
18 \ENDFOR  
19 \RETURN $A$  
20 \end{algorithmic}  
21 \end{algorithm}  
22  
23 \end{document}
```

To the right of the code editor, there is a sidebar titled "File outline" which states: "We can't find any sections or subsections in this file. Find out more about the [file outline](#)". Below the code editor, the status bar shows "PAGE" and "Type here to search". On the far right, there is a system tray with icons for battery, signal strength, and date/time.

## **12. Develop a LaTeX script to create a simple report and article by using suitable commands and formats of user choice.**

```
\documentclass{report}
```

```
\title{Simple Report}
```

```
\author{}
```

```
\date{}
```

```
\begin{document}
```

```
\maketitle
```

```
\tableofcontents
```

```
\chapter{Introduction}  
This is the introduction.  
\chapter{Methods}  
This is the methods section.  
\chapter{Results}  
This is the results section.  
\chapter{Discussion}  
This is the discussion section.  
\chapter{Conclusion}  
This is the conclusion.  
\end{document}
```

**OUTPUT:**

## Simple Report

# Contents

1 Introduction	2
2 Methods	3
3 Results	4
4 Discussion	5
5 Conclusion	6

# Chapter 1 Introduction

This is the introduction.

# Chapter 2 Methods

This is the methods section.

# Chapter 3 Results

This is the results section.

# Chapter 4

# **Discussion**

This is the discussion section.

## **Chapter 5**

# **Conclusion**

This is the conclusion.