Project title (maybe over two lines)

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3rd Year Project Interim Report

Department of Electronic &
Electrical Engineering

UCL

Supervisor: My Professor
Advisor: My advisor

16 December 2022

I have read and understood UCL's and the Department's statements and guidelines concerning plagiarism.

I declare that all material described in this report is my own work except where explicitly and individually indicated in the text. This includes ideas described in the text, figures and computer programs.

This report contains 7 pages (excluding this page and the appendices) and 4401 words.

Signed: _____ Date: _____

(Student)

Project title
(maybe over two lines)

A. N. Author

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1 Usage

This document provides a brief overview of how to use the 3rd year project interim report LaTeX template. It assumes that you have a basic understanding of LaTeX.

This template should work "out of the box" together with any standard LaTeX distribution, including MikTeX and Overleaf. The first time you use this template with MikTeX it might ask you to download some additional packages. This is normal and you should add those packages to your LaTeX distribution. In the "preamble" of the document, i.e. before `\begin{document}` you need to write

```
\documentclass{project_report}
\usepackage{amsmath,amsthm,graphicx}

\title{Project title}
\author{A.\,N. Author}
\date{16 December 2022}
\supervisor{My Professor}
\advisor{My advisor}
\wordcount{the number of words of your report}
```

which tells LaTeX to typeset the document to use the definitions in the `project_report` class file. You need to define values for `title`, `author`, `date`, `supervisor`, `advisor` and `wordcount`.

After the preamble you need to write

```
\begin{document}

\coverpage
\declaration
\maketitle

\tableofcontents
\section{The first section}
Write your report here.

Put your references at the end of your
report using the ‘‘IEEE’’ style
(see alternative method later in the text)
\bibliography{example-references}
\bibliographystyle{IEEEtr}

And finish with the appendices:
\appendix

\section{The first appendix}

\end{document}
```

Let's start with some text. LaTeX formats the text for you, so you can just continue typing. This allows you to focus on the text or content.

If you would like to start a new paragraph, like this one, you need to enter an empty line. To force a
newline you can use \\.

The typesetting engine will determining where tables and figures should sit.

LaTeX provides environments for producing lists. We can create numbered lists like

1. the first item,
2. the second item,
3. the third item,

by using the `enumerate` environment. Similarly, we can create a bullet point list like

- the first item,
- the second item,
- the third item,

by using the `itemize` environment.

After a while, we'll have finished the introduction and will want to move onto the next section. This can be achieved by using the `\section` command.

2 A new section

LaTeX takes care of the formating and numbering of the section titles. We can add subsections by using the `\subsection` command.

2.1 On mathematics and tables

Do not use too many and too short subsections. You can add another level of `\subsubsection`, but only if this really helps your report structure.

2.1.1 Mathematical equations

We can now write some mathematical equations, first as a display equation, using the `equation` environment:

$$A = \frac{\partial \theta}{\partial t} + \boldsymbol{u} \cdot \nabla \theta = 0. \tag{1}$$

We can also write mathematics inline, like $x^2 + y^2 = z^2$. If the equation should not be numbered, we should use the `equation*` environment. This naming scheme applies to many environments, such that the version suffixed with an asterisk has no number. Please remember that variables are written in italics, e.g. T, but units are typeset using upright characters, e.g. $T = 2\,^{\circ}\mathrm{C}$ not $T = 2\,^{\circ}C$. This is especially import when dealing with voltages such as $V_{\mathrm{out}} = 2.7\,\mathrm{V}$.

2.1.2 Tables

Let's have a look at some tables. As an example, we'll define a table just after this line in the LaTeX code, although it won't necessarily appear just below in the typeset PDF. By

Table 1: Table of repeat length of longer allele by age of onset class.

	Repeat length				
Age of onset / years	n	Mean	SD	Range	Median
Juvenile, 2–20	40	60.15	9.32	43–86	60
Typical, 21–50	377	45.72	2.97	40–58	45
Late, $>$ 50	26	41.85	1.56	40–45	42

giving the table a label, we can reference it automatically with `Table \ref\{table-label\}` to produce Table 1. Note that the `table` envronment generates a "floating" table, i.e. one that will be positioned according to LaTeX's typesetting rules. The actual table is defined within the `tabular` environment. A basic table is generated as follows:

```
\begin{tabular}{lcc}
A left aligned column & Two center aligned columns & 5\\
The next line & 7.5 & 3.6\\
\hline
\multicolumn{2}{c}{An entry spanning two columns} & \\
```

```
\hline
\end{tabular}
```

A left aligned column	Two center aligned columns	5
The next line	7.5	3.6
An entry spanning two columns		

3 On figures

We can use figures in a similar way. By giving the figure a label, we can reference it automatically with `Figure \ref{figure-label}` to produce Figure 1. You can force figures into certain places using the `[t]` (top of the page), `[b]` (bottom of the page) and `[h]` ("here") options e.g. `\begin{figure}[b]`. Moving the figure to a slightly different position in the LaTeX code often helps to get it into the right space in the PDF output. Sometimes you might want to make a figure smaller to fit into the desired space.

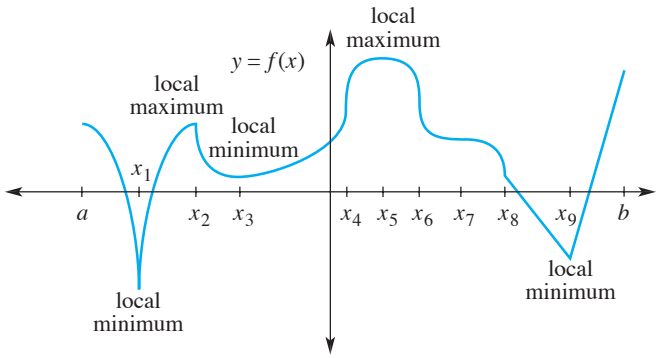

Figure 1: LKB1 phosphorylates Thr-172 of AMPKα *in vitro* and activates its kinase activity. Make sure that the font sizes in the figures are large enough to be legible.

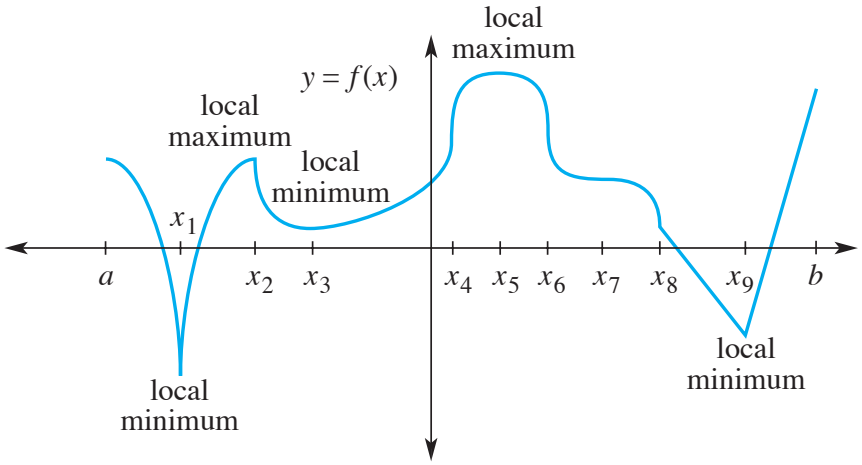

Figure 2: LKB1 phosphorylates Thr-172 of AMPKα *in vitro* and activates its kinase activity. This figure has been centred using the `center` environment.

4 On references

There are two principal ways of producing references in LaTeX, either incorporating the references within the LaTeX code itself or creating a bibliography file which then needs to be processed with BibTeX. The first method is useful for short documents, like a paper or report. The second is more suited for a thesis.

4.1 Simple method

The simple method looks like this:[1]

```
\begin{thebibliography}{99}

\bibitem{kadison1959} Kadison, R. V. and
Singer, I. M. {\em "Extensions of pure states"},
Amer.\ J. Math. {\bf 81}, pp. 383--400 (19 59)

\bibitem{anderson1981}  Anderson, J.
{\em "A conjecture concerning the pure states
of $B(H)$ and a related theorem"}, Topics in
Modern Operator Theory, pp. 27--43 (1981)

\bibitem{anderson1979} Anderson, J.
{\em "Extreme points in sets of positive linear
maps on $B(H)$"}, J. Funct. Anal. {\bf 31},
pp. 195--217 (1979)

\end{thebibliography}
```

You would put the above at the end of your text and before the appendices. You can cite these references with the `\cite` command, e.g. `\cite{kadison1959}` will produce [1]. Note that the formating of the reference itself is done in the LaTeX file. You need to run LaTeX twice for the references to appear properly in the final document.

4.2 Method involving BibTeX

For this method all references are put into a `.bib` file, e.g. `example.bib` which could look like this:

```
@article{kadison1959,
Author = {Kadison, R. V. and Singer, I. M.},
Date-Modified = {2014-06-30 18:43:47 +0100},
Journal = {Amer. J. Math.},
Pages = {383-400},
Title = {Extensions of pure states},
Volume = {81},
Year = {1959}}
```

[1] The 99 indicates that you expect up to 99 citations.

```
@article{anderson1981,
Author = {Anderson, J.},
Date-Modified = {2014-06-30 18:39:55 +0100},
Journal = {Topics in Modern Operator Theory},
Pages = {27-43},
Title = {A conjecture concerning the pure
states of $B(H)$ and a related theorem},
Year = {1981}}

@article{anderson1979,
Author = {Anderson, J.},
Date-Modified = {2014-06-30 18:39:40 +0100},
Journal = {J. Funct. Anal.},
Pages = {195-217},
Title = {Extreme points in sets of positive
linear maps on $B(H)$},
Volume = {31},
Year = {1979}}
```

The `.bib` file allows many types of references, e.g. `article`, `book`, `conference` and `phdthesis`, which each have different compulsory and optional fields. To tell LaTeX where to find this bibliography file and where to place the bibliography in the final text we use the `\bibliography` command. E.g. if we have saved the references in `example-references.bib` then

```
\bibliography{example-references}
\bibliographystyle{IEEEtr}
```

will place the reference at this position of the text using the IEEE referencing style. Printing the bibliography in the final output requires several steps. Programmes like TeXworks (part of MikTeX) can carry these out automatically but you can also execute them step by step manually, e.g. from a Linux command line. The process is summarised as follows:

1. run LaTeX on the `.tex` file as usual
   this will place the cited references in an `.aux` file
2. run BibTeX on the `.aux` file to transfer the details of the cited references into a `.bbl` file
3. run LaTeX *twice* again to make sure the references appear properly in the final document

Like before citations are added with the `\cite` command, e.g. [1] and [2] by using `\cite{kadison1959}` and `\cite{anderson1979}`. Note that although `anderson1981` is part of the `.bib` file it does not appear in the references because it is not cited in this document. This is usefull if you have a long list of relevant references but only need to cite a few of them in a particular text. Also note that the style of the references is provided by the `\bibliographystyle` command, i.e. the formatting happens automatically. Common referencing styles are `nature`, `apalike` or `ieeetr`. Please use the latter in this report.

References

[1] R. V. Kadison and I. M. Singer, "Extensions of pure states," *Amer. J. Math.*, vol. 81, pp. 383–400, 1959.

[2] J. Anderson, "Extreme points in sets of positive linear maps on $B(H)$," *J. Funct. Anal.*, vol. 31, pp. 195–217, 1979.

5 Appendices

To add appendices, use the `\appendix` command, followed by `\section` commands for each appendix. Appendices start on a new page. To start every appendix on a new page use `\newpage` in the LaTeX code.

Appendices

A Some supplemental material

Note that this page does not appear in the page count in the declaration.

B The second appendix

It doesn't contain much.