

Agri Robot Mapping and Pathing Literature Review

Toby Towler

registration: Your registration

1. Introduction

Before reading this document you should go through the \LaTeX tutorials that have been provided for you to learn the basics of \LaTeX such as sectioning, style, lists, referencing, bibliography and mathematics if applicable. Even if you already know \LaTeX , please at least go through *Tutorial 6: Bibliography and citations in $\text{\LaTeX} 2_{\epsilon}$* and *Tutorial 5: Producing professional-looking tables*.

The basic structure of your reports is introduced in section 2 with the \LaTeX commands used to implement it¹. Section 3 shows how to create figures and gives examples of tables produced with the `cmpreport` class. Section 4 shows how you can produce a Gantt chart with $\text{\LaTeX} 2_{\epsilon}$.

2. The structure of the document

As any other \LaTeX documents, your report starts by declaring the style of your document. For your final report this is done by issuing the command `\documentclass [final]{cmpreport}` which means that your report follows the style specified for the `final` report in the file `cmpreport.cls`. Your bibliography file (bib file) and any pictures you use in your figures should be placed in the same directory as your report. The option `final`, between the square brackets, must be replaced with `review` or `progress` for the corresponding pieces of assessment. There is another option `tutorial` that you will have used if you went through some of my tutorials. However, this is of no concern when using the class for your reports.

The main differences between the options of interest are:

- The option `review` produces a simple title page and add a “performance sheet”² at the end of the document that indicates the evaluation criteria for the corresponding piece of work and provides a comment box for your supervisor.
- The option `final` provides a “more official” title page³. It creates a table of contents, and possibly a list of tables and a list of figures (see below).

2.1. The preamble

The structure of your document preamble is as follows:

¹The beginning of your reports, usually the *Introduction* section, should tell the reader about the organisation of the report.

²This is not a mark sheet, as this corresponds to a formative piece of coursework. However, your supervisor may indicate a level of performance for each of the criteria in the performance sheet.

³You may want to show your report to a future employer.

```
\documentclass[final]{cmpreport}
\title{A simple proof that  $\$P \neq NP\$}$ 
\author{Harold P\textbackslash'etard}
\registration{31415927}
\supervisor{Dr Ersatz Stanislaus Pondiczery}
\ccode{CMP-6012Y}
%\confidential{}
\summary{This document shows that  $\$P \neq NP\$$ .}
\acknowledgements{
I would like to thank my supervisor Dr Ersatz
Stanislaus Pondiczery, from the Royal Institute of
Poldavia, for observing that the fundamental
difference between  $\$P\$$  and  $\$NP\$$  is the letter  $\$N\$$ .
}
%\nolist
\onePageLists
```

The \LaTeX source of this document contains extra comments to explain these commands.

If the command `\author` is present the name provided will appear as author of the report. The command `\author` is not compulsory because, at some point, you'll have to submit an electronic version of your final report to a School database that future students can consult. You may not want your name to appear in the electronic version. It is up to you, *but do not forget to use the `\author` command to produce printed versions*.

`\registration`, `\supervisor` and `\ccode` are all compulsory for all reports. `\summary` and `\acknowledgements` produce the *Abstract* and *Acknowledgements* sections. These two commands are for the final report; the first one is compulsory, the second one, optional.

In the final report, a *List of figures* followed by a *List of tables* are automatically constructed after the *Contents* section. The `cmpreport` class is intelligent enough to realise that any such list should not be created if nothing goes in that list, that is if you do not have figures or do not have tables in your document. In addition, use the command `\onePageLists` if you have modest-size lists you want to fit on a single page.

Some supervisors are of the opinion that list of tables and list of figures should not be included in a report. If this is the case you just have to uncomment the command `\nolist`⁴. This also blocks the use of the standard $\text{\LaTeX} 2_{\epsilon}$ commands for creating list of figures and list of tables.

The command `\confidential{}` adds a confidential stamp to the margin of each page. This should only be used in specific cases that in general involve a non-disclosure agreement.

⁴Reminder: By now you should know that anything that follows a `%` is a comment.

Note that L^AT_EX truncates the progress report if it exceeds twenty-two pages and the final report if it exceeds fifty-five pages as limits in the number of pages are requirement for these deliverables⁵.

2.2. Your document

The structure of your document (after the preamble) should be of the form

```
\begin{document}
% Main content of report goes here
\clearpage
\bibliography{reportbib}
\clearpage
\appendix
\section{My first appendix}
% content of first appendix
\clearpage
\section{My second appendix}
% content of second appendix
\end{document}
```

You should not need to use the command `\maketitle`. Making the title is compulsory and is taken care of by the `cmpreport` class.

3. Producing tables and figures

Tables are produced using a rewriting of the `table` environment that is specific to the report class. This new environment `cmptable` imposes some choices onto the user of the class to ensure a particular style in the report, but also provides new commands to facilitate the writing of quality tables. Tables 1 and 2 show examples of tables produced using this environment. Details are provided in Chardaire (2013).

⁵The truncation values are ten percent over the requirement limits to comply with University regulations. To be clear the limit for the final report is 50 pages, meaning up to 55 pages will be accepted.

Table 1: Rates of DHS^a shelter use by selected characteristics

	Shelter system		
	Either ^b (%)	Family (%)	Single Adult (%)
<i>History of out-of-home care:</i>			
Yes	22.4	17.0	8.9
No	10.8	9.4	2.5
<i>Type of final exit from ACS^c:</i>			
Reunification	19.4	14.7	7.6
Independent living	25.6	18.8	10.7
Absconding from care	33.6	22.4	15.6
Preventive services	12.4	11.0	3.0

^a Department of Homeless Services.

^b This category reflects the unduplicated sum of the other two columns.

^c The New-York City Administration for Children's Services.

All relationships are statistically significant for χ^2 test ($p < .001$).

Source: The University of Chicago Press (2013).

Table 2: Effect of parameters on performance^a

Parameter	Data set			
	SINGLE		MULTIPLE	
	CPU (msec)	Effective (%)	CPU (msec)	Effective (%)
$n(k = 10, p = 100)$				
2	75.5	55.5	174.2	22.2
3	21.5	50.4	79.4	19.9
4	16.9	47.5	66.1	16.3
$k(n = 2, p = 100)$				
10	57.5	51.3	171.4	21.7
100	60.0	56.1	163.1	21.3
1000	111.3	55.9	228.8	21.4
$p(n = 2, k = 10)$				
100	3.3	5.5	6.1	1.2
1000	13.8	12.6	19.8	2.1
10000	84.5	56.0	126.4	6.3
100000 ^b	—	—	290.7	21.8

^a Results on processing time and effectiveness for various combinations of the three parameters for both data sets. Default parameters are shown in parentheses.

^b Value not meaningful for the data set SINGLE.

Adapted from Zobel (1997).

The figure environment has also been rewritten so that the caption is now a compulsory parameter of the environment. Note that the `label` command for the figure must be included just before the closing brace of the caption parameter. The code:

```
\begin{cmpfigure}[htb]{Cool cat \label{fig1}}  
\includegraphics[width=0.5\textwidth]{coolcat.jpg}  
\begin{tablenotes}  
\item Image in the public domain.  
\end{tablenotes}  
\end{cmpfigure}
```

produces figure 1.



Image in the public domain.

Figure 1: Cool cat

Figures, as tables, should **not** be centred. Figure 2, whose code is given in Appendix A, shows an example of a figure that includes sub-figures. The choice of parameters in the code was slightly complicated by the fact that I used photographs that I did not crop to size. Only a few students working on Graphics projects may need sub-figures. The sub-figures can be referenced: the command `\ref{fig2:tired}` produces “2e”

4. Producing a Gantt chart

The Gantt chart in figure 4 is produced by the code in figure 3 and can be found in Appendix B. To compile this code you need to include the command `\usepackage{rotating}` in your preamble.



(a) Cool

(b) Bossy

(c) Reflective



(d) Scared

(e) Tired

Images in the public domain.

Figure 2: Cats

You may want to reuse this code and only modify the part that starts with the elements, bars and milestones, as the granularity of the schedule is right. The commands used in this part are as follows

- `\ganttbar{Final report writing}{25}{30}` creates a task named `Final report writing` and an associated bar that goes from the 25th time slot of the schedule to the 30th.
- `\ganttvoidbar{}{13}{16}` creates a grey bar from the 13th slot to the 16th to show a period of break in a task.
- `\ganttmilestone{Code delivery}{26}` shows a milestone in the 26th slot.
- `\\` indicates a change of line in the schedule. Notice how three bars without change of lines are used to show the tasks that include a break period in grey.
- `\ganttlink{elem0}{elem2}` creates a link from `elem0` to `elem2`. `elem0`, `elem1`, ... are identifiers of the bars and milestones in the order they are introduced in the code.

5. Producing an appendix

To create an appendix, make sure you use the `\appendix` command to make sure that subsequent `\section{}` commands will be labelled "Appendix X" rather than carrying on with text body section numbers (e.g Section 6).

```
\begin{cmpfigure}{Project Gantt chart \label{pplan}}
\begin{sideways}
\newganttchartelement{voidbar}{
voidbar/.style={
draw=black,
top color=black!25,
bottom color=black!23
}}
\begin{ganttchart}[x unit=0.35cm, y unit chart = 1.0cm,
y unit title=0.5cm, title height=1.0, vgrid,
title label font=\scriptsize,
canvas/.style={draw=black, dotted},
/pgfgantt/milestone left shift = 0,
/pgfgantt/milestone right shift = 0
]{1}{34}
\gantttitle{Project schedule shown for semester week numbers}{34} \\
\gantttitlelist{1,...,34}{1} \\
\gantttitlelist{1,...,12}{1}
\gantttitle{CB}{4}
\gantttitle{AP}{2}
\gantttitlelist{1,...,8}{1}
\gantttitle{EB}{4}
\gantttitlelist{9,...,12}{1} \\

%the elements, bars and milestones, are identified as elem0, elem1, etc.

%elem1
\ganttbar{Project proposal}{1}{2}           \\      %elem0
\ganttbar{Literature review}{2}{5}          \\      %elem1
\ganttbar{Design}{6}{11}                    \\      %elem2

%week 1 of semester 2 is the 17th week in schedule
\ganttbar{Coding}{12}{12}                   %elem3
\ganttvoidbar{}{13}{16}                     %elem4
\ganttbar{}{17}{20}                         \\      %elem5

\ganttbar{Testing}{12}{12}                   %elem6
\ganttvoidbar{}{13}{16}                     %elem7
\ganttbar{}{17}{26}                         \\      %elem8
\ganttmilestone{Code delivery}{26}          \\      %elem9
\ganttbar{Final report writing}{25}{30}      \\      %elem10
\ganttmilestone{Portfolio submission}{33}   \\      %elem11
\ganttbar{Inspection preparation}{31}{34}    %elem12

\ganttlink{elem0}{elem2} \ganttlink{elem1}{elem2} \ganttlink{elem2}{elem3}
\ganttlink[link mid=.25]{elem2}{elem6} \ganttlink{elem5}{elem6}
\ganttlink{elem8}{elem9} \ganttlink{elem9}{elem10}
\ganttlink{elem10}{elem11} \ganttlink{elem11}{elem12}
\end{ganttchart}
\end{sideways}
\end{cmpfigure}
```

Figure 3: Code for the Gantt chart of Figure 4

References

Chardaire, P. (2013). Tutorial 5: Producing professional looking tables.

The University of Chicago Press (2013). Manuscript preparation - tables. <http://www.press.uchicago.edu/infoServices/prep-table.html>. Instructions for building and formatting tables according to University of Chicago Press guidelines.

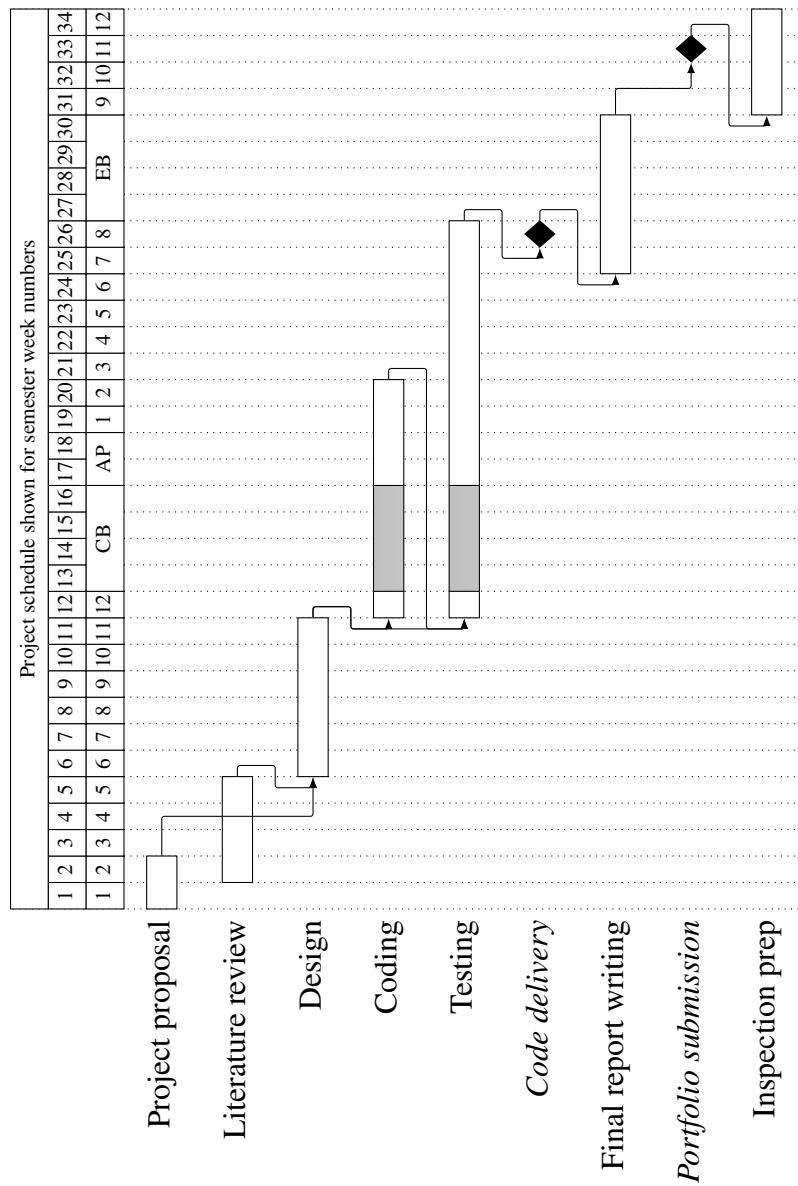
Zobel, J. (1997). *Writing for computer science*. Springer-Verlag New York Incorporated.

A. Code for the “Cats” figure

```
\begin{cmpfigure}[htp]{Cats \label{fig2}}
  \begin{subfigure}[b]{0.2\textwidth}
    \centering
    \includegraphics[width=0.98\textwidth]{coolcat}
    \caption{Cool} \label{fig2:coolcat}
  \end{subfigure}
  \begin{subfigure}[b]{0.398\textwidth}
    \centering
    \includegraphics[width=0.99\textwidth]{bossycat}
    \caption{Bossy} \label{fig2:bossycat}
  \end{subfigure}%
  \begin{subfigure}[b]{0.4\textwidth}
    \flushright
    \includegraphics[width=0.98\textwidth]{frowningcat}
    \caption{Reflective} \label{fig2:frowningcat}
  \end{subfigure}
% leave a blank line to change row

  \begin{subfigure}[b]{0.31\textwidth}
    \centering
    \includegraphics[width=0.985\textwidth]{scaredbabycat}
    \caption{Scared} \label{fig2:scared}
  \end{subfigure}
  \begin{subfigure}[b]{0.69\textwidth}
    \centering
    \includegraphics[width=\textwidth]{tiredcat}
    \caption{Tired} \label{fig2:tired}
  \end{subfigure}
\begin{tablenotes}
\item Images in the public domain.
\end{tablenotes}
\end{cmpfigure}
```

B. Gantt chart



Literature review

Introduction: brief description of project, aims and objectives, areas of knowledge required.	First	2.1	2.2	3	Fail
Discovery of suitable quantity and quality of material.	First	2.1	2.2	3	Fail
Description of key issues and themes relevant to the project.	First	2.1	2.2	3	Fail
Evaluation, analysis and critical review.	First	2.1	2.2	3	Fail

Quality of writing

Clarity, structure and correctness of writing	First	2.1	2.2	3	Fail
References correctly presented, complete adequate (but no excessive) citations.	First	2.1	2.2	3	Fail

Planning

Risks: identification, suitable contingency planning.	First	2.1	2.2	3	Fail
Measurable objectives : appropriate, realistic, timely.	First	2.1	2.2	3	Fail
Gantt chart: legibility, clarity, feasibility of schedule.	First	2.1	2.2	3	Fail

Comments

<div style="border: 1px solid black; height: 380px; width: 100%;"></div>
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Supervisor: Edwin Ren

Markers should circle the appropriate level of performance in each section.