ENMT221 Elevator Project 2020
Report Hints

1 General

- Use A4 paper, **single sided**.

- Staple the top-left corner.

- Body text should be size 11-12pt. Body text should be fully justified.

- The main-matter (the body) of the report should be no more than **7 pages**.

1.1 How to Write

- Write in formal, 'technical' English. Passive voice is acceptable, or even preferable.

- Use short, concise sentences.

- Being formulaic is fine, this isn't creative writing.

- **Proof-read for both spelling and grammar.**

- Then have somebody else proof-read your report as well.

2 Floating Elements (Figures & Tables)

The most important thing here is that *every* floating element should be referenced in the body text. The reader will *only* look at your floats if directed to by the body text. References should be by label, rather than by geographical placement. For example, never say "the figure below" (if you learn to use LaTeX, you will discover why).

2.1 Figures

Figures should generally be included in the body of the report rather than in appendices (more specifically, if should be included in the body if the reader *needs* to look at it to understand the body text). Figures should be labelled as "Figure 1", "Figure 2", "Figure 3a", "Figure 3b" etc. The numbering of floats is relative to *chapter* number, so for a report like this, without chapters (it has 'sections' not 'chapters'), you can assume that the numbering is absolute (not related to

the section number in which the figure is located). If applicable, include legends and scale bars etc within the figure. Each figure should have an accompanying caption, and be referenced in the body text. For example, see Figure 1
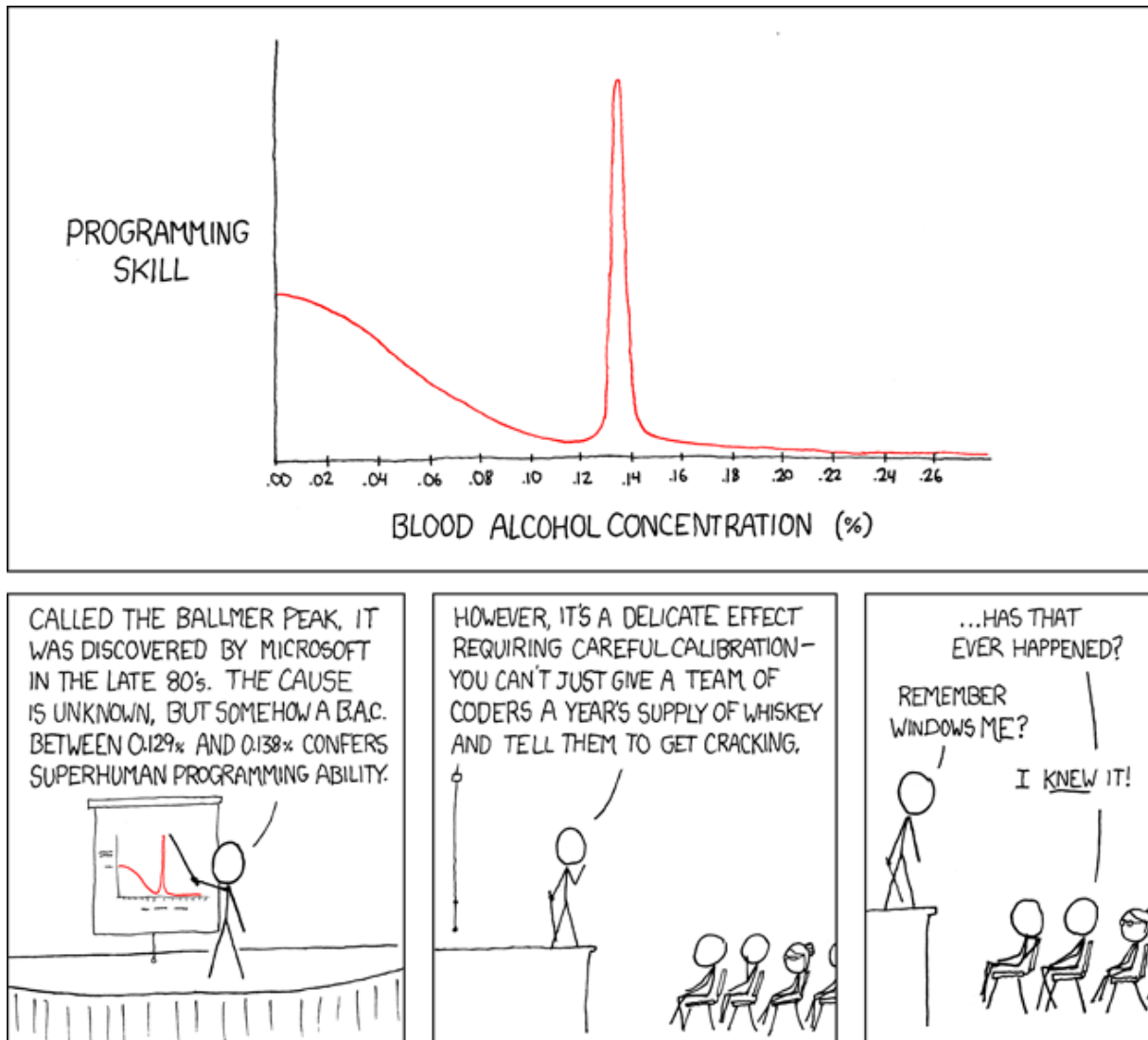

Figure 1: Image Courtesy of XKCD.

2.2 Tables

Similarly, tables should generally be included in the body of the report rather than in the appendices. Tables should be labelled as "Table 1", "Table 2" etc. If some explanation of the data in the table is required, this should be included as footnotes to the table, rather than in the body text. Each table should have an accompanying caption, and be referenced in the body text. For example, see Table 1

Use SI units for *all* scientific and technical information, unless it is totally unavoidable.

Name	Numbers (%)		
John	38.0	72.0	94.5
jill	75.0	67.5	56.0

Table 1: Some random data.

2.3 Formulae

Formulae should be presented centred on their own line, with an equation number right justified. For example, see Equation 1.

$$y_{model} = A_1 \cdot cos(\omega \cdot t) + A_2 \cdot sin(\omega \cdot t) \tag{1}$$

3 Report Structure

3.1 Overview

- Title page.
- Abstract.
- Table of Contents.
- Introduction.
- Methodology.
- Results.
- Discussion.
- Conclusion.
- References.
- Appendices.

3.2 Abstract

This can be one of the most difficult parts of a report to write. The abstract should summarize the *entire* report into a single paragraph (perhaps 100-200 words). The abstract doesn't have to mention everything, but it should give the reader an understanding of the *scope* of the report, and the major outcomes.

From reading *only* the abstract, a reader should know both what was done, and what was found out.

The abstract should be the *last* thing that you write.

The abstract **isn't an introduction**.

3.3 Introduction

The introduction sets the scene for the report, by introducing and explaining information which is needed to understand the remainder of the report.

Most obviously, describe the scenario or problem which the project seeks to address. This may require background information about the industry or the state-of-the-art, to explain *why* the project is being undertaken.

Review the most current methodologies or tools which are being used in the industry, and how these are relevant to this project. In a work such as a thesis, a whole chapter may be devoted to this task, but for the purposes of this assignment, a very brief summary of how PLCs and similar technologies are used in industry will be sufficient.

Explain the objectives of the project (and how success will be measured), and introduce how these objectives will be addressed.

Unlike the abstract, the introduction doesn't depend on the results of the project.

3.4 Methodology

In a 'design' report such as this, the methodology section will usually be the largest. The section will detail both the methods utilized in the design of your hardware/software (this is where you need to discuss the 'software engineering' considerations you applied, as per the assignment handout) and the actual hardware/software design you created.

The aim of this section is to allow another person to recreate your design (and if necessary improve upon it). Accordingly, this section needs to detail how you went about your design, the details of what you actually designed, and **why** you decided to design it that way.

This section should demonstrate that you are following correct technical procedure, complying with required design specifications etc.

For the elevator assignment, it will probably make sense to break this section up in to sub-sections which each deal with the design of a different component of your software. For instance, the motion controller, the scheduler, the carriage doors etc.

3.5 Results

In this section, you present whatever data or results you obtain from your methodology. Unless you combine this section with the following 'Discussion' section, there is little actual analysis here. In the case of the Elevator Project, there is little in the way of numerical results, so you will probably choose to combine this section with your discussion.

Do not just include figures and tables. Ensure that the body text provides a commentary which guides the reader through the results. Remember that the reader will not look at the figures unless directed to by the body.

3.6 Discussion

In this section, you provide analysis of your results. This should include assessment of how well the results meet the objectives of the project, and how well the results correlate with what you were *expecting* (note that these two things are not always the same).

If you have identified any limitations in the methodology or scope of your project, you should discuss them here.

3.7 Conclusion

A conclusion must *conclude* the report. It should inform the reader of what the major impact of the report is, along with any caveats they should be aware of. Whilst the conclusion may summarize the technical aspects of the project, the conclusion is *not* just a summary. Emphasis should be on how the project has performed in terms of meeting its objectives.

You may also include some detail (or a whole section, depending on how much content there is) on discussion of possible future development which could further the project.

4 References

Each reference should be cited in the body [1]. For this report, you do not need a *huge* number of references. Just the main Omron documentation you have used, plus anything you used to when designing your state machine, scheduling algorithm, etc.

References may be listed either by alphabetical order or by the numerical order in which the references appear in the body. Formatting of references is a whole topic to itself (there are computer programmes which do *just* this); for this report any reasonable formatting will be accepted.

A Appendices

Appendices make your report easy to read by moving large amounts of auxiliary information, which would otherwise swamp the reader, to a separate section. Things such as complete source code listings, or large amounts of test data, should be located in appendices. Reading your report should not *require* reading the appendices. However, the appendices allows readers to analyse your findings in more detail, should they wish too (for instance, they may wish to investigate any differences between your results and their own).

Appendices are 'numbered' alphabetically, rather than numerically. Each appendix should have a self-explanatory title. Generally (unlike here), each appendix should begin on a new page.

Remember that appendices should still be referenced in the body of your report (otherwise the reader will not find them).