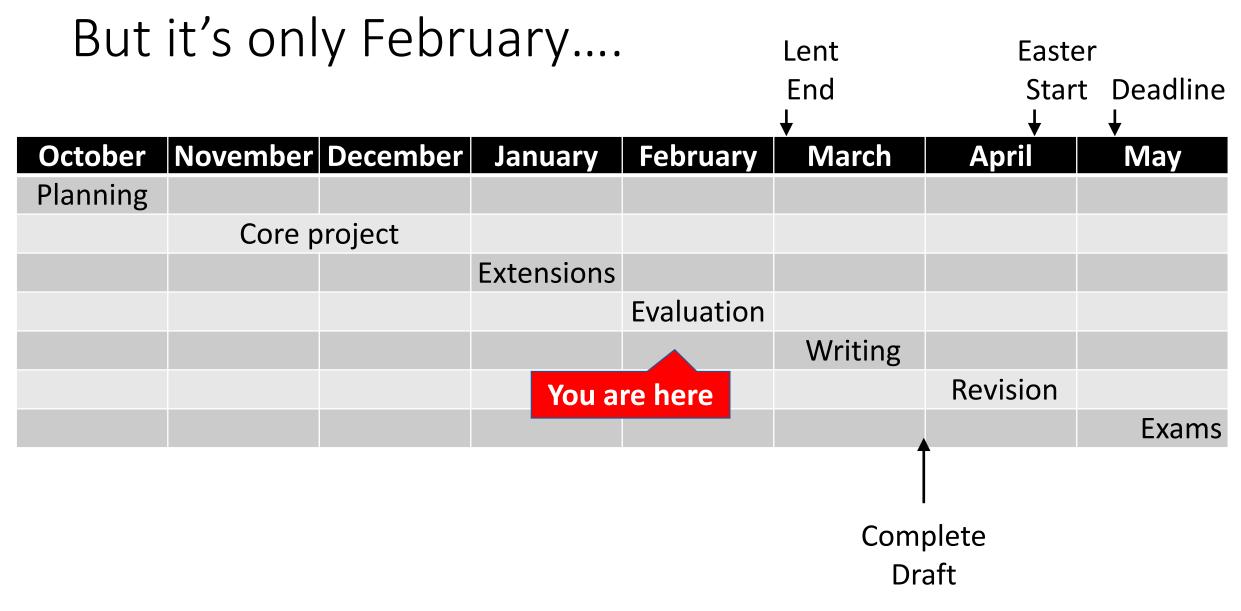# How to write a dissertation

Alastair Beresford

February 2020

With significant contributions from previous presenters, including Neil Dodgson, Anuj Dawar and Robert Mullins.

But it's only February….

| | | | | | Lent End | | Easter Start | Deadline |
| | | | | | ↓ | | ↓ | ↓ |

October	November	December	January	February	March	April	May
Planning							
	Core project						
			Extensions				
				Evaluation			
					Writing		
				You are here		Revision	
							Exams

Complete Draft ↑

Deadlines

- Dissertation due   12 noon, Friday 8th May 2020
- Source code submission   5pm, Friday 8th May 2020
- Supervisor report   4pm, Wednesday 13th May 2020
- Viva announcement   Friday 7th June 2020
- Viva (~10% of cohort)   Friday 12th June 2020

How to write a dissertation

- What
- Why
- When
- Who
- How

What is the dissertation?

A document of about 10,000 words

  … describing your project

  … in a carefully prescribed format

  … worth a quarter of your final mark

Length

- Maximum of 12,000 words
    - Including main text, tables, footnotes
    - Excluding appendices, bibliography, photographs, diagrams
- It's a limit, not a target
- Aim for 10,000 words
- Probably the biggest formal document you've written

What? 10,000 words!

- I'll never be able to write that much!
- [Yeah, okay.]
- I'll never be able to fit it into 12,000 words, let alone 10,000!

Advice for terse writers

It would be very hard to describe a Part II project properly in under 7,000 words

1. Write 7,000 words as best as you can

2. Then see how you can improve your core by adding more words:
   - Longer explanation of the key algorithms?
   - More results?
   - More detailed analysis of the results?

Advice for verbose writers

Aim: the best project write-ups fit comfortably in 12,000 words

- What are the key points you need to cover to get the marks?
- What are the largely irrelevant side issues?
- It is especially easy to write too much in the Introduction and Preparation chapters
- You do not have to explain every function you wrote, every data structure you use, every book you read, and every interesting idea
- If all else fails, write too much and then ruthlessly cut it down

Advice for all: What are the key points?

Cover all the key points. Some ideas on how to find them:

- what did you set out to do?
- what did you actually do?
- how did you do it?
- what are the results?
- how good are the results?

A dissertation is *not* a diary of things done

- It is a report not a diary or lab notebook
- Do not write the dissertation in the order in which tasks were completed write it in the order that will make most sense to the reader
- Decide on what is important and what is irrelevant or less important detail

Why should I spend time on my dissertation?

- You will write many reports in your professional life; this is good practice
- You will be judged on the dissertation, not directly on your program
- It is worth a good proportion of your final mark

Read existing dissertations

- Every Part II student has written a dissertation. There are over 3,000 in the library

- You will learn a lot by reading a few

Start writing in February and finish in March

- Finish programming, testing and results-gathering by end of Lent Term
- Prepare a complete draft by the end of March
- Ask your supervisor and Director of Studies to read
- Update and submit at the beginning of the Easter Term

Penalty for late submission

$$Penalty = \frac{10 + n}{40}$$

- You loose 25% of the mark if you are one minute late, with a further 2.5% lost for each subsequent day late
- This isn't an idle threat: the penalty is frequently applied

Who is the "reader" of your dissertation?

Who is the "reader" of your dissertation?

- Two or three computer science lecturers or professors
- You may assume intelligence and computer science knowledge
- They may not know the detailed area of your project
- You should demonstrate *you* know the detail in your chosen area
- They prefer good writing
- They will read your dissertation fairly quickly

Golden rule: assume the reader has just finished Part IB

Examiners read ~40 dissertations in two weeks

- **Be clear and concise**

- Tell them what you want them to know

- Do not assume they know anything beyond Part IB

- Say things up front, don't hide interesting stuff,
  you are not a mystery writer or a magician

- Do not use code extracts when prose will do a better job

Provide signposts to tell the reader…

- where you are going
- why you are going there
- how you are going to get there

Say everything three times

- Provide an overview of what you are going to say
- Say it
- Summarise what you've said

Say everything three times

This idea applies recursively:

- To whole dissertation: Chapter 1 provides an overview, Chapters 2–4 say it and Chapter 5 summarises
- To each chapter: provide an introduction, then the main content, and finally provide a summary
- To each section in each chapter

Don't just copy and paste the text

Say everything three times

- Provide an overview
- Provide the detail
- Summarise at the end

(And apply this idea at three different levels.)

Who should proof-read it?

- Supervisor
- Director of Studies
- Friends

Allow sufficient time for feedback

- Your supervisor and Directors of Studies are busy people so:
  - allow them enough time to read and comment (at least a week)
  - use them wisely – do not give them a draft that you haven't checked yourself
  - do not assume they'll read more than one draft
  - never give them a second draft if you haven't incorporated their corrections from the first draft
- You will need two weeks to produce the final version

Choose a suitable tool for writing

- It's a big document with structure so choose a capable tool
  - LaTeX
  - Microsoft Word
  - [Insert other suitable word processors here]

- Whichever tool you use:
  - set up a template of the whole dissertation straight away
  - ensure that you can include mathematics, figures, photos, equations, etc.
  - ensure that you produce a PDF

Microsoft Word

- Learn to use styles (Format menu)
  - Keeps your typesetting consistent
  - Ensures section numbers appear automatically and correctly
- Difficult to typeset complex mathematics efficiently
- Including figures neatly is often a challenge

LaTeX

- A programming language
- Provides a uniform typesetting automatically
- Easy to handle equations and tables
- Including figures works well, once you know how to get it to work
- Consider tools built on top, including Overleaf, TeXworks or LyX

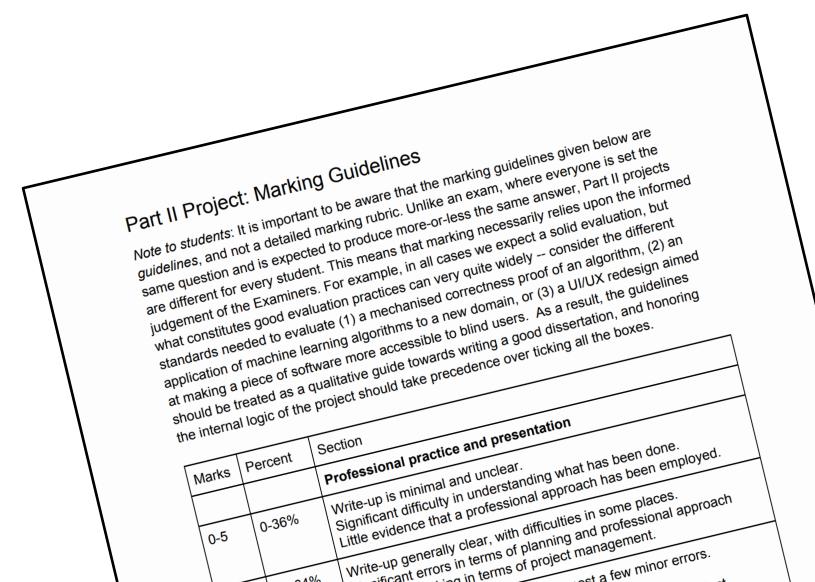# Structure: your dissertation has five chapters

- Introduction
- Preparation
- Implementation
- Evaluation
- Conclusion

Understand mark allocation and word budget

26%   Introduction & Preparation   ~500 + ~2,500 words

40%   Implementation   ~4,500 words

20%   Evaluation & Conclusion   ~2,000 + ~500 words

14%   Professional Practice and Presentation

New this year: detailed marking guidelines

Part II Project: Marking Guidelines

Note to students: It is important to be aware that the marking guidelines given below are guidelines, and not a detailed marking rubric. Unlike an exam, where everyone is set the same question and is expected to produce more-or-less the same answer, Part II projects are different for every student. This means that marking necessarily relies upon the informed judgement of the Examiners. For example, in all cases we expect a solid evaluation, but what constitutes good evaluation practices can very quite widely -- consider the different standards needed to evaluate (1) a mechanised correctness proof of an algorithm, (2) an application of machine learning algorithms to a new domain, or (3) a UI/UX redesign aimed at making a piece of software more accessible to blind users. As a result, the guidelines should be treated as a qualitative guide towards writing a good dissertation, and honoring the internal logic of the project should take precedence over ticking all the boxes.

Marks	Percent	Section
		Professional practice and presentation
		Write-up is minimal and unclear. Significant difficulty in understanding what has been done. Little evidence that a professional approach has been employed.
0-5	0-36%	Write-up generally clear, with difficulties in some places. ...ificant errors in terms of planning and professional approach ...ing in terms of project management.
	24%	...est a few minor errors.

The Proforma is important

- Provides an important summary of key details
- Text summary acts as a reminder to the examiner of the topic
- Special difficulties should be completed only if significant unforeseen (and unforeseeable) difficulties occurred since the project started.

1. Introduction – a clear first paragraph

Make it clear in the first paragraph what your project is about and how well you've done it

"My project concerns the creation of a new operating system. My OS is based on quantum uncertainty. I have successfully implemented the heart of the new OS, which I have demonstrated running a range of key operations. This implementation fulfils the requirements of my core project proposal and one proposed extension: recovering deleted files through a time-warp mechanism."

2. Preparation – provide relevant background

- Work done before code was written

- Provide evidence of planning and requirements analysis

- Show evidence of good software practice, including libraries and tools

- Explain background material required beyond Part IB

3. Implementation – get level of detail right

“I wrote a class which implemented public key cryptography using the new BWR algorithm.”

“My BWR cryptography class contains six methods. The first method is called X, it has four parameters called A, B, C and D and returns an E. Parameter A is of type F, it indicates to method X exactly how many…”

Not enough detail: you need to tell the reader something about how you implemented this clever algorithm

Too much detail: Demonstrate clear thinking, sensible decisions, knowledge, skill etc.

4. Evaluation – demonstrate success

- Provide evidence that you met your success criteria
- Be systematic
- Use appropriate techniques (e.g. confidence intervals)
- Ensure your comparisons with other work are fair
- Try to go beyond a simple measures of performance or correctness
- Use appropriate visualisations

5. Conclusion – provide a good summary

- Likely to be short
- Make it clear in the first paragraph what your project was about, and how well you've done it
- Discuss what you have learnt; what you would do differently with the benefit of hindsight?
- Briefly outline ideas for further work

Professional Practice and Presentation

- Get the basics right: pleasant to read as a PDF, reasonable grammar and spell-checked

- Show you followed good professional practice

- Demonstrate an ethical approach in your work

Language tips

- Do not use "don't" and the like – including "it's".
- Use "I" for things you've done, "we" is OK for "the reader and I".
- Hyphenate compound adjectives: "light-blue ball", "high-level language", "a model-checking algorithm".
- Avoid doubt and convoluted sentences: "I planned to aim at the possibility of constructing…". Be definite, be judgemental.

Examples from Plain English...

High-quality learning environments are a necessary precondition for facilitation and enhancement of the ongoing learning process.

Examples from Plain English…

High-quality learning environments are a necessary precondition for facilitation and enhancement of the ongoing learning process.

Children need good schools if they are to learn properly.

Source: www.plainenglish.co.uk/campaigning/examples/before-and-after.html

Examples from Plain English…

If there are any points on which
you require explanation or further
particulars we shall be glad to
furnish such additional details as
may be required by telephone.

Examples from Plain English...

If there are any points on which you require explanation or further particulars we shall be glad to furnish such additional details as may be required by telephone.

If you have any questions, please phone.

Examples from Plain English...

It is important that you shall read
the notes, advice and information
detailed opposite then complete
the form overleaf (all sections)
prior to its immediate return to
the Council by way of the
envelope provided.

Examples from Plain English...

It is important that you shall read the notes, advice and information detailed opposite then complete the form overleaf (all sections) prior to its immediate return to the Council by way of the envelope provided.

Please read the notes opposite before you fill in the form. Then send it back to us as soon as possible in the envelope provided.

Do not copy text or ideas without attribution

Output from Turnitin

My coursework submission: a statement on plagiarism

By Alastair Beresford

2 Plagiarism is the "wrongful appropriation" and "stealing and publication" of another author's "language, thoughts, ideas, or expressions" and the representation of them as one's own original work.

Plagiarism is considered academic dishonesty and a breach of journalistic ethics. It is subject to sanctions such as penalties, **2** suspension, expulsion from school or work and even substantial fines. Recent cases have been seen in academia. The modern concept of plagiarism as immoral and originality as an ideal emerged in Europe in the 1700s. The has since flourished: we no longer accept plagiarism in academic work tod

3 For decades many computing departments have dep plagiarised student source code submission student plagiarism are just becom is valuable for their su

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Final words

- Read the pink book: it tells you what you need to write
- Prepare a complete template before starting to write
- Write clearly at an appropriate level of detail
- Be ready to submit 2–3 weeks early
- Read the pink book again (in case you missed something first time)