1 How to write a dissertation
Peter Robinson
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Slides mainly due to Neil Dodgson

2 How to write a dissertation
• what
• why
• when
• who
• how

3 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
• Due 12 noon on Friday 19 May 2017
• Vivas on Friday 16 June 2017

4 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

5 Reactions to the word limit
• 10,000 words! – I’ll never be able to write that much!
• 10,000 words – yeah, O.K.
• 10,000 words?!! – I’ll never be able to fit it into 12,000 words, let alone 10,000!

  ○ Pascal (1656) “I would have written a shorter letter, but I did not have the time.”

6 Advice for terse writers
• It would be very hard to describe a Part II project properly in under 7,000 words
• So write your 7,000 words as best as you can
• 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?

7 Advice for verbose writers
• The best project write-ups fit nicely within the 12,000 word limit, rather than feeling squashed
• What are the key points you need to cover to get the marks? – cover these
• What are the fascinating but largely irrelevant side issues? – drop these
• It is especially easy to write too much in the Introduction and Preparation chapters
8 More advice for verbose writers
- You do not have to explain every function you wrote, every data structure you use, every book you read, and every interesting idea for extensions that you had
- If all else fails, write too much and then ruthlessly cut it down, preferably with help from your Supervisor (and/or Director of Studies)

9 Advice for all
- What are the key points?
  - Make sure you cover these
  - Some ideas for key points:
    - what did you set out to do?
    - what did you actually do?
    - how did you do it?
    - what were the results?
    - how good were the results?
- Always remember who your readers are
  - In this case they are three examiners!

10 It’s not a diary
- It is a report not a diary
- Don’t write it in the order you did it
- Write it in the order that will make most sense to the reader

11 Over 3,000 dissertations so far
- Every Part II student has had to write a dissertation
- Why not visit the library and leaf through a few?

12 Why?
- 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
- You need to present your work as well as possible
- It is worth a good proportion of your final mark

13 When?
- Finish programming, testing and results-gathering by end of Lent Term at latest
  - The core project should have been finished by the end of January
- Complete draft by the end of March
- Give to supervisor and Director of Studies to read
- Correct and submit at the beginning of the Easter Term
  - Deadline: 12 noon on Friday 19 May 2017
  - Two paper copies or electronic submission of PDF document

14 Penalty
- If you submit past the deadline, you will be docked 25% of the mark
  - With a further 5% of your mark docked for each subsequent day late
- This isn’t an idle threat – we do it
  - Even if you are just one minute late
15 Who are you writing for?

- Three Computer Science lecturers
- You may assume that they are intelligent
- They know a lot of computer science
  - so they are not ignorant
- They do not know the detailed area of your project
  - so you need to tell them about it
  - treat them as having just finished Part IB
- They prefer good writing
- They will read your dissertation fairly quickly

16 They read quickly?

- Each examiner reads 50 Part II dissertations in 2 weeks
  (while still working on other things)
- I can read 12,000 words/hour (if it’s interesting!)
- Expect the examiner to spend between 15 and 30 minutes reading your dissertation

17 They read very quickly

- Be clear and concise
- Tell them what you want them to know, do not expect them to read your mind
- Say things up front, don’t hide interesting stuff,
  you are not a mystery writer or a magician
- Do not expect them to plough through pages of boring detail
- Do not use code extracts when prose will do a better job

18 Provide signposts

- Your reader needs to know why they should bother to read each bit of the dissertation
- You should tell the reader
  - where you are going
  - why you are going there
  - how you are going to get there

19 Say everything three times

- Structure
  - give an overview of what you are going to say
  - say it
  - summarise what you’ve said
- This applies
  - to whole dissertation
    - Ch.1, Ch. 2–4, Ch. 5
  - (recursively) to each chapter
    - introduction, content, summary
  - (recursively) to each section in a chapter
- But don’t just copy and paste the text

20 Who should proof-read it?

- Supervisor
  - obviously
- Director of Studies
  - if he/she has time
Friends
• provided they aren’t also overloaded with work

21 Allow sufficient time
• Your supervisor and Directors of Studies are busy people so:
  • allow them enough time to read and comment (say 2 weeks) so they can fit it around their other commitments
  • 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

22 Tools
• It’s a big document with structure
  • Microsoft Word
  • LaTeX
  • your own favourite word processor
• Whichever tool you use:
  • set up a template of the whole dissertation straight away
  • ensure that you can include figures, photos, equations, etc (whatever you need)
  • ensure that you can print it
  • find somewhere to get it bound

23 Microsoft Word
• Learn to use styles (Format menu)
  • they will help you keep your typesetting consistent (e.g. all second level headings in the same typestyle)
  • make it easy to get section numbers automatically and correctly
• Difficult to typeset complex mathematics efficiently
• Including figures neatly is often a challenge
  • easy to include figures in a clunky way

24 LaTeX
• Similar to a programming language
• Gets all the typesetting right for you automatically
• Easy to handle equations and tables – but don’t confuse $different$ and \emph{different}
• Including figures works well, once you know how to get it to work
• Consider tools like Overleaf, TeXworks or LyX

• Martin Richards has provided a collection of files that constitute the basis of a LaTeX dissertation:
  www.cl.cam.ac.uk/teaching/projects/demodiss.zip

25 Structure – five chapters
• See the Pink Book for details of what should go into each of the five chapters
  • Introduction
  • Preparation
How to write a dissertation

Mark allocation

- The pink book tells you how marks are allocated and what the examiners want to see
  - 26% Introduction & Preparation: 500+2,500 words
  - 40% Implementation: 4,500 words
  - 20% Evaluation & Conclusion: 2,000+500 words
  - 14% Presentation

It's a good idea to make your word budget for each section approximately match the mark budget.

1. Introduction

- Make it clear in the first paragraph what your project is about and how well you've done it
- E.g. “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

- “Work done before code was written”
- Show evidence of planning
- Show evidence of good software practice
  - tools and libraries
- Explain any background
- The nature of this chapter will vary greatly between dissertations

3. Implementation

- What level of detail?
  - Too little detail
    - “I wrote a class which implemented public key cryptography using the new BWR algorithm.”
    - you need to tell the reader something about how you implemented this clever algorithm
  - Too much detail
    - “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…”
    - but not so much detail that the reader loses the will to live

4. Evaluation

- Many projects fall down on evaluation
- You may have the most fantastic implementation ever, but you still need to evaluate it
- Allow 2-4 weeks for evaluation:
5. Conclusion

- Make it clear in the first paragraph what your project was about, and how well you’ve done it.
- Also say what you’d do differently if you did it again.

Presentation: 14% of the marks

- Primarily for being literate and tidy.
- No need to spend hours on advanced graphic design or page layout ...
- ... but you do need to ensure that:
  - it is pleasant to read, especially as PDF
  - it is spell-checked
    (en_GB is good, en_US is OK, but inconsistency looks sloppy)
  - grammar is reasonable

Language tips

- Don’t use “don’t” and the like – including “it’s”.
- Use “I” for things you’ve done, “we” is OK for “the reader and I”. Passive voice tends to be clumsy.
- 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.
- Plain English is good
  - www.plainenglish.co.uk/campaigning/examples/before-and-after.html
  - More hints
    www.cl.cam.ac.uk/~pr10/teaching/dissertation.html

Final words

- Read the pink book
  - It tells you what you need to write
- Prepare a complete template before starting to write
- Ensure that you know how you’ll get it printed & bound
- 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