How to write

Written communication, critical assessment, and avoiding plagiarism

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Writing a literature review

• Start writing early
  - keep notes while reading papers
• Present a coherent framework
  - what are the major approaches?
  - what are the main open problems?
• Choose the right level of detail
  - keep your audience and goals in mind
• Don’t just copy, give your own opinion!
Structure

- Usual structure:
  - Abstract
  - Introduction
  - Problem analysis and proposed solution
  - Implementation and evaluation
  - Discussion and related work
  - Conclusions and future work

- Variations are possible
  - e.g., related work after introduction

- Don't write the document in this order!
  - Do abstract last
Getting started writing

- Prepare an outline of the paper
  - section and subsection headings
  - a few sentences about each (sub)section
- Start with the most concrete bits...
  - i.e., what you did, results
- ...then the more abstract bits
  - discussion, related work, etc.
Logical structure

• A document has a “fractal” structure:
  - document has introduction, body, conclusion
    • section has introduction, body, conclusion
      - subsection has introduction, body, conclusion
        • paragraph has introduction, body, conclusion
Flow and Signposts

• A well-written document flows naturally
  - It has connections between sections, subsections, and paragraphs

• Add signposts to help the reader
  - Where did we come from, where are we now, where are we going?
  - “In the last section we saw a formal definition of X. In this section we will see some examples of X, in preparation for section 3 which will introduce a special case of X which we will focus on in the rest of the report.”
Each unit is self-contained

- Sections are roughly of equal length
  - subsections only needed in longer sections
  - try to avoid sub-subsections
- Paragraphs are roughly of equal length, and express a single coherent thought or argument
  - roughly 5-10 sentences
  - break up overly long sentences
General advice

• Try to “sell” your approach
  - choose an attractive title
  - abstract, introduction and conclusions are very important

• Be concise and to the point
  - aim to explain, not to impress
  - keep things as simple as possible, but no simpler
  - use well-chosen examples

• Every section, paragraph, sentence and word should serve a purpose — if not, throw it out!
Example 1: complex version

“The reason that this is called a linear function is because the output is formed from a linear combination of the inputs.”

This isn't a terrible sentence but we can improve it
Example 2: complex version

“We consider the architectural style of the system, the structures and properties of the components that comprise the system and the interrelationships between them.”

See http://www.cs.bris.ac.uk/Teaching/learning for more
After producing a first draft

• Leave it aside for a day or so, then re-read
  - be critical, approach it as a marker or reviewer
  - check the logic of your arguments
  - check if everything is there with a purpose

• Pay attention to detail
  - general appearance, typography, figures and tables, cross-references, captions, citations, spell-checking, ...

• Proof-read, then proof-read, then proof-read
Simplicity and Clarity

“Make everything as simple as possible, but not simpler.’’ - Albert Einstein

- The goal is to communicate your knowledge
- Put yourself in the reader’s shoes
  - Is what I’ve written understandable?
  - How much have I assumed the reader knows?
  - Is there a simpler way to explain this?
  - Can I give some simple examples or intuition?
Simplicity and Clarity

• Do not try to impress the reader with unnecessary complexity
  - Avoid unnecessary math, notation, abbreviations, terms, and facts
  - Sometimes math is the simplest way to write it
• Do not just write everything you know
  - This shows you don’t know what is most relevant
• Do not write about it if you don’t understand it
  - You will probably reveal your lack of understanding
Formal and Informal English

Informal:
• “R U going 2 mark this soon?”
• text message, emails, conversations

More formal:
• “I don’t know why it isn’t working.’’
• Oral presentations, some reports, conversations

Very formal:
• “It is not known why the service is unavailable.”
• Dissertations, scientific publications, legal documents, news readers, formal speeches
Formality

More formal writing:
• Avoids contractions, e.g.
  - don’t → do not
  - it’s → it is
• Uses “we’’ instead of “I’’
• Avoids subjective statements such as “I like...’’

But: Excessive formality is hard to read

• We don’t insist on very formal writing
• Emulate scientific papers and books
• If in doubt ask your supervisor
Common Mistakes: ’s and ’

We often add ’s to a word to show plurality (more than one)
- “My car…” (I'm talking about one car)
- “My cars…” (I'm talking about multiple cars)

We add ’s to show possession
- “My car’s door is rusty” (The door belongs to the car)

What if we want both?
- “Both my cars’ doors are rusty” (I have 2 cars, each with >1 doors belonging to them)

Compare with
- “Both my car’s doors are rusty” (The car has 2 doors)
Common Mistakes: it’s and its

We also use ’s in a contraction of “it is”
  - “It is raining” → “It's raining”

Because “it’s” means “it is”, when we want to show something belongs to “it”, we don't use ’
  - “It’s [it is] raining”
  - “Its [possessive of it] door is rusty”

It’s very common for ’ to be used incorrectly
  “Would you like some donut’s?” ← wrong!
Common Mistakes: Latin

Some Latin abbreviations are often used in English:

- et al. → “and others” - note full stop
- i.e. → “that is” - note two full stops
- e.g. → “for example”

E.g.

- “The paper by Flach et al. shows…”
- “It is difficult (i.e. time-consuming) to …”
- “When the University is closed, e.g. at Christmas, …”
Common Mistakes: Incomplete Comparison

Comparisons:
• Don’t say: Results show x is better
• Do say: Results show x is better than y
• Even when it’s clear to you, it may not be to others
Notation

Introduce all notation

“My knowledge, $k$, increases as follows:

$$k = \sqrt{2hc}$$

where $h$ is the number of hours I study and $c$ is the amount of coffee I drink.”
Technical Terms

• Introduce and define any unusual technical terms (e.g. polysomnography, kurtosis).

• Spell out **all** acronyms the first time you use them. E.g. ``This dissertation applies Machine Learning (ML) to ... ML is...’’.

• Best to insert this on final proofreading as things tend to move around.
  - Also the time to check typesetting.
Maths

• Simple expressions such as $x = 2y$ can occur in-line (i.e. within text).

• More complex or important expressions should be centred:

\[ \sqrt{e} = \sqrt{mc^2} \]

• Numbering equations, such as (1), is useful if you need to refer to them later.

\[ \sqrt{e} = \sqrt{mc^2} \] (1)
Figures and Tables

Figures and tables should be numbered, have a caption and a long description in a paragraph. E.g. “Figure 1 shows the quarterly profits in each area for the year…”

Figure 1. Quarterly profits in each area.

Start another paragraph after the figure and caption. The caption should be a very short description.
Use of others’ material

• Use lots of references
• Use few or no quotations
  - Your own words are preferable
• Do not cut and paste maths
  - The resolution is too low
• Reference any figures you duplicate
• Notice “others’ material”
  - Material that belongs to others
Use of others’ material

• Do take (and cite) ideas from other people
• Do not take their words

• We want you to write things in your own words because we want to see if you understand the material
• We prefer bad English written by you to good English written by someone else
Wikipedia/Web Sources

• Do NOT rely entirely on unpublished material from the web
  - The quality is highly variable
  - It has not been reviewed like a journal article or text book

• Cite web pages if you must
  - Include date you read the page
  - Better to cite published sources if you can
Plagiarism

• Copying words without quotation or ideas without citation is plagiarism
• Plagiarism is a serious offense
• The minimum penalty is a mark of 0
• We have software to detect plagiarism in both code and text

Rules of thumb
• do not cut and paste without quotation
• do not quote much
How to get bad marks

• Plagiarise
• Follow the structure of the original very closely
  - Use same sections
  - Use the same logical arguments and examples
  - See http://www.cs.bris.ac.uk/Teaching/learning for a detailed example.
• Do not criticise flaws in the original
• Base your work on only one other work
How to get good marks

The best reports show:

• Critical analysis
  - Evaluation of quality, significance, relevance

• Synthesis
  - Combining existing things into something new
Critical Analysis

• Convince the marker you really understand:
  - The existing work
  - What is good and bad about it
  - What is significant about it
  - What is relevant to your work
  - How it relates to other areas

• Do the same analysis of your work!
Example Critical Analysis

• What point from *this* talk is most significant?
  - Don't plagiarise!

• What's least significant
  - Trimming unnecessary words (?)

• How could this talk be improved?
  - Some slides have have a lot of text
  - …
Further Resources

http://www.cs.bris.ac.uk/Teaching/learning/