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 $\rightarrow$ do not
  - it's $\rightarrow$ 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. $\rightarrow$ “and others” – note full stop
- i.e. $\rightarrow$ “that is” – note two full stops
- e.g. $\rightarrow$ “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.

$$\sqrt{e} = \sqrt{mc^2} \tag{1}$$

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...”

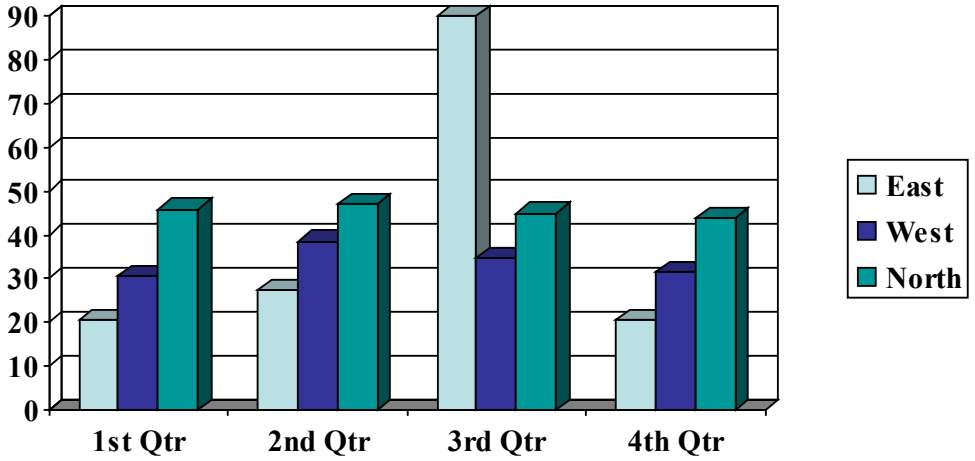

Figure 1. Quarterly profits in each area.

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 other***s***

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/