# Fun with algorithms

## How to write & present
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# Preliminaries

*"It is a small step from asking "how do I write?" to asking "what is it what I write about?""*
Justin Zobel, Writing for computer science

## a) On your scientific writing

How to:

1. Keep a good style
2. Manage style specifics
3. Punctuate better
4. Present your algorithm

## b) How to present your scientific work

*"Break the following rules if there is a good reason to do so."*,
Justin Zobel

# Good style in writing - 1

## Economy

Text should be concise and controlled
But, do not omit words that make the writing easier to understand

## Tone

Use a simple and logical organization, where:
You have one idea per sentence and one topic per section
You use short sentences with simple structure
You are specific, not abstract

## Examples

Use an example if it adds clarification

# Good style in writing - 2

## Motivation of writing

Paragraph!:

a. Tell the reader what your are going to say
b. Then, say it
c. Then, tell the reader that you have said it

## Motivation of flowing writing

At each part of the paper, you should think:

a. what the reader learned up to now
b. whether this knowledge is sufficient to understand what follows
c. whether each part follows from what has already been presented

# Good style in writing - 3

## Have a balanced organization

Explain each subject equally

## Voice

Use active voice, not only passive
Use "we" (for example we can prove the following theorem)

## The upper hand

Please, do not write to show off. Write for an ordinary reader, as equal to you

## Obfuscation (= blackout)

Make statements using clear and simple terms

## Straw men

Prove arguments by reasoning. If not, say "we believe .. by our experiments"

# Good style in writing - 4

## Reference and citation

You need to explain the relationship of your new work to existing work. By showing how your work builds on previous knowledge and how it differs from contributions in other relevant publications.

Do not cite to support common knowledge

## Citation styles

a [11]

b Gibbs (1972), or Howers *et al.* [9] provide

c [MAR91]

## Acknowledgements

Thank only people who help you in this research. Also, thank the financial support

# Specifics of good style - 1

## Titles & Headings

Titles & sections should be specific and accurately describe the content

Reader-friendly sub-levels of a section:

Title $\rightarrow$ Section$_1$,..,Section$_n$ $\rightarrow$ Subsection$_{1a}$

## Abstract

The abstract should be written especially well, without an unnecessary words, and the opening should be direct and straightforward

The publication should be complete even after removing the abstract

## Open Headings ?

In the first paragraphs, communicate the results and the importance of the work with simple words. By this, the first paragraphs must be understandable to any reader

# Specifics of good style - 2

## Paragraph! - Extended

a. 1st sentence = Outline or argument
b. Main body = Reasoning about the argument (you may give an example)
c. Concluding sentence = How the reasoning/amplification leads to the argument

Link the paragraphs by expressions that connect the content of one paragraph to that of the following

# Specifics of good style - 3

## Sentence structure

Sentences should have simple structure, usually no more than one or two lines

Do not use nested sentences[1]

Sometimes longer sentences can be split by, replacing "and" or semicolon (";") with a period (".")

Organize your sentences so that they can be parsed without too much backtracking

## Tenses

Present $\rightarrow$ truths, about the text itself

Past $\rightarrow$ describing the work and outcomes

[1] "Well, ultimately, I'm the guy who pulled the trigger that fired the round that hit Harry." Example link

# Specifics of good style - 4

## Repetition and parallelism

Do not use the same connection words again and again

Complementary concepts ([2]) should be explained as parallels

Parallels can be based on antonyms (the former, the latter)

Comparisons and relative statements should be complete[3]

## Emphasis

When a key word is introduced, consider if you need to place it in italics

Do not use italics or bold for emphasis, only underlining is sufficient

[2] for example, compression and decompression

[3] "E-R model is a better method" compared to ?

# Specifics of good style - 5

## Definitions

Terminology, variables, abbreviations and acronyms should be explained the first time they appear in the text

## Choice of words

Use short, direct words rather than long and speaking around(circumlocutionary)[4]

Do not use abstract, broad terms [5]

Does the change of words results to an more coherent meaning ?

[4] initiate $\rightarrow$ start, firstly $\rightarrow$ first

[5] information about programs, information = complexity or bug reporting system or .. ?

# Specifics of good style - 6

## Misused words

Commonly misused words[6]

## Specific words

Do not use foreign words

Do use Latin if you are confident with the meaning

Do not use domain-specific words[7], cliché or idioms

## Overuse of words

Eliminate repetition,when the same word is used with different meanings [8]

Use not excessively "so", "also", "hence", "note that" and "thus"

Sometimes repetition is useful [9]

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[6] Reference link 1,reference link 2

[7] The transaction log is a ~~record~~ (history) of changes to the database

[8] Values are stored in a set of accumulators, each ~~set~~ (initialized) to zero

[9] What does "from two to four hundred" mean?

# Specifics of good style - 7

## Plurals

The set of negatives ~~are~~ (is) then discarded

Remove plural to gain clarity[10]

Classes may not need a plural[11]

## Abbreviations

- Expand abbreviations[12]
- Do not use ".." or "/"

## Acronyms

- Use when the actual name is too long
- Introduce it early enough

[10] A Packets that contain an error are automatically corrected

[11] These kinds of algorithms are irrelevant

[12] e.g = for example, w.r.t = with respect to

# Punctuation - 1

## Stops(.)

- End a sentence
- Do not use stop in the end of a heading

## Commas(,)

- Mark a pause
- Indicate correct parsing[13]
- To comment, parenthetical remark
- To give the reader time to breathe

[13] One node was allocated for each of the states, but of the nine seven were not used $\Rightarrow$
Nine nodes were allocated, one for each of the states, but seven were not used

# Punctuation - 2

## Colons (:)

- Join related statements
- Introduce lists

## Semicolons (;)

- Separate elements in a list
- Divide a long sentence, or emphasize a part of a sentence

## Apostrophes (')

- Singular possessives (Su and Ling's method)
- Plural possessives (Students' passwords)
- pronoun possessive (its, hers)

# Presenting your algorithm - 1

## Necessary ingredients:

- The steps that make up the algorithm
- The input and output, and the internal data structures used by the algorithm
- The scope of application of the algorithm and its limitations
- Properties that will allow demonstration of correctness, such as preconditions, postconditions and loop invariants
- A demonstration of correctness
- A complexity analysis, for both space and time requirements
- Experiments confirming the theoretical results

# Presenting your algorithm - 2

## Style of presentation of an algorithm[14]

- List style
- Pseudocode (not self-explanatory for a reader)
- Prosecode (has longer introduction and use of text in the presentation helping the reader to understand it easier)
- Literal code (simultaneously presentation and explanation of the algorithm)

## Explanation of an algorithm

By written text to describe in sufficient detail the method

By figures to show key ideas of the algorithm

[14] Link for all styles of presentation of an algorithm

# Presenting - 1

## Content

- What to cover?
- What and how much to select depends not only on the time available but also on the expertise of the audience
- When constructing a talk, begin by choosing the simple main goal, that is, the particular idea or result that the audience should learn
- Brainstorm with a friend for what are the valuable parts of the presented idea
- Select the most important ideas
- A talk should be straightforward, although it can be used to convey complex ideas

# Presenting - 2

## Tips

- Motivate listeners: Why the problem is important, where it arises? How do you solve it?
- Most listeners appreciate if they are not exposed to unnecessary details not needed to understand the result
- Say the needed in the given time

## Organization

- Presenting should be flowing and linear. Connect the separate parts with glue words
- Try to make a story out of your presentation. Connect each slide to the next with a logical why-because

# Presenting - 3

## Introduction

Begin well, motivating the audience to hear your work

## Conclusion

Revise the main points and ideas you want the audience to remember

## Question time

Involve the audience for each question not only the questioner

If so, admit ignorance

# Presenting - 4

## Slides

- Slides should be legible, simple and relevant to the work
- All presented information should be discussed before moving to the next slide
- Minimize the details that audience should not remember through the presentation

## Preparation

- Rehearse with yourself and with other (at least 5 times)
- Familiarize with questions and equipment
- Have pace and tone
- Enjoy it, be enthusiastic!
- Do not show off

# References

A very useful book to read:
Justin Zobel, Writing for computer science, Springer 2nd edition 2004