Seminar: Turing Award Winners and Their Contributions

2. How to Write a (Seminar) Report?

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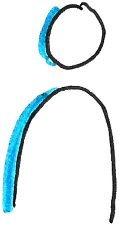
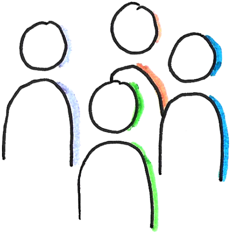
Let's Go!

Goals



You

practice reading and writing scientific literature



Other seminar participants

- Who is your audience?
- What do they already know?
- What should they learn?

Source Material

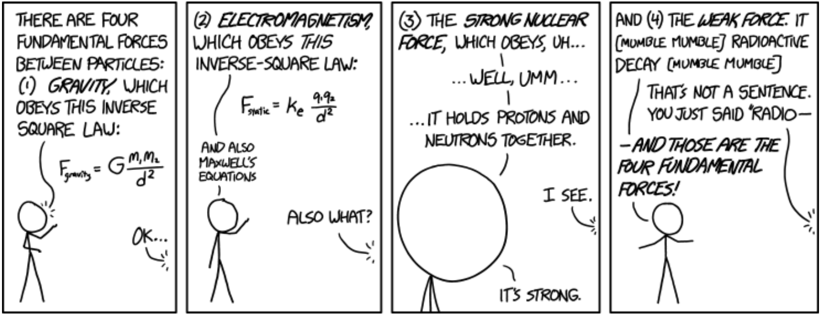
Finding source material

- References in existing material (e.g., Turing lectures)
- `https://scholar.google.com` (demo)
- References in Wikipedia articles (in the end of the article)
- Library
- Ask your supervisor for help!

Articles behind a paywall?

- Authors' homepages
- University subscriptions
- Library

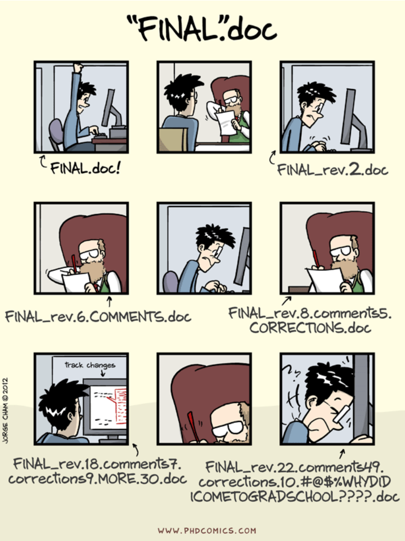
Understanding the Source Material


THERE ARE FOUR FUNDAMENTAL FORCES BETWEEN PARTICLES: (1) GRAVITY, WHICH OBEYS THIS INVERSE SQUARE LAW:
$F_{gravity} = G\frac{m_1 m_2}{d^2}$
OK...
(2) ELECTROMAGNETISM, WHICH OBEYS THIS INVERSE-SQUARE LAW:
$F_{static} = k_e \frac{q_1 q_2}{d^2}$
AND ALSO MAXWELL'S EQUATIONS
ALSO WHAT?
(3) THE STRONG NUCLEAR FORCE, WHICH OBEYS, UH...
...WELL, UMM...
...IT HOLDS PROTONS AND NEUTRONS TOGETHER.
I SEE.
IT'S STRONG.
AND (4) THE WEAK FORCE. IT [MUMBLE MUMBLE] RADIOACTIVE DECAY [MUMBLE MUMBLE]
THAT'S NOT A SENTENCE. YOU JUST SAID "RADIO—
—AND THOSE ARE THE FOUR FUNDAMENTAL FORCES!

www.xkcd.com

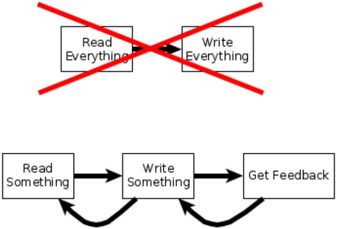
- Do not ignore complex details.
- We are happy to help.

Version Control Systems



- Use version control for files you create (`tex`).
- Ignore automatically created files (`pdf`, `log`, `aux`, . . .).
- Repositories on Bitbucket or Github

Start Early



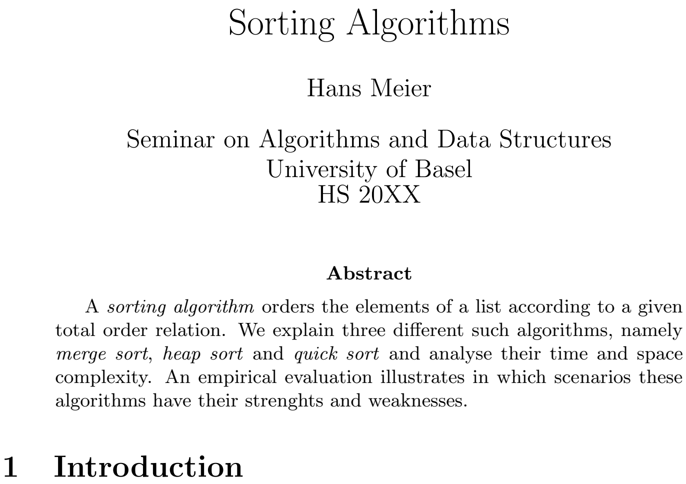
- Writing is an iterative process.
- Don't wait until you read everything.
- Get feedback on drafts.
- Be prepared to make revisions.

Structure

A Common Structure

- Abstract
- Introduction
- Background
- Main Part(s)
- Related Work
- Conclusion
- References

Abstract I



Sorting Algorithms

Hans Meier

Seminar on Algorithms and Data Structures
University of Basel
HS 20XX

Abstract

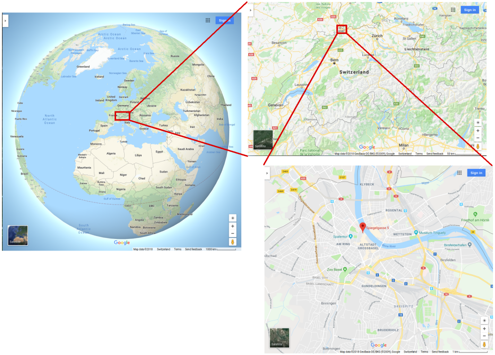
A *sorting algorithm* orders the elements of a list according to a given total order relation. We explain three different such algorithms, namely *merge sort*, *heap sort* and *quick sort* and analyse their time and space complexity. An empirical evaluation illustrates in which scenarios these algorithms have their strenghts and weaknesses.

1 Introduction

Abstract II

- very short summary of the report's content
- high-level, no details, no references
- potential readers decide whether to read on
- expectation management
- in LaTeX: `\begin{abstract}...\end{abstract}`

Introduction I



- context
- (gap in previous approaches)
- motivation, why the topic is interesting
- high-level description of the topic

Introduction II

- structure of the report

  We present an extension of the LM-Cut heuristic that preserves both admissibility and dominance over the maximum heuristic. For this purpose we introduce context splitting as a new general technique which allows us to split up actions in a tasks to distinguish different scenarios of their application. We show how context splitting can be made useful for the extension of the LM-Cut heuristic. After proving the desired theoretical properties of the heuristic, we also evaluate its performance empirically.

  [Röger et al., ECAI 2014]

Background

- introduces basic terminology and notation
- foundation of main parts, not a goal in itself
- often general or known definitions or previous work
- makes report self-contained.
- title does not have to be "Background"
  - SAS$^+$ Planning, μ-recursive Functions, Turing Machines, ...

Background (style)

- formal language
  - clear, easy to read, unique interpretation
  - not too complicated
  - not too colloquially

More details

Zobel, J. (2015). *Writing for computer science*. Springer.

Examples for good and bad style

No unique interpretation

If some nodes get me from A to B, I'll call them a path.

Too complicated

A path is $\pi = \langle e_i \mid \forall i : 1 \leq i \leq n \rangle, e_i = \langle v_{i,1}, v_{i,2} \rangle \in E$, $\forall i : 1 \leq i \leq n$, and $v_{i,2} = v_{i+1,1} \forall i : 1 \leq i \leq n - 1$.

Unique interpretation and easy to read

A path is a sequence of nodes such that there is an edge between each pair of subsequent nodes.

Main Parts

- main part of your report
- structure depends on the topic

Related Work

- short description of other approaches for the same problem or similar problems
- focus on core ideas
- sometimes also directly after introduction

Conclusion

- short summary of the main results
- do not repeat abstract or introduction
- often ends with open questions
  or discusses how work can be continued

References

- list of used literature (and other sources)
- complete and consistent
  - don't use "Proceedings of the Xth Conference on Blabla" for one conference and "Proc. ACRONYM 2000" for another
  - or even worse: the same conference
- use bibtex, biblatex, ...
- read the output of these tools
  - warnings for incomplete entries

Citations

Citing

- “Meier and Huber (2013) have shown. . . ”
- “Für das n^2-Puzzle ist es NP-schwer eine kürzeste Lösung zu finden (Ratner und Warmuth 1986).”
- **Theorem 1** (Murphy’s law, Sack 1952)**.**
  Anything that can possibly go wrong, does.

- not “(Meier and Huber 2013) have shown. . . ”
- not “In (Ratner und Warmuth 1986) . . . ”’

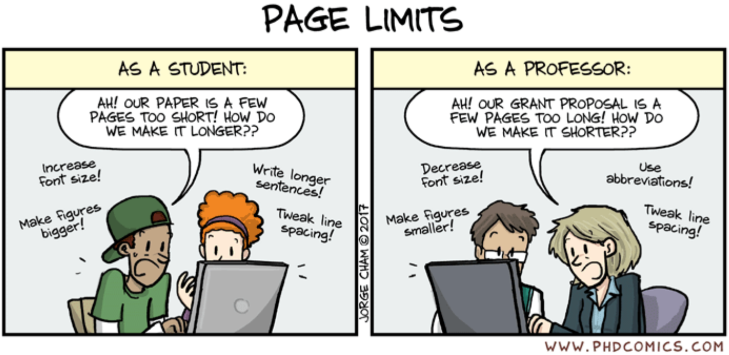
Bibtex

```
@Book{hofstadter-1979,
  author =    "Douglas R. Hofstadter",
  title =     "Gödel, Escher, Bach:
               an eternal golden braid",
  year =      "1979",
  publisher = "Basic books"}
```

(demo)

FAQ

How can I fill the pages?



- explain things in more detail
- explain more things
- use more examples

What are common mistakes?

- Using terms/notation before they are introduced
- Only translating/paraphrasing an original text
- Colloquial or ambiguous language
- "The authors wrote this in the best way possible. How should I write this in a different way?"
  - get a deeper understanding of the material
  - read alternative sources
  - do not read source while writing

Where can I get further information?

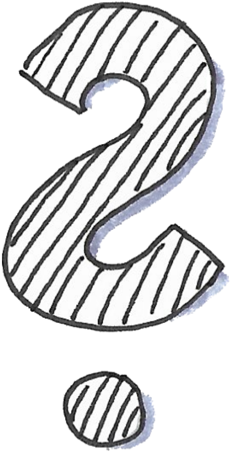
Good example

We uploaded a good example from last year to the course website.

Great talk by Simon Peyton Jones

https://www.microsoft.com/en-us/research/academic-program/write-great-research-paper/

Questions



References