



Umeå University
**Department of
Computing Science**

Student Conference in Computing Science

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<http://www8.cs.umu.se/kurser/5DV144/HT14/>



Overview

- Your next deliverable (D2)
- How to do research (!)
- Literature
 - Searching for literature
 - Reading the literature
- Writing
 - Structure of a research paper
 - Referring to others work
 - Guidelines for writing
 - Latex overview
- What to do now!



Next Deliverable: Outline and Annotated Bibliography

After (approved) topic selection

- research the field (literature research)
- outline your paper
- document literature research in an annotated bibliography
- deliver D2 (outline and annotated bibliography) at latest October 8, 12:00 via EasyChair in required format (LaTeX)



How to do Research

- Define a specific research question (topic selection)
- Make a research plan with concrete (sub)goals:
 - Search for literature, read and think
 - Do the “real” research: develop, implement, prove, experiment, conduct user tests, evaluate, draw conclusions, ...
 - Write
- Execute the plan
 - Not always linearly
 - Modify the plan and/or hypothesis/question if necessary
 - There is no recipe!
- Finalize your paper, publish results
- Discuss and exchange ideas (conferences!)

Why?

- Topic selection!
- To learn about an area
 - What is interesting and important (for others!)
 - What has/has not been tried?
 - What is suggested to be tried?
 - To be able to come up with new things!
 - Research builds on earlier work!
 - "Standing on the shoulders of giants"
 - You **must** give references to related work on
 - the relevance of the problem
 - related problems and solutions
 - your used tools and methods





Searching for Literature (2)

Where?

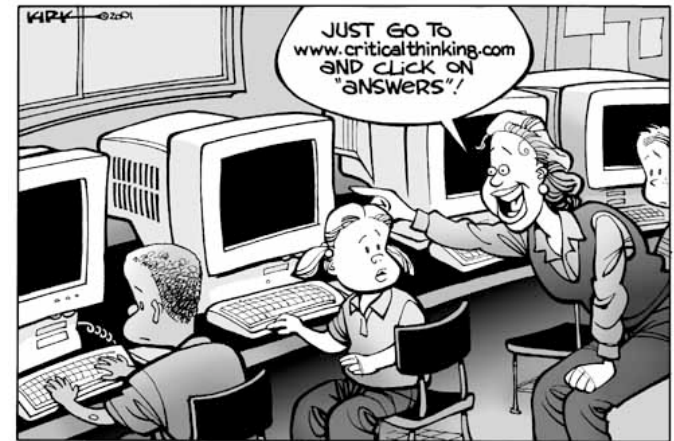
- Search engines (Google, etc.)
- Specific literature databases or search engines
 - **Google Scholar** (motto: "Stand on the shoulders of giants"), Scirus from Elsevier, **CiteSeerX**, getCITED, INSPEC
 - Check out www.ub.umu.se
- Physical library (not everything is available online!)

How?

- Search for topics, keywords, authors, ...
- Focus on publications (.pdf)
- Browse the publications
 - Introduction, abstract
 - **Look in the reference section!**
- Surveys (recent!) can be excellent
- Identify key authors in the area - Google for more info

Avoid "Blind" Trust

- Critically evaluate your sources
- Try to see the difference between
 - Facts & interpretations of facts
 - Original work & (mis)interpretations
 - Check primary sources if possible, avoid secondary (and higher order) sources
 - Seriousness (high quality) & sloppiness (low quality)
 - Science & pseudoscience
- ➔ Prefer resources that apply a peer review system
 - ➔ Home pages, company web sites, on-line magazines, Wikipedia, etc. are not trustworthy





Reading (1)

- The purpose of searching!
- Reading and literature search are intertwined
- You can't read everything
 - Try to spend your time on relevant and good papers (hard to know in the beginning ...)
- Make notes using your own words
 - What is interesting and important?
 - What has/has not been tried/examined?
 - What is suggested to be tried/examined?
 - Your own ideas
 - Critical comments and explanations
 - Relate to other information
 - ➔ This results in the **annotated bibliography**



Reading (2)

Bibliography:

A set of publications related to a given subject

To annotate:

To add comments (annotations) or explanations

- Annotated bibliography = commented reference section: *year, author, title, publisher, comments*
- Comments \neq Abstract
- Useful for keeping track of your readings and comments/thoughts
- Useful for your writing



Types of Research Papers

- Experimental results
 - Studying natural systems
 - Formal constructions
 - Algorithm development, proofs, ...
 - Evaluation/comparison
 - User tests
 - Survey
 - ...
- ➔ They all have different styles



Typical Structure of a Paper

- Title and author
 - Abstract – summarizes the paper
 - **Introduction**
 - ...
 - ...
 - **Discussion/Summary/Conclusion**
(choose what fits best)
 - **References**
- } MAIN SECTIONS
headings and subheadings
must fit YOUR TOPIC.

Writing the Outline

- Make sure you know what you are going to do
 - Summarize relevant background and context
 - Refine your question/hypothesis/statement
 - Write section- and subsection headers
 - Write some raw text for each section and subsection
 - Add “reminders” for the things you plan to write (e.g., in bullet list form)
 - Add appropriate citations and references
 - The intermediate result will be presented and discussed at the peer review meetings
- ➔ Read and use the LaTeX template (demo.tex) on the homepage



The Introduction

- Should present
 - The problem investigated:
 - What, Why ← The “sales pitch”
 - Review of relevant earlier work – incl. references
 - Other approaches
 - your used techniques
 - Your chosen approach/technique
 - What, Why
 - Major results and conclusions!
 - “Reading a scientific article isn’t the same as reading a detective story. We want to know from the start that the butler did it” (Ratnoff, 1981)
- Start writing the Introduction while your work is still in full progress [1]
 - You have it all fresh in your mind
 - The writing may reveal inconsistencies in your work



- Main components (also see [1])
 - Discuss (do not repeat) main results
 - Point out exceptions where the results don't apply
 - Show how results match previously published work (can also be in the introduction)
 - Discuss the consequences of the results
 - State and motivate your conclusions as clearly as possible
- Avoid the Squid technique (Doug Savile, 1972):
“The author is doubtful about his facts or his reasoning and retreats behind a protective cloud of ink”



Why using references?

they

- show the relevance of the topic/question
- distinguish between yours and others' ideas
- give other authors credit for their work
- direct the reader to relevant sources of information
- show that you know the area of research
- give evidence for your claims



References (2)

References

- The list of other work, placed at the end of the paper (the Reference section):
 - *year, author, title, publisher, ...*

Citations

- Abbreviations that refer to entries in the Reference section

Examples:

“A comparison of similar methods can be found in Ref. [3]. Johns et al. [7] refer to SPVS as one of the best methods.”

References

[3] J. Dogherty. Solving image problems using invariant features. In: Proceedings of the Image Understanding Workshop (IUW), 2010, pp. 1181–1192.

[7] D. Johns, M. Brown, P. Blue, T. Lee. Computers in Sight, Prentice Hall, Englewood Cliffs, NJ, 1992.

Quoting (1)

Referring to other's work by **including** (parts of) it

- We normally use our own words when citing other work:

Research in cognitive science shows the importance of detailed and situated narratives (Carroll et al., 1994).

- Quotations are used if the wording itself is of particular interest or if you want to present a position you will argue or comment on
- The original text must be repeated exactly as in the source:

"Recent theory and methodology in cognitive science clearly reflects a growing and broadening awareness of the importance of detailed and situated narratives" (Carroll et al., 1994, p 245).

Quoting (2)

- Quoting figures, tables, video, audio, etc. in your material **requires permission from the copyright holder**
- A reference alone will not do
- This also holds for your own publications (self-plagiarism)
- Even public domain material (e.g., under Creative Commons) requires creator, source, and type of license to be pointed out
- Anything else is **plagiarism** and/or **copyright infringement**

THIS IS A SERIOUS WARNING!
All cases of suspected plagiarism will be forwarded to the disciplinary board – no exception!

Plagiarism

“... re-use in one paper of material that has appeared in another, without appropriate acknowledgement.”

(Zobel, 2004, p 217)

Can be anything; book, journal, web page, etc.

Can be anything; ideas, phrases, illustrations, etc.

- Possible reasons
 - Misjudgment (by an inexperienced researcher)
 - Carelessness
 - Deliberate theft
- ➔ **The reason is irrelevant**
- ➔ Also applies to your previous publications!
- ➔ Ask supervisors and check homepage for examples

How to Cite (1)

- There are many common formats for citation marks
 - Number styles:
 - [1], [2–4], or the like ← We will use this style
 - Harvard style:
 - (Björk, Knight & Wikborg, 1988), (Carroll et al., 1994; Holtom & Fischer, 1999; Zobel, 1997), ...
 - “Abbreviation” style:
 - [BKW 88], [Car+ 94, HoFi 99, Zob 97], ...
 - APA style, MLA style, ...
- Depends on the journal, conference, etc.
- BIBTeX does the formatting for you.

How to Cite (2)

- Citation marks are placed inside the sentence, as
We use Parikh's Theorem [12] to prove the result.
- We use Parikh's Theorem to prove the result [12].*
- Wording is important. Compare
 - *According to [5], design should follow function.*
 - *In [5], it is claimed that design should follow function.*
 - *Design should follow function [5].*

What to Cite (1)

- Trustworthy and objective sources

- Peer reviewed publications
- Books
- Technical reports
- **No** sales/marketing brochures
- Prefer primary sources
 - Be careful with secondary sources
 - Be precise about who said what



Journals
Magazines
Conferences
Workshops

What to Cite (2)

- Do not rely on Wikipedia, web pages, etc.
 - They can be very good starting points but are definitely not reliable scientific references
 - Mention them in footnotes rather than in the reference section
- However, remember not to equate “scientific” with “on paper”
 - there are high quality electronic scientific journals
 - there is a lot of rubbish printed on paper



Guidelines for Writing (1)

Structure the information

- Use a **simple and logical** organization of the paper
- Omit unnecessary information/details
- Say things once – at the right place
- One topic per section
- One idea per paragraph
- Logical and verbal bridges between sentences



Guidelines for Writing (2)

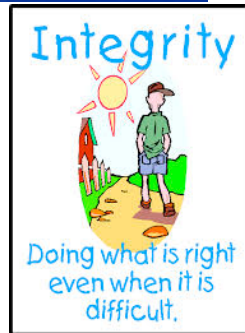
Write clearly

- Describe **everything** such that a non-expert reader has a chance to understand!
- **Motivate** and **explain** (why, what, how)
- Be **specific and clear**, not vague and hand waving
- If you cannot say it clearly, think it over again
- Define all terms and acronyms, and use them consistently

Guidelines for Writing (3)

Integrity

- Carefully distinguish between
 - your own original ideas and those of others
 - what you have done and others have done
 - facts and interpretations of facts
 - Do not exaggerate - abandon “commercials”
 - Critically discuss your own work and assumptions
- ➔ In short, **be honest and serious**



Guidelines for Writing (4)

Choose your words carefully



- Do not try to sound elaborate
 - “An example of this fact is” → “for example”
 - “of great theoretical and practical importance” → “useful”
- Avoid buzzwords and jargon
- Ban conversational phrases like *Well, You see, Bored to death...*
- Avoid short verb forms, like *we’re, can’t, it’s, ...*
- Avoid emotional expression such as *gigantic, ridiculous, funny...*
- Be careful with culturally or geographically localized concepts, such as times, dates, seasons, school grades, currencies, ...
- *The best sentence? The shortest. (Anatole France)*
- *The letter I have written today is longer than usual because I lacked the time to make it shorter. (Blaise Pascal)*
- *Simplicity is the ultimate sophistication. (Leonardo da Vinci)*

The use of personal pronouns

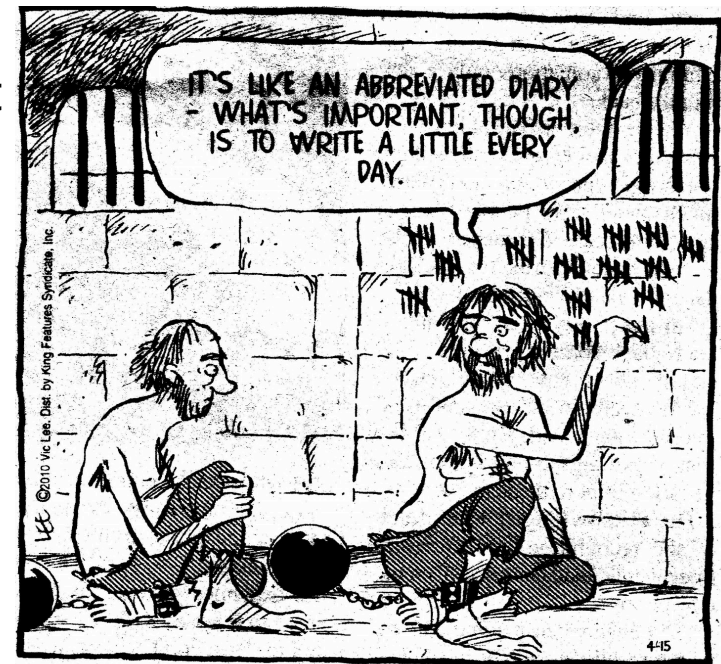
- Avoid excessive use of personal pronouns
- “We” to refer to author(s) or author(s)+reader is most common
- Do not address readers with “you”
- No first person singular (as it sounds subjective)



Guidelines for Writing (6)

General

- Writing supports understanding
 - “if you can't say it clearly, you don't understand it yourself” (John Searle)
- Have high demands!
 - Read what you have written and edit
 - Do not hesitate to rewrite even big parts completely
- Do not postpone writing until the end
- Discuss your work
 - Peer review group meetings
- Overall productivity is **much** lower than you may expect (maybe 1–2 pages a week)





Paper Evaluation Criteria

Your work must indicate competence/ability to ...

- analyse some relevant aspect(s) in depth
- analyse and synthesize arguments/resources
- back-up claims and facts by well-developed arguments, discussions and/or references
- tell apart relevant from irrelevant material, facts, and details
- make use of references in a correct way
- use a scientific style of writing
- manage the mechanics of writing; follow formatting/style guidelines

- Typesetting system to create good looking text
- You write your paper as unformatted text in a text editor, and LaTeX generates a pdf file
- Quite the opposite of WYSIWYG!
- Powerful support for layout, formulas, tables, bibliography, ...

- **From now on, everything** must be prepared with LaTeX
- Template, format, and guidelines from course web pages must be used
- Your source files will finally be to put together the conference proceedings
- Check out **demo.tex** and read **demo.pdf**



An Example LaTeX Source File

```
\documentclass{llncs}           % declares the document type
\usepackage{...}              % imports special purpose packages

\begin{document}
\title{The title}             % defines the title of your paper
\author{John Doe}
\institute{...}
\maketitle
```

The text of the paper

```
\bibliographystyle{plain}     % declares the bibliography formatting style
\bibliography{demo}           % refers to external bibliography file demo.bib
\end{document}
```



An Example Bibliography File demo.bib

```
@article{beck:1993,  
  Author = {Beck, Kent},  
  Title = {{CRC}: Finding objects the easy way},  
  Journal = {Object Magazine},  
  Volume = {3},  
  Number = {4},  
  Pages = {42--44},  
  Year = {1993} }
```

Type and key
required field

optional field

```
@book{bellin:1997,  
  Author = {Bellin, David and Suchman Simone, Susan},  
  Title = {The {CRC} Card Book},  
  Publisher = {Addison-Wesley},  
  Address = {Reading, MA},  
  Year = {1997},  
  Annote = {Blah blah blah} }
```

normally ignored field



Running LaTeX

To convert the .tex file to a pdf file

From the command prompt:

1. *pdflatex mypaper* reads *mypaper.tex* and creates
 - *mypaper.pdf* (the typeset paper) and
 - *mypaper.aux* (info about citations, references, etc)
2. *bibtex mypaper* reads *mypaper.aux* and creates reference section (*mypaper.bbl*) from BIBTeX file.
3. *pdflatex mypaper* (again!)
 - updates *mypaper.pdf* with info collected in 1 and 2.

If you get "Undefined references found" and "References may have changed", re-run *bibtex* and *pdflatex* once or twice.



References and Resources

- [1] Day, R.: How to write and publish a scientific paper. Phoenix: Oryx Press (2006).
 - [2] Lamport, L.: *LaTeX: A Document Preparation System*, 2nd edition. Addison-Wesley, Reading, MA (2004)
 - [3] Zobel, J.: *Writing for Computer Science*, 2nd edition. Springer, London (2004)
- The literature list, links, and examples on the course web
 - Purdue Online Writing Lab (OWL)
<http://owl.english.purdue.edu/owl/>
 - The Writing Center (Univ. of Wisconsin-Madison)
<http://www.writing.wisc.edu/>

What to do now!

- If you really want to improve
 - Re-read the slides, internalize and contemplate
 - Do this also later during the course
- Start writing your outline and annotated bibliography
- Intensify your literature research



Next step:

- **Obligatory** peer review meeting on Wed Oct 1st
- Distribute your draft at latest Mon Sep 29th 08:00 A.M.
(to your peers + supervisor in your group)



GOOD LUCK AND HAVE FUN!