COS 700 Notes 2015

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# 4 February 2015

## What is research, topic and problem statement?

Core idea of class = define what is research in computer science.

Questions for discussion:

* What are you hoping to achieve through your research project?
* How many people do you expect will read your research report? i.e. bear in mind who you are writing for – supervisor and external examiner.
* How important is it for you to do well?
* What’s your plan for fitting in time to work on your project?
* How are you progressing with finding a topic?

Academic research:

* What is research?
  + Research is a systematic investigation to discover facts.
  + The purpose of research is to come to new knowledge.
* What is not research:
  + A software development project
  + Writing a textbook
* Framework of questions for driving the process of research:
  + What do you want to investigate?
  + Where will the data come from?
  + What will you do with the data?
  + How do you know if you have achieved your goal?
  + How will you report your result?

The research topic vs. the problem

* The research topic:
  + The subject of the research project.
  + A good topic is focused within a discipline, there is an area of interest
  + Field > area of interest > concentration > focus > THE TOPIC
* The topic is not the research problem

Group exercise

Topic -> effects of complete mediation on usability (constantly ask for authentication)

# 18 February 2015

The literature review

## Becoming well read

* What does it mean?
  + To have read broadly and to understand what was read.
* The importance of reading(“reading for a degree”)
  + In research it is critical to be willing to read.
* In research you have to be well read in your topic. Why?
  + You only know that you are not duplicating other work if you have read enough of other peoples work.
  + It develops your confidence in your research study.
    - You know what is already known,
    - What are the open Q’s in the field,
    - Who tried what and what where the results?
    - Who are the main people in the field?
* You also have to show what you know by writing a literature review.
  + Literature review builds credibility in the field.
  + Puts your work in context of existing work
  + Confirms that there is a reason/Gap for your research and to show the legitimacy of your research.
  + For Honours: to prove that you can do a lit review.

What is a good literature review?

* Critical description of literature relevant to a particular research topic that provides justification for the research:
  + Critical: not just a list of previous work, but critical summary. What is critical in academic terms?
    - Careful analysis of the merits and the faults, not just finding faults.
    - Thinking further and putting their work into context.
  + Literature: Proper academic source
  + Relevant: must be related to your specific topic.
  + Justifications: from the related literature, it must be clear why your study is necessary.
* A lit review should not just be a summary of literature, but a structured flow of related work, well categorised and lying the foundation for your study.

Group exercise on good vs bad literature reviews

How do we approach a literature review?

* Start with your topic
  + What are the key concepts? Compile a list of keywords.
* Find information sources
  + Conduct searches on keywords.
  + Start with relevant paper and track backwards and forwards, if you find one, look at the journal that it was published in.
  + Read latest issues of relevant journals.
* Read and re-read papers that are difficult to understand
* As you read, group the sources by topic
  + Adapt your key topics as new, more specific, themes become apparent.
  + Take notes as you read.
  + Start to critically analyse.
  + Grouping by topic makes it easier to add references later.

Have a system

Referencing:

* Use latex or bibtex
* Use systematic key numbering

Take Notes:

* Any notes must have your reference key.

Academic lit sources

* Journal articles
* …

Wikipedia and other web sources

* Wikipedia pages change, therefore your references could end up lying.
* Source is unknown/not well checked.
* There is no guarantee that the definition is correct.
* Rather look on Wikipedia and follow their references.

Tracking references

* Start with first paper,
* Then go back in time to work that first paper was based on, only the relevant stuff.
* Then go forward and search for papers that cite your key paper.
* The relevant papers that you find will then become your new key paper, then loop back and start again.
* This process can be infinitely long, therefore be selective.
* Google scholar will tell you “cited by 9” in the link below the search results.
* If it is a journal paper, go to the up library website. Click “E-journals A-Z Off Campus”.
* If it is a conference paper, (acm vs ieee) library web > e-resources > Databases A-Z > ACM||IEEE > search.
* If it is a chapter in a book
  + Find pdf on google.
  + Book in library?
  + Inter library loan request online.

Academic reading

* So you have a paper that may be related to your topic. How do you actually read it?
* Make sure your purpose is clear
  + You must know what you are looking for before you start reading.
* Skim it and decide if it’s worth reading.
  + Reading everything in depth is not feasible.
* Read the relevant parts and make notes
* Understand what you read and if you don’t, discuss it with your supervisor.

Referencing

* References must be accurate in content and in style.
* The quality of academic work is often judged by their references
  + The most important work should be referenced in your paper.
  + There must be enough references.
  + Variety is also important. Conference vs journal vs books …
  + Are references current?
  + Are references reputable?
  + Are the references focused or all over the place?
* Many different styles
  + Our department don’t prescribe a style. Use supervisor style or just be consistant.
* Example given that is numbered and alphabetically sorted. Sometimes add the author, other times just the number, depending on the relevance.
* Example given on how bibtex works.

Plagiarism

* Using the work of others and pretending that it is yours.
* Always credit the work of others by referencing the source of information.
* Make sure that you are clear about plagiarism and how to avoid it.
* If you paraphrase, reference.
* If you copy-paste, use quotes.
* If you use somebodies data, reference them.

The actual literature review.

* This will be a chapter in your final report
* Give it a relevant name, not”lit review”
* Structure:
  + Intro: define the topic and provide a context for the rest of the chapter
  + Body : see slides.
  + Conclusion : see slides.

# Meeting with L marshall

Create a framework to teach Boolean logic using logic circuits in minecraft, using minecraft redstone.

We only create the framework and leave population of the content to who uses the framework.

Firstly go write a proposal about it, talk about what is possible and exactly what we want to do.

Things to research:

Learning methods/styles – how do people learn?

How does e-learning work?

How does gamification work?

How does minecraft work?

How to write mods for minecraft?