CSE Undergraduate Theses - Introduction

Hui Wu

CSE Thesis Team

People who can help:

- **Thesis Supervisor** … all thesis related issues
- **Thesis Coordinator** ... Hui Wu
  - ‘other’ thesis related issues: nominations, guidance, staff liaison
  - Email: huiw@unsw.edu.au Room: K17-501D, by appointment
  - Let’s utilise the forum function of the new thesis sites (Thesis A/B/C)
- **Thesis Administrator** … Jing Hsu
  - Email: jing.hsu@unsw.edu.au (cc Hui Wu as well)
  - administration: extensions, late penalties, reassessment

Thesis Sites

Topics: https://moodle.telt.unsw.edu.au/course/view.php?id=33523

Thesis A: https://moodle.telt.unsw.edu.au/course/view.php?id=40119

Both websites are on Moodle

- Use your zPass to sign in
- Student key for topics website: cse-44747437

Thesis Intro Lecture

The goals of this lecture:

- Describe the process and requirements for a CSE thesis
- Get you started with Thesis A …

At the end, you should ...

- understand what's required of you
- start to make a plan for Thesis A

Aims of 4th-year Thesis

- Allow you to "**put together**" what you've learned
- Give you experience in tackling a **sizeable** project
- Give you exposure to **research/implementation**
- Require you to practise **project planning/time-management**
- Give you experience in **formal technical report writing and presentation**

Normal Thesis Process (1/4)

- **Do Thesis A, Thesis B and Thesis C in three consecutive terms**
  - Thesis A in Term 1, Thesis B in Term 2 and Thesis C in Term 3
- **If you have special reasons such as internship, you may apply for leave to interrupt your thesis after you finish Thesis A or Thesis B**
  - Get approval of your supervisor
  - Then get approval of CSE Thesis Coordinator (currently me)

Normal Thesis Process (2/4)

Term 1:

- Find a topic (do it now)
- Register your topic (Week 1)
- Do background research (literature survey), work out your approach (framework) for the project and make a plan (Weeks 1-6)
- Seminar presentation (project overview + plan) (Week 6)
- Follow up on feedback, continue to do literature survey and work on your approach (framework) and revise your plan (Weeks 7- 10)
- Preliminary report (due Week 10)
  - Project description, literature review, your approach and your plan for Thesis B and Thesis C

Normal Thesis Process (3/4)

Term 2:

- Start working on solution and evaluating results (Weeks 1-7)
- Preliminary demonstration (Week 7)
  - Show your partial approach and results
- Follow up on feedback, and continue to work on solution
- Progress report (due Week 10)
  - Describe part of your solution and results you have completed
  - Give a detailed plan for Thesis C

Normal Thesis Process (4/4)

Term 3:

- Continue to work on solution and evaluate results (Weeks 1-8)
- Demonstration (Week 8)
  - Show your whole approach and complete results
- Follow up on feedback, and continue to work on solution and evaluate results
- Final thesis (project description + literature review + your approach + results + conclusion) (due Week 10)

Accelerated Thesis Process (1/2)

- Do both Thesis B and Thesis C in Term 2
- To be eligible, you need to meet all the following requirements:
  - Demonstrated excellent performance and did extra work in Thesis A
  - Have a good plan in your Thesis A report for Thesis B and Thesis C in one term
  - Approval from your supervisor
  - Approval from CSE Thesis Coordinator

Accelerated Thesis Process (2/2)

- Different deadlines for Thesis B deliverables
  - Thesis B demonstration due Week 4 and Thesis B report due Week 5
- The deadlines for Thesis C deliverables are the same as in normal thesis process
  - Thesis C demonstration due Week 8 and final thesis due Week 10

Deliverables in Thesis A

Thesis A Presentation (during Week 6) (50%)

- A 30 minute presentation about your Thesis A topic and the plan
- Organise the time/date **with supervisor/assessor** and book a room for your seminar
- **Submit the presentation slides by Sunday Week 6 11:59pm**

Thesis A Report (Sunday 11:59pm Week 10) (50%)

- Literature review + design and implementation plan of your thesis
- Use the template provided (thesis course web site)

Deliverables in Thesis B

Thesis B Demonstration/Presentation(during Week 7) (30%)

- A 30 minute demonstration/ presentation about the partial outcome of your thesis.
- Organise the time/date yourself with supervisor+assessor
- **Submit the presentation slides by Sunday Week 7 11:59pm**

Thesis B Report (Sunday 11:59pm Week 10) (70%)

Deliverables in Thesis C

Thesis Demonstration/Presentation(During Week 8) (20%)

- A 30 minute demonstration/presentation about the final outcome of your thesis.
- Organise the time/date yourself with supervisor+assessor
- **Submit the presentation slides by Sunday Week 8 11:59pm**

Final Thesis (Sunday 11:59pm Week 10) (80%)

Thesis Summary/Abstract (Week 10)

- You are required to submit 150-word summary of your thesis (besides the report)

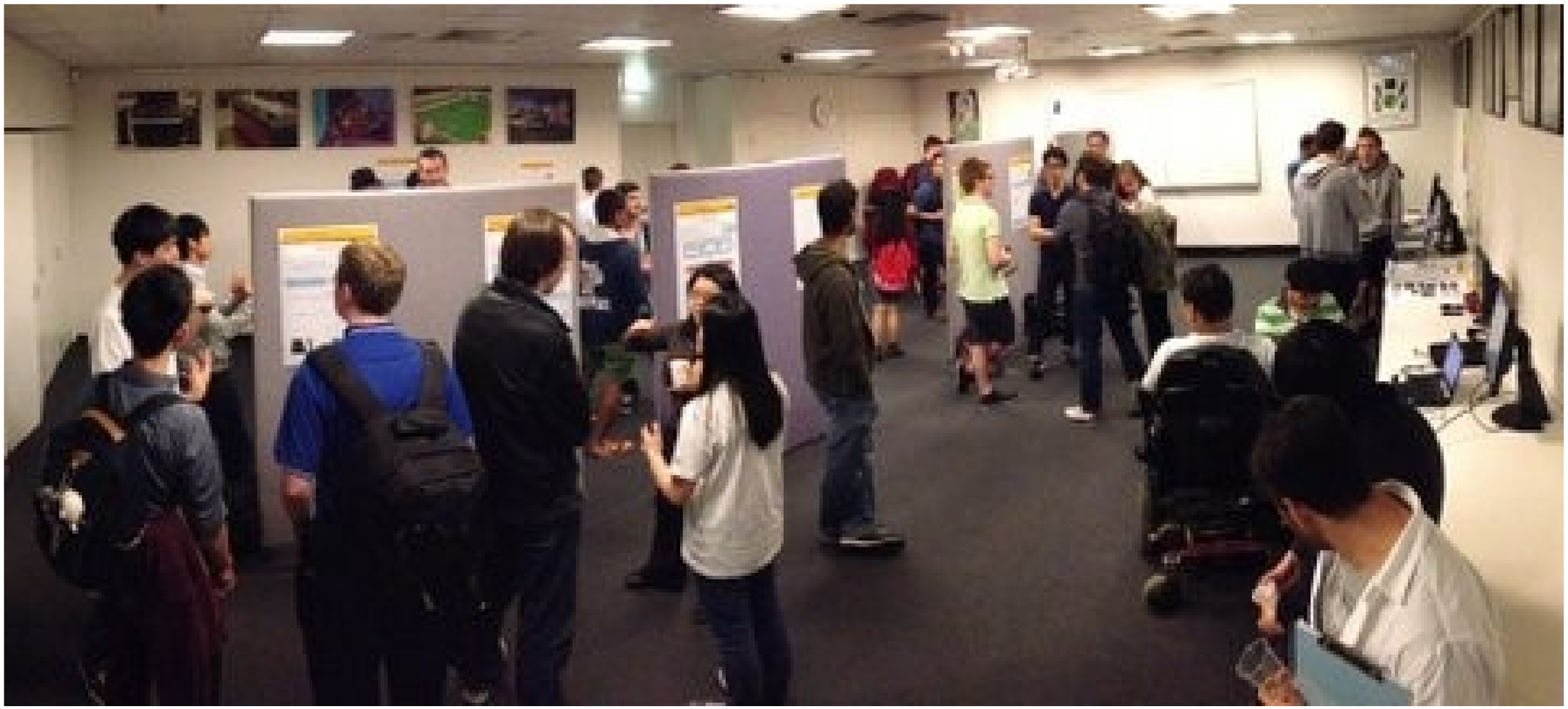
Thesis Showcase

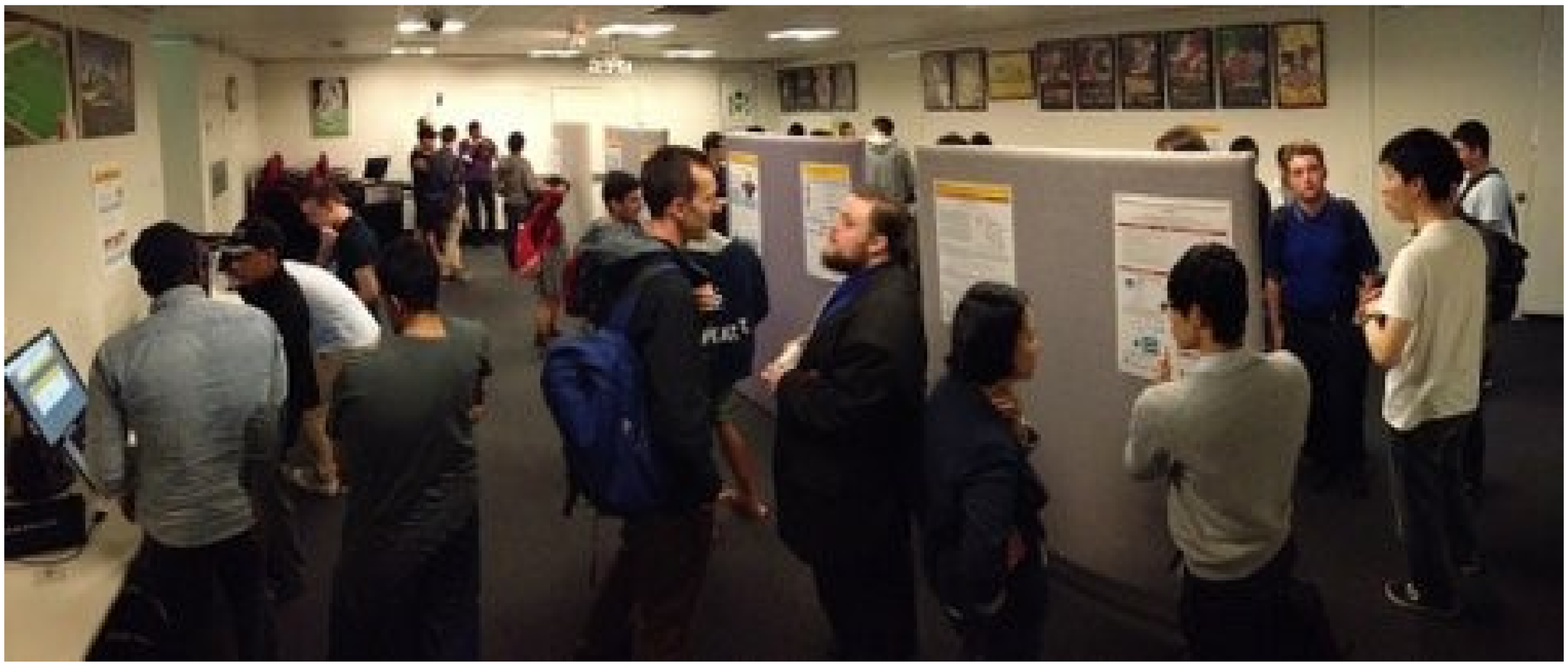
Term 3 Week 11 Thursday 5.30pm

Students with good demo results will be invited

- poster/demonstration sessions.
- guests: year 2/3 students, staff members, industry sponsors, postgrad students
- **food (not pizza)**

Need to submit a poster (extra work), but worthy event to participate





Thesis Marks (1/4)

Thesis A:

ThesisASeminar = mark out of 100

ThesisAReport = mark out of 100

ThesisAMarkSupervisor = 0.5*ThesisAReport + 0.5*ThesisASeminar

ThesisAMarkAssessor = 0.5*ThesisAReport + 0.5*ThesisASeminar

ThesisAMark = (ThesisAMarkSupervisor+ThesisAMarkAssessor) / 2

ThesisAGrade = SY, if ThesisAMark >= 50; FL, otherwise

Thesis Marks (2/4)

Thesis B:

ThesisBDemo = mark out of 100

ThesisBReport = mark out of 100

ThesisBMarkSupervisor = 0.3*ThesisBDemo + 0.7*ThesisBReport

ThesisBMarkAssessor = 0.3*ThesisBDemo + 0.7*ThesisBReport

ThesisBMark = (ThesisBMarkSupervisor + ThesisBMarkAssessor) / 2

ThesisBGrade = SY, if ThesisBMark >= 50; FL, otherwise

Thesis Marks (3/4)

Thesis C:

ThesisCDemo = mark out of 100

ThesisCReport = mark out of 100

ThesisCMarkSupervisor = 0.2*ThesisCDemo + 0.8*ThesisCReport

ThesisCMarkAssessor = 0.2*ThesisCDemo + 0.8*ThesisCReport

ThesisCMark = (ThesisCMarkSupervisor+ThesisCMarkAssessor) / 2

Thesis Marks (4/4)

Final Thesis Mark:

FinalMark = 0.2*ThesisAMark + 0.15*ThesisBMark + 0.65*ThesisCMark

FinalGrade = HD|DN|CR|PS|FL, determined by FinalMark

Late Penalties

- 0 mark for any late deliverables except the final thesis
- 5 marks deducted for every day late for the final thesis until your thesis C mark reaches 50

FAQ (1/3)

- Q: How long should X be? (X ∈Chapter,Report,Seminar,Thesis)
  - A: As long as is necessary to make it convincing.
- Q: When is Y due? (Y ∈ Report,Seminar,Thesis)
  - A: Check the thesis course home page.
  - A: Help fellow Thesis A students out through the course forum for any ‘how to’/‘where to’ questions …
- Q: How much time should I spend on my Thesis?
  - A: Notionally, 100 hours per 4UoC - roughly 10 hours a week. But, generally, the more time you spend, the better the outcome

FAQ (2/3)

- Q: What happens if I cannot finish?
  - A: You get lower marks than you would if you finished. (The definition of "finished" is looser for thesis than assignment)
- Q: Can I get an extension?
  - A: As per usual special consideration procedure (myUNSW)
  - A: Extension can be granted if you have special reason(s). You need to show evidence and get the approval of your supervisor first and then the approval of CSE Thesis Coordinator.

FAQ (3/3)

- Q: What must I do to get good marks?
  - A: Depends on who you're asking ...
    - ✓ Supervisor: knows everything you did. May assess based on continuous performance
    - ✓ Assessor: (most likely) sees only Seminar, Demo, Thesis. Likely to assess based on what she/he observes in S/D/T
  - To be safe: ask what they're looking for in a good thesis

Why a Thesis is not an Assignment

- A thesis is significantly different from an assignment:
  - It is, typically, open-ended
    - ✓ There is not an obvious "correct" answer or end-point
    - ✓ You have more say in the direction the work takes
  - It is much more complex and thus poses much more challenges
  - It has a much longer time-frame
    - ✓ You need more self-discipline to get things done
    - ✓ You have more responsibility to plan your progress
- Think about employing popular time management skills/tools

Different Types of Theses

- Theses have been classified into:
  - **RES** carry out a small focused piece of research
  - **DEV** build a software and/or hardware system
  - **R&D** combination of the above two ... build a system, but needs research to get it done
- Expectations for each type are slightly different

Ethics Clearance

- https://research.unsw.edu.au/human-research-ethics-home

- Check with your supervisor early - this takes time.

Doing Thesis A (1/3)

- Thesis A aims for you to demonstrate that ...
  - you have a thorough understanding of the topic
  - you have identified an area that requires work
  - you have an approach for solving the problem
  - you have a plan to demonstrate the likely effectiveness of this approach
  - you have a plan for carrying out the work (including time-frames for tasks)

Doing Thesis A (2/3)

- Specific tasks for Thesis A ...
  - Accumulate a collection of references that
    - ✓ Discuss issues related to the problem being addressed
    - ✓ Describe attempts by others at solving the problem
  - Describe/analyse the problem (aided by references)
  - For DEV theses: produce detailed requirements/spec
  - Establish an evaluation framework; analyse prior work
    - ✓ Consider Ethics Clearance
  - Draw up a plan for work to solve the problem
  - Start work on solving the problem

Doing Thesis A (3/3)

Suggested timetable for Thesis A work:

- Weeks Task
- 1-2 Meet your supervisor, and sort out what your project is
- 3-10 Collect and read relevant literature
- 3-10 Make notes on your reading (build them up gradually)
- 4-5 Prepare seminar presentation (Seminar)
- 4-10 Prepare/revise your method and plan
- 4-10 Write the report
- 10 Report

Start working on your project ASAP

Thesis A Seminar (1/3)

- Typical Seminar Structure
  - Introduction: sell the topic, summarise aims
  - Background: set context, evaluate previous work
  - Proposal/Plan: how do you plan to tackle the problem
  - Bibliography: give references for all work cited
- Seminar = summary of Report, publicity for project, chance to get feedback

Thesis A Seminar (2/3)

- The seminar aims to:
  - give you a chance to practice your presentation skills
  - let you show that you have met the goals of Thesis A
    - ✓ convince others that you're studying an important/interesting problem
    - ✓ demonstrate that you've done some research/thinking about it already
    - ✓ have a plan for the rest of the year to solve the problem
- If you already have some results to show, that's a bonus.
- Target your seminar at fellow thesis students (general audience)
- Target the hard-core technical stuff at your supervisor and assessor.

Thesis A Seminar (3/3)

- 45 minute timeslot is allocated for each presentation:
  - 25 mins talk, 5-10 mins Q+A with audience
  - 10-15 mins debrief with supervisor/assessor
- Take it seriously ... you're being assessed.
- Use max 20 slides; you cannot cover more in 25 mins.
- Pay attention to questions - good source of feedback/ideas
- Attend other people's seminars (recommended).
  - You might get some ideas for your own project
  - They get a chance to present to an audience

Thesis A Report (1/2)

- Typical Thesis A Structure:
  - Introduction: sell the topic, summarise aims (1-2 pages)
  - Background: introduce the background of your project (2-3 pages)
  - Literature survey: summarise the related work (8-10 pages)
  - Proposal/Plan: how do you plan to tackle the problem (with justification based on ideas in Background) (6-8 pages)
  - Bibliography: give references for all work cited (1-2 pages)

Thesis A Report (2/2)

- Extra work for students doing Thesis B and Thesis C in one term
  - Detailed proposal/plan
  - Partial solution and results

Academic Writing Style (1/2)

- Thesis/report both have overall structure:
  - Introduction ... what the thesis is about
  - Main Part ... the details of the work
  - Conclusion ... what the thesis achieved
- Individual chapters should follow a similar structure:
  - Introduction ... what this chapter is about
  - Main Part ... the details of the chapter
  - Summary ... what the chapter achieved
- May sound repetitive but it provides linkage and rationale for the reader.
- Use **the thesis template** provided (LaTeX and Word)

Academic Writing Style (2/2)

- UNSW Student Resources (+ many other university online resources)
- A few common (easy) tips that you can immediately use:
  - Try to be “formal”, “technical”, “impersonal”
    - ✓ Using “I” ?
    - ✓ Don’t, Isn’t ?
    - ✓ “a bit”,“get used in …”?
    - ✓ “wonderful”, “beautiful”, “terrible”, “hopeless”, “useless”, “amazing”, etc.
  - Introduce and define “terms” properly before start using them
  - Introduce acronym properly when first used
    - ✓ e.g., The University of New South Wales (UNSW) is …
  - Use caution: This may cause, vs. I think this must cause, or say ``There is evidence to support that …’’
  - Use Active Voice whenever possible

Doing Literature Review (1/2)

- Goals:
  - Collect a comprehensive set of publications on the topic
  - Build a picture of the nature and scope of the problem
  - Develop a framework for evaluating possible solutions
  - Analyse the specific work described in the publications
- How comprehensive? (a.k.a. how many references?)
  - Until you are convinced that you have all relevant materials
  - Use your judgement when to stop (and **ask supervisor**)

Doing Literature Review (2/2)

- Some tips ...
  - try to identify seminal papers on the topic (ask Supervisor)
  - use bibliographies to find prior work
  - use Citation Index to find subsequent work (e.g. Google Scholar)
  - maintain a database using a bibliography tool (e.g. Mendeley)
  - read and think about the references
  - keep electronic notes; describe in your own words
  - identify common themes, structures and assumptions

Orchestration

have been found and bound
hestrate them to execute their
. Fig. 3 shows the lifecycle of
ution consists of:

stage is to call the bound
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ponse comes asynchronously
create or update the output.
: multiple responses to one
pdate, and the request can be
iders'response.

to evaluate the task's output
by the bound provider. Ac-
agreement, evaluation can be
ıe requester), or automatically
ıe third-party service). Based
and detailed agreement terms,
l or redone.

:d as a set of interdependent
may drive another, based on
e consider the interdependen-
' that can be expressed by an

REFERENCES

[1] D. C. Brabham, "Crowdsourcing as a model for problem solving an introduction and cases," *Convergence: the international journal of research into new media technologies*, vol. 14, no. 1, pp. 75–90, 2008.

[2] M. Vukovic, "Crowdsourcing for enterprises," in *SERVICES 2009 - 5th 2009 World Congress on Services, September 21, 2009 - September 25, 2009*, ser. SERVICES 2009 - 5th 2009 World Congress on Services. Bangalore, India: IEEE Computer Society, 2009, pp. 686–692.

[3] A. Kittur, J. V. Nickerson, M. S. Bernstein, E. M. Gerber, A. Shaw, J. Zimmerman, M. Lease, and J. J. Horton, "The future of crowd work," in *2013 2nd ACM Conference on Computer Supported Cooperative Work, CSCW 2013, February 23, 2013 - February 27, 2013*, ser. Proceedings of the ACM Conference on Computer Supported Cooperative Work, CSCW. San Antonio, TX, United states: Association for Computing Machinery, 2013, pp. 1301–1317.

[4] M. P. Papazoglou, P. Traverso, S. Dustdar, and F. Leymann, "Service-oriented computing: state of the art and research challenges," *Computer*, vol. 40, no. 11, pp. 38–45, 2007.

[5] A. Kittur, B. Smus, S. Khamkar, and R. E. Kraut, "Crowdforge: Crowdsourcing complex work," in *24th Annual ACM Symposium on User Interface Software and Technology, UIST'11, October 16, 2011 - October 19, 2011*, ser. UIST'11 - Proceedings of the 24th Annual ACM Symposium on User Interface Software and Technology. Santa Barbara, CA, United states: Association for Computing Machinery, 2011, pp. 43–52.

[6] A. Kulkarni, M. Can, and B. Hartmann, "Collaboratively crowdsourcing workflows with turkomatic," in *ACM 2012 Conference on Computer Supported Cooperative Work, CSCW'12, February 11, 2012 - February 15, 2012*, ser. Proceedings of the ACM Conference on Computer Supported Cooperative Work, CSCW. Seattle, WA, United states: Association for Computing Machinery, 2012, pp. 1003–1012.

Using References (1/2)

- What you should NOT do with references:
  - copy/paste chunks of text from them into your report
  - if you do this, it's plagiarism and you fail
- Every statement in your thesis which is based on others' work
  - must be attributed to them (via a reference)
  - even if you make the statement entirely in your own words
  - but especially if you are "quoting" them (minimise this)

Using References (2/2)

M-trees do not assist Z queries. Even if the Z queries conform to the normal pattern of querying expected in this context, the algorithmic complexity is still too high

- Examples of acceptable use of others' material:
  - and Smith [8] noted "M-trees do not assist Z queries".
  - and (Smith, 1998) noted "M-trees do not assist Z queries".
  - ... and as was pointed out by Smith [8]:

The Bibliography (1/3)

- The bibliography
  - consists of a list of all of references used in the report
  - with **enough detail** that a reader could find each reference
- It should **not be** simply a list of URLs.
- For each reference, there must be:
  - an author, a title, a date
  - information to identify publication source
- BibTeX has well-defined styles for different kinds of references.

The Bibliography (2/3)

Example: BibTeX and reference for a journal article:

```
@Article{ dapd2004,
title    = {Query Size Estimation for Joins
            using Systematic Sampling},
author   = {Anne Ngu and Banchong Harangsri
            and John Shepherd},
journal  = {Distributed and Parallel Databases:
            An International Journal},
year     = {2004},
volume   = {15},
number   = {3},
pages    = {237--275},  }
```

which produces:

Anne Ngu, Banchong Harangsri, and John Shepherd. Query size estimation for joins using systematic sampling. Distributed and Parallel Databases: An International Journal, 15(3):237-275, 2004.

The Bibliography (3/3)

Example: BibTeX and reference for a web page:

```
@misc{ postgresql,
author = "PostgreSQL Global Development Group",
title  = "PostgreSQL: The world's most advanced
          open source database"
howpublished = "http://www.postgresql.org/",
note  = "Accessed: 7 March 2008", }
```

which produces:

PostgreSQL Global Development Group. PostgreSQL: The world's most advanced open source database. http://www.postgresql.org/. Accessed: 7 March 2008.

Last Words

- Use Thesis Course Web Site
- Start as soon as possible
- Contact your supervisor ASAP
- Successful Thesis A —> successful Thesis B —> successful Thesis C
- Be positive and enthusiastic. It’s your thesis.