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TIETS18 Master's Thesis Seminar in Software Development 2015-2016

Zheying Zhang

SIS SCHOOL OF INFORMATION SCIENCES

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Agenda

- General information on the MSc thesis seminar
- Writing an MSc thesis
- Other practical issues in thesis writing
- Evaluating an MSc thesis

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General information

- Participants: SDE program students who will start or are in the thesis writing process
- Instructors: Zheying Zhang
- Seminar sessions: Wednesday afternoons, 14:15–16, from Period I to Period IV
  - Thesis work presentations and discussions, guest talks (if there are any), etc.
  - Classroom: Pinni B2077

- Seminar schedule is updated at: http://www.uta.fi/sis/tie/sdseminar/teaching/2015_2016.html
- Information is shared in Moodle: https://learning2.uta.fi/course/view.php?id=7056, please check for updates regularly

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The credit units

- Credits units: 5 ects
- Grade: Pass/Fail
- Assignments include
  - A short thesis idea presentation (5-10min)
  - A thesis progress presentation (20min),
    - *a written report on thesis progress (including thesis proposal + literature review (10-15 pages)) shall be submitted to Moodle a week before the scheduled presentation*
  - A final thesis presentation (30min)
  - Being an opponent to prepare for the review (1-2 pages) of a thesis progress report and discuss it in the thesis progress presentation (2 reviews/partcipant) -> a guideline for preparing for an MSc thesis review will be given
  - Participation in seminar sessions (>1/2 of total no. of sessions)

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A thesis progress presentation vs. a final thesis presentation

- **A thesis progress presentation shall include**

  - an introduction to the research field;

  - ***tentative questions to be tackled;***

  - ***Knowledge of the topic:***
    - ***Explanation of the key concepts/principles/theory in the thesis work***
    - ***An overview and summary of the literature relevant to the topic***
    - ***A presentation of the most influential articles/books in the topic area; and***

  - *A* brief summary of your progress on the research

- **A thesis presentation shall include**

  - a brief introduction to the research field;

  - the questions to be tackled;

  - importance of the topic;

  - prior research or related research on the topic;

  - approaches to the research (research methods);

  - ***a detailed presentation of your own work (analysis of the questions, solutions, evaluation, etc.) in the research; and***

  - discussion of the results, contributions and limitations

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Planning the seminar sessions

- Autumn
  - Oct. Sessions for thesis idea presentations and final thesis presentations
  - Nov. & Dec. Sessions for thesis idea, progress, and final thesis presentations
- Spring
  - Jan. & Feb. sessions for last chance thesis idea presentations
  - Jan., Feb., Mar., Apr. & May sessions for thesis progress and final presentation
- Schedule your presenations in autumn 2015
  - Possible Wednesdays in autumn: **23/9**, 21/10, 28/10, 4/11, 11/11, 18/11, 25/11, 2/12, 9/12, 16/12
  - Please fill in the planning form in Moodle by 14/10

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What is an MSc thesis

- A compulsory part of studies, typically done in the 2nd study year in the MSc degree programme
- Not a work report
- In principle the expectation is that the student studies some new area (methodology / theory / technology)
  - No scientific new results are expected from an MSc thesis –and you should not demand them from yourself, either.
- The length should be between 50-70 pages
  - These are not hard limits, but discuss with your supervisor if you feel that the limits do not suit you

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Info page of thesis in computer sciences

- Thesis info page: http://www.uta.fi/sis/en/tie/studypractices/thesis/index.html
- An MSc thesis guideline (on the university level) will be available later

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Credits modes of MSc thesis

- Option 1
  - Maturity test
  - Thesis, 40 ects
- Option 2
  - The thesis work is divided into four phases/components
  - Each phase, 10 ects
  - The maturity test is in the 4th phase
- The credits modes shall be agreed with your thesis supervisor

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Practical instructions for thesis writers

- Consider the following questions first
  - Have I done the pre-requisite studies?
  - On what subject or field do I want to write my thesis?
  - Am I interested primarily in theory or in practical applications? Do I want to do concrete programming work?
- Identify a thesis topic
  - Define a thesis topic based on your own interests – taking advanced courses that seem interesting or likely your thesis topics
  - Discuss in your working place about a thesis topic. Often a suitable topic can be found.
  - Professor may have some topics for theses – last possibility
- Contacting a possible supervisor
- Write a two or three pages introduction in which problem statement about the topic is include – a thesis proposal to achieve a common understanding about the topic
- Sign on the agreement for MSc thesis supervising (will be updated soon)
- During the work, discuss your work with your supervisor **regularly** (6 months – 12 months)
  - Literature review, planning and writing, iterations
  - MSc thesis seminar
- When you have finished your work, give your manuscript to the supervisor for their final evaluation
- Write maturity test, and submit the thesis for grading

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An MSc thesis shall find convincing answers to the questions

- What is the **PROBLEM** you are trying to solve? Or what is the research **QUESTION** you are trying to answer?
- Why is this problem/question **worth** solving/asking? Who would care?
- How have other people in the past tried to solve/answer it?
- What is your approach to solving/answering this problem? Or what improvement are you making on an existing solution?
- How do you prove that the solution you came up with is a **GOOD** solution?
- How can you demonstrate that your solution works?

Research problems

Importance of the topic

Prior research on the topic

Research approach

Results and evaluation

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What type of questions are you asking?

- Existance
  - Does X exist?
- Description & classification
  - What is X like?
  - What are its properties?
  - How can it be categorized?
  - How can we measure it?
  - What are its components?
- Descriptive-comparative
  - How does X differ from Y?
- Frequency and distribution
  - How often does X occur?
  - What is an average amout of X?
- Descriptive-process
  - How does X normally work?
  - By what process does X happen?
  - What are the steps as X evolves?
- Relationship
  - Are X and Y related?
  - Do occurences of X correllate with occurrences of Y?
- Causality
  - Does X cause Y?
  - Does X prevent Y?
  - What causes X?
  - What effect does X have on Y?
- Causality-comparative
  - Does X cause more Y than does Z?
  - Is X better at preventing Y than is Z?
  - Does X cause more Y than does Z under one condition but not others?
- Design
  - What is an effective way to achieve X?
  - How can we improve X?

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Type of results we are expecting

Shaw M (2003) Writing Good Software Engineering Research Papers, in Proceedings of the 25th International Conference on Software Engineering, IEEE Computer Society, 2003, pp. 726-736.

- Procedure or technique
  - New or better way to do some task, such as design, implementation, maintenance, measurement, evaluation, selection from alternatives; includes techniques for implementation, representation, management, and analysis; a technique should be operational—not advice or guidelines, but a procedure
- Qualitative or descriptive model
  - Structure or taxonomy for a problem area; architectural style, framework, or design pattern; non-formal domain analysis, well-grounded checklists, well-argued informal generalizations, guidance for integrating other results, well-organized interesting observations
- Empirical model
  - Empirical predictive model based on observed data
- Analytic model
  - Structural model that permits formal analysis or automatic manipulation
- Tool or notation
  - Implemented tool that embodies a technique; formal language to support a technique or model (should have a calculus, semantics, or other basis for computing or doing inference)
- Specific solution, prototype, answer, or judgment
  - Solution to application problem that shows application of SE principles – may be design, prototype, or full implementation; careful analysis of a system or its development, result of a specific analysis, evaluation, or comparison
- Report
  - Interesting observations, rules of thumb, but not sufficiently general or systematic to rise to the level of a descriptive model

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General working habits

- Write using your own words
  - No copy-paste even in the early phase of your work
  - Add quotation marks and source to the copied text
  - Write with your own words
- Start building the reference list from the beginning of your work
  - URL is never enough! Write down all possible information
  - Make an annotated bibliography, i.e. keywords, summaries
- Mark the used source immediately when writing a text based on the source
  - Mark the sources where you used them, not always in the end of a paragraph

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Finding References

- Find theses from the uta thesis database at: http://tampub.uta.fi/
- Several search engines exist for scientific papers
  - IEEE Xplore consists IEEE's journals, conference proceedings and magazines.
  - ACM Digital Library - the guide to computing literature has ACM's publications.
  - Springerlink publishes books, journals, etc.
  - CiteSeerX is a Scientific Literature Digital Library that also lists how scientific papers refer to each others.
  - Google Scholar is a nice search engine for scientific information (bibtex entries available).
- White papers from corporate are generally considered as marketing

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Templates and tools

- If possible, use a template from the beginning of the writing
  - Practical instructions for thesis writers, http://www.uta.fi/sis/en/cs/thesis/index/thesis.rtf
  - You see possible problems early enough
  - You see how long you still need to write/how much you still have room for your text

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Other tips

- Writing is a personal thing
  - If you got stuck, write some other part of the work or draw a picture and explain it.
  - You can start from the middle, not from the beginning, it is usually easier.
  - Try to divide your work to smaller pieces.
- Plan the timetable well
  - Make a writing plan: your outline with how many pages each chapter will contain and when you write that chapter.
  - Take into account other things that affect your writing, e.g. courses and their deadlines, your supervisor's holidays etc.
  - Take into account the iterations, revision, etc.

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Turnitin

- The use of Turnitin to check the originality of all MSc thesis: Dec 31, 2015
- Info sessions for students and teachers have been given
- Information and instructions are available on the University's Academic Ethics website
  - http://www.uta.fi/studies/studying/practices/ethics/index.html
  - It is allowed to submit only one's own text to the Turnitin system
  - The Turnitin report must be interpreted
  - Contact your thesis supervisor on practically using Turnitin

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”The best thesis is a finished thesis!”

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  - http://www.uta.fi/sis/en/tie/studypractices/thesis/index/pro_gradu_arviointi_2012_tietojenk%C3%A4sittelytiede_EN.pdf

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