What Does it Take to Succeed with Your Master Thesis

Dr. Peep Küngas
Institute of Computer Science
University of Tartu
Aim of the Seminar

• Help students to deliver a high-quality Masters thesis on time
Topic Selection

• The thesis must entail either
  – a solution either to an advanced engineering problem at the time of writing a thesis
  – or an answer to a novel research question
• Should demonstrate your professional qualities and mastery in the field
Difficulty of Topics

• Weak topics
  – Sharepoint: An Overview
  – Using Drupal for a Web Site of Online Chess Competitions
  – Introduction to Android Operating System

• What about these instead?
  – Comparative study of Open Source Content Management Systems with Respect to Compliance to Best Practices of W3C Linked Data Platform 1.0
  – Performance Optimization and Memory Footprint Reduction of Android Rich Inter-Application Message Passing System
Deliverables

EXPECTATIONS
Deadlines

• **30 September** - deadline for identifying title, supervisor and presentation time slot
• **14 October** - deadline for a 2-page problem statement
• **31 October** - deadline for a draft thesis
Deliverable 1

• 2-page problem statement containing the following:
  – Short overview
  – Main research question
  – More specific research questions
  – Objectives
  – The initial plan for the Masters project
Deliverable 2

• A thesis draft containing
  – Structure (placeholders for relevant sections/chapters)
  – Title page
  – Table of contents
  – Abstract
  – Introduction
  – Literature study on state of the art

• The deliverable should reflect that about 80 hours have been spent in its preparation
Getting started

PRACTICAL HINTS
Objectives vs Research Questions

- **Main Research Question**
  - How is and should enterprise modeling be performed when the main purpose of modeling is to support human sense-making and communication?

- **Partial Research Questions**
  - **RQ1**: What are the purposes of developing and using enterprise models, and how are enterprise models actually used?
  - **RQ2**: What activities are most important in an enterprise modeling process?
  - **RQ3**: What are the most important properties of enterprise models, i.e., the artifacts or manifestations of the modeling process?

- **Research Objectives**
  - **RO1**: Based on empirical studies of real enterprise modeling projects, formulate a set of assertions concerning enterprise modeling practice when the purpose of modeling is human sense-making and communication.
  - **RO2**: Develop a methodological framework based on the above-mentioned assertions to guide practitioners in their enterprise modeling efforts.

From [http://www.idi.ntnu.no/grupper/su/publ/html/totland/ch012.htm](http://www.idi.ntnu.no/grupper/su/publ/html/totland/ch012.htm)
Introduction (Layout)

- Current trends/technology landscape / terminology
- General problems and solutions
- Specific problems and solutions
- Niche problem (unsolved)
- Solution approach
- Results (including validation results)
- Thesis structure
Introduction (Content)

- Typically 4-7 pages
- The introduction should define the problem clearly and give sufficient background for the following chapters
  - What is the purpose of the research? Main research questions?
  - What is the scope? Indicate explicitly all limitations and restricting assumptions!
  - Why the topic is important or interesting?
  - What methods are used?
  - Briefly references to related research (just the main references – more references in chapter ”Related research” or throughout the thesis)
  - Emphasize your own contribution: what is original or new?

A Bit Fun

Background vs Related Work

• Related work – similar approaches to solve the similar research question or solutions to a similar problem
• Background – the framework your solution will be build upon – the formalisms, components, key concepts etc
Literature Study

- Scholar.google.com (article texts + citations + citation counts)
- DBLP (coauthors, exporting citations)
- Articles (see references, access through utlib)
Learn from the best

EXAMPLES
Probabilistic Localization of a Soccer Robot

- Author: Priit Kallas
- Type: Algorithm application

Strengths
- Application of complex algorithms for solving a practical problem
- Evaluation through simulations and in practical settings

Weaknesses
- Structure
- No explicit statement of a research question / engineering problem
Role-Based Enterprise Mashups with State Sharing, Preservation and Restoration Support for Multi-Instance Executions

• Author: Liisi Haav
• Type: Software technology
• Strengths
  – Well-structured thesis + introduction
  – Incremental extension and combination of existing frameworks
  – Proof-of-concept implementation
• Weaknesses
  – Research question not explicit
  – Too many contributions
  – No case study
Insecurity of Transformation-Based Privacy-Preserving Linear Programming

- Author: Alisa Pankova
- Type: Applied mathematics
- Strengths
  - A good review of the technical background and state of the art
  - Systematic approach
  - Challenging research question
- Weaknesses
  - Research question not explicit
Model-Driven Role-Based Access Control for Databases

- **Author**: Henri Lakk
- **Type**: Software engineering
- **Strengths**
  - Challenging research questions
  - Results published in form of articles
  - Case study
- **Weaknesses**
  - Structure – instead of a monograph a collection of articles is presented
  - Lost focus – each article has its own focus
Discovery and Push Notification Mechanisms for Mobile Cloud Services

• Author: Carlos Paniagua
• Type: Platform development
• Strengths
  – Well-structured
  – Non-trivial engineering solution implemented
  – Performance evaluation conducted
• Weaknesses
  – Description of the architecture
Lightning Fast Business Process Simulator

• Author: Madis Abel
• Type: Application development
• Strengths
  – Solution available online and in practical use
  – Performance comparison
• Weaknesses
  – Structure
  – Description of the architecture
A Pattern-Based Development of Secure Business Processes

• Author: Naiad Hossain Khan
• Type: Information system design

• Strengths
  – Explicit research questions (see Ch 1.3) and research method description
  – 2 case studies for validation of the developed

• Weaknesses
  – Usability evaluation
https://courses.cs.ut.ee/2013/enterprise/fall

THANK YOU