



Linnéuniversitetet
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Master Thesis Project

Title of your thesis project
- *Optional subtitle*



Author: Your name here
Supervisor: AA
Examiner: . XX
Reader: YY
Semester: VT/HT 20X
Course Code: ZZ
Subject: Computer Science

Abstract

The report shall begin with a summary, called abstract. The abstract shall not be longer than a paragraph, and is not divided into more than one piece. It shall contain:

- A short background description to the area of your project
- A description of your research problem
- A motivation why this problem is interesting to investigate
- What you have done to answer the problem
- A short summary of your results

From reading the abstract the reader should clearly understand what the report is all about. The purpose of the abstract is to make the reader interested in continue reading the report, if it covers something that the reader wants to know more about.

Preface

You can have a preface in the report if you want, but it is not necessary. In this you can write more personal reflections on your thesis project. In the preface you can also take the opportunity to thank the people who have been particularly helpful during the report writing, for example if you had any contact with a company that helped with the project, people that guided or helped you during the project, or your family and friends that supported you during the project. The preface shall not be longer than half a page.

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1 Introduction

In this chapter you shall give an introduction to your thesis project. It shall start with a broad overview of what your project is all about. Similar to the abstract, the introduction shall make the reader interested in continue reading your report. Don't be too detailed here; there are plenty of opportunities to add details in later chapters.

1.1 Background

After you have described your project, you shall continue with writing a background to the area your project is in. Here you describe theories necessary to understand your project and explain terms you will use in the report.

Example: if you do a project that is about evaluating software architectures, you describe what a software architecture is, why it is important to design an architecture that suits a specific software system, methods for evaluating and comparing different architectures, etc.

1.2 Motivations

Then you briefly describe what others have done in the field or how others have attempted to explain or solve the same or similar problem as you are investigating. You should refer to the published scientific articles in the field. To find related articles, use the search tools listed [here](#).

Afterwards, you motivate why your research problem is interesting for science, society or industry. You can re-use the motivation part from your project plan.

1.3 Problem Statement

Here you give a detailed description of the research problem you intend to investigate. You can re-use the problem formulation from your project plan. You can read more about research problems [here](#).

Your research problem is broken down into one or more research questions (RQ). RQs state exactly what you want to investigate in your thesis project. You have already defined research questions in your project plan. Copy and paste them here, if they have not changed. It is often difficult to foresee everything that can occur when writing the project plan.

RQ1	Research question 1 ...
RQ2	Research question 2 ...

1.4 This Thesis Report

In this section, you should briefly describe your solution to answer the research questions. What was your method to solve the research problems? Which steps/sub-tasks did you take? What results did you obtain? How your results are compared to others? You should also, point to limitations of your project, e.g. you only compared some frameworks of all frameworks available on the market, or you only suggested an architecture for a specific software product and not a general architecture, or that you only included university students in a study and not a broader population sample etc.

1.5 Contributions

In this section discuss contributions and novelty of your thesis project compared to the other existing works.

1.6 Target groups

Here you outline the target groups that might be interested in your thesis. If you, for example, do a project about software architectures, a target group can be professional developers and architects that work with similar software systems as the system you investigated.

1.7 Report Structure

Here you outline the rest of the report. It shall contain which chapters that will follow, and what each of them is about.

2 Background

In this chapter you should classify and review the existing research. This is the extended version of Background section in Introduction.

3 Method

In this chapter you shall describe the scientific approach that will be used to answer your research problem.

3.1 Scientific approach

Here you define which formal research method(s) used to answer your research question(s). Research methods are divided into quantitative and qualitative methods. Quantitative methods result in numerical data, and qualitative in non-numerical data. You can read about different research methods [here](#).

3.2 Method description

In this section, you will describe the method and strategy used to answer the research questions. You should describe each step of the method and discuss which research method(s) are used to answer your research question(s), you shall continue by describing how the research methods will be applied in your project. If you for example shall conduct an experiment you describe your *independent* and *dependent* variables, how many times the experiment will be repeated, which software tools that will be used to run the experiment, etc. If you for example shall conduct a survey you describe how participants will be selected, how the questionnaire will be designed, how it shall be distributed to the participants, how data will be analyzed, etc.

3.3 Reliability and Validity

Here you discuss the reliability and validity of your project. You can read about reliability [here](#) and about validity [here](#). Discuss if you have any reliability issues or validity threats in your project here.

3.4 Ethical considerations

You are required to discuss any ethical considerations (if any) in your project. If you do an experiment you will most likely not have any ethical considerations, but in a survey ethical considerations can for example be how you make sure that the privacy of the people participating in the study is not violated (by for example removing names from the gathered data).

4 Implementation

It is common that you will develop something in your project. It can be a mobile app, a stand-alone application, a website, a game, etc. In this chapter you describe the software you have implemented.

In some projects you don't develop anything, for example if you do a systematic literature review. In this case you remove this chapter.

5 Evaluation

In this chapter you show and describe your results. Try to be as objective as possible. An example of results from an experiment comparing five sorting algorithms is shown in Table 4.1 below.

Run	Bubble	Quick	Selection	Insertion	Merge
1	17384	24	3258	3	30
2	17559	21	3386	3	27
3	17795	19	3344	4	28
4	17484	20	3417	3	28
5	17642	19	3358	3	30
Average	17572.8	20.6	3352.6	3.2	28.6

Table 5.1: Execution times for the five sorting algorithms on 100 000 random numbers between 0 and 10 000.

What you show heavily depends on the type of research and what type of data you collect. Numerical data can for example be shown in both tables and graphs. A complementary graph for the sorting algorithms example is shown in Figure 5.1. For a questionnaire you can show the frequency (how many participants that selected the same answer) of each possible answer to a question.

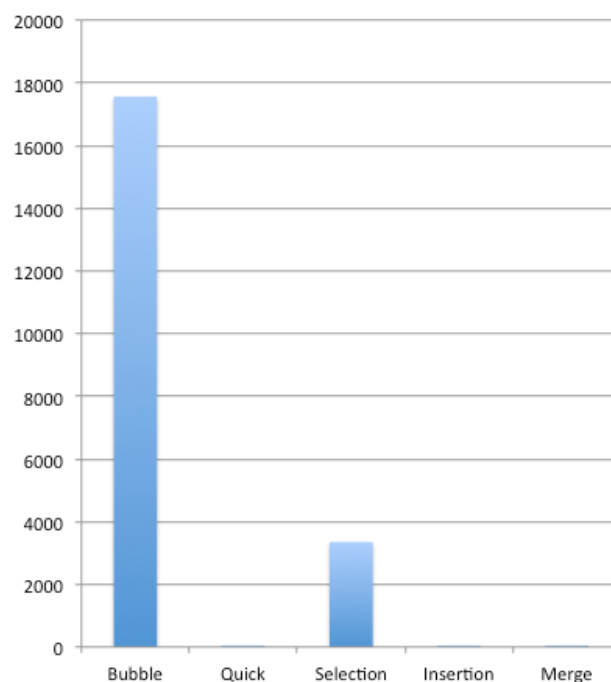


Figure 5.1: Execution times for the five sorting algorithms shown as a graph.

Note that Tables and Figures shall be labeled with chapter.number, for example Table 4.1 and Figure 1.6.

Then you should analyze the results. What conclusions can you draw from the results? Note that you cannot draw any conclusions that are not supported by your

results. Consider using statistical tests to back up your claims. You can read about statistical testing [here](#).

Afterwards, you discuss your findings and if your research question(s) have been answered. Think of research as a feedback loop. You define a problem, find a method of approaching it, execute the research and gather data. The data is then used to answer your research problem, thus creating the loop. You shall also discuss how your findings relate to what other researchers have done in the area. Are your results similar to the findings in the related research you described in the Previous Research section? This chapter is typically written in the present tense, while the previous chapters typically are written in past tense.

6 Conclusions and Future Work

In this chapter you end your report with a conclusion of your findings. What have you shown in your project? Are your results relevant for science, industry or society? How general are your results (i.e. can they be applied to other areas/problems as well)? Also discuss if anything in your project could have been done differently to possibly get better results. This part is written in the past tense.

Future Work You cannot do everything within the limited scope of a thesis project. Here you discuss what you would do if you had continued working on your research project. Are there any open questions that you discovered during the project work that you didn't have time to investigate? How can you extend your work?

Here you shall include a list of all references used in your report. The reference list shall use the IEEE format. You can read about IEEE referencing [here](#). In the reference list below you can find examples of how to list a webpage [1][2], a journal article [3], a book [4] and a conference proceeding (article) [5].

References

- [1] Linnaeus University. (2015) Course Room for Degree Projects. [Online]. Available: <https://mymoodle.lnu.se/course/view.php?id=5297#section-4>
- [2] Monash University. (2015, Oct. 13) Citing and referencing: IEEE. [Online]. Available: <http://guides.lib.monash.edu/citing-referencing/ieee>
- [3] C. Lynch, “Big data: How do your data grow?” *Nature*, vol. 455, pp. 28–29, 2008.
- [4] S. Russell and P. Norvig, *Artificial Intelligence: A Modern Approach*, 3rd ed. Prentice Hall, 2010.
- [5] D. Agrawal, S. Das, and A. E. Abbadi, “Big data and cloud computing: current state and future opportunities,” in *Proceedings of the 14th International Conference on Extending Database Technology*, 2011, pp. 530–533.

A Appendix 1

In the appendix you can put details that does not fit into the main report. Examples are source code, long tables with raw data and questionnaires.