

# Master Thesis at Department of Electronics Systems

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## 1 Introduction

This document serves as a supplement to KTH's requirements for a Masters thesis project. It is intended to provide information to the student, the examiner, the industrial supervisor and the administrator.

## 2 Formal Procedures

The overall flow of the project with the respective responsibilities is illustrated in figure 1. The following steps have to be done.

1. Find a suitable thesis project either in the department, somewhere else at KTH, at a company in Sweden or abroad, at an academic or a research organization in Sweden or abroad;
2. Find a Supervisor and an Examiner at the Department. The supervisor and examiner may or may not be the same person. If the project is carried out outside the department, a local supervisor and contact person is required. Give to the local supervisor a copy of this guide. If the project is carried out outside the department, the examiner has to give his/her explicit consent.

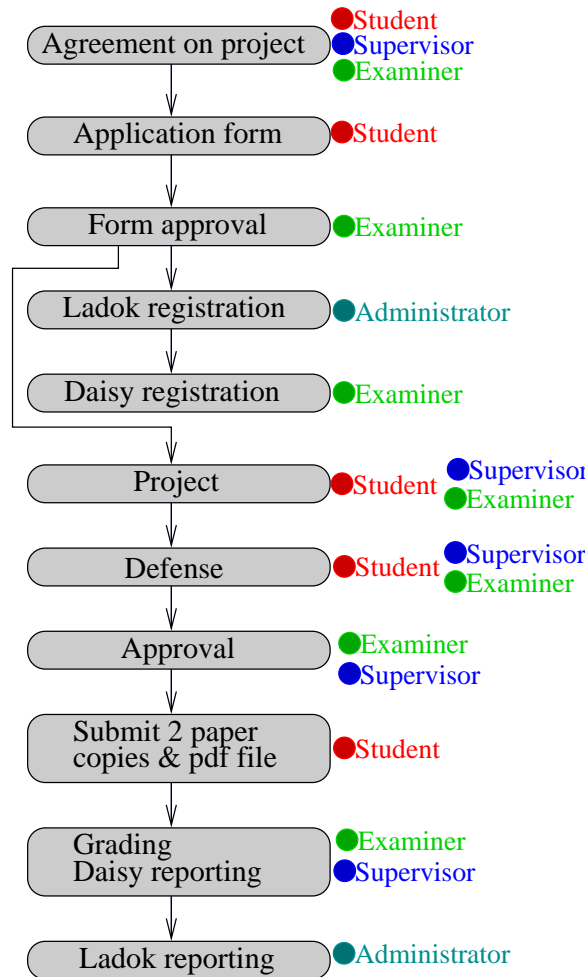


Figure 1: The project flow.

3. Apply for the degree project course by filling in this form:  
[http://www.kth.se/polopoly\\_fs/1.10933!Degree%20Project%20090423.pdf](http://www.kth.se/polopoly_fs/1.10933!Degree%20Project%20090423.pdf) and hand it over to your supervisor. The course code for SoC Design students is IL222X. Registration has to be done before the start of the project.
4. The supervisor registers the project in Daisy and hands over the form to the Ladok administrator.
5. Before, or at the very beginning of the project, the student writes a project plan that includes **Background, Project Description, Main Results, Deliverables, Project Risks** and **Time Schedule**. The project plan is typically 3-10 pages long. Supervisors and examiner have to agree on that plan.
6. During the project, the student writes a status report *once a month*. The status report includes the sections **Work Progress Since Last Report, Deviations from Project Plan, Project Risks** and **Updated Time Schedule**. The status report is submitted to the supervisors and the examiner per email as a pdf file.
7. For the final report, the student has to request a report number (publication number), and in-

structions for the cover page from the administrator.

8. Based on the submitted report the examiner allows the student to present the thesis in a public presentation.
9. The student finds an opponent for the presentation (use exjobbsinfo@imit.kth.se to find one).
10. The student sends title, abstract, opponent name to the examiner and supervisors, who make a public announcement for the presentation.
11. After the presentation, the thesis is approved by the examiner, possibly after one or more iterations.
12. The student delivers two paper copies with the final cover page to the administrator and sends one pdf complete file of the thesis to the supervisors and examiner.
13. The student submits the report from his/her opposition to the examiner.
14. The examiner grades the thesis project and registers it in Daisy.
15. The administrator reports it in Ladok.

### **3 What the Student Proves**

The student should

- be able to apply relevant knowledge and skills, within the main area, to a given problem
- within given constraints, even with limited information, independently analyze and discuss complex inquiries/problems and handle larger problems on the advanced level within the main area
- reflect on, evaluate and critically assess ones own and others scientific results
- be able to document and present ones work with strict requirements on structure, format, and language usage
- be able to identify ones need for further knowledge and continuously develop one's own knowledge

### **4 The Project**

- Regular meetings with the supervisor is recommended.
- A literature study should be carried out to get started
- Try to attend 1-2 thesis seminars before your own presentation/opposition.
- Try to find a thesis mate to cooperate with for sharing of problems and a source for inspiration and criticism of your report, method etc.
- A good thesis is good enough to be published as a scientific paper, that is, aim for publication! The potential to be published is also a requirement for a top grade.

## 4.1 Project plan

At the beginning the student has to write a project plan that includes

- Project objectives
- Main results and deliverables
- Main tasks
- Time schedule

## 4.2 Progress report

Every four weeks a progress report has to be submitted to the supervisor and examiner. It shall include

- A consecutive progress report number;
- The time period covered by the report;
- Progress made;
- Failures: things that should have been done but could not be accomplished;
- Change of plan, if any;
- Updated time schedule;

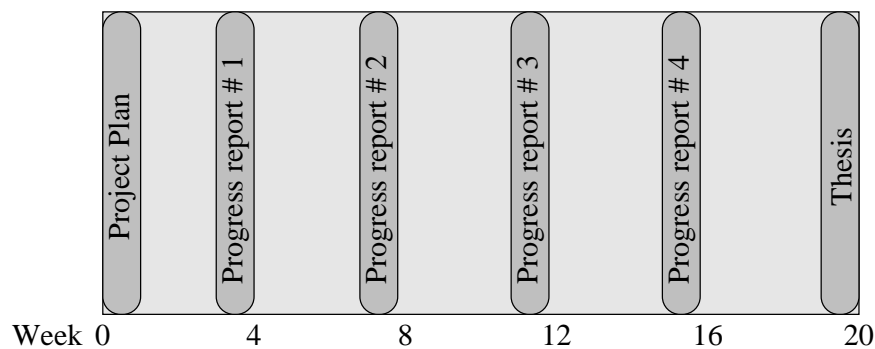


Figure 2: The reports during a project.

Hence, during a typical project with a duration of 20 weeks the following reports are submitted by the student (figure 2):

- Project plan;
- 4 progress reports;
- Final thesis.

## 5 The Report

- The report should be written in English.
- Expert knowledge should not be a pre-requisite to read the report.
- The front-page must be according to the template provided by ICT.
- Browse through other thesis reports from the department to learn the style of writing and to tell apart a poor from a strong report.
- A good report typically comprises the following chapters: **Introduction, Background and Related Work**, one or more chapters describing the project results, **Experiments and Main Results, Summary and Conclusion, References**. Program code, schematics, algorithms and other design artifact and project results can be collected in appendices.
- If the company wants that parts of the report should be confidential then a public report must be written and handed in to the examiner. The formal examination of the thesis work will be based on the public version only!
- We expect the following (public) deliverables
  - 2 paper copies of the final version
  - 1 electronic copy in .pdf format

All the files must be adjusted for double-sided printing, i.e. some blank pages must be inserted to avoid, for instance, chapters starting at even pages etc.

- In the case where two people cooperate and work within the same master's thesis project, it must be clear from the report who has done what, by writing one section which lists very explicitly who has done what in the project and in the report.
- Check the English spelling and grammar. Use the spell checker of your word processor. Ask a fellow student or friend to read the report to correct all language errors.

Do not expect your supervisors and examiner to correct your language! Don't submit a report with poor spelling and grammar because it will simply be rejected and you lose weeks of precious time.
- Do not insert code in running text. Separate it out as a figure or as an appendix. Only relevant pieces of source code should be included in the report.
- A typical report is between 50 and 100 pages in a 11 point font.
- See the thesis as a good lesson in how to write a good documentation. If your work does not have a good documentation it is useless! This is true for all development environments.
- It is quite common that people tend to use non-defined words and concepts. Once you have written your report, try to read it in a way where you try to find explanations for all the concepts, words etc. that you are using. Is it obvious what they mean?

- A picture is much often a better way of explaining things than a long and complicated text. When using pictures or schematics try to simplify them as much as possible. Ask your self whether all parts of the picture really is necessary for describing whatever you what describe. A more complete picture can always be put in appendix.
- Abbreviations is a good way of making a text both easier and sometimes impossible to read. If many abbreviations are used and most of them is defined a hundred pages away you have most probably created something unreadable.
- If you want to use abbreviations - use the abbreviation and what the abbreviation stands for interchangeably. E.g. Use My Abbreviation (MA) interchangeably with just MA.
- A list of abbreviations is always good to have in the beginning of the report. It is also recommended to give references/page number to where in the report the different concepts behind the abbreviations are explained.
- If you decide to base your text, e.g. the theory section on somebody else's work this must be mentioned! Be very careful in referencing and citing somebody else's work correctly. When you take a concept, and idea, a way to present something from somewhere else, cite it properly. Never copy a text or a figure literally! You can quote one or two sentences literally but then it must be clear that it is a quote.
- References must be used at all places where something is stated and you don't prove it. References are also inserted when they might help the reader in finding more information regarding the current topic.
- As a good rule of thumb you should never have more than three levels of headline hierarchy.
- The two most common weaknesses of a report is the transition between the theory section and the section where your work is described together with the implementation part of the thesis.
- The most common way of describing an implementation is to draw a box (the component) and then list all the signals and their usage without putting them in a bigger context.
- When describing a program, in running text, to have the name of signals, variables etc. in courier looks good.
- Long sentences with many subordinate clauses (bisatser) might be impressive in a novel. In a report they only make the text unreadable...
- Examples of different concepts are (almost) always good. Give a few illustrative examples of how your algorithm, model, implementation, etc. behaves in different situations. An example is often easy to grasp, whereas ten pages of pages where the behavior is described might not...
- A subtle way to make your report hard to read is to change tense within a sentence or section of the text. It is very common to find that the idea was, both, thought to be implemented, will be implemented, is implemented and has been implemented in the same section of the text.
- Since the List of Figures and the List of Tables only serves the purpose of making your thesis look thicker I suggest you put them in the end...;)
- Be consistent!

- Be careful what to distinguish the logical description of a system and the physical implementation, i.e. to explain how a system is supposed to work, it might not be useful/necessary to mention that a particular part of a logical block is physically spread out over ten circuit-boards.
- Put your work in perspective, the description of a microprocessor as such is pretty boring. If you tell where, and how, it is supposed to be/work it is still boring but at least, now, the reader knows the set-up!

## 6 The Presentation

- 25-30 min. of presentation.
- 15-20 min. of opposition.
- 10 min. of questions from the audience.
- The presentation should be held in English.
- The opponent always start asking questions before the audience.
- In general one third of the presentation should be background, one third the problem and the remaining third the solution.
- A good presentation is good advertisement for you as a person. Think of that someone in the audience might be the one offering/denying you a job in the future!
- 18p is minimum font size for slides;
- Less is more, e.g. max five bullets per slide; 1-3 min. per slide;
- No complete sentences on the slides !!! Just keywords, figures and diagrams; The slides provide information in addition to what you talk. Don't read out the slides.
- Point to the slides, don't speak to them! Face the audience when speaking.
- Keep it simple for a broad audience;
- There should be a focus on 2-3 key issues in the presentation. Not everything in the report has to be covered in the presentation.
- Never use abbreviations in spoken language during your presentation!
- Explain things as simple as possible - but not simpler!
- What you chose to present is not necessary what you have spent most time on. Focus on what is interesting for the audience not on what you have struggled with hardest.
- What do you want the audience to learn from your presentation?

## 7 The Opposition

- Read the thesis report critically. A very important skill is to be able to read another person's work critically, assess its quality and provide constructive feed-back. 15-20 min.
- Prepare 4-5 questions to be asked during the opposition.
- Prepare a 2-3 page document assessing the thesis, pointing out short comings and mistakes and suggesting improvements. This is sent to the examiner.
- Mark all errors you find in the thesis and make suggestions what to improve. Give the marked report to the defendant.
- When reading, try to find answers to the following questions:
  - Is it understandable for you?
  - Does it provide all the information you need as non-expert reader to understand the thesis?
  - Is the problem well stated?
  - Is it well motivated?
  - Have you problems to understand the relevance of the problem?
  - Does the work method become clear by the structure and the content of the thesis?
  - Does it become clear what has been done to address the problem?
  - Is there a logic in the work method, is each step and activity motivated by the final problem?
  - Has the problem, as stated in the beginning, been addressed successfully?
  - Is the solution good and convincing?
  - Is it complete?

If any of these issues do not become clear to you, prepare and formulate questions to clarify them. You ask these prepared questions after the presentation. You may also ask spontaneous questions and involve the respondent in a dialog.

## 8 Grading

The basis for the grade comprises three components:

- Process: How do you organize and conduct the project
- Technical content
- Presentation: Status reports, presentation, final report

Each of these three components weigh equally. To pass the thesis you have to pass each and every of these criteria.

In order to obtain grade A you have to be good or excellent in all three criteria and your work must have a significant research content. A piece of engineering work, even if done very well, does not qualify for an A or B if the research content is missing.

Under the process criteria falls also, how well you can plan and organize your work, if you are able to search for and obtain the missing knowledge needed to complete your task.

A detailed description of criteria can be found in the KTH handbook:

<http://www.kth.se/info/kth-handboken/II/15/Bilaga%20A.html>

If the project is done outside KTH, the hosting supervisor is expected to send a report about the students performance to the examiner at the end of the project. This report should elaborate on all three aspects, i.e. the technical content, the conduct of the project and the presentation skills of the student. For each aspect the quality should be indicated according to the following scale: *excellent, good, sufficient, insufficient*.