How to Write a Proposal for a Master Thesis Project in Computing Science

This document describes the purpose and content of proposals for master thesis projects in Computing Science. Since it is the content of the document that is important, no specific form is required. This does *not* imply that the document may be written without care. In fact, whether or not you manage to turn the content into a reasonable form indicates whether you are mature enough for a master thesis project.

As a student, you usually choose your master thesis topic based on some kind of description provided by a company (*external projects*) or a researcher at the Department of Computing Science (*internal projects*). These descriptions are usually a good basis for the proposal, but are not sufficient in their own. This is particularly true for external projects, because companies are usually interested in some kind of practical work to be done, whereas your interest should be to show that you deserve the title *Master of Science in Computing Science* – and this includes much more than "just" making an implementation of a fancy system.

So, what is it you are supposed to demonstrate? To receive the *pass* grade, your work on the project, including the thesis itself, the presentation, and the opposition, must

- reveal considerably deepened knowledge in at least one area of Computing Science, and your ability to
- identify and formulate complex problems showing a scientific attitude characterized by a critical, independent, and creative way of thinking,
- make adequate plans and execute them to solve problems of substantial complexity within a given time and resource frame,
- contribute to the development of knowledge by taking part in research or development projects,
- both orally and in writing present and discuss your work and its conclusions in a clear and convincing manner, using the English language as a medium,
- in a critical and systematic way combine knowledge acquired during your master education in order to seek, analyse, synthesize and critically assess scientific literature that is of relevance for a given problem,
- systematically and critically review your own and other's work with respect to relevant scientific, social, and ethical aspects.

Your master thesis project and its outcome are, thus, the "crowning event" of your education. Naturally, this means that you should fulfil all other degree requirements before embarking on your master thesis project. While there are cases in which small deviations from this general rule are well motivated, no major departures from it will be accepted. For this reason, *we want you to hand in a Ladok printout of your completed courses* together with the specification of our project.

In order to be acceptable, the proposal must, of course, specify the goals of the project and who is going to work on it (your name, study programme, and personal number). However, it is at least as important that the proposal provides enough information for the programme coordinator to be able to assess whether your own prerequisites, in combination with the requirements imposed by the project, will probably result in a successful thesis. Here, successful means that it demonstrates the abilities listed above. Therefore, you should have an

eye on the list when describing the requirements and circumstances of the project and your own background in the field. You can start by answering the following questions, and add further information to the extent you consider useful:

- Is the project an external or internal one (see above)? What is its background?
- What are the goals and methods? Possible examples include literature studies, simulations, systems development, evaluation, and so forth. Especially if the project is ambitious and embedded in a larger context, *you should explicitly mention what is the minimal outcome for the work to be considered successful.*
- Which ones of the advanced courses that you have taken (and passed!) is the work based upon, and in which way? (It is, of course, OK to mention even relations to courses at the basic level. However, in view of the list above, the advanced ones are of special importance, because they define the ground on which you are supposed to stand and relative to which your thesis will be evaluated.)
- What are the necessary resources and are they available? (Think of, e.g., external supervisor, work place, literature, data, soft- and hardware, people to interview, etc.)
- Will any part of the results of your work be confidential? (This may be the case if you are thinking about an external project.)
- Most importantly, how are you going to make sure that your work shows the required scientific depth? A rather safe way to achieve this is the inclusion of a dedicated in-depth study of a question or theory important to the practical goals of the project. If you choose this possibility, make sure that the in-depth study plays a meaningful role within the project as a whole (and describe how!).

Note that the specification does not need to be a long document. In most cases, 2–3 pages will be sufficient. In most cases, you will already be in contact with a possible supervisor (namely the one who proposed the topic). In this case, it is advisable to formulate the proposal with him/her. The following steps are:

1. Contact your programme coordinator (currently Frank Drewes for the Master Programme in Computing Science) when you have a decent specification.
2. Once the proposal has been approved, suitable supervisors are assigned (an internal one in all cases, together with an external one if the project is an external project), and you are registered on the master thesis course. Currently, this is the duty of the course responsible Jerry Eriksson.
3. You prepare a project plan together with your supervisor(s).
4. You start working on your actual project according to the plan.

Note that your project plan is not a static document. Most plans will have to be adjusted to some extent during the running time of the project. The goal is not to adhere to a plan that does not work, but to use it as a meaningful document that is revised in a well-motivated and transparent way if necessary. To be able to assess the way in which you follow and update the plan (see the third item in the initial list of demonstrated abilities), we want you to set up a project diary. (In most cases, one that is accessible via the Internet is most appropriate.) This diary should be updated at least once every week and has to be handed in when your thesis is finished, possibly in the form of a web link. It should document

- what you have been working on,
- what are the lessons learned (both positive and negative ones),
- how well your progress corresponds to the plan and, if necessary, how the plan is adjusted (in agreement with your supervisors and possibly other involved people),
- (the results of) important meetings that have taken place.