

# Informal description of the PhD defense procedure at the Embedded Systems research environment at Mälardalen University\*

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The PhD thesis can be either a monography or a collection of published papers with an introduction explaining the overall research challenge and how the pieces fit together.

## The PhD defense procedure

The defense process includes two phases – prior to the defense and the defense.

### Prior to the defense:

1. The candidate proposes the thesis. An internal reviewer from Mälardalen University reviews the proposal and gives recommendations for improvements. The proposal is presented around one year before the defense.
2. A preliminary review of the thesis is done, typically by the same person who reviewed the proposal, resulting in either recommending or advising against submission of the thesis.
3. Latest 8 weeks before the defense the faculty examiner (opponent) and the examining committee are selected. The examining committee consists of 3 (or 5) participants, excluding the faculty examiner.
4. Around 5 weeks before the defense, the members of the examining committee get the official invitation for the defense. At this point, a pdf version of the thesis should be available to the committee and the faculty examiner. If a member has major objections and thinks that the thesis is not acceptable or ready for the defense, she/he should state this and provide the arguments why it is so. In that case the defense will be postponed or canceled if necessary. Otherwise the member should just confirm their participation. Smaller issues or unclear things are supposed to be discussed during the defense.
5. The thesis in its final form should be available 3 weeks before the defense. Please note that at this point the thesis is final and it is not supposed to be changed after the defense. A printed copy of the thesis will be sent to the committee as soon as it is available.

### The defense:

The defense is open to public. Usually colleagues, other researchers, students, but also some friends and relatives to the student are in the audience. The main advisor conducts the defense.

For a PhD defense, the faculty examiner (opponent) is not considered to be part of the examining committee.

The defense procedure is the following.

1. Presentation of the participants. The main advisor presents all people involved in the defense procedure and describes the procedure itself.

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\*For the formal rules and regulations, see *Rules for Third-cycle Studies at Mälardalen University (valid from 20th Dec 2016)*

2. The candidate presents the main points of the thesis. The objective is to highlight the area, the motivation, the research work and the achieved results. The presentation should be understandable also for people with a technical background (typically computer science) that are not experts in the specific thesis topics. Duration: approximately 45 minutes.
3. After the candidate's presentation, the faculty examiner (opponent) states question and discusses the thesis with the candidate. At the start of the session, the faculty reviewer can summarize her/his impression from the thesis and the defense, but this should not be a long presentation (typically just 1-2 minutes). The questions should primarily be directed towards the work conducted. In particular, issues which need to be clarified or challenged, for example, in terms of "why have you done it in this way instead of using this other approach" and so forth. The main objective is to make sure that the candidate knows the subject well and is able to defend and explain the work. The role of the opponent could be compared with a tough but fair and constructive examiner. The questions should be of a kind and level that are not simple, but the candidate is supposed to be able answer at the defense. Minor issues, for example, specific formulations could be mentioned but it is good to not get stuck on an individual detail for too long. The faculty reviewer is not expected to conduct a general inquiry about computer science or software engineering, although some questions may challenge the candidate in areas closely related to the thesis work. The focus should be on the research and questions related to the research and the thesis. Note that the actual questions and things to cover are very much up to the opponent. Some opponents show their (main) questions on slides (which makes it easier for the defendant and for the public to remember the question), but this is up to the opponent. A good defense is often characterized with that the candidate has had to work a bit and "think on his/her feet" (i.e., being able to defend the work without having the time to prepare detailed answers in advance) to defend his/her thesis. It is, however, also important to let go if it is obvious that the candidate is unable to provide a better answer. Duration: Formally, the length is entirely up to the opponent, and should continue until the opponent feels that the work has been covered enough to make a decision about passing or failing the thesis, but in practice it is good to aim for no more than approximately 45-60 minutes.
4. Next, the remaining committee members get to ask questions to the candidate. Normally, each committee member only adds one or two questions to highlight some aspects that they feel was not sufficiently covered. Duration: Approximately 15-30 minutes in total.
5. Now, the audience can ask questions. Normally, the audience only asks a few questions.
6. The open part of the defense is done, and the committee have a closed meeting. Typically, they also invite the faculty examiner (opponent) and the advisors to join the meeting as observers and to answer questions about the student and the research process, but they have the right to discuss without the advisors being present if they would like that. One person from the committee is appointed chairman for the committee and leads the discussion. Typically, each committee member gives his/her opinions about the strengths and weaknesses of the thesis and the student's ability to discuss and defend the work. The advisors may be (which is usually the case) asked for their view, but do not take part in the decision. The committee then agrees on a decision, which is either "pass" or "not pass" (the decision is expected to be positive, otherwise someone should have objected in advance).
7. After having agreed on a decision, the committee joins the people waiting, and the chairman of the committee announces the decision, and the procedure is over.