Guidelines for the documentation of E/ICT-projects at ASE

Requirements on the submitted project material

The submitted material must comprise the following two parts:

1. **A project report,** which describes the project and the working process chosen.
In this part, the individual stages of the project are explained. Furthermore, the individual choices, the experience obtained and the strengths/weaknesses can be described and emphasized. At the same time, there must be an explanation of the engineering methods chosen and the new knowledge you have acquired in carrying out the project. This report is primarily written to the external examiner, the supervisor and yourselves.
The extent of this project report must not exceed approximately 30 pages of text (exclusive of figures). Thus it is not the quantity but the quality of this report that counts. It is important to limit yourself and only include the most important elements, yet to write sufficiently for others to get an idea of the whole project. Only from the information in the project report must the external examiner be able to form an idea of the project carried out.

2. **A project documentation,** which in detail describes the result of the project.
The contents of this documentation will depend on the type of the project. If the project treats the development of a product or a system, then the project documentation will be the same as the development documentation. This documentation is primarily written to another developer, who must be able to continue working with the product or the system and further develop and/or maintain it, using the prepared documentation.
The project report as well as the project documentation must be handed in in a number of copies corresponding to the number of supervisors, plus a copy for the external examiner and a USB-stick version for each supervisor/examiner.

Generally on the project report

Unfortunately, it frequently happens that a project, into which has been invested reasonable planning, persistent efforts, technical ingenuity, extensive analysis work etc., does not get the evaluation it deserves. The reason for this is almost always poor documentation. With the aim of avoiding such unpleasant episodes, some advice and suggestions to the preparation of a project report have been collected in the following.
The first thing you must realize is to whom the project report is written. If you choose the project supervisor, who is already well-informed about the project, you abandon the possibility of other readers deriving benefit from the report. This would be a wrong choice.
It is a question of informing, not impressing. The ability to clearly communicate a message is more important than leaving the impression that the author probably knows a lot about the subject, but the reader did not get much wiser.
The author ought to imagine the person who reads the report to be a colleague/fellow student with the same common knowledge within the subject area as the author himself/herself, but without special knowledge about the current subject that the project treats.
This main rule sets a natural limit to how detailed the author must describe the basic disciplines within the subject area, and the use of technical slang expressions.

Suggestions to outline of project report

A. Front page and title page

The front page of the report should contain the following information:

- Project title and possibly subtitle
- Names of project participants
- Type of assignment (e.g. final project)
- Name of institution and possibly company and department
- Date for submission
- Supervisor(s)
- Illustration

The project title must be carefully phrased. A good title should not contain more than 9 to12 words and must contain one or more key words for the subsequent work.

B. Abstract

The abstract is a short summing up of the project work and should contain the following:

- Presentation of the problem
- Aim of the project
- Materials and methods
- Most important results
- Conclusion

The abstract must describe the work more precisely than is possible in the short title, so that the reader from this can decide if it is worth while reading the whole report. It must be possible to read it independently, and there must be no references to sections in the report.

The extent of the abstract may, if possible, not exceed 200 to 300 words, and under no circumstances 500 words. Write in as concrete a matter as possible, and avoid vague expressions and empty words.

C. Table of contents

The table of contents must mention titles and page numbers of chapters and sections in the report, and also references.

D. Preface

The preface is not always necessary. It can be used to shortly inform about certain external circumstances for the project, such as project type and where the project has been carried out, historical background (other projects which have resulted in the current project), and where the inspiration and the idea have come from, etc.

Here you can also state your appreciation of support or help received during the work. This can be a question of economy (authorized funds), laboratory assistance, and rather extensive assistance in calculation, writing and drawing etc. Normally you neither repay good advice, nor the supervisor’s contribution (it is his/her job).

1. Introduction

The first paragraph of the actual report is the introduction, which is supposed to give the reader the necessary introduction to the subject of the project, its background and objective. Therefore, never underestimate the importance of this paragraph.
The introductory paragraph must be able to answer the following questions: *What, Why* and *How*. *What* is the subject of the report, why this subject has been chosen and how you have planned to carry out the assignment.
The introduction must briefly explain the background of the project (w*hy*) and describe other assignments that have connection to the project or on which the project relies.
Actual theory and textbook material can normally be eliminated. Methods are treated in principle, details only to the extent where they are directly relevant for the project. References are given to the original literature, where the interested reader can study further details. This should lead to a motivation for the current project, or for attacking the problem using a new method of solution. There can be reason to call attention to certain historical conditions, such as originator of ideas on which the project relies, etc.
The introduction must describe a carefully phrased "objective of project" – possibly specified sub-items. You can also indicate a hypothesis, which is sought confirmed or denied in the assignment.
The introduction must briefly introduce the procedure applied, with a short introduction to the method(s) applied (*how*).
The introduction can also describe important terms, definitions and abbreviations applied.
If it is considered necessary for the understanding of the project, you can after the introduction insert a special paragraph about the theoretical background for the work.
The introduction concludes with reading guidelines, which present the structure of the report.

2. Project description

Depending on the project type, the following subjects *can* be included and illustrated in the report:

- Project context

Description of the project seen in a wide context and the limitations you have chosen for the project.

- Project course

Description of how the project has been carried out, including a general time schedule and possible work sharing. If, for example, several iterations have been used, here you can describe how these have been defined and how they have been used in connection with the management of the project.

- Methods

Description of the working methods applied (for example which analysis and design method have been used)

- Specification and analysis work

Description of the specification and analysis work and an evaluation of the work. This can for example be the considerations and the choices you have made.

- The architecture and design process

A description of the architecture and design process and an evaluation of this. Which design solutions you have considered and reasons for the choices made.

- Development tools

A short description of the development tools applied and the experience you have made with these.

- Test

A short description of the HW/SW-unit test, the integration test and the acceptance test.

- Results

A description of the project results in short form, a.o. by using tables, graphs or pictures. It is important that you here present your results in a clear and matter-of-fact way and without any form of evaluation. The interested and knowledgeable reader should after this be able to draw his/her own conclusions of the work.

- Discussion of results obtained

Here comments are made on the results obtained. It will be reasonable to begin with a general evaluation of the results in the light of the way the problem presents itself and the objective of – or hypothesis for the project. Furthermore, comparisons can be made with other related work.

- Experience obtained

A description of what you have learned in carrying out the project. What problems you have encountered during the process and how they were solved.

- The excellence of the project

A description of the parts of the project that you are especially proud of.

- Suggestions to improvements of the project or product

A description of the suggestions to improvements that have been identified throughout the work

The subjects mentioned can, as required, be supplemented with relevant information related to the current project. Important and selected parts of the project documentation can very well be included in the project report, where it is considered to be able to improve the presentation and the understanding. Alternatively, there is a reference in the text to the

enclosed project documentation with a clear indication of paragraph and page number.

3. Conclusion

Here a general conclusion of the project work is presented. What has been a success, what has perhaps been a failure and the reason for this. The conclusion is supposed to contain a clear message.

In this section is a summary of the conclusions that can be drawn from the results that are mentioned in the earlier sections of the report. Conclusions can be positive as well as negative. You must take care not to suppress the negative findings (if, for example, a method has proved unsuitable, this should be regarded as a contribution to your empirical material, not as a personal defeat).

In the conclusion, the big lines are moreover drawn. Essential, quantitative results can be mentioned, whereas the detailed explanation and argumentation are referred to the discussion in the main part of the report.

4. References

There are two accepted methods for stating references in the text, i.e. partly by a reference number alone and partly by name of author and date of publication. In both forms, reference is made to the complete indication of source later in the report. The reference number is stated in the following parenthesis, depending on taste and ability: (Ref. 7), (lit. 7), (7) or [7]. Page number can be added as required [7, p.117]. This form is mostly used in magazine articles, where space-saving is welcome. The use of the other form, which is more informative and thus more readerfriendly, appears from a couple of examples:

Recent measurements (Jensen 2013, Olsen 2014) have shown that…

Jensen (2013) and Olsen (2014) found in measuring…

Page number can also here be added in parenthesis. If the source has more than two authors, you can in the text (but NOT in the bibliography) use the form Hansen et al. (2015). The abbreviation is Latin and means “and others”. If there are more references within one year by the same Olsen, (2014a), (2014b) etc. are used.

For Web references, also author and year are stated as far as possible, as well as the URL for the reference. **Essential Web documents, referred to in the document, must be copied on the enclosed USB-stick.**

Generally on the mode of expression

Write as briefly and clearly as possible. Read the written text with critical eyes. Rewrite it if the wording is inaccurate, if there are flaws in the logical argumentation, or if appropr iate respect has not been shown for grammatical rules. Break up long periods: the short ones are more reader-friendly. Keep out personal feelings (disappointment, amazement etc.) and, if possible, avoid the I-form.

It can be difficult to decide how many details to include. The principal rule is that the presentation must be exactly so detailed that it is possible from the report to reconstruct the work carried out.

The linguistic form inevitably affects the reader’s attitude to the work as a whole. Illogical and unclear style breeds mistrust. Even the best article is difficult to sell if the packaging is dirty and sloppy. Bear in mind that, among other things, the task is to guide the reader through the text by always changing between the familiar and the unfamiliar.

Illustrations are important aids in the communication of technical assignments. A good figure with supplementing text is often preferable to a purely verbal presentation. A carefully prepared diagram or a sketch of a measurement arrangement can replace many words and often leaves the reader with a more precise picture.
You must be able to read the introduction and the conclusion end to end. You must never underestimate the importance of these two sections.

Generally on the project documentation

The presentation of this documentation will depend on the project type.
If it is a hardware or software development project, the form will be adapted to this.
If it is an investigation project, a form that is suitable to this is chosen.
Depending on the concrete project, different documentation models can here be applied, IHA-models as well as specific company models.
See enclosure with examples of some IHA-models.
Generally, it applies that the detailed project documentation, e.g. data sheets and source texts for programs are always only to be found on an enclosed USB-stick.

Outline of project documentation:

A. Front page with project title and project participants

B. Table of contents

1. Requirement specification
Here the Use Case technique can be used to describe the functional requirements.

2. System architecture design
Here the overall architecture of the system is described, SW/HW interface and the division into threads/processes and their communication and synchronization. The document is divided into several “views”. This document can either contain the whole design documentation or alternatively, only parts of the design are described in their own partial document under section 3. Design documentation.

3. Design documentation
Here the software design of for example a package, a component or a thread is described.

4. Implementation documentation
General implementation principles, which describe selected important parts of the implementation.
Auto-generated reference documentation for classes or .h files and code files is only enclosed on USB-stick.

5. Test documentation
Here the test documentation of the project is described. Possible test programs are enclosed on USB-stick.
5.1 Unit test

5.2 Integration test
5.3 Acceptance test

6. Appenices (should also be found on USB-stick)
Here relevant enclosures for the project are inserted, e.g. AC's, agendas and minutes from meetings.

NB! Reference documentation for classes, source texts, test programs etc. are always only enclosed on USB-stick.