


COMP390/393/394/395: Project Specification and Design Documentation

 cgi.csc.liv.ac.uk/~comp39x/2018-19/guides/SpecAndDesign.html

Background

1. The purpose of project **Specification** is
 - to ensure that there is a *clear idea* of what the project comprises
 - there is a *well defined plan* showing how the project will be carried out.Note that this is intended to be a *specification of the project*, rather than a *specification of the system* you intend to produce.
2. For the project **Design**, you should have completed most of the research and analysis required for your project and so have a clear idea of how you will realise your project. Typically this understanding will be recorded in a design using some standard methodology, such as UML.

Learning Outcomes

After completing the project specification and design documentation students should be able:

- To specify a substantial problem, and produce a plan to address the problem
- To manage their time effectively so as to carry out their plan
- To locate and make use of information relevant to their project
- To design a solution to a substantial problem

Description of the Task

Your task is to produce a **Specification and Design Document** for your project. The Specification and Design report must be self contained. A target of 4,500 words is recommended. The report must be typeset for A4 paper format, using a 12 point font for the text.

1. The suggested structure of the **Project Specification** is described below. The recommended length for the project specification is about *three pages of A4* long. You must also include a Gantt Chart for your project, which can be on an additional fourth page, again of A4 paper format.
2. The project **Design Documentation** should comprise full documentation of your design. Your design will depend on your chosen methodology, but should cover all aspects of the system, at an appropriate level of detail. The suggested structure of the design document is described below. There is no page nor word limit for your design documentation.

The project Specification and Design document must be written by yourself using your own words (see the University guidance on academic integrity, which can be found at <http://www.liv.ac.uk/student-administration/student-administration-centre/policies-procedures/academic-integrity/>, for additional information).

Submission and Deadline

1. Digital pdf file of your project Specification and Design documentation must be submitted through the E-project system by **Thursday 15 November, 2018 (noon)**.

Late Submissions

The University's standard lateness penalties will be applied. See Section 6 of the Code of Practice on Assessment for further details. Note that Work received more than five working days after the submission deadline will receive a mark of zero. For assignments that are required to be submitted electronically a working day is defined as the 24 hour period immediately following the submission date and time.

Other Penalties

1. If the electronic submission is not a PDF file, then 5 marks (out of 100 available for this assessment) will be subtracted for each non PDF file submission.

However, the mark will not be reduced below the pass mark for the assessment. Work assessed below the pass mark will not be further penalised for exceeding the presentation time limit or electronic submission in an incorrect format.

Assessment

This assessment will contribute 20% of the total project mark.

Failure of this assessment can be compensated by higher marks on other assessments of the project.

The project Specification and Design documentation will be assessed by the supervisor and the marker.

For your guidance a copy of the feedback form that will be used to assess your specification and design documentation is available at

http://cgi.csc.liv.ac.uk/~comp39x/2018-19/forms/comp39xSpecAndDesign_AssessForm.pdf

to be taken in conjunction with the University Marking Descriptors. The feedback forms completed by the supervisor and the marker in the E-project system, including the overall grades independently given to the design assignment by each of them, will be made available about two weeks after the deadline.

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Project Specification: Structure

The project specification should be structured as follows:

1. Project Description

This section describes what the project is about. This should include:

- Who the project is being done for (your supervisor, and any external customer);
- What the aim of the project is, what it is intended to achieve;

- What the proposed solution is, how the aim will be achieved.

2. Statement of Deliverables

This section describes what will be produced in the project. In some cases it may be useful to identify some deliverables as essential and others as desirable. As appropriate this will include:

- Description of anticipated *documentation*;
- Description of anticipated *software*;
- Description of any anticipated *experiments*;
- Description of methods for *evaluation* of the work.

Where appropriate, 3rd party evaluation of the software/computer system/application developed on the project, and/or customer feedback, be obtained in strict accordance with

ethical use of the project 3rd party evaluation human participants

- explicitly state if human participants be involved for the project 3rd party evaluation;
- if human participants be involved for the project 3rd party evaluation,

The focus should be on the description of the anticipated software. A detailed description of the features / functionalities of the software should be given (again, possibly distinguishing essential and desirable features).

3. Conduct of the Project and Plan

This section describes how the project will be carried out and describes the activities involved in different stages. This should include, where appropriate:

Preparation

- *Background research*: what information will be used to fully understand the problem and derive its solution, and provide a context for the project (you should state clearly what information you have already absorbed and what is yet to be read during the early stage of the design stage);
- *Data required*:
 - what data will be needed to be acquired for the project and where it will be obtained;
 - ethical use of data, including use of human data & human participants:
 1. ethical use of data
 - explicitly specify whether you are to use
 - Synthetic data,
or
 - Real Non Human data
 - make sure to check and explicitly confirm ethical source of the data,
 - If considered appropriate, your 1st supervisor has to make an application for and obtain the University Ethical approval on your behalf **before the project started**.

or

- Real Human data:
 - make sure to check and explicitly confirm ethical source of the data
 - State the University Policy on ethical use of human data will be followed: here is the flow chart for the University Ethical approval.
 - If considered appropriate, your 1st supervisor has to make an application for and obtain the University Ethical approval on your behalf **before the project started**.
- be aware that only the following types of data do not require Research ethics approval:
 1. information freely available in the public domain;
 2. anonymised records and data sets that exist in the public domain

2. ethical use of human participants (other than project 3rd party evaluation)

explicitly state

- if human participants are necessary and will be involved in the project;
- if human participants are to be involved in the project, the University ethical review procedure will be followed: here is the flow chart for the University Ethical approval, and the required human participants information sheet and consent form to be completed and used in due course.
- If considered appropriate, your 1st supervisor has to make an application for and obtain the University Ethical approval on your behalf **before the project started**.

Design stage

What *design methods* will be used and what the *design documentation* will consist of;

Implementation stage

- What *hardware* and *software* will be used;
- What *testing* will be carried out;

Project Plan

in the form of a time-tabled schedule of project activities and outputs will be given. This should include internal milestones as well as external assessments and reviews. The plan should both state *progress to date* and indicate *future activities*. A diagrammatic presentation of the plan is usually best, and there are standard techniques, such as *Gantt Charts*, which you can use.

The stages of the project should be broken down into an appropriate level of detail, e.g., "design 5 weeks" is too vague: you need to indicate what tasks will go into your design and how long you expect each of these tasks to take.

Risk assessment

containing the following and how they might affect the plan.

- What are the major *challenges* in carrying out the project;
- What *new skills* will be required and how these will be acquired;

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Design Documentation: Structure

The project Design Documentation should be structured as follows:

1. Summary of Proposal

A brief statement of the background, aims and objectives of the project , including any necessary changes to the original proposal or specification, based on new information or understanding.

A summary of the research and analysis carried out so far should also be included.

2. Project Design

Here, **full details of the design**, should be given according to methodology and techniques chosen in the specification. Although designs will vary according to the needs of particular projects a typical design of a software implementation will comprise

- a description of the anticipated components of the system and how they are to be organised;
- a description of data structures to be used by the system;
- algorithms to manipulate these data structures;
- a design of the intended interfaces; and
- a description of the evaluation of the system;
- ethical use of data, in particular, ethical use of human data and human participants.

The design should include **both the system design** and **evaluation design**.

Some examples are given below.

If following an object-oriented design methodology one might include:

- Use-case diagrams;
- An interaction chart (sometimes called an event trace);
- The objects to be used in the system;
- Attributes and methods of objects;
- Pseudo-code for the key methods;
- Interface design;
- Evaluation design.
 - what criteria will be used to evaluate whether the system is successful;
 - how to assess these criteria;
 - who will be involved in the evaluation;

Where appropriate, 3rd party evaluation of the software/computer system/application developed on the project, and/or customer

feedback, be obtained in strict accordance with

ethical use of the project 3rd party evaluation human participants

- explicitly state if human participants be involved for the project 3rd party evaluation;
- if human participants be involved for the project 3rd party evaluation,
 - what testing will be carried out;
 - what kind of conclusion do you expect from evaluation.
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 - explicitly confirm an ethical source of the data,
 - If appropriate, confirm the University or a relevant Professional Body Ethical approval has been obtained for the use of the data in your project.
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 - explicitly confirm that the University ethical procedure will be followed: here is the flow chart for the University Ethical approval;
 - explicitly confirm that the University or a relevant Professional Body Ethical approval has been obtained for the use of human participants in your project;
 - include into your design documentation the required human participants information sheet and consent form to be signed by the human participants on your project.

If following a more traditional DB application design methodology one might include some of the following:

- Data dictionaries;
- System boundary diagrams;
- Entity-relationship diagrams;
- Logical table structures;
- Physical table structures;
- Transaction matrix;
- Pseudo-code for the key methods;
- Interface design;
- Some other additional design methods may be included;
 - Data flow diagram;
 - Navigation path diagrams;
 - Storyboards;
 - Functional descriptions or components.
- Evaluation design.
 - what criteria will be used to evaluate whether the system is successful;
 - how to assess these criteria;
 - who will be involved in the evaluation;

Where appropriate, 3rd party evaluation of the software/computer system/application developed on the project, and/or customer feedback, be obtained in strict accordance with

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For a project involving an empirical investigation of some hypothesis one would normally expect to see **in addition** things such as:

- A statement of the hypotheses to be tested;
- A description of the test data to be used;
- An experiment design, the experiments to be performed, any control to be used;
- A description of how the results will be analysed, including any statistical techniques that will be used;
- Anticipated conclusions.

For a project attempting to devise new algorithms one would normally expect to see **in addition** things such as:

- A description of the problem to be solved;
- A description of the existing algorithms of related problem and a critical evaluation of them (e.g., why they are not applicable in your project);
- A description of the approach used to solve the problem;
- A description of how the new algorithms will be analysed, including mathematical and experimental analysis;
- For the mathematical analysis to be carried out
 - A description of the mathematical model to be used;
 - A description of the performance metric the algorithm will be measured, ranging from correctness, running time, optimally or approximability for some objective functions;
 - A description of the control against which your algorithm is compared, e.g., the optimal algorithm;
- For the experimental analysis to be carried out
 - An experiment design, the experiments to be performed, any control to be used;
 - A description of how the results will be analysed, including any statistical

techniques that will be used;

The **important** thing is that the design documentation clearly shows a design methodology to have been followed, and that the design has been carried out with sufficient attention to detail to inspire confidence that it can be realised, tested and evaluated in the time remaining for the project.

3. Review against Plan

This is the plan produced as part of the specification, showing what has been completed, and the progress to date. Any necessary changes to the plan should be indicated also. (You are expected to include the Gantt Chart again.)

4. Bibliography

An outline *bibliography* showing what reference material has been and will be used. These references should be cited wherever appropriate.

See the lecture on bibliographies and referencing by Ullrich Hustadt

http://cgi.csc.liv.ac.uk/~ullrich/COMP110/notes/Bibliographies_and_Referencing.pdf.