Software Engineering Group 11
SE_11_QA_05A
Design Specification Standards Summary

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1. Introduction

1.1. Purpose of Document

The Purpose of this document is to provide an outline and summary of the content included in SE.QA.05A [1] for group members to use as a basic reference when creating the design specification.

1.2. Scope

This document aims to be a Summary aims to act as a basic guide and a quick referencing material for all members of the group and is to be used in conjunction with the original SE.QA.05A [1] provided.

1.3. Objectives

This document covers:

- Structure of the design specification
- Creation of the design specification

2. Relevant QA Sections

The design spec must be produced in accordance with SE.QA.01[2]

Must be produced as a part of a task in SE.QA.02[3]

And be maintained in a CMS according to SE.QA.08[4]

The general layout and form must adhere to SE.QA.03[5]

3. Outline Structure

1. Intro – defined in SE.QA.03[5]
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6. References – Defined in SE.QA.03[5]

4. Decomposition Description

- The decomposition description records the division of software into programs and then the modules which make them programs.
- Describes the structure and purpose of each function of each program and significant module.
- Gives an overview and justification for design.

4.1. Programs in the System

- If only one program in the design then simplify headings and brief summary of what it does
- If more than one program should explain relationship between them and how they support each other
- It should state the requirements it implements and which ones it must conform too
- It should describe the program and how it will be implemented and what methods it may include eg ' The program will have a form-based method of entry as described in (EIR5)' [7]

4.2. Significant Classes

- Each program should have main classes named and shortly explained
- Statement of purpose should be a plain English description a few lines long
- Spec for each module not given here
- If a set of classes shared between several programs then should be made into a Package and a section describing each Package e.g.
    - 'Heating. This will be the main class of the Heating program.
    - DayBooking. This will hold a list of HeatingEvents detailing all of the changes to the Heating which need to be made today.
    - HeatingEvent. This is a single event in the list of events in DayBooking. It tells you which rooms need heating turned on or off and why' [7]

4.3. Table Mapping Requirements onto Classes

- To understand the implications of changes in requirements or design
- To check all requirements met
- Produce a table mapping functional requirements onto the classes which contribute to requirements for e.g.

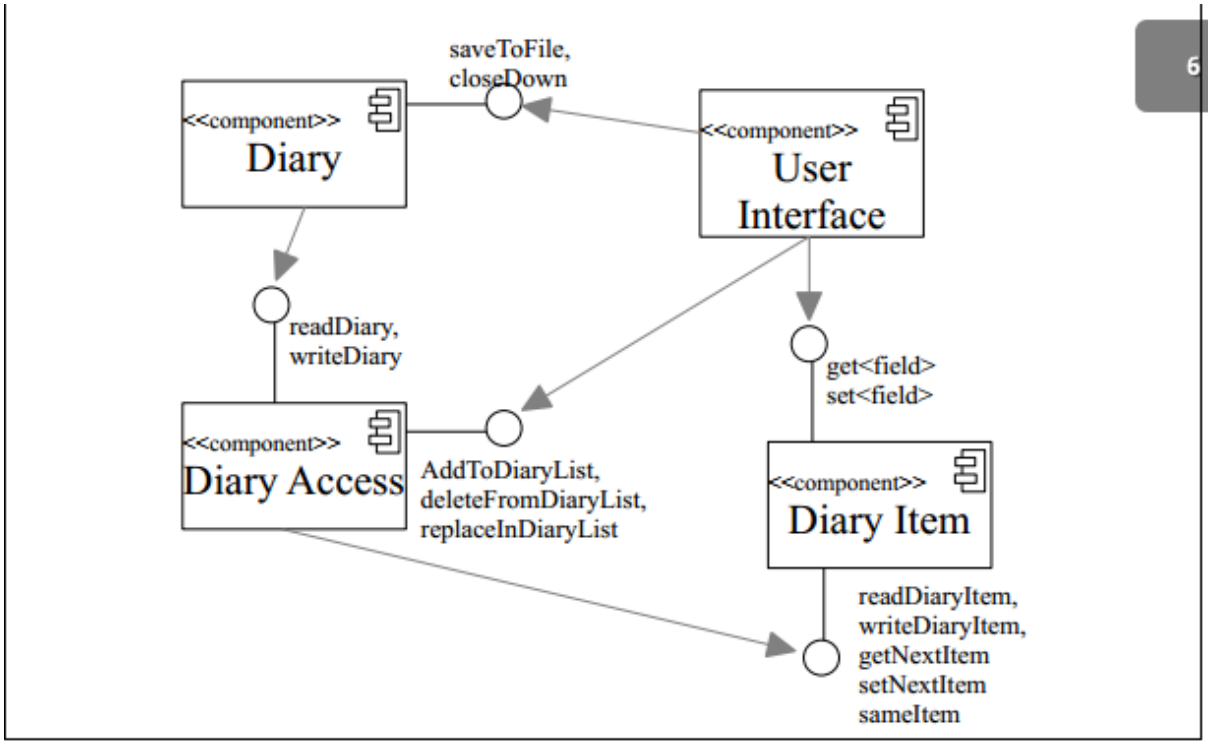
Requirement	Classes providing requirement
FR1	HeatingClass, DiaryClass, DiaryObject
FR2	LogClass, DiaryClass, DiaryObject

5. Dependency Description

- Specifies relationship and dependencies between modules
- Helps reader see how parts of system fit together as described in the Decomposition Description
- Describes general architecture such as
  - Model-view-controller
  - UML provides a formalism called Component Diagrams
- These are appropriate ways of describing relationships between modules in java
- The spec should contain a subsection containing a component diagram for each program
- Should show method links between modules
- Can show compilation dependencies between modules
- Can show inheritance dependencies between classes

5.1. Component Diagrams

e.g. [7]



5.2. Inheritance Relationships

- Can show compilation dependencies between modules
- Can show inheritance dependencies between classes

6. Interface Description

- Should provide everything designers, programmers and testers need to know to use the facilities of the module.
- Outline spec of each class or interface in the system which should include
  - Name and type of class or interface (private/public, abstract for a class)
  - Classes or interfaces which it extends and why
  - Public methods implemented by the class
  - Parameter names and types for each method should be given and a short summary of the method
- Simplest way of specifying each task may be a java outline
- Tools are available for generating code automatically from UML class descriptions
- Java coding standards should be used as in SE.QA.09[6] and should compile into a system
- Won't do a lot as only contains outlines of classes
- Where possible a java interface should be specified rather than class, together with one or more factory classes which contain static factory methods which return an instance of the interface type.
- Ordering of class descriptions in this document should follow a sensible convention (e.g. alphabetical or order by program to match decomposition stage)
- See Nigels example

7. Detailed Design

- It is not needed to provide all of the internal details of each module
- You should however consider the difficult parts of the design and the way classes work together
- For any module that the internal workings are not self-evident detail is needed to demonstrate feasibility and coherence of the overall design
- Specifying the interface of an intractable module leave the whole design intractable
- UML sequence diagrams are one good way of documenting how classes work together for major operations in the program
- State diagrams and activity diagrams may also be of use
- During design we will have experimented and done theoretical investigation to reduce risk decisions on difficult parts of the system should be documented here
- For algorithms easier way is to do a textual description of what is to be done
- If code exists it should be referred to but not included here
- Significant data structure will occur when a number of objects are linked in a complex structure
- Class diagrams showing entity relationships should be drawn where appropriate
- Object diagrams should show how static relationship in class diagrams work in real examples
- The mechanism to support any persistent data must be described
- Language specific mechanisms may be cited and need not to be explained

8. Teams For DS and Prototyping

8.1. Design Specification – Rough Draft Friday 21st November

Decomposition Description

- Aloysius
- Qiaoyang
- Theo (back up)

Dependency

- Theo
- Richard
- Gavin (back up)

Interface

- Tom
- Aled
- Kieran
- Gavin

Detail

- Jack
- Alan
- Elliot

8.2. Prototype 1- Rough Draft Friday 14th November

Android Prototype

- Jack, Elliot

Web Prototype

- Gavin, (1 more if needed)

Database Prototype

- Kieran, (1 more if needed)

8.3. Coding – Start 1st December (hopefully)

Coding teams will be those of the normal web, android and database teams with Aled joining Android and Theo will join the Web team.

Android Coding Team

- Jack
- Elliot
- Aled
- Alan
- Qiaoyang

Web Coding Team

- Gavin
- Aloysius
- Theo
- Richard

Database Coding Team

- Kieran

Members to Move Round All

- Tom

9. Redrafted Timetable

9.1. Prototype

Prototype to be put together in Work Week – Not a final draft

9.2. Design Spec

Design spec to be finished if possible a week earlier than originally planned – Earlier we finish this the sooner we can start coding

9.3. Coding

Coding is now to be started on the 1st December if possible if not then the 8th December at the latest – earlier rather than later would be ideal due to exam revision over the xmas break

Due to no other recommendations (e-mail yesterday) this is the time table we will be going by.

10. REFERENCES

[1] QA Document SE.QA.05A – Design Specification

[2] QA Document SE.QA.01 – Quality Assurance Plan

[3] QA Document SE.QA.02 – Project Management Standards

[4] QA Document SE.QA.08 – Operating Procedures and Configuration Management Standards.

[5] QA Document SE.QA.03 – General Documentation Standards

[6] QA Document SE.QA.09 – Java Coding Standards

[7] Software Engineering Group Projects – Design Specification

11. DOCUMENT HISTORY

Version	CCF No.	Date	Changes made to document	Changed by
1.0	N/A	18/10/14	Document Created and Structured	Tcg2
1.1	N/A	05/11/14	Updated Document into new template and more information included	Tcg2