Inf2C-SE tutorial: Requirements (mostly)

Study this tutorial sheet and make notes of your answers BEFORE the tutorial.

1   Prerequisites

To get the most out of this tutorial you need:

- to have reviewed the lecture notes to the end of Week 3;

- to have done the associated required reading;

- to have (at least) made a provisional choice of system for the software engineering assignments.

Some of the questions in this tutorial are about the system that you will work on for the assignments. In the tutorial, you will each explain your answers to the group and the group will discuss any issues that arise. It also contains some other questions suitable for checking your understanding of the lecture material – you probably won't go through it all in the tutorial, but you should certainly ask your tutor about anything you are unsure of.

2   Requirements

Review the following concepts and consider how they apply to your system, and/or to an organisation that might use and possibly extend your system:

1. stakeholders;

2. functional and non-functional requirements.

   Next recall the basics of UML use casess:

3. What are they good for?

4. Define the main elements of this kind of diagram.

5. What are the main steps to be followed in order to produce this kind of diagram?

6. What are their limitations?

   Develop a use case diagram for your system, showing only the functionality it has now. Issues to think about (for discussion with the group):

- the differences and similarities between *stakeholders* and *actors*

- the granularity at which use cases may be useful in development;

- how a use case diagram might be connected to further documentation of the requirements: what information is essential, beyond the diagram? How does this depend on the context, e.g., the use to which the documentation is to be put?

Next, imagine that you are a potential user who wants the system extended with some more functionality. Write a *user story* to describe a simple possible extension that would be of value to you.

Issues to think about (for discussion with the group):

- what are some differences and similarities between use cases and user stories?

- what makes a good user story?

- how long you think it would take to implement this user story?

3   A selection of lecture content questions

1. What is the definition of a nonfunctional requirement?

2. "Grouping and packaging the elements and internal details of an abstraction and making those details inaccessible" is a definition of what design principle?

3. In a use case diagram for a system, an actor may represent:

   (a) a user of that system
   (b) an object in that system
   (c) another use case
   (d) more than one of the above

4. "The process of forgetting information so that things that are different can be treated as if they were the same" is a definition of what design principle?

5. What are the design rules for "coupling" and "coherence"?

6. A use case diagram shows an actor connected to a use case. Which of the following must be true?

   (a) every scenario in the use case results in an outcome which has value for an instance of the actor
   (b) there is at least one scenario in the use case which results in an outcome which has value for an instance of the actor
   (c) every scenario in the use case involves every instance of the actor
   (d) every scenario in the use case involves an instance of the actor
   (e) there is at least one scenario in the use case which involves an instance of the actor

4 Exam question, Dec 2009

Note: this was a relatively easy question compared to most exam questions.

(a) What is a *functional requirement* and what is a *non-functional requirement*? Explain, giving an example of each. **(4 marks)**

(b) After the ReformHealthcare party's surprise win in the 2010 UK General Election, a new type of health clinic is to be set up, using treatments whose effectiveness is highly controversial. Because the health outcomes associated with the new clinics will be of wide interest, a new computer system must quickly be developed to track patient treatments and outcomes.

All patient appointments must be entered into the system by the clinic administrators. During the appointment, the doctor or nurse will enter details of the patient's condition and any treatment prescribed. Patients are requested to report on any changes in their health, one week after each appointment. They can do this either by filling in a web form or by telephoning the clinic, in which case an administrator will enter the information.

The system must be able to produce reports of statistics such as the number of patients treated in a given period, their conditions, and their reported state of health a week afterwards.

Suggest four different stakeholders in the project, with a brief explanation of why each has a stake. **(8 marks)**

(c) Explain how use cases can be useful for managing requirements of systems with multiple stakeholders, and give one drawback of use cases for managing requirements. **(5 marks)**

(d) Draft a use case diagram for the system described in part (b). Comment briefly on any important ambiguities or problems you find in the system description. **(8 marks)**