

DAT230 / DIT276 Requirements Engineering

Exam

Thursday October 25, 2012

Examiner

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Contact person during exam

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Allowed tools / material

None except pen/pencil and eraser

General information

Numbers within parentheses show the maximal points awarded for each question.

Maximal points can be given if:

- The answer is correct.
- The presentation of the answer is readable and clear.
- The answer is given in English.

One sheet of paper may only contain parts of solutions belonging to one question.

Grading

The grades on this exam are based on your total score on the questions. For Chalmers students:

0 – 29 points: Fail

30 – 38 points: 3

39 – 47 points: 4

48 – 60 points: 5

For GU students:

0 – 29 points: Fail

30 – 47 points: G (Pass)

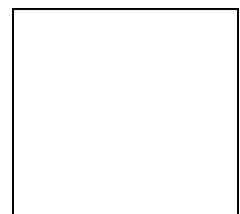
48 – 60 points: VG (Pass with distinction)

Results

Exam results will be available from the course homepage.

Review

Time and place will be announced on the course homepage.



1. Requirements specification (8p)

- A. What is the largest drawback with pure natural language requirements? Explain why. (1p)
- B. Why does a template such as: “The [actor] shall [action verb] [observable result]” **not** solve the largest drawback with pure natural language requirements, from question 1A? (1p)
- C. What does a template, e.g. the template from question 1B, contribute to a SRS (compared to not using any template)? Motivate your answer in terms of the quality attributes. (2p)
- D. Write your own structured natural language template (minimum of 4 tags) and motivate why these tags are the most important to make the requirement high quality according to the quality attributes. (4p)

2. P-language (8p)

- A. Why is P-language a good specification technique for non-functional/quality requirements? Motivate your answer! (2p)
- B. Write the six most important tags prescribed by P-language and explain the purpose of each tag. (6p)

3. Requirements elicitation and stakeholder identification (12p)

- A. What is the main difference between requirements engineering for a bespoke development project compared to Market driven development project? (1p)
- B. What are the unique problems with requirements elicitation within a Market driven development project and what practices can you use to mitigate these problems? (2p)
- C. If you have many primary stakeholders in a bespoke project, what problems can you experience in the requirements engineering process? (1p)
- D. Why is it important to identify the different stakeholders during the requirements engineering process? (2p)
- F. If the customer company of a bespoke system, all stakeholders, have very limited time and therefore cannot attend any interviews, what other sources of information or practices can you use to elicit requirements? (2p)
- G. What is a rainbow diagram, describe its elements and what it can be used for in relation to stakeholders? (1p)
- H. Draw a rainbow diagram, with proper labeling of its elements, and then place the following three stakeholders into the diagram and describe why you placed them at their positions, respectively: manager at the customer company that will not use the system but whose budget will pay for it, end user of the software system, manager of the end user that will get reports from the software system but not use it directly him/herself. (3p)

4. Software Requirements Specification (12p)

Given that you are developing a commercial-off-the-shelf (COTS) product that consists of a 3-inch touch-screen that can act as a digital emergency stop button. The interface is completely red with the text “STOP” in white letters in the middle of the screen. Additionally, this COTS is connected via an USB cable to the system it should stop and has a simple external API that allows the COTS to be accessed through the COM port. When the touch screen stop button is pressed, the COTS simply sends a 1 bit interrupt signal to the COM port, 0 when everything is okay and 1 to cause an interrupt.

This COTS has the following requirements:

1. The system GUI shall be completely red with a centred text that says “STOP” with white letters.
2. The system shall send a 1-bit interrupt signal on the COM port if pressed.
3. The system shall have a 3-inch touch screen monitor.
4. The 3-inch touch screen must react by sending an interrupt signal within 0.1 seconds after being pressed.

Questions: (12p)

- A. Given that this specification (4 requirements) was written in a product specification, is the requirements specification complete? Why/Why not? (1p)
- B. Which quality attributes, if any, does the specification (All the requirements together) **not** fulfil? Describe why. (2p)

C. Which quality attributes, if any, does the individual requirements (Each individual requirement) **not** fulfil? (4p)

D. Rewrite requirement 4, stated above, into a P-language requirement. Make sure that all tags contain reasonable information to make the requirement verifiable. (5p)

5. Requirements changes (10p)

A. Discuss why there is likely to be changes to requirements throughout a software development project. (1p)

B. Describe three different types of requirement changes as described in the lectures. For each one, give an example of such a change. (3p).

C. For each of the three types of changes in 5B above, state at least two different reasons for such a type of change and what can be an origin of each change. Together you should cover at least 4 different reasons and origin types. (4p)

D. Describe how requirement change request are typically handled in a bespoke software development project and contrast and compare that with how it is handled in a typical market-driven software development project. Why do the latter have to use different methods to handle changes? (2p)

6. Future of Large-Scale Requirements Engineering (10p)

Given the knowledge you have gained about Requirements Engineering (RE), how do you think the area will develop in the future to support projects of very large scale, i.e. with at least several thousand requirements? Discuss (a) what characterizes such projects as well as (b) how you see the future of RE overall and given that background (from a-b) discuss (c) how you foresee that the area of large-scale RE will develop in the next 5-10 years. Your answer will be graded based on *breadth* (more, well-supported ideas/arguments/areas gives more points), *depth* (how well supported an idea/argument is, without any motivation for an idea you will not get any points at all for it), as well as *realism* (unrealistic ideas gives no points). (10p)