DAT230/DAT231/ DIT276 Requirements Engineering

Exam

Monday, October 23rd, 2017

Examiner
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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.

Each question must be answered on a new sheet of paper. Hence, the answers to Question 1 and 2 must NOT be written on the same sheet of paper. You are NOT allowed to write answers to questions on the backside of a sheet of paper!

Grading
The grades on this exam are based on your total score on the questions. For Chalmers students:
0 – 39 points: Fail
40 – 51 points: 3
52 – 63 points: 4
63 – 80 points: 5

For GU students:
0 – 39 points: Fail
40 – 63 points: G (Pass)
63 – 80 points: VG (Pass with distinction)

Review
2017-Nov-17, 10-12, Room: J121

Institutionen för Data- och informationsteknik
CHALMERS TEKNISKA HÖGSKOLA & GÖTEBORGS UNIVERSITET

Part 1 – Multiple Choice (30p)

Question 1: Multiple-choice problems (26p)

This part consists of multiple-choice problems. These problems consist of pairs of *propositions* and *reasons*. For each problem, you shall answer by using one of the following answers:

A Both the proposition and the reason are correct statements. In addition, the reason explains the proposition in a correct way, i.e. the reason explains why the proposition is correct.

B Both the proposition and the reason are correct statements, but the reason does not explain the proposition.

C The proposition is a true statement, but the reason is false.

D The proposition is false, but the reason is a true statement.

E Both the proposition and the reason are false.

Correctly answered problems give **1 point**, while incorrect or missing answers give 0 points, regardless if you are partially correct in your answer!

	Proposition	*Reason*	*Answer A|B|C|D|E*
1) **(1p)**	According to [AGRE], agile RE suggests frequent collaboration with an accessible and available onsite customer.	Customer involvement and interaction have been reported as primary reasons for project success or limited failure.	
2) **(1p)**	Cross-functional teams increase the risk of miscommunication and over-scoping of requirements.	Cross-functional teams include members from different functional groups (such as testsers, designers, developers) who intermingle and share knowledge.	
3) **(1p)**	R1 ICOST R2 denotes that R2 affects the cost of implementing R1	In some cases, there can be more than one relationship type between requirements.	
4) **(1p)**	Requirements validation is about customers checking that requirements reflect their demands correctly.	Acceptance test is a requirements validation technique.	
5) **(1p)**	Requirements elicitation is a difficult process.	Sometimes the product is completely new and nobody has used IT for the problem before.	
6) **(1p)**	An analyst shall document how each business goal is reflected in the requirements.	It is the supplier's responsibility to reach the customer's business goals.	

7) **(1p)**	A data model is insensitive to the level of abstraction we work on.	If we make an E/R model of the information occurring in the domain, the model will be similar to an E/R model of the data, inside the final product.	☐
8) **(1p)**	Context diagrams can reflect an early decision about the scope of the product.	Context diagram arrows can refer to either dataflow or events.	☐
9) **(1p)**	It's generally unnecessary to identify all events in the inner and outer domains.	Customers can generally validate a list of product events better than they can validate a list of domain events.	☐
10) **(1p)**	Customers may dream up so many features that the whole system becomes unrealistic.	Feature requirements are hard to understand for the customer.	☐
11) **(1p)**	When using screens and prototypes, it is enough to review the screens to validate task support and high usability.	Experience has shown that screens as requirements leads to a smoother programming phase and a higher user acceptance of the product.	☐
12) **(1p)**	Actors that are not in the immediate surrounding of the product (the "inner domain") should be excluded from the task descriptions.	Business process re-engineering takes the present user tasks for granted.	☐
13) **(1p)**	A development process requirement can be used when requirements are vague and time is short.	The sole purpose of development process requirements is to serve as a framework for structured requirements management.	☐
14) **(1p)**	In practice, we have to live with tacit requirements.	In principle, we can assume that domain knowledge is non-obvious and specify all requirements in detail.	☐
15) **(1p)**	Using quality grids, requirements engineers shall specify the concerns behind the priority of all the specified quality factors.	Quality grids are used to present the importance of quality factors.	☐
16) **(1p)**	A technique that reports that a threat to security was successfully exploited in the software under development is a prevention kind of safeguard.	Prevention techniques reduce the occurrence of security threats.	☐
17) **(1p)**	The requirement “The product shall prevent users from deleting invoices before transferring them to the account system.” is an example of a requirement that deals with fraud threats to security.	The presence of temporary account data on the product exposes risks.	☐
18) **(1p)**	In practice, it is often difficult to distinguish functional and non-functional requirements.	Quality requirements often manifest as extra functionality.	☐

19) **(1p)**	It is important to consider trade-offs between quality requirements.	If more than one quality is important, these qualities will be in conflict with each other and must be balanced.	☐
20) **(1p)**	The observation technique for elicitation of requirements is needed only when there is no user to ask about how user tasks are done.	The users can explain what they do, so if they are available, an analyst could ask them about their tasks.	☐
21) **(1p)**	A requirements analyst can use questionnaires to gather opinions and suggestions.	When collecting data through questionnaires, the requirements analyst can use open questions as he would ask during an interview.	☐
22) **(1p)**	During the brainstorming session, unrealistic ideas shall be criticized and possibly rejected.	If the generated ideas are not criticized, there will be many unrealistic ideas left to discuss.	☐
23) **(1p)**	Managers are not needed to participate in domain workshops.	They rarely know the real details of the procedures and can not replace the expert users.	☐
24) **(1p)**	It is crucial that in the design workshops, the team checks the task descriptions and business goals often.	When users in the design workshop become very committed to the solution they design, they can divert from the goal, which threates the result of the workshop.	☐
25) **(1p)**	Goal-domain tracing is a checking technique which is an important part of requirements elicitation.	Goal-domain tracing can detect missing requirements, and goals.	☐
26) **(1p)**	The requirement R1 "The system shall process all keyboard strokes quickly, in order for a user to not be disturbed by latency" is not valid	R1 is not quantifiable (measurable)	☐

Question 2. Match-assignment: Problem sources (4p)

This part of the exam consists of a *match-assignment* where different alternatives shall be matched with the most suitable, proposed, alternative. A correct answer gives **0.5 points**, while incorrect or missing answers gives 0 points even if you are partially correct in your answer!

	Requirements state
A	Programm Error
B	Requirement Defect
C	Usability Problem

Match an alternative from the list above (A-C) with the most suitable alternative in the table below (1-8). The same letter may be the answer in more than one row of the table; some letters may not be the answer in any row. Only one letter (A-C) shall be placed on each row!

	Description	*Answer A|B|C*
1) **(0.5p)**	It is impossible to carry out the user registration task.	☐
2) **(0.5p)**	The user erroneously believes that the registration task is completed.	☐
3) **(0.5p)**	The user can register after lengthy attempts.	☐
4) **(0.5p)**	The user registration functionality does not work as the programmer had intended.	☐
5) **(0.5p)**	The system does not provide the necessary fields to store user data.	☐
6) **(0.5p)**	The system crashes when the user attempts to store user data.	☐
7) **(0.5p)**	The user is asked to include between 2 to 4 digits in the new password. The program only checks whether the password includes any digits.	☐
8) **(0.5p)**	The user thinks he has updated the password successfully, but the system requires the user to confirm the new password to complete the updating task.	☐

Part 2: Apply RE Knowledge (10p)

Question 3: Usability requirements and risk (10p)

Ms. Taylor has been in contact with Requirements Engineered Ltd., a company specialized in Requirements Engineering and bespoke development, to realize one of her project ideas. The company has worked for several months to come up with a specification. Now, Ms. Taylor would like to move to the next step and sign a contract for development of the resulting specification. She has asked you, as an expert in Requirements Engineering, to give her a second opinion on the following requirements.

R1	At most 1 of 5 novices shall encounter critical problems during tasks Q and R. At most 5 medium problems shall be encountered in total.
R2	Novice users shall perform tasks Q and R in 15 minutes. Experienced users shall perform tasks Q, R, and S in 2 minutes.
R3	Recording breakfast shall be possible with 5 keystrokes per guest. No mouse.
R4	80% of users shall find system easy to learn. 60% shall recommend system to others.
R5	Show 5 users 10 common error mesages, e.g. Amount too large. Ask for the cause. 80% of the answers shall be correct.

Which issues and risks do you see in these requirements? Name each issue/risk, argue whether it applies to supplier or customer, and motivate why you think it is problematic/risky.

Part 3 – Essays (40p)

For each topic below, write an essay that includes all of the listed concepts within the given maximum number of pages. The essays are graded based on

(a) how well the topic is described using the concepts in the list under each topic (thus judging the general flow and argumentation), and
(b) how well the concepts in the list are described and/or exemplified in the essay (thus, points are given for each concept that is mentioned and explained in sufficient depth).

Please make an effort to write readable. Essays that are difficult to read or difficult to understand will render a deduction of received points. An unreadable essay will receive zero points! Each essay should start on a new sheet of paper.

Question 4: Topic: Difficulties of Elicitation **(10p)**
Max 1 page!
List of concepts: Gulfs of understanding, symmetry of ignorance, tacit knowledge, stakeholder, interviews

Question 5: Topic: Managing Quality Requirements **(10p)**
Max 1 page!
List of concepts: Quality Grid, Planguage, Open Metric, Relationship to Functional Requirements

Question 6: Topic: Agile Requirements Engineering **(10p)**
Max 1 page!
List of concepts: Agile RE practice, Challenge in Traditional RE Solved by Agile RE, Challenge of Agile RE, Breadth-First RE, Just-in-time RE

Question 7: Topic: Data Requirements (**10p**)
Max 1 page!
List of concepts: Data model, Data dictionary, Virtual Windows, Specify Quality of Data, Relationship to Functional Requirements