

# **SE-2001: Software Requirements Engineering**

Serial No:

**Sessional Exam-1**

**Total Time: 1 Hours**

**Total Marks: 70**

Tuesday, 26<sup>th</sup> September, 2023

## **Course Instructors**

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Signature of Invigilator

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Student Name

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Roll No.

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Section

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**DO NOT OPEN THE QUESTION BOOK OR START UNTIL INSTRUCTED.**

### **Instructions:**

1. Attempt on question paper. Attempt all of them. Read the question carefully, understand the question, and then attempt it.
2. No additional sheet will be provided for rough work. Use the back of the last page for rough work.
3. If you need more space write on the back side of the paper and clearly mark question and part number etc.
4. After asked to commence the exam, please verify that you have Eleven (11) different printed pages including this title page. There are a total of Four (4) questions.
5. Answers of **Question 4** must be provided on the attached Grid sheet.
6. Use permanent ink pens only. Any part done using soft pencil will not be marked and cannot be claimed for rechecking.

	<b>Q-1</b>	<b>Q-2</b>	<b>Q-3</b>	<b>Q-4</b>	<b>Total</b>
<b>Marks Obtained</b>					
<b>Total Marks</b>	<b>10</b>	<b>15</b>	<b>8</b>	<b>37</b>	<b>70</b>

# National University of Computer and Emerging Sciences

FAST School of Computing

Fall-2023

Islamabad Campus

Question 1	Marks (5+5) 10
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## Case Study

JazzN!ghts is a famous Jazz festival, held in Zurich every year. Since its first edition in 1986, it has gone through several major changes regarding its structure, length and location, but the tickets have always been sold in a traditional way through two events agencies. The organizers decided to completely modernize the tickets selling system and created the following concept:

*“From this year on, the tickets will be sold in three distinct ways: traditionally, i.e. by the two events agencies, in electronic format directly on the festival website, and through SBB. All parties will have access to the same unique tickets database of the new system, to avoid double selling. A partnership with the SBB railway company needs to be set up, such that SBB can sell combi-tickets including both the festival admission fee and the train ride to the festival venue at reduced price, from anywhere in Switzerland. This way, more music fans would have easier and cheaper access to JazzN!ghts. Moreover, the system will have to be extended to support not only German, but also English, French and Italian. Since tickets will also be sold online, SecurePayment Inc. will be contracted to provide and ensure the security of the online payment service. The JazzN!ghts event manager will take care and negotiate all these details with the involved parties. Additionally, upon arrival at the festival venue, each participant has to self-check in at a touch screen terminal, which scans the barcodes on his/her ticket and issues a bracelet with an electronic chip. This can be used to load money, such that whenever (s)he wants to purchase snacks or beverages, (s)he does not have to use cash any more, thus reducing waiting times. This measure was initiated by the program manager and will be deployed by WristSolutions Inc. Lastly, according to the cantonal laws, the way the payment transactions are performed has to be audited by an external company at the end of the festival, since this is a public event, where the municipality of Zurich is also involved - allowing free use of the public space.”*

**a) Identify and name all the stakeholders of the JazzN!ghts new tickets selling system (5).**

1. Event agencies
2. SBB railway company
3. Event manager
4. Participants
5. Program manager
6. wristSolutions
7. External audit company
8. municipality of Zurich

Atleast 5 stakeholders must be listed

**b) Identify Three functional requirements and two non-functional requirements in the case study. (3+2)**

*All parties will have access to the same unique tickets database of the new system, to avoid double selling.*

*SBB can sell combi-tickets including both the festival admission fee and the train ride to the festival venue at reduced price, from anywhere in Switzerland.*

*the system will have to be extended to support not only German, but also English, French and Italian.*

*Upon arrival at the festival venue, each participant has to self-check in at a touch screen terminal, which scans the barcodes on his/her ticket and issues a bracelet with an electronic chip.*

NFRs:

Usability (e.g. system should be easy to use to allow self-check-ins)

Security (e.g. secure transactions)

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Question 2

3+6+4+2+2 (15)

Provide brief and concise answers:

1. Why are elicitation techniques recommended to be used in combination? Why a single elicitation mechanism is not sufficient? (3)

One single elicitation technique cannot cover all aspects of underlying knowledge (unconscious, sub-conscious, conscious). Infact different elicitation techniques are essential to gather dissatisfiers, delighters and satisfiers. For instance techniques suitable for elicitation of conscious requirements such as surveys, are not suitable for dissatisfiers.

2. Elaborate the difference between the following concepts? (6)

a) brainstorming and brainstorming paradox

b) Bionics and Bisociation

c) System archaeology and Perspective-based reading

**As highlighted in the IREB's book**

- (a) What are the four most essential skills required by a Business Analyst/System Analyst? List them according to their priority with most essential skill on top.? (4)

1. Identifying stakeholders and deciding suitable elicitation mechanisms to gather requirements from different stakeholders
2. Transform/convert the business requirements into Technical requirements
3. Develop requirements specification in a manner ensuring that specifications are complete, coherent, consistent, and unambiguous
4. Design wireframes, prototypes, NFPs to demonstrate application workflows.
5. Conflict resolution strategies and negotiation skills to establish a consensus across the board.
- 6.

- d) You work as a business analyst on a project to which a few years ago a forerunner project existed. During this earlier project the requirements were documented with high quality. You decide to reuse a large part of the old specification. (2)

The requirements are classified according to the Kano model. Which of the following statements are correct and which are false?

- A. In principle, the current delighters must be determined again. correct**
- B. The current satisfiers are typically fully covered by the former delighters.
- C. The former satisfiers are partially passed into the current dissatisfiers. correct**
- D. The former satisfiers and dissatisfiers need to be checked for completeness against the market trend. correct**

- e) You are working on a Term project/ Final Year project. What elicitation techniques would you use to elicit system requirements from stakeholder(s) and why? (2)

They must be able to justify their choices of elicitation techniques in the light of kano's model

- a) An automated ticket-issuing system sells rail tickets. Users select their destination and input a credit card and a personal identification number. The rail ticket is issued and their credit card account charged. When the user presses the start button, a menu display of potential destinations is activated, along with a message to the user to select a destination. Once a destination has been selected, users are requested to input their credit card. Its validity is checked and the user is then requested to input a personal identifier. When the credit transaction has been validated, the ticket is issued.

List down set of User's Quality concerns that you think ticket-issuing system must incorporate and why?  
(4)

**1. Quality Concern A usability, ease of use**

Justification: so that general public can use the ticketing system conveniently.

**2. Quality Concern B reliability, fault avoidance**

Justification: during the operations, ticketing system must be able to resist any possible failures, crashes

**3. Quality Concern C accuracy**

Justification: information accuracy must be ensured for ticket and amount deducted.

**4. Quality Concern D accessibility**

Justification: so that ppl with disabilities and different age groups can use the system

Apart from these, security, operability, learnability, **performance (response time)**, and **availability** (uptime) are some of the major quality concerns. Student must be able to justify the four quality concerns he/she listed and there must be a solid justification.

- b) Among others, the customer demands from the contractor who is responsible for delivering an information system the following: (2)

- A. The contractor shall process a change request within five days.
- B. The test reports of the integration test are to be disclosed for examination, the test report of the system test is to be handed over.
- C. At any time, the system shall grant a throughput of 100 transactions per second.**
- D. For configuration management throughout the project, the tool Subversion has to be used.
- E. Under normal load the response time must not be more than two seconds in 90 percent of the cases.**

**Which two requirements place a *system constraint*?**

- A Requirement A

- B Requirement B
- C Requirement C
- D Requirement D
- E Requirement E

Question #4

37 Marks

Multiple choice / Scenario-based questions. (More than one answers may be required in certain cases)

1. Why questionnaires should be used as an elicitation tool? (2) (only two answers. If more than two answer, do the negative marking. Deduct 1 mark if more than two answers)

- A Relatively higher participation
- B Statistically relevant statements on requirements can be made.
- C Questionnaires allow the participants' understanding to be validated.
- D Questionnaires provide insights on delighters (excitement factors).
- E Questionnaires provide insights on dissatisfiers (basic factors).

2. You have to elicit requirements for sales software that will be used worldwide. In the initial elicitation of requirements, participants from all 30 branches should be involved. Project management has decided that for the documentation of the initial requirements a wiki system will be used. (2) (only single answer. If more than one answer, do the negative marking. Deduct 1 mark if more than one answers)

Which of the following statements is most likely correct?

*Comment: A wiki system is a web-based system that allows several people to work on one document collaboratively. The respective revisions are visible for all people involved. A prominent example of a wiki system is the online encyclopedia Wikipedia.*

- A. The approach makes no sense as a wiki system is not a requirements management tool.
- B. The approach makes no sense because the initial requirements analysis must be carried out through interviews done by a requirements engineer.
- C. The approach makes sense because all stakeholders can collaboratively work and comment on the initial requirements.
- D. The approach makes sense as wiki systems provides a history (of the modifications)

3. Why is requirements elicitation difficult? (2) (only single answer. If more than one answer, do the negative marking. Deduct 1 mark if more than one answers)

- a) Because there doesn't exist a suitable UML notation for requirements elicitation

b) Because it is difficult to identify the relevant stakeholders, and, once identified, the stakeholders have difficulties describing what they want/need

c) Because requirements can change over time

d) Because stakeholders don't understand use cases

**4. Which of the following statements best characterizes the relationship between a requirements engineer and a stakeholder in the role of a tester? (2) (only single answer. If more than one answer, do the negative marking. Deduct 1 mark if more than one answers)**

a) The requirements engineer delivers input for the work of the stakeholder

b) The output from the requirements engineer is managed by the stakeholder who also acts as Scrum Master

c) The requirements engineer delivers input for the stakeholders who adapt it for the product owner

d) The stakeholder monitors the work of all involving the requirements engineer

5. During the requirements engineering process for an online database you find that data protection regulations do not apply, as the data processed by the system is anonymized.

**What will be influenced by this finding? (2) (only single answer. If more than one answer, do the negative marking. Deduct 1 mark if more than one answers)**

A The system boundary

**B The context boundary**

C System interfaces

D Gray zone of the system boundary

6. You are employed as requirements engineer in a company that develops Industrial control systems (ICSs). During your work it becomes increasingly evident that the developers are very aware of the necessary requirements, even though the requirements are not documented in their entirety. Nevertheless, you decide to document requirements systematically. **Which of the following arguments you should not use as the justification of this systematic documentation? (2) (only single answer. If more than one answer, do the negative marking. Deduct 1 mark if more than one answers)**

A. ... implementation without documented requirements is not possible.

B. ... non-documented requirements are difficult to negotiate between the stakeholders.

C. ... the coverage of the requirements by means of test cases cannot be checked.

D. ... Without systematic documentation of the requirements, overall effort and size of the software can not be estimated in a credible manner.

**7. Which of the below is included in the definition of system and system boundary? (2) (only single answer. If more than one answer, do the negative marking. Deduct 1 mark if more than one answers)**

A The affected software component

B The necessary dialogues between the application



- C The interfaces between the system and its environment
- D The required capacity of the system
- E Costs of the project

**8. Which of the following statements about elicitation techniques are true? (2) (only single answer. If more than one answer, do the negative marking. Deduct 1 mark if more than one answers)**

- A An interview is a survey technique.
- B Change of perspective is an observation technique.
- C System archaeology is an observation technique.
- D Apprenticing is a creativity technique.

**9. What is the *system context*? (1)**

- a) Part of the system environment that is relevant for the definition as well as the understanding of the requirements
- b) A specific context that can only be interpreted correctly by the business analyst
- c) **It is the context that separates the system to be developed from its environment**
- d) All aspects within the system

**10. What is a disadvantage of survey techniques? (1)**

- a) **Can't uncover subconscious requirements**
- b) Time consuming
- c) Costly in any scale
- d) Gathers requirements that the requirement engineer already knows

**11. Which sentence best characterizes the term *requirement*? (1)**

- a) A thing that is needed or wanted.
- b) A thing that is compulsory; a necessary condition.
- c) **A condition or capability needed by a user to solve a problem or achieve an objective.**
- d) A condition or capability needed by a user to solve a range of problems.

**12. Which of the following is not a type of requirement source? (1)**

- a) Stakeholders
- b) Legal documents
- c) Systems in operation
- d) **obsolete document**

**13. Under the Kano model, dissatisfiers are concerned with: (1)**

- a) **Subconscious properties**
- b) Conscious properties
- c) Unconscious properties
- d) System properties that the stakeholder does not know or expect and discovers only while using the system

**14. System archaeology belongs to what kind of group of techniques? (1)**

- a) Support techniques
- b) **Document-centric techniques**

- c) Observation techniques
- d) Creativity techniques

**15. Which of the following aspects may influence the context of a system? (1)**

- a) People**
- b) Systems not in operation
- c) Former events
- d) Obsolete documentation

**In Scrum, requirements are called: (1) not included**

- a) User stories**
- b) Features
- c) Requirements
- d) Epics

**16. You have identified opportunities and challenges to a process. In which document is the result most likely documented? (1)**

- a) Project scope description
- b) Vision document**
- c) Statement of the problem
- d) Project charter

**17. Which role is responsible for communicating the needs assessment in Scrum to the development team? (1)**

- a) The development team
- b) The product owner**
- c) The Scrum Master
- d) The business analyst

**18. Why is it important for the business analyst to define the system context? (1)**

- a) To know which systems are to be developed**
- b) To know which systems are not included
- c) Because the system context includes the constraints
- d) Because the system context includes the systems attributes

**19. Requirements elicitation may derive from stakeholders (individuals or groups) and other sources. Which other sources? (1)**

- a) Legacy systems
- b) System documentation
- c) Lessons learned
- d) All of the above**

**20. You need to elicit the Satisfiers from the Kano model. Which techniques would be most suitable? (1)**

- a) Survey techniques**
- b) Observation
- c) Creativity techniques
- d) Document-centric techniques

**21. Which factor most influences the choice of elicitation techniques? (1)**

- a) The quality expectations
- b) The business analyst's lack of experience with a particular elicitation technique
- c) Distinction between conscious, unconscious, and subconscious requirements**
- d) Opportunity of risks

**22. Which of these are typical types of requirements? (1)**

- a) Functional requirement**
- b) Constraints**
- c) Quality requirement**
- d) Risk-based requirement

**23. The vision document defines: (1)**

- a) High-level scope**
- b) The risk management plan
- c) All needed inputs to the project charter
- d) All of the above

**24. The business case is important because it: (1)**

- a) Justifies IT investments**
- b) Contains a cost-benefit analysis
- c) Justifies costs
- d) Includes financial measurements

**25. Which of the following activities is not a core activity of the requirements engineer? (1)**

- A Requirements negotiation
- B Formalizing requirements**
- C Documenting of requirements
- D Requirements validation

**26. Why the presence of customer representative is essentially required in Agile projects? (1)**

- a) The project leader has obligation to report customer representative
- b) Customer representative is the main judge of the business value**
- c) Customer representative can dictate the project plan
- d) All of the above

**27. "Consider a system where, a heat sensor detects an intrusion and alerts the security company." What kind of a requirement the system is providing? (1)**

- A. Non-Functional
- B. Functional**
- C. Known Requirement
- D. None of the mentioned

**28. What is the best elicitation technique for dissatisfiers? (1)**

A Interview

B Questionnaire

**C Field observation/Social Analysis**

D prototyping

E Brainstorming

**29. The prototyping model of software development is: (1)**

a) A reasonable approach when requirements are well understood

**b) A useful approach when customers are unable to define requirements clearly.**

c) Very convenient and adaptable to large-scale software projects

d) A risky model that rarely produces any meaningful product.