University of Ruhuna - Faculty of Technology

Bachelor of Information and Communication Technology
Level 2 (Semester 2) Examination - April 2019
Course Unit: ICT2233 Software Engineering (Theory)   **Time: 2 hours**

Answer all **four** questions

1.

a)	Define three types of software applications and give a suitable example for each of them.	(6 marks)
b)	Briefly describe the following attributes of good software.	(4 marks)

    I.   Maintainability
    II.   Dependability
    III.   Efficiency
    IV.   Usability

c)	'Developing large complex software applications are very challenging.' Briefly explain this statement.	(5 marks)
d)	What is the old computer system that requires a change? Briefly explain why it must change.	(5 marks)
e)	"Software failure is the situation resulted due to the catastrophic failure of software development that leads to the incomplete performance of software products." Explain the reasons for software failure.	(5 marks)

2.

An organization specializing in dress delivery in Sri Lanka requires an online order processing system to be developed. It should be easy-to-use by its employees and should provide a good response time such as less than five seconds. Orders are received from customers online (through the Internet). The customer must state the items, quantity, and expected delivery deadlines. The orders are recorded and prioritized according to transport capacity, delivery deadlines, and time of order.

Then, the system will provide the total price of the order and the possible delivery times. Finally, the customer has the option to confirm or reject the order.

Answer the following questions based on the scenario given above.

a) List two (02) functional requirements of the above software system.   (2 marks)

b) Identify two (02) non-functional requirements of the above software system.   (2 marks)

c) Suggest three (03) stakeholders of the above system and briefly explain in   (6 marks)
    which way they are interested about this system.

d) Discuss how the response time of a software system affects the overall user   (2 marks)
    experience.

e) i)   Name a suitable software process model for the above scenario.   (2 marks)

    ii) Justify the reason for the answer provided in 2) e) i).   (3 marks)

    iii) Explain the mentioned process models with clearly labeled diagrams.   (8 marks)

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3.

A software process model is a group of related activities that use to construct software. Many different models exist and are used; but, specially Waterfall model, Prototyping, Incremental development, Spiral model and Agile process model are the widely used basic models.

a) Consider the above five (5) process models and explain the features of the software projects that are suitable for each of these models. **(5 marks)**

    I.   Waterfall Model

    II.   Incremental Development

    III.   Spiral Model

    IV.   Prototyping

    V.   Rapid Application Development

b) "A good software will have low coupling and high cohesion." Justify your answer. **(5 marks)**

c) Draw a high-level use case diagram for a Hotel Management System. It should include minimum five use cases with possible <<include>> and one <<extend>> connections and two actors. **(10 marks)**

d) Consider the five programming languages given below. Select the most suitable programming language for each of the following applications in I-V. **(5 marks)**

Programming Languages: Java, C, SQL, HTML, and Fortran

    I.   Database system for a banking system

    II.   Web application for the airline reservation system

    III.   Webpage for a university

    IV.   Operating system application

    V.   Numerical weather prediction application

4.

a) Describe the importance of software testing. (5 marks)

b) State three differences between "Verification" and "Validation" (6 marks)

c) Identify software metrics that are applied in Quality Management Processes. (3 marks)

d) Briefly explain how software metrics are applied in Quality Management Processes. (6 marks)

d) A software company is developing a software system for taxi booking. The company team has identified the following information and decided the major milestones. (5 marks)

Task	dependencies	Duration(days)
T1	-	4
T2	T1	3
T3	T1	5
T4	T2	2
T5	T3	1
T6	T3	5
T7	T4, T5	8
T8	T6, T7	5

Consider the task durations and dependencies from the above table and draw an activity diagram.

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