University of Ruhuna - Faculty of Technology

Bachelor of Information & Communication Technology Honours Degree
Level 2 (Semester II) Examination, November/December 2022
Academic year 2020/2021

Course Unit: ICT 2233 Software Engineering (Written) **Duration: 2 hours**

This question paper contains **four (04) pages** including this instruction page.

IMPORTANT INSTRUCTIONS

- The medium of this examination is **English**.
- This is a **Closed Book** examination.
- This Examination consists of **four (04)** questions that are given equal marks.
- You must **answer all four (04) questions** in this examination.

1.

a) "*Software engineering is an engineering discipline that is concerned with all aspects of software production*"

i. Briefly explain what is a software.

ii. "Legacy software must be changed"; explain this statement by giving **two (02)** reasons.

b) "*The software requirements are description of features and functionalities of a target system*"

i. Describe requirements engineering (related to software projects) in your own words.

ii. Briefly explain the **four (04)** main activities associated with requirements elicitation and analysis process using a suitable diagram.

c)

i. Briefly explain the configuration management process.

ii. A change in the configuration of a product has to follow main six (06) steps; such as identification, validation, **analysis, control**, execution and close request. Briefly explain the following **two (02)** steps.

I. Analysis
II. Control

d) Give **two (02)** differences between *centralized version controls* and *distributed version controls*.

2.

a) Consider the following scenario to answer the questions ii-vi.

A Pizza company requires to develop an online Pizza delivery order processing system. The system should be easy to use by its employees, and should provide a good response time of less than 5s. Orders are received from customers online who must state the items and expected delivery deadlines. The orders are recorded and prioritized according to preparation time, transport capacity, delivery deadlines, and time of order. This system will output the order-price, and the delivery time. The customer then has the option to confirm or reject the order.

i. Briefly explain the difference between functional and non-functional requirements.

ii. Identify **three (03)** functional requirements of the above system.

iii. Identify **two (02)** non-functional requirements of this system.

iv. Identify **two (02)** stakeholders of this system.

v. Discuss how the response time of a particular software system affects the overall user experience.

vi. Suggest a suitable **software process model** for the above scenario. Justify your answer.

b) You are required to develop a web-based system to help students to practice for IELTS academic writing test. The proposed system has the following functionalities.

- Student can request a paper from the system after registering to the system.
- Student has to pay a subscription to get registered.
- Once a student request is made, a question paper will be generated by the system by picking questions available in the database.
- Questions will be verified by the moderators before the system provide them to the students.
- Also, there are certified examiners who will correct the question papers answered by the students and provide marks after students attempt the paper.
- Furthermore, examiners will provide feedbacks to the students if requested.

Create a high-level use-case diagram to model this system.

Use **at least one (01) <<extend>>** and **two (02) <<include>>** relationships in the use-case diagram.

3.

a) Using suitable examples, explain the terms *verification* and *validation*.

b) Briefly explain the followings:
   i. Acceptance testing
   ii. Regression testing

c) Explain the importance of *software testing* since early stages of software development life cycle.

d) "Trendy" is a popular online-clothing company in Sri Lanka. There are several departments in the company namely, finance, management, sales and information technology (IT). All the activities related to the website is handled by the IT department. With the economic crisis the top management has decided to cut down the budget allocated for the maintenance of the website. Moreover, most of the well-experienced members in the IT department's development team are leaving the company.

   i. Explain what do you understand by *risk management* in software engineering.

ii. Identify **two (02)** risks stated in the above scenario and explain the effect/s of them to the IT department.

e) "*In software Engineering, design phase focuses on transforming requirements into implementable version of the software system*".

i. Using **two (02)** key points explain why software designs are important.

ii. Briefly explain the terms *cohesion* and *coupling* and how they are related to one another.

4.

a)

i. Briefly explain *software quality management.*

ii. "*Standards define the required attributes of a process or product*". State **two (02)** importance of standards with respect to software products.

iii. State **two (02)** common coding standards that needs to be followed to enhance the quality of codes.

b)

i. Briefly describe the terms given below.
   I. Pair Programming
   II. Refactoring
   III. Test automation

ii. "*Scrum approach is a general agile method*". Write down **two (02)** benefits of using Scrum approach for software development.

iii. Identify **five (05)** principles of *Agile methods* and briefly explain any **two (02)** of them.

iv. "*In agile development, it is more important to build software that meets the customer's current needs than worrying about features that might needed in the future*".
Do you agree with the above statement? Justify your answer.

End of Paper