



University of Kelaniya – Sri Lanka
Centre for Distance and Continuing Education
Bachelor of Science (External) First Year Second Semester - 2024
2026 – March
Faculty of Science
Software Engineering
COSC 17032

No. of Questions: Four (04)

No. of pages: Three (03)

Time: Two (02) Hours

Answer ALL questions

1.

a.

- i. List the **five** (05) phases of the Software Development Life Cycle (SDLC). (10 Marks)
- ii. Describe **two** (02) issues that could arise in a software project, if Software Engineering practices are not followed. (10 Marks)
- iii. State **three** (03) attributes of good software. (10 Marks)
- iv. Briefly explain **three** (03) application software types you have used. (10 Marks)
- v. Discuss **two** (02) advantages and **two** (02) disadvantages of following the Spiral Development Process during software development. (20 Marks)

b.

National Union Bank (NUB) is developing a Core Banking System to manage customer accounts, transactions, and loan processing across all its branches. Prior to development, the bank's IT and compliance division has produced a comprehensive requirements specification covering all functional requirements, security standards, and banking regulatory guidelines. These requirements have been formally approved by senior management and cannot be modified during development due to strict financial regulations and audit requirements. The system must be fully delivered within a fixed 24-month contract and must pass a formal compliance audit before going live.

Based on the above scenario:

- i. Out of the Waterfall, Agile, and Spiral models, which software process model is the most appropriate for this project and why? (20 Marks)
- ii. Provide reasons why the other two models are not selected for this project. (20 Marks)

....[Total 100 Marks]

2.

a.

- i. List **three** (03) Agile principles from the Agile Manifesto. (12 Marks)
- ii. Agile methodologies are widely used in modern software development. Briefly explain **three** (03) advantages of using Agile methodologies. (12 Marks)
- iii. Describe **two** (02) ceremonies conducted during a Sprint in the Scrum development process. (15 Marks)
- iv. Briefly explain the difference between a product backlog and a sprint backlog. (10 Marks)

- b. Apollo Private Hospital is developing an Online Patient Appointment and Medical Records System to streamline patient care across its departments. Patients can register online, search for available doctors, book appointments, and view their medical history through the system. Doctors can access patient records, update diagnoses, and issue digital prescriptions. The reception staff can manage appointment schedules, track walk-in patients, and generate daily reports. The system ensures fast response times, high availability during peak hours, and secure handling of sensitive patient data in compliance with medical privacy regulations. It is designed to run on both desktop and mobile devices, supported by reliable servers to handle high traffic and multiple simultaneous users.

Based on the above scenario:

- i. List **five** (05) functional requirements of this system. (20 Marks)
- ii. List **three** (03) non-functional requirements of this system. (9 Marks)
- iii. Identify **four** (04) stakeholders of this system. (12 Marks)
- iv. Suggest **one** (01) requirement elicitation (gathering) technique suitable for this project and justify your answer. (10 Marks)

....[Total 100 Marks]

3.

a.

- i. What is system modelling? (10 Marks)
- ii. What are the **two** (02) categories of UML (Unified Modeling Language) diagrams? Provide **two** (02) examples for each category. (10 Marks)
- iii. Briefly describe the aggregation relationship used when drawing a class diagram. (15 Marks)

- b. CityFit Gym is developing a Gym Management System to manage its members and fitness services. Each user has a name, email, and phone number. Members have an additional membership ID, membership type, and join date. They can register for fitness classes, view their class schedule, and cancel registration. Trainers have an employee ID and specialization. They can create fitness classes and track member attendance. The system stores details about fitness classes, including class ID, class name, schedule, and maximum capacity. Each class is conducted by one trainer and can have many members. A booking record is maintained with a booking ID, booking date, and status (confirmed or cancelled), linking a member to a specific fitness class.

Based on the above scenario:

- i. Draw a Use Case Diagram for this system. (20 marks)
- ii. Draw a Class Diagram for this system. (20 marks)

c.

- i. State **two** (02) benefits of following software architecture to develop a system. (5 Marks)
- ii. List **two** (02) types of software architecture patterns and briefly explain them. (20 Marks)

[Total 100 Marks]

4

a.

- i. Briefly explain **two** (02) Object Oriented Programming (OOP) concepts. (10 Marks)
- ii. Why are coding standards followed during software implementation? (10 Marks)
- iii. Explain the importance of using version management during software implementation (10 Marks)

iv. List **three** (03) Integrated Development Environments (IDEs) used for software implementation. (5 Marks)

b.

i. What is Verification and Validation in the context of testing a software application? (10 Marks)

ii. "*Black-box testing requires testers to have a thorough knowledge of the internal code and structure of the application being tested.*"

Is this statement true or false? Justify your answer. (15 Marks)

iii. List **two** (02) automation testing tools used in the software industry. (5 Marks)

c.

i. Define the term *change request* in the context of software evolution and describe the steps involved in implementing a change request. (20 Marks)

ii. Briefly explain **three** (03) types of software maintenance that can occur during software evolution. (15 Marks)

[Total 100 Marks]

*** END OF PAPER ****