

Course: CS 3332 – Software Engineering 1

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Duration: 90 minutes

Total of pages: 01

Total marks: 100

Student name:

Student ID:

Note: - **Open book (Students can use any learning materials);**
- **No electronic devices.**

Q1. Multiple choice: Circle the correct answer (30 points)

Q1.1 - In requirements engineering, which type of model specifically focuses on describing how the system communicates with external entities such as users or other systems, emphasizing the flow of events during exchanges?

- A. Structural Models
- B. Behavioral Models
- C. Interaction Models
- D. Context Models

Q1.2 - Which type of model is primarily used to define the boundaries of a system and show its relationship with external entities, without detailing the internal structure?

- A. Context Models
- B. Structural Models
- C. Interaction Models
- D. Behavioral Models

Q1.3 - When requirements engineers want to represent the organization of a system in terms of components and their relationships, which model is most appropriate?

- A. Behavioral Models
- B. Structural Models
- C. Interaction Models
- D. Context Models

Q1.4 - Which model emphasizes the dynamic aspects of a system, such as how it responds to events or changes in state over time?

- A. Interaction Models
- B. Context Models
- C. Behavioral Models
- D. Structural Models

Q1.5 - In software architecture, which concept refers to presenting the system from different perspectives to address the concerns of various stakeholders, such as developers, users, and managers?

- A. Architectural Patterns
- B. Architectural Styles
- C. Architectural Models
- D. Architectural Views

Q1.6 - Which architectural concept captures the typical organization of software systems within a specific application domain?

- A. System Architecture
- B. Application Architecture
- C. Repository Architecture
- D. Client–Server Architecture

Q 1.7 - A software engineer reuses a proven solution that describes how objects should interact to solve a recurring software design problem, independent of a specific programming language or application. What is this solution called?

- A. Architectural Pattern
- B. Design Pattern
- C. Application Framework
- D. Software Component

Q1.8 - A software company builds a product by publicly sharing its source code, allowing external developers worldwide to inspect, modify, and contribute improvements through a collaborative process. Which software development approach is being used?

- A. Component-Based Development
- B. Agile Development
- C. Open Source Development
- D. Reuse-Oriented Development

Q1.9 - During software design, engineers create diagrams and representations to describe the system's structure, interactions, data organization, and behavior before implementation. What are these representations collectively called?

- A. Architectural Patterns
- B. Design Models
- C. Software Components
- D. Design Patterns

Q1.10 - Which type of testing is performed directly by programmers during implementation, focusing on unit and component verification before the system is passed to independent testers?

- A. System Testing
- B. Regression Testing
- C. Development Testing
- D. Acceptance Testing

Q1.11 - Which type of testing is carried out on a complete version of the system before delivery, focusing on validating that the software meets its requirements and is acceptable to the customer?

- A. System Testing
- B. Regression Testing
- C. Acceptance Testing
- D. Release Testing

Q1.12 - Which development approach requires writing automated tests before implementing the corresponding code, ensuring that the software is incrementally built and validated against its specification?

- A. Regression Testing
- B. Test-driven Development
- C. Release Testing
- D. Unit Testing

Q1.13 - Which activity in the software lifecycle involves modifying a system after it has been delivered to correct faults, improve performance, or adapt it to a changed environment?

- A. Software Maintenance
- B. Software Evolution
- C. Software Refactoring
- D. Software Re-engineering

Q1.14. - Which concept in software engineering describes the set of activities involved in systematically modifying and adapting a software system after its initial development, ensuring it continues to meet changing requirements and environments?

- A. Software Maintenance
- B. Evolution Processes

- C. Software Re-engineering
- D. Software Configuration Management

Q1.15 - Which term refers to long-established software systems that are still in use, often critical to business operations, but difficult to modify due to outdated technologies and documentation?

- A. Software Maintenance
- B. Legacy Systems
- C. Software Evolution
- D. Software Re-engineering

Q2. (20 points): In 2026, the Ministry of Education of Vietnam aims to enhance the quality of university admissions. Several changes have been introduced, but the existing system is no longer sufficient. At Hanoi University of Science and Technology (HUST), the student management system is considered a critical business asset, and the institution seeks to preserve its value. However, developing a new system requires a large budget.

Question: As a system analyst, propose a comprehensive solution to address this situation. Your answer should consider both the preservation of existing assets and the implementation of new requirements. In order to solve this problem, sketch and explain shortly the activities you would carry out in this process.

Q3. (30 points): The dean of the Faculty of Engineering asks you to develop a student's management system for his faculty. Sketch the student's database for this system (hint: the answer should be table). Select 05 attributes and for each, write 04 test cases representing correctness and incorrectness.

Q4. (20 points): Based on your experience with a bank ATM, draw an activity diagram that models the data processing involved when a customer withdraws cash from the machine.