B.Sc. Engg. / HD CSE 5ᵗʰ Semester

8 March 2018 (Afternoon)

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION

WINTER SEMESTER, 2018-2019

DURATION: 1 Hour 30 Minutes

FULL MARKS: 75

CSE 4513: Software Engineering and Object Oriented Design

Programmable calculators are not allowed. Do not write anything on the question paper.
There are **4 (four)** questions. Answer any **3 (three)** of them.
Figures in the right margin indicate marks.

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1. a) Define Software and Software Engineering. Draw and describe the failure curve of Hardware and Software. — 3+3

   b) What is Legacy Software? Describe how the legacy software can turn into modern reusable software. — 2+3

   c) What is Pareto Principle? Following table shows the number of faults found during testing phase of software. Using pareto principle, identify which errors need to be removed first in order to enhance the software quality. — 3+7

   Table 1: Table for question 1(c)

Error Name	Count
Input Field Exception Handling	130
Buffer overflow	60
Array Index Invalid	41
Improper Resource Allocation	39
Improper Branch Handling	19
Infinite Loops	7
Null Pointer Reference	85
Incompatible Types	5
Error initialization	94
Missing return type	2

   d) What are the two major requirements FURPS emphasize on? State the name of the quality attributes covered by FURPS. — 2+2

2. a) Assume one of your software projects and describe the four major practices to follow in order to solve the problem. — 8

   b) Assume, an online library management system. It provides an easy book management platform for the students, teachers and librarians. The librarian can add, delete, upload, issue books, add or remove teacher and student profiles etc. On the other hand, teacher and students can view, search and request for books. — 10
   Given the scenario, identify the data entities of the system. Later, draw the Entity Relationship and Schema Diagram of the scenario.

   c) Describe the main roles and their expectations associated with Software Quality Management. — 2

   d) "XYZ is a known software firm for its high quality software development strategy. The company has set standard rules for companywide project development. Besides, the company ensures high quality software by measuring the quality attributes regularly for enhanced — 5

software performance." - Why and Which CMM level the company has achieved? What are the Key Process Areas (KPA), the company ensured for achieving this level?

3. a) "Consider a hotel management system used by hotel staffs and external users to book hotel rooms online. The system has also features like showing nearby visiting spots and travel details for ease of users". Given the scenario, draw the Architectural Context Diagram of the system. 5

   b) What is SCRUM? How can it help in adaptive software development? 5+2

   c) Identify and explain the Generalization, Aggregation and Composition relationships in the following diagram: 6
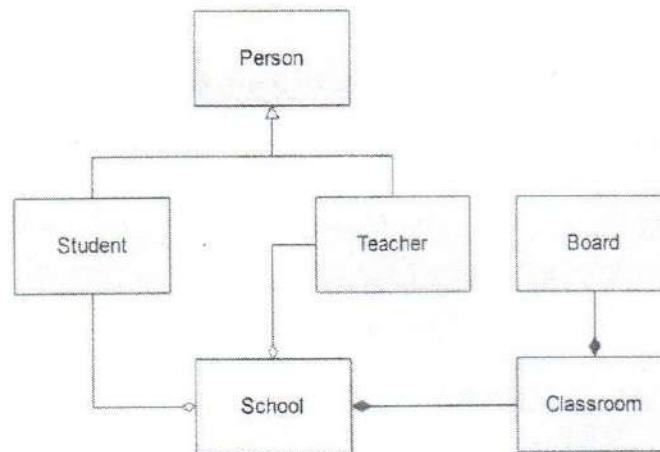

Figure 1: Diagram for question 3(c)

   d) Due to human misconception or information lack, defects get injected into the software system. Using which techniques, those injected defects could be removed? 7

4. a) Write short notes on - Reliability, Dormant Faults, Fishbone Diagram and Extreme programming. 6

   b) Identify and justify which process model will you follow for each of the following software development problems: 6

      i.   An international insurance company wants to offer a huge number of insurance policies to its customers. The company requires a website where the customers can manage the insurance policies. The company also aims to provide multilingual support in future for the worldwide customers.

      ii. The railway organization wants to support online ticket management system with the existing pre-specified functionalities. The organization wants the development team to deliver the software incrementally within some specified number of meetings.

      iii. There is a need of a small app for transaction management offered by a specific bank. The app will be used by that specific bank only. However, the customer wants the app to be tested properly before its delivery.

   c) Demonstrate and draw the relationship among software error, faults and failures. 5

   d) An ATM system has some user accounts where the accounts are protected through account number and pin number. After two failed attempts to insert a pin, the account is locked. If a user enters the right pin number, the user is allowed to perform some transactions like - checking balance, withdrawing and depositing money. A user is allowed to withdraw money if enough money is available in the corresponding user account.
   Now, Identify the events and draw a single state diagram considering these events associated to an "ATMAccount" class. 8