Reviewed!
19/12/25

COMSATS University Islamabad, Abbottabad Campus
Department of Computer Science
Final-Term Examination Fall 2025-26

Class: BCS-4 C&D **Date:** 24th Dec 2025

Subject: Software Engineering (CSC291) **Instructor:** Ayesha Bibi

Total Marks: 80 **Time Allowed:** 3 Hours

Name: _____ **Reg No:** _____

Q1. Understanding CLO-1 (10 Marks). Each part consists of 5 marks

a) **Explain** the following terms
i) Software Quality Assurance Activities ii) Formal Technical Review (FTR)

b) **Describe** Spiral model. models. Also discuss its pros and cons.

Q2. Analyzing CLO-2 (20 Marks). Each part consists of 10 marks

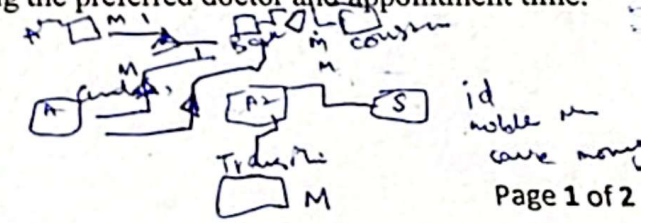
a) Pair programming is an agile software development technique in which two programmers work together at one workstation. One types in code while the other reviews each line of code as it is typed in. The person types are called the driver. The person reviewing the code is called the observer. The two programmers switch roles frequently (possibly every 30 minutes or less). Suppose that you are asked to build a system that allows Remote Pair Programming. That is, the system should allow the driver and the observer to be in remote locations, but both can view a single desktop in real-time. The driver should be able to edit code, and the observer should be able to "point" to objects on the driver's desktop. In addition, there should be a video chat facility to allow the programmers to communicate. The system should allow the programmers to easily swap roles and record rationale in the form of video chats. In addition, the driver should be able to issue the system to backup old work.
Describe in detail four non-functional requirements for the system.

b) **Analyze** the key tasks involved in Requirement Engineering towards the successful development and delivery of a software project?

Q3. Applying CLO-3 (20 Marks). Each part consists of 10 marks

a) Create a class diagram to operate an ATM machine. The classes to be included are Bank, customer, ATM, Account having current account and saving account types, as well as ATM transactions. List all the main attributes of each class as well as desired main operation of classes.

b) Construct a sequence diagram for a patient booking an appointment with a doctor by considering the following points.
1. The patient initiates a request by selecting the preferred doctor and appointment time.



CamScanner

2. The appointment scheduler object receives the request and checks the availability of the chosen doctor and time slot. If the doctor is available, the appointment scheduler confirms the booking and sends a confirmation message to the patient.
3. If the doctor is not available, the appointment scheduler suggests alternate time slots or doctors to the patient.
4. The patient responds with their preferred alternative.
5. The appointment scheduler updates the booking accordingly and sends a confirmation message to the patient.
6. The patient receives the confirmation, and the booking process is complete.

Q4. Applying CLO-4 (15 Marks)

a) You are developing a user authentication system for a web application. The system should handle user registration, login, and password management securely. Your task is to create test cases to ensure the correct functioning of these authentications.

Testable Functionalities:

1. User Registration
2. Login Authentication
3. Invalid Login Attempt
4. Password Strength Validation
5. Password Change

Q5. Applying CLO-5 (15 Marks)

a) Given a project was estimated with a size of 300 KLOC. Calculate the Effort, and scheduled time for development by considering the developer having high application experience and very low experience in programming. Use the following data for help. **(10)**

Software Project	a	b	c	d
Organic .	3.2	1.05	2.5	0.38
Semi-Detached	3.0	1.12	2.5	0.35
Embedded	2.8	1.20	2.5	0.32

b) As the project manager of a team developing an online shopping platform, how would you plan and estimate the development process to ensure successful delivery of the software? **(5)**