United International University
Department of Computer Science and Engineering
CSE 3421: Software Engineering   Final: Spring 2025

Total Marks: 40   Time: 2 hours

Any examinee found adopting unfair means will be expelled from
the trimester / program as per UIU disciplinary rules.

Answer all the questions. The numbers on the right of the questions denote their marks.

1. Design **UML diagrams** using the **appropriate design pattern** for the following scenarios:

   (a) Tekno is a code editor that can compile and run codes for C, C++ and Java. Recently the developers at Tekno want to shift to Python as it is high on demand. (4)

   (b) Tekno has a built in compiler system that optimizes compilation by using different algorithms for different programming languages. For C and C++, the compiler uses the X2 algorithm. For Java, Y7 algorithm is used. Z3 algorithm is applied for Python codes. (4)

2. (a) QuickPharma is a new online medicine delivery app. When users search for a medicine and it's out of stock, no message appears, the screen just looks empty. During checkout, users are not asked to confirm the order, leading to accidental purchases. Additionally, when trying to cancel an order, users find no "Cancel" button, and must go through multiple menus and settings to attempt contacting support, which often doesn't respond. Which of the **8 Schneiderman's Golden Rules** of Interface Design are **violated** in the above scenario? Justify with **reasoning** and **suggest design changes** to remedy the violations. (5)

   (b) What are the **steps in UI design**. Explain with a **simple example**. (3)

3. (a) You are developing a smart city management application for a municipality. The system includes features such as real-time traffic monitoring, public transport tracking, garbage collection scheduling, citizen complaint registration, and utility bill payments. The application needs to support different departments (transport, waste, utilities) and integrate IoT sensor data for traffic and garbage bin levels. Which **architectural pattern** will be best suited for the software above? Explain with **proper reasons**. Also explain how your selected architecture **functions**. (5)

   (b) What is the **difference** between **load testing** and **stress testing**? **When** should each be performed? (3)

4. (a) Farhan, a mid-level developer at a fintech company, was assigned to update the payment system. To save time, he reused outdated code from an old project without checking for compatibility or vulnerabilities. He discovered a bug that occasionally charged users twice but chose not to report it, assuming it wouldn't be noticed. He also shared part of the source code with a friend outside the company for help, violating confidentiality. When a junior developer pointed out the ethical concerns, Farhan dismissed him, saying, "This is how things work in the real world.". Which of the **ACM principles of ethics** are violated in the above scenario? Explain with **proper reasoning**. (5)

   (b) **Explain** the concept of **code smell** with relevant **example**. (3)

5. (a) Find the **Earliest Start, Earliest Finish, Latest Start, Latest Finish, Project Deadline, and Critical Path** using the **Critical Path Method** for the following tasks: (8)

Tasks	Duration	Precedents
A	15	C, F, K
B	10	D
C	5	-
D	15	-
E	10	C
F	10	B
G	5	E, A
H	25	D
I	5	-
J	20	K
K	10	I