United International University
Department of Computer Science and Engineering

CSE 3421: Software Engineering Final: Fall 2024

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. (a) Pookaburra is a cricket kit manufacturing company which produces the best quality cricketing equipments. They mainly produce bats, balls, and cricket gear. The raw materials required for the bats are wood(for the body) and rubber(for the grip). They produce two kinds of balls - white(for ODIs and T20s) and red(for Test cricket). The balls require wood and leather to produce. For gears, they mainly produce pads and helmets.
Draw an **UML Diagram** using an appropriate **Design Pattern** for the scenario above. (5)

   (b) **Explain** the usage of the **Singleton** pattern with **suitable diagram** (3)

2. (a) FoodTeddy is a new online food delivery application. This new software comes with a variety of problems. When an order is placed, the screen simply transitions to the home page of the app, and the user remains confused about the progress of the order. Tim once wanted to order a burger, but pressed on the pizza by mistake and his order was taken. When you are scrolling the menu of a restaurant, there is an add button to add the food to the cart. If you accidentally swipe right, this also adds the food to the cart. Which of the **8 Schneidermann's Golden Rules** have been **violated** in the above scenario? **Explain** with **proper reasoning**. Give **suggestions for features** that can be added to remedy these problems. (5)

   (b) **Explain** the **difference** between **Native app** and **Web app** using **suitable examples**. (3)

3. (a) Suppose you are building an educational platform for a university. This platform provides a range of options such as student-teacher counseling booking system, course and section selection, course file upload and distribution for teachers and grading and marking system for teachers.
Which **architectural pattern** will be best suited for the software above? **Explain** with **proper reasons**. Also **explain** how your selected architecture **functions**. (5)

   (b) **Explain** briefly the **architecture and working** of a **Docker** system. (3)

4. (a) Tim is very lazy and careless. He is implementing the AI Chatbot feature for the software. He copies and pastes boilerplate code for the Chatbot from various sources and does not even cross check whether the program runs well with the rest of the software. During the last update, Tim did not even let his boss know that there was a major bug in the software, due to his careless nature. His laziness also prevents him from adapting with new technology.
Which of the ACM **principles of ethics** are **violated** in the above scenario? **Explain** with **proper reasoning**. (5)

   (b) **Explain** the **differences** between **Load** and **Stress** testing with **proper examples** for each. (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	10	E, G
B	5	J
C	20	F
D	10	-
E	15	C
F	5	-
G	15	F
H	25	G
I	10	D
J	15	K
K	20	-