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Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Final Examination, Fall 2025

Course Code: CSE221, Course Title: Object Oriented Programming

Level: 2 Term: 2

Time: 02:00 Hrs **Marks: 40**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	Explain multithreading with its key advantages. Additionally, explain the life cycle of a thread, illustrating your answer with a properly labeled diagram.	**05**	**CO2**
2.	You are asked for designing an **Online Food Delivery System**.The system consists of three core entities: **Customer, Restaurant, and Order**.Analyze the relationships among these entities and determine the appropriate association types and multiplicities.Based on your analysis, create a UML class diagram showing all associations among the classes with accurate multiplicities.	**10**	**CO3**
3.	You are tasked to develop a simple **Arithmetic Calculator** in Java that can perform **addition, subtraction, multiplication, and division**. To make your program robust and maintainable, you must follow the below guidelines. 1. Create a class named **Calculator** with private instance variables to store two numbers (num1 and num2). 2. Apply the **encapsulation** concept to access and modify these numbers. 3. Implement the following public methods in the class: **add()** → returns the sum of the two numbers ,**subtract()** → returns the difference ,**multiply()** → returns the product , **divide()** → returns the quotient, but should handle division by zero using exception handling to avoid the exception. 4. Declare the main method in another class named User which has association relation with Calculator class and from the main method, set the values, and display results of all operations.	**12**	**CO4**
4.	Daffodil International University is developing a **Campus Security & Access Control System**. The system manages different categories of users: **Students, Teachers**, all of whom must access DIU's Digital Campus in different ways. Additionally, DIU sends various alerts (class reminders, exam schedules, salary notices, maintenance alerts) to all users through a **common notification**	**13**	**CO3**

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	mechanism. Now, analyze this system and implement this system using java with the proper use of interface, abstract class and concrete class.		