

COMSATS University Islamabad

Sahiwal Campus

Course Title:		Object Oriented Programming			Course Code:		CSC261	Credit Hours:	4(3,1)
Course Instructor:		Syed Ameer Ahmed Gillani			Program Name:		BS (SE)		
Semester:		3 rd	Batch:	FA24	Section:	A,B		Date:	19/10/25
Time Allowed:					Maximum Marks:			10	
Student's Name:					Reg. No.	CUI/ /SWL			
CLOs Addressed	CLO1			CLO2					
	Question Nos.	Max. Marks.	Obtained Marks	Question Nos.	Max. Marks.	Obtained Marks			
				2	10				

Assignment # 02

CLO-02: Apply the concepts of object-oriented programming principles along with interfaces and exception handling to solve a real-world problem.

Instructions:

- Read each scenario carefully and provide well-structured answers.
- Your responses must include class diagrams, code snippets, and explanations.
- Clearly define your classes, relationships, and method implementations.
- Follow best programming practices and use meaningful names for classes, methods, and variables.
- Submit your answers in a properly formatted document with relevant diagrams and explanations.

Question 1:

[5 x 2 = 10]

Task:

1. Identify and list the **classes** needed for the below mentioned scenarios.
2. Implement a **class diagram** representing each system.
3. Explain the **relationships** between the classes (e.g., **Composition, Aggregation, or Inheritance**).
4. Suggest how **Encapsulation** can be applied to ensure data security.
5. Write **codes** in Java to for each scenario to demonstrate the functionality with appropriate constructors, getters/setters, and method overriding concepts.

Scenario 1: Vehicle Registration System

A **vehicle rental system** needs to manage multiple types of vehicles (car, bike) available for rent. Each car has details such as vehicleID, brand, model, rentalPricePerDay, and isAvailable. The system should allow customers to rent a car, return a rented car, and check the availability of cars. Additionally, an invoice should be generated when a customer rents a car, showing the total cost based on the number of rental days. Apply method-overriding to calculate cost of vehicles of different types.

Scenario 2: Hotel Management System

A **hotel management system** wants to automate the process of booking rooms for guests. Each room has some common details like roomID, pricePerNight, roomNo, but the total cost may vary depending on the category of the room (deluxe, suite). When a guest books a room, the system should record all necessary information and generate the invoice of total number of days. The system should be able to handle multiple room categories, ensure secure handling of room and customer details, and allow easy addition of new room types later. Apply method overriding to calculate price of different types of rooms.