



COMSATS University Islamabad Sahiwal Campus

(Department of Computer Sciences)

Course Title:	Object Oriented Programing				Course Code:	CSC241	Credit Hours:	4(3,1)
Course Instructor:	Ali Sher Kashif				Program Name:	BS(CS)		
Semester:	3 rd	Batch:	FA23	Section:	E	Date:	24-10-2024	
Time Allowed:	25 minutes				Maximum Marks:	10		
Student's Name:					Reg. No.	CUI/	/SWL	

Quiz # 03

CLO-03 (Analyzing):

Students should be able to analyze a problem and identify how object-oriented programming (OOP) concepts, such as inheritance, can be applied to design efficient software systems.

Question 1: (10 Marks)

You have been assigned to design a software system for a university to manage different types of users, including Students, Professors, and Administrators. The system needs to track general information like userID, name, and email, which is common for all users. However, each type of user has unique attributes:

- **Students** have additional attributes: major and yearOfStudy.
- **Professors** have additional attributes: department and researchArea.
- **Administrators** have additional attributes: role and officeLocation.

Task:

1. Design a base class called **UniversityUser** to include the common attributes (userID, name, email).
2. Create three derived classes: **Student**, **Professor**, and **Administrator**, each extending from **UniversityUser**.
 - The Student class should include the additional attributes major and yearOfStudy.
 - The Professor class should include the additional attributes department and researchArea.
 - The Administrator class should include the additional attributes role and officeLocation.
3. Implement a method **displayDetails()** in each class to display the details of the respective user, including both common and specific attributes.
4. Write the Java code to implement the above system.

Analysis Task:

- Explain how using **inheritance** in this design helps reduce redundancy and improve code efficiency. Analyze how inheritance provides a structured and scalable approach to managing different types of users while ensuring code reusability.