**Submitted By:**

**HABIB UR REHMAN (FA23-BCS-251)**

**Assignment No 03**

**COMSATS University Islamabad, Sahiwal Campus.**

**Submitted To: Sir Ali Sher Kashif**

**Subject: OOP**

**Question 1:**

**Scenario:**

You are hired as a software developer for a company that manages employee payroll

systems. The company wants to ensure that sensitive employee information such as salary

and bank account details is not exposed directly to external classes. The system should allow

users to update their name and position but only authorized personnel should be able to

modify the salary.

**Code:**

class Employee {  
 private String employeeID;  
 private String name;  
 private String position;  
 private double salary;  
 private String bankAccountNumber;  
  
 public Employee(String employeeID, String name, String position, double salary, String bankAccountNumber) {  
 this.employeeID = employeeID;  
 this.name = name;  
 this.position = position;  
 this.salary = salary;  
 this.bankAccountNumber = bankAccountNumber;  
 }  
  
 public String getEmployeeID() {  
 return employeeID;  
 }  
  
 public String getName() {  
 return name;  
 }  
  
 public void setName(String name) {  
 this.name = name;  
 }  
  
 public String getPosition() {  
 return position;  
 }  
  
 public void setPosition(String position) {  
 this.position = position;  
 }  
  
 public void updateSalary(double newSalary) {  
 this.salary = newSalary;  
 }  
}  
public class Main {  
 public static void main(String[] args) {  
 Employee emp1 = new Employee("PK001", "Ali ", "Software Engineer", 150000, "PK12");  
 Employee emp2 = new Employee("PK002", "Ayesha ", "Project Manager", 250000, "PK09");  
  
 System.*out*.println("Employee 1 Details:");  
 System.*out*.println("ID: " + emp1.getEmployeeID());  
 System.*out*.println("Name: " + emp1.getName());  
 System.*out*.println("Position: " + emp1.getPosition());  
 emp1.updateSalary(160000); // Authorized update  
 System.*out*.println("Updated Salary: 160000");  
  
 System.*out*.println("\nEmployee 2 Details:");  
 System.*out*.println("ID: " + emp2.getEmployeeID());  
 System.*out*.println("Name: " + emp2.getName());  
 System.*out*.println("Position: " + emp2.getPosition());  
 emp2.updateSalary(260000); // Authorized update  
 System.*out*.println("Updated Salary: 260000");  
  
 *printName*();  
 }  
  
  
 static void printName() {  
 System.*out*.println("My name is HABIB UR REHMAN\nFA23-BCS-251");  
 }  
}

**Question 2:**

**Scenario:**

You are tasked with designing a software system for a university to manage different types

of users such as Students, Professors, and Administrators. The university wants to keep

track of general information like userID, name, and email, but each type of user has specific

attributes.

**Code:**

class UniversityUser {

protected String userID;

protected String name;

protected String email;

public UniversityUser(String userID, String name, String email) {

this.userID = userID;

this.name = name;

this.email = email;

}

public void displayDetails() {

System.out.println("User ID: " + userID);

System.out.println("Name: " + name);

System.out.println("Email: " + email);

}

}

class Student extends UniversityUser {

private String major;

private int yearOfStudy;

public Student(String userID, String name, String email, String major, int yearOfStudy) {

super(userID, name, email);

this.major = major;

this.yearOfStudy = yearOfStudy;

}

@Override

public void displayDetails() {

super.displayDetails();

System.out.println("Major: " + major);

System.out.println("Year of Study: " + yearOfStudy);

}

}

class Professor extends UniversityUser {

private String department;

private String researchArea;

public Professor(String userID, String name, String email, String department, String researchArea) {

super(userID, name, email);

this.department = department;

this.researchArea = researchArea;

}

@Override

public void displayDetails() {

super.displayDetails();

System.out.println("Department: " + department);

System.out.println("Research Area: " + researchArea);

}

}

class Administrator extends UniversityUser {

private String role;

private String officeLocation;

public Administrator(String userID, String name, String email, String role, String officeLocation) {

super(userID, name, email);

this.role = role;

this.officeLocation = officeLocation;

}

@Override

public void displayDetails() {

super.displayDetails();

System.out.println("Role: " + role);

System.out.println("Office Location: " + officeLocation);

}

}

public class Main {

public static void main(String[] args) {

Student student1 = new Student("U001", "Sara Siddiqui", "sara@university.pk", "Computer Science", 3);

Professor professor1 = new Professor("U002", "Dr. Kamran Ali", "kamran@university.pk", "Engineering", "Artificial Intelligence");

System.out.println("Student Details:");

student1.displayDetails();

System.out.println("\nProfessor Details:");

professor1.displayDetails();

}

*printName*();  
 }  
  
  
 static void printName() {  
 System.*out*.println("My name is HABIB UR REHMAN\nFA23-BCS-251");  
 }  
}