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Btech CSE 6Y
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ASSIGNMENT - 5

Q) Develop a java application with Employee class with Emp name, Emp id, Address, Mail id, Mobile no as members. Inherit the classes, Programmer, Assistant Professor, Associate Professor and Professor from employee class. Add Basic Pay (BP) as the member of all the inherited classes with 97% of BP as DA, 10% of BP as HRA, 12% of BP as PF, 0.1% of BP for staff club fund. Generate pay slips for the employees with their gross and net salary.

INPUT –

```
import java.util.Scanner;
abstract class Employee {
    String empName, empId, address, mailId, mobileNo;
    public void getDetails(Scanner sc) {
        System.out.print("Enter Employee Name: ");
        empName = sc.nextLine();
        System.out.print("Enter Employee ID: ");
        empId = sc.nextLine();
        System.out.print("Enter Address: ");
        address = sc.nextLine();
        System.out.print("Enter Mail ID: ");
        mailId = sc.nextLine();
        System.out.print("Enter Mobile Number: ");
        mobileNo = sc.nextLine();
    }
    public void displayDetails() {
        System.out.println("Employee Name: " + empName);
        System.out.println("Employee ID: " + empId);
        System.out.println("Address: " + address);
        System.out.println("Mail ID: " + mailId);
        System.out.println("Mobile Number: " + mobileNo);
    }
    public abstract void calculateSalary(Scanner sc);
}
```

```
class Programmer extends Employee {
    public void calculateSalary(Scanner sc) {
        System.out.print("Enter Basic Pay: ");
        double basicPay = sc.nextDouble();
        double da = 0.97 * basicPay;
        double hra = 0.10 * basicPay;
        double pf = 0.12 * basicPay;
        double staffClub = 0.001 * basicPay;
        double grossSalary = basicPay + da + hra;
        double netSalary = grossSalary - (pf + staffClub);
        displayDetails();
        System.out.println("Gross Salary: " + grossSalary);
        System.out.println("Net Salary: " + netSalary);
    }
}
class AssistantProfessor extends Employee {
    public void calculateSalary(Scanner sc) {
        System.out.print("Enter Basic Pay: ");
        double basicPay = sc.nextDouble();
        double da = 0.97 * basicPay;
        double hra = 0.10 * basicPay;
        double pf = 0.12 * basicPay;
        double staffClub = 0.001 * basicPay;
        double grossSalary = basicPay + da + hra;
        double netSalary = grossSalary - (pf + staffClub);
        displayDetails();
        System.out.println("Gross Salary: " + grossSalary);
        System.out.println("Net Salary: " + netSalary);
    }
```

```
}
class AssociateProfessor extends Employee {
    public void calculateSalary(Scanner sc) {
        System.out.print("Enter Basic Pay: ");
        double basicPay = sc.nextDouble();
        double da = 0.97 * basicPay;
        double hra = 0.10 * basicPay;
        double pf = 0.12 * basicPay;
        double staffClub = 0.001 * basicPay;
        double grossSalary = basicPay + da + hra;
        double netSalary = grossSalary - (pf + staffClub);
        displayDetails();
        System.out.println("Gross Salary: " + grossSalary);
        System.out.println("Net Salary: " + netSalary);
    }
}
class Professor extends Employee {
    public void calculateSalary(Scanner sc) {
        System.out.print("Enter Basic Pay: ");
        double basicPay = sc.nextDouble();
        double da = 0.97 * basicPay;
        double hra = 0.10 * basicPay;
        double pf = 0.12 * basicPay;
        double staffClub = 0.001 * basicPay;
        double grossSalary = basicPay + da + hra;
        double netSalary = grossSalary - (pf + staffClub);
        displayDetails();
        System.out.println("Gross Salary: " + grossSalary);
        System.out.println("Net Salary: " + netSalary);
    }
```

```
}
public class EmployeePaySlip {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Select Employee Type:");
        System.out.println("1. Programmer");
        System.out.println("2. Assistant Professor");
        System.out.println("3. Associate Professor");
        System.out.println("4. Professor");
        System.out.print("Enter your choice: ");
        int choice = sc.nextInt();
        sc.nextLine(); // Consume the newline
        Employee employee = null;

        switch (choice) {
            case 1:
                employee = new Programmer();
                break;
            case 2:
                employee = new AssistantProfessor();
                break;
            case 3:
                employee = new AssociateProfessor();
                break;
            case 4:
                employee = new Professor();
                break;
            default:
                System.out.println("Invalid choice!");
        }
```

```
        if (employee != null) {
            employee.getDetails(sc);
            employee.calculateSalary(sc);
        }

        sc.close();
    }
}
```

OUTPUT –

```
Select Employee Type:
1. Programmer
2. Assistant Professor
3. Associate Professor
4. Professor
Enter your choice: 1
Enter Employee Name: Mahi Tyagi
Enter Employee ID: A2304553409
Enter Address: GBN, Noida
Enter Mail ID: aka@yahoo.com
Enter Mobile Number: 6342789890
Enter Basic Pay: 32000000
Employee Name: Mahi Tyagi
Employee ID: A2304553409
Address: GBN, Noida
Mail ID: aka@yahoo.com
Mobile Number: 6342789890
Gross Salary: 6.624E7
Net Salary: 6.2368E7
```

Q) Declare a class called item having data members item_code, item_name, cost and discount. Derive two classes from class item, namely employee and customer. The class employee has data members like employee_code, employee_name and amount. The class customer has data members like customer_name and amount. Define following functions for initializing data members. displaying the values of data members. computing amount to be paid for a purchased item. Also define function main to create objects of both derived classes and to show usage of above functions.

INPUT -

```
class Item {
    protected int itemCode;
    protected String itemName;
    protected float cost;
    protected float discount;
    public void initializeItem(int code, String name, float itemCost, float itemDiscount) {
        itemCode = code;
        itemName = name;
        cost = itemCost;
        discount = itemDiscount;
    }
    public void displayItem() {
        System.out.println("Item Code: " + itemCode);
        System.out.println("Item Name: " + itemName);
        System.out.println("Cost: " + cost);
        System.out.println("Discount: " + discount + "%");
    }
    public float computeAmount() {
        return cost - (cost * discount / 100);
    }
}
class Employee extends Item {
    private int employeeCode;
```

```
    private String employeeName;
    private float amount;
    public void initializeEmployee(int empCode, String empName) {
        employeeCode = empCode;
        employeeName = empName;
    }
    public void displayEmployeeDetails() {
        amount = computeAmount();
        System.out.println("\nEmployee Code: " + employeeCode);
        System.out.println("Employee Name: " + employeeName);
        displayItem();
        System.out.println("Amount to be Paid (after discount): " + amount);
    }
}
class Customer extends Item {
    private String customerName;
    private float amount;
    public void initializeCustomer(String custName) {
        customerName = custName;
    }
    public void displayCustomerDetails() {
        amount = computeAmount();
        System.out.println("\nCustomer Name: " + customerName);
        displayItem();
        System.out.println("Amount to be Paid (after discount): " + amount);
    }
}
public class Main {
    public static void main(String[] args) {
        Employee emp = new Employee();
```

```
        Customer cust = new Customer();
        emp.initializeItem(19, "Laptop", 79000, 20); // Item details
        emp.initializeEmployee(1001, "MARY JANE SIMPSON");    // Employee details
        emp.displayEmployeeDetails();
        cust.initializeItem(6, "Mobile", 80000, 15); // Item details
        cust.initializeCustomer("Aaron Pierre aka Mufasa");       // Customer details
        cust.displayCustomerDetails();
    }
}
```

OUTPUT -

```
Employee Code: 1001
Employee Name: MARY JANE SIMPSON
Item Code: 19
Item Name: Laptop
Cost: 79000.0
Discount: 20.0%
Amount to be Paid (after discount): 63200.0

Customer Name: Aaron Pierre aka Mufasa
Item Code: 6
Item Name: Mobile
Cost: 80000.0
Discount: 15.0%
Amount to be Paid (after discount): 68000.0
```

Q) Create a class student that stores roll_no, name. Create a class test that stores marks obtained in five subjects. Class result derived from student and test contains the total marks and percentage obtained in test. Input and display information of a student.

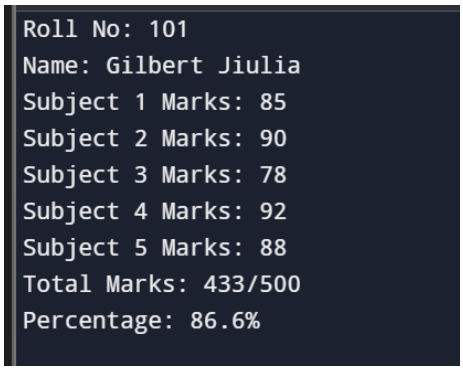
INPUT -

```
class Student {
    int rollNo;
    String name;
    public Student(int rollNo, String name) {
        this.rollNo = rollNo;
        this.name = name;
    }
    public void displayStudentInfo() {
        System.out.println("Roll No: " + rollNo);
        System.out.println("Name: " + name);
    }
}
class Test {
    int[] marks = new int[5];
    public Test(int[] marks) {
        this.marks = marks;
    }
    public void displayMarks() {
        for (int i = 0; i < marks.length; i++) {
            System.out.println("Subject " + (i + 1) + " Marks: " + marks[i]);
        }
    }
}
class Result extends Student {
    Test test;
```

```
    // Constructor to initialize Student and Test
    public Result(int rollNo, String name, int[] marks) {
        super(rollNo, name);  // Calling Student constructor
        this.test = new Test(marks);  // Creating Test object with marks
    }

    // Method to calculate total marks and percentage
    public void calculateResult() {
        int totalMarks = 0;
        for (int mark : test.marks) {
            totalMarks += mark;
        }
        double percentage = (totalMarks / 500.0) * 100;
        System.out.println("Total Marks: " + totalMarks + "/500");
        System.out.println("Percentage: " + percentage + "%");
    }

    // Method to display full information of the student including result
    public void displayResult() {
        displayStudentInfo();  // Display student info
        test.displayMarks();   // Display marks
        calculateResult();     // Display result (total and percentage)
    }
}

// Main class to test the implementation
public class Main {
    public static void main(String[] args) {
        // Sample data
```

```
        int rollNo = 101;
        String name = "Gilbert Jiulia";
        int[] marks = {85, 90, 78, 92, 88};  // Marks for five subjects

        // Creating Result object
        Result result = new Result(rollNo, name, marks);

        // Displaying the complete result of the student
        result.displayResult();
    }
}
```

OUTPUT –



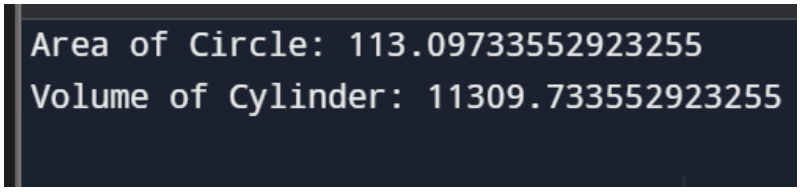
Q) Assume that Circle is defined using radius and Cylinder is defined using radius and height. Write a Circle class as base class and inherit the Cylinder class from it. Develop classes such that user can compute the area of Circle objects and volume of Cylinder objects. Area of Circle is pie *radius*radius, while volume of Cylinder is pie*(radius * radius)*height.

INPUT –

```
class Circle {
    double radius;
    public Circle(double radius) {
        this.radius = radius;
    }
    public double computeArea() {
        return Math.PI * radius * radius;  // Area = π * r²
    }}
class Cylinder extends Circle {
    double height;
    public Cylinder(double radius, double height) {
        super(radius);  // Calling the constructor of Circle (Base class)
        this.height = height;
    }
    public double computeVolume() {
        return Math.PI * radius * radius * height;  // Volume = π * r² * h
    }
}
public class Main {
    public static void main(String[] args) {
        Circle circle = new Circle(6.0);  // Radius = 5
        System.out.println("Area of Circle: " + circle.computeArea());
        Cylinder cylinder = new Cylinder(6.0, 100.0);  // Radius = 5, Height = 10
        System.out.println("Volume of Cylinder: " + cylinder.computeVolume());
```

```
    }
}
```

OUTPUT –


Area of Circle: 113.09733552923255
Volume of Cylinder: 11309.733552923255