Rajalakshmi Engineering College

Name: Puvanesu R
Email: 241901085@rajalakshmi.edu.in
Roll no: 241901085
Phone: 6382355104
Branch: REC
Department: CSE (CS) - Section 1
Batch: 2028
Degree: B.E - CSE (CS)

Scan to verify results

2024_28_III_OOPS Using Java Lab

REC_2028_OOPS using Java_Week 6_CY

Attempt : 1
Total Mark : 40
Marks Obtained : 40

Section 1 : Coding

1. Problem Statement

A bank provides two types of deposit schemes: Fixed Deposits (FD) and Recurring Deposits (RD). Customers want to calculate the interest they can earn based on their selected scheme.

Develop a Java program using inheritance to compute the interest for FD and RD. The program should include:

A base class Account with attributes accountHolder and principalAmount, along with a method for interest calculation.A subclass FixedDeposit that calculates interest for FD.A subclass RecurringDeposit that calculates interest for RD.

Formulas Used:

Interest for FD: (principal amount * duration in years * rate of interest) / 100

Interest for RD: (maturity amount * duration in months * rate of interest) / (12 * 100), where maturity amount = monthly deposit * duration in months.

Input Format

The first line of input consists of the choice (1 for FD, 2 for RD).

If the choice is 1, the following lines consist of account holder (string), principal amount (double), duration in years (int), and rate of interest (double).

If the choice is 2, the following lines consist of account holder (string), monthly deposit (int), duration in months (int), and rate of interest (double).

Output Format

The output prints the calculated interest with one decimal place in the following format.

For choice 1: "Interest for FD: <calculated interest >"

For choice 2: "Interest for FD: <calculated interest >"

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 1
Alice
50000.56
5
6.5

Output: Interest for FD: 16250.2

Answer

```
import java.util.Scanner;

// You are using Java
class Account {
   protected String accountHolder;
   protected double principalAmount;
```

```
    public Account(String accountHolder, double principalAmount) {
        this.accountHolder = accountHolder;
        this.principalAmount = principalAmount;
    }

    public double calculateInterest() {
        return 0.0;
    }
}

class FixedDeposit extends Account {
    private int durationYears;
    private double rateOfInterest;

    public FixedDeposit(String accountHolder, double principalAmount, int
durationYears, double rateOfInterest) {
        super(accountHolder, principalAmount);
        this.durationYears = durationYears;
        this.rateOfInterest = rateOfInterest;
    }

    @Override
    public double calculateInterest() {
        return (principalAmount * durationYears * rateOfInterest) / 100;
    }
}

class RecurringDeposit extends Account {
    private int monthlyDeposit;
    private int durationMonths;
    private double rateOfInterest;

    public RecurringDeposit(String accountHolder, int monthlyDeposit, int
durationMonths, double rateOfInterest) {
        super(accountHolder, monthlyDeposit * durationMonths);
        this.monthlyDeposit = monthlyDeposit;
        this.durationMonths = durationMonths;
        this.rateOfInterest = rateOfInterest;
    }

    @Override
    public double calculateInterest() {
```

```
    double maturityAmount = monthlyDeposit * durationMonths;
    return (maturityAmount * durationMonths * rateOfInterest) / (12 * 100);
  }
}

public class Main {
  public static void main(String[] args) {
    Scanner sc = new Scanner(System.in);

    int choice = sc.nextInt();

    switch (choice) {
      case 1:
        sc.nextLine();
        String fdName = sc.nextLine();
        double fdPrincipal = sc.nextDouble();
        int fdDuration = sc.nextInt();
        double fdRate = sc.nextDouble();

        FixedDeposit fd = new FixedDeposit(fdName, fdPrincipal, fdDuration,
fdRate);
        System.out.printf("Interest for FD: %.1f", fd.calculateInterest());
        break;

      case 2:
        sc.nextLine();
        String rdName = sc.nextLine();
        int rdDeposit = sc.nextInt();
        int rdDuration = sc.nextInt();
        double rdRate = sc.nextDouble();

        RecurringDeposit rd = new RecurringDeposit(rdName, rdDeposit,
rdDuration, rdRate);
        System.out.printf("Interest for RD: %.1f", rd.calculateInterest());
        break;

      default:
        System.out.println("Invalid Choice");
    }
  }
}
```

Status : Correct ***Marks : 10/10***

2. Problem Statement

Bob has been tasked with creating a program using CircleUtils class to calculate and display the circumference and area of the circle.

The program should allow Bob to input the radius of a circle as both an integer and a double and compute both the circumference and area of the circle using separate overloaded methods:

calculateCircumference- To calculate the circumference using the formula 2 * 3.14 * radiuscalculateArea- To calculate the area 3.14 * radius * radius

Write a program to help Bob.

Input Format

The first line of input consists of an integer m, representing the radius of the circle as a whole number.

The second line consists of a double value n, representing the radius of the circle as a decimal number.

Output Format

The first line of output displays two space-separated double values, rounded to two decimal places, representing the circumference of the circle with the integer radius and the double radius, respectively.

The second line displays two space-separated double values, rounded to two decimal places, representing the area of the circle with the integer radius and the double radius, respectively.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 5
3.50

Output: 31.40 21.98
78.50 38.47

Answer

```
import java.util.Scanner;

// You are using Java
class CircleUtils {
    public double calculateCircumference(int radius) {
        return 2 * 3.14 * radius;
    }

    public double calculateCircumference(double radius) {
        return 2 * 3.14 * radius;
    }

    public double calculateArea(int radius) {
        return 3.14 * radius * radius;
    }

    public double calculateArea(double radius) {
        return 3.14 * radius * radius;
    }
}

class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        int radiusInt = scanner.nextInt();
        double radiusDouble = scanner.nextDouble();

        CircleUtils circleUtils = new CircleUtils();

        double circumferenceInt = circleUtils.calculateCircumference(radiusInt);
        double circumferenceDouble = 
circleUtils.calculateCircumference(radiusDouble);
        double areaInt = circleUtils.calculateArea(radiusInt);
        double areaDouble = circleUtils.calculateArea(radiusDouble);

        System.out.format("%.2f %.2f\n", circumferenceInt, circumferenceDouble);
        System.out.format("%.2f %.2f", areaInt, areaDouble);

        scanner.close();
    }
}
```

Status : Correct **Marks : 10/10**

3. Problem Statement

Arun wants to calculate the age gap between the grandfather and the son and determine the father's age after 5 years.

Your task is to assist him in developing a program using three classes: GrandFather, Father, and Son, where the GrandFather stores the grandfather's age, the Father extends GrandFather to include the father's age and calculates his age after 5 years, and Son extends Father to include the son's age and calculate the age difference between the grandfather and the son.

Input Format

The input consists of three integers representing the ages of the grandfather, father, and son, one per line.

Output Format

The first line of output prints "Grandfather and son's age gap:" followed by an integer representing the age gap between the grandfather and the son, ending with "years".

The second line prints "Father's Age:" followed by an integer representing the father's age after 5 years, ending with "years".

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 50
30
3

Output: Grandfather and son's age gap: 47 years
Father's Age: 35 years

Answer

```
import java.util.Scanner;

// You are using Java
class GrandFather {
   protected int grandfatherAge;

   public void setGrandfatherAge(int age) {
      this.grandfatherAge = age;
   }
}

class Father extends GrandFather {
   protected int fatherAge;

   public void setFatherAge(int age) {
      this.fatherAge = age;
   }

   public int calculateFatherAgeAfter5Years() {
      return fatherAge + 5;
   }
}

class Son extends Father {
   private int sonAge;

   public void setSonAge(int age) {
      this.sonAge = age;
   }

   public int calculateGrandfatherSonAgeDifference() {
      return grandfatherAge - sonAge;
   }
}
public class Main {
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);
      Son son = new Son();

      int grandfatherAge = scanner.nextInt();
      son.setGrandfatherAge(grandfatherAge);
```

```
        int fatherAge = scanner.nextInt();
        son.setFatherAge(fatherAge);

        int sonAge = scanner.nextInt();
        son.setSonAge(sonAge);

        System.out.println("Grandfather and son's age gap: "+
son.calculateGrandfatherSonAgeDifference() + " years");

        int fatherAgeAfter5Years = son.calculateFatherAgeAfter5Years();
        System.out.println("Father's Age: " + fatherAgeAfter5Years + " years");
  }
}
```

Status : Correct ***Marks : 10/10***

4. Problem Statement

Adams has a reputation company with a great number of employees. He must calculate the salary weekly according to the hourly rate and working hours. Create a program to define a class Employee with attributes name and hourly rate. Create a subclass HourlyEmployee that calculates the weekly salary based on the number of hours worked.

(The first 40 hours are based on the regular hour rate. If the work hours are greater than 40 then the work wage is 1.5 times the hourly rate)

Note: Use Math(Math.max, Math.min) functions .

Example

Input:

Chris

10

45

Output:

Weekly Salary: Rs.475.00

Explanation:

Calculation:

The first 40 hours are paid normally: 40 × 10 = 400.00The extra 5 hours are paid at 1.5 times the hourly rate: 5 × (10×1.5) = 5 × 15 = 75.00Total salary: 400.00 + 75.00 = 475.00

Input Format

The first line of input consists of a string that represents the name of the employee.

The second line consists of a double value that represents the rate for an hour.

The last line consists of an integer that represents the total hours worked.

Output Format

The output displays the total salary of the employee, where salary is rounded to two decimal places in the format: "Weekly Salary: Rs.<double value>".

Refer to the sample output for formatting specifications.

Sample Test Case

Input: Dave
10.0
40
Output: Weekly Salary: Rs.400.00

Answer

```
import java.util.Scanner;
import java.text.DecimalFormat;

class Employee {
   protected String name;
   protected double hourlyRate;

   public Employee(String name, double hourlyRate) {
      this.name = name;
      this.hourlyRate = hourlyRate;
```

```
    }
}

class HourlyEmployee extends Employee {
    private int hoursWorked;

    public HourlyEmployee(String name, double hourlyRate, int hoursWorked) {
        super(name, hourlyRate);
        this.hoursWorked = hoursWorked;
    }

    public double calculateWeeklySalary() {
        int regularHours = Math.min(hoursWorked, 40);
        int overtimeHours = Math.max(hoursWorked - 40, 0);

        double regularPay = regularHours * hourlyRate;
        double overtimePay = overtimeHours * hourlyRate * 1.5;

        return regularPay + overtimePay;
    }
}

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        String name = scanner.nextLine();
        double hourlyRate = scanner.nextDouble();
        int hoursWorked = scanner.nextInt();

        HourlyEmployee employee = new HourlyEmployee(name, hourlyRate,
hoursWorked);

        double weeklySalary = employee.calculateWeeklySalary();
        DecimalFormat df = new DecimalFormat("#.00");
        String formattedSalary = df.format(weeklySalary);
        System.out.println("Weekly Salary: Rs." + formattedSalary);
        scanner.close();
    }
}
```

Status : Correct ***Marks : 10/10***