

Rajalakshmi Engineering College

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2024_28_III_OOPS Using Java Lab

REC_2028_OOPS using Java_Week 6_CY

Attempt : 1
Total Mark : 40
Marks Obtained : 30

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: $(\text{principal amount} * \text{duration in years} * \text{rate of interest}) / 100$

Interest for RD: $(\text{maturity amount} * \text{duration in months} * \text{rate of interest}) / (12 * 100)$, 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 FixedDeposit{  
    String fdName;  
    double fdPrincipal, fdRate;  
    int fdDuration;
```

```
FixedDeposit(String fdName, double fdPrincipal, int fdDuration, double fdRate)
{
    this.fdName = fdName;
    this.fdPrincipal = fdPrincipal;
    this.fdRate = fdRate;
    this.fdDuration = fdDuration;
}
double calculateInterest(){
    return (fdPrincipal*fdDuration*fdRate)/100;
}
}
class RecurringDeposit{
    String fdName;
    double fdPrincipal, fdRate;
    int fdDuration;
    RecurringDeposit(String fdName, double fdPrincipal, int fdDuration, double
fdRate){
        this.fdName = fdName;
        this.fdPrincipal = fdPrincipal;
        this.fdRate = fdRate;
        this.fdDuration = fdDuration;
    }
    double calculateInterest(){
        return (fdPrincipal*fdDuration*fdDuration*fdRate)/(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
 $2 * 3.14 * \text{radius}$
calculateArea- To calculate the area $3.14 * \text{radius} * \text{radius}$

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{  
    double calculateCircumference(int r){  
        return (2*3.14*r);  
    }  
    double calculateCircumference(double r){  
        return 2*3.14*r;  
    }  
    double calculateArea(int r){  
        return (3.14*r*r);  
    }  
    double calculateArea(double r){  
        return 3.14*r*r;  
    }  
}
```

```

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

Teena's retail store has implemented a Loyalty Points System to reward customers based on their spending. The program calculates and displays the loyalty points based on whether the customer is a regular or a premium customer.

For regular customers (class Customer), the loyalty points are calculated as:

$$\text{Loyalty points} = \text{amount spent} / 10$$

For premium customers (class PremiumCustomer, which inherits from Customer), the loyalty points are calculated as:

$$\text{Loyalty points} = 2 * (\text{amount spent} / 10)$$

The program should use method overriding for premium customers to

calculate their loyalty points. The method that needs to be overridden is calculateLoyaltyPoints in the Customer class.

Input Format

The first line of input consists of an integer representing the amount spent by the customer.

The second line consists of a string representing the premium customer status:

- "yes" if the customer is a premium customer.
- "no" if the customer is not a premium customer.

Output Format

The output should display the loyalty points earned based on the amount spent and the customer type.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 50

yes

Output: 10

Answer

```
import java.util.Scanner;  
  
// You are using Java  
class Customer {  
    //type your code here...  
    int calculateLoyaltyPoints(int amountSpent){  
        return amountSpent/10;  
    }  
}  
  
class PremiumCustomer extends Customer {  
    //type your code here...  
    @Override  
    int calculateLoyaltyPoints(int amountSpent){
```

```

        return 2*amountSpent/10;
    }

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

        int amountSpent = scanner.nextInt();

        String isPremium = scanner.next().toLowerCase();

        Customer customer;

        if (isPremium.equals("yes")) {
            customer = new PremiumCustomer();
        } else {
            customer = new Customer();
        }

        int loyaltyPoints = customer.calculateLoyaltyPoints(amountSpent);

        System.out.println(loyaltyPoints);
    }
}

```

Status : Correct

Marks : 10/10

4. Problem Statement

A painter needs to determine the cost to paint different shapes based on their surface area. The program should be designed to handle the area of a sphere and calculate the total painting cost using the following formulas:

Area of sphere: $\text{Area} = 4 * \pi * r^2$ where $\pi = 3.14$
 Total painting cost: Cost = cost per square meter * area of sphere

The program will consist of three classes:

Shape class: This class should set the shape type and radius.
 Area class: This class should extend Shape to calculate the area.
 Cost class: This class should extend Area to calculate the total painting cost.

Input Format

The input consists of a string representing the shape type, a double value representing the radius, and another double value representing the cost per square meter on each line.

Output Format

For a valid shape type of "Sphere":

- The first line prints: "Area of Sphere is: <calculated_area>" rounded to two decimal places.
- The second line prints: "Cost to paint the shape is: <total_painting_cost>" rounded to two decimal places.

For any other shape types, print: "Invalid type".

Refer to the sample output for formatting specifications.

Sample Test Case

Input: Sphere

3.4

5.8

Output: Area of Sphere is: 145.19

Cost to paint the shape is: 842.12

Answer

-

Status : Skipped

Marks : 0/10