

Object Oriented Programming

ASSIGNMENT - 1

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1. Five bikers compete in a race such that they drive at a constant speed which may or may not be the same as the other. To qualify the race, the speed of a racer must be more than the average speed of all 5 racers. Take as input the speed of each racer and print back the speed of qualifying racers.

INPUT:

```
import java.util.*;

public class As_1_1 {

    public static void main(String[] args) {

        Scanner in = new Scanner(System.in);

        System.out.print("Enter the Speed of 5 Racers Seperated by Space :");

        String s = in.nextLine();

        String[] t= s.split(" ");

        int[] speeds=new int[t.length];

        int count=0;

        for(String a : t){

            speeds[count]=Integer.parseInt(a);

            count+=1; }

        System.out.println("Speed of the bikers are : "+Arrays.toString(speeds));

        double avgSpeed;

        int sum=0;

        for(int speed : speeds){sum+=speed; }

        avgSpeed=sum/5;

        System.out.println("Average speed of the racers is : "+avgSpeed);

        System.out.print("Speed Greater than Average Speed are :");

        for(int speed : speeds){

            if(speed>avgSpeed){System.out.printf("%d ",speed);} }

        in.close(); } }
```

OUTPUT:

Enter the Speed of 5 Racers Seperated by Space :45 23 78 65 98

Speed of the bikers are : [45, 23, 78, 65, 98]

Average speed of the racers is : 61.0

Speed Greater than Average Speed are :78 65 98

2. Create a class named 'Rectangle' with two data members 'length' and 'breadth' and two methods to print the area and perimeter of the rectangle respectively. Its constructor having parameters for length and breadth is used to initialize length and breadth of the rectangle.

INPUT:

```
import java.util.Scanner;
```

```
class Rectangle {
```

```
    double length;
```

```
    double width;
```

```
    // Constructor to initialize length and width
```

```
    public Rectangle(double len, double wid) {
```

```
        length = len;
```

```
        width = wid;
```

```
    }
```

```
    // Method to calculate and print the area
```

```
    public void printArea() {
```

```
        double area = length * width;
```

```
        System.out.println("Area of rectangle: " + area);
```

```
    }
```

```
    // Method to calculate and print the perimeter
```

```
    public void printPerimeter() {
```

```
        double perimeter = 2 * (length + width);
```

```
        System.out.println("Perimeter of rectangle: " + perimeter);
```

```
    }
```

```
}
```

```
public class As_1_2 {
```

```
    public static void main(String[] args) {
```

```
        Scanner scanner = new Scanner(System.in);
```

```
System.out.print("Enter length of rectangle: ");  
double len = scanner.nextDouble();  
  
System.out.print("Enter width of rectangle: ");  
double wid = scanner.nextDouble();  
  
Rectangle rect = new Rectangle(len, wid);  
rect.printArea();  
rect.printPerimeter();  
  
scanner.close(); }  
}
```

OUTPUT:

Enter length of rectangle: 8
Enter width of rectangle: 4
Area of rectangle: 32.0
Perimeter of rectangle: 24.0

3. Write a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$. Read in a, b, c and use the quadratic formula.

INPUT:

```
import java.util.Scanner;

public class As_1_3 {

    public static void main(String[] args) {

        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the value of a: ");

        double a = scanner.nextDouble();

        System.out.print("Enter the value of b: ");

        double b = scanner.nextDouble();

        System.out.print("Enter the value of c: ");

        double c = scanner.nextDouble();

        double discriminant = b * b - 4.0 * a * c;

        if (discriminant > 0.0) {

            double root1 = (-b + Math.sqrt(discriminant)) / (2.0 * a);

            double root2 = (-b - Math.sqrt(discriminant)) / (2.0 * a);

            System.out.println("The roots are " + root1 + " and " + root2);

        } else if (discriminant == 0.0) {

            double root = -b / (2.0 * a);

            System.out.println("The root is " + root);

        } else {

            System.out.println("The equation has no real roots."); }

        scanner.close();}}
```

OUTPUT:

Enter the value of a: 1

Enter the value of b: 1

Enter the value of c: 1

The equation has no real roots.

4. Develop a FloatingPointSum class to perform sum of all floating-point values which are entered by user. If the user enters improper floating value then our class gives a second chance to enter the value. After two chances, quit from reading the input by displaying appropriate message. Add all correctly entered values and print the sum when the user is done entering data.

INPUT:

```
import java.util.Scanner;

class FloatingPointSum {
    private double sum;
    private int chances;

    public FloatingPointSum() {
        sum = 0.0;
        chances = 2; }

    public void readInput() {
        Scanner scanner = new Scanner(System.in);
        while (chances > 0) {
            System.out.print("Enter a floating-point value: ");
            if (scanner.hasNextDouble()) {
                double value = scanner.nextDouble();
                sum += value;
                chances = 2; // Reset chances if valid input
            } else {
                System.out.println("Invalid input. Please enter a valid floating-point value.");
                chances--;
                scanner.next(); // Consume invalid input } }
        scanner.close();}

    public double getSum() {
        return sum; }
}

public class As_1_4 {
    public static void main(String[] args) {
        FloatingPointSum floatingPointSum = new FloatingPointSum();
```

```
floatingPointSum.readInput();  
  
System.out.println("Sum of correctly entered values: " + floatingPointSum.getSum());  
}}
```

OUTPUT:

Enter a floating-point value: 5.6

Enter a floating-point value: 4.4

Enter a floating-point value: a

Invalid input. Please enter a valid floating-point value.

Enter a floating-point value: a

Invalid input. Please enter a valid floating-point value.

Sum of correctly entered values: 10.0

5.The star rating of restaurants is a universal code that shows customers the restaurant's quality before dining. The star rating system operates on a 5-point scale. 1 is awful, meaning poor hygiene, service, and food quality. Whereas 5 means outstanding hygiene, food quality, and service. This system is crucial for customers. For instance, a 5-star restaurant has a high food quality and a great dining experience. Customers can see this before dining and decide this is their preferred restaurant. A 1-star restaurant might have poor-quality food and an awful dining experience. The customer can take note of this and decide against dining there. Consider a class Restaurant maintain information about a restaurant. The class has the following attributes:

- Name
- Category (e.g., Multi-Cuisine, Family-Dining, Fine-Dining. etc)
- The number of people who have rated this Restaurant as a 1
- The number of people who have rated this Restaurant as a 2
- The number of people who have rated this Restaurant as a 3
- The number of people who have rated this Restaurant as a 4
- The number of people who have rated this Restaurant as a 5

Implement the class with get and set methods for the restaurant name and Category. Write a method addRating that takes an integer as an input parameter. The method should verify that the parameter is a number between 1 and 5, and if so, increment by one the number of people rating the restaurant that matches the input parameter. For example, if 3 is the input parameter, then the number of people who rated the movie as a 3 should be incremented by one. Write another method, getAverage, that returns the average value for all of the restaurant ratings.

Test the class by writing a main method that creates at least two Restaurant objects, adds at least five ratings for each restaurant, and outputs the restaurant Name, Category, and Average Rating for each Restaurant object.

INPUT:

```
import java.util.Scanner;
```

```
class Restaurant {  
    private String name;  
    private String category;  
    private int rating1;  
    private int rating2;  
    private int rating3;  
    private int rating4;  
    private int rating5;
```



```
// Constructor
public Restaurant(String name, String category) {
    this.name = name;
    this.category = category;
    this.rating1 = 0;
    this.rating2 = 0;
    this.rating3 = 0;
    this.rating4 = 0;
    this.rating5 = 0; }

// Getters and Setters
public String getName() {
    return name}

public void setName(String name) {
    this.name = name; }

public String getCategory() {
    return category; }

public void setCategory(String category) {
    this.category = category; }

// Method to add a rating
public void addRating(int rating) {
    if (rating >= 1 && rating <= 5) {
        switch (rating) {
            case 1:
                rating1++;
                break;
            case 2:
                rating2++;
                break;
            case 3:
                rating3++;
                break;
```

```

        case 4:
            rating4++;
            break;
        case 5:
            rating5++;
            break;}}
else {System.out.println("Invalid rating. Please provide a number between 1 and 5.");}}

// Method to calculate average rating
public double getAverage() {
    int totalRatings = rating1 + rating2 + rating3 + rating4 + rating5;
    if (totalRatings == 0) {
        return 0.0; // Avoid division by zero}
    double sum = rating1 + 2 * rating2 + 3 * rating3 + 4 * rating4 + 5 * rating5;
    return sum / totalRatings; }}

public class As_1_5 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        // Create two restaurant objects
        System.out.print("Enter name for Restaurant 1: ");
        String name1 = scanner.nextLine();
        System.out.print("Enter category for Restaurant 1: ");
        String category1 = scanner.nextLine();
        Restaurant restaurant1 = new Restaurant(name1, category1);
        System.out.print("Enter name for Restaurant 2: ");
        String name2 = scanner.nextLine();
        System.out.print("Enter category for Restaurant 2: ");
        String category2 = scanner.nextLine();
        Restaurant restaurant2 = new Restaurant(name2, category2);
        // Add ratings for each restaurant
        for (int i = 0; i < 5; i++) {
            System.out.print("Enter rating (1-5) for " + name1 + ": ");

```

```

        int rating1 = scanner.nextInt();
        restaurant1.addRating(rating1);
    }
    for (int i = 0; i < 5; i++) {
        System.out.print("Enter rating (1-5) for " + name2 + ": ");
        int rating2 = scanner.nextInt();
        restaurant2.addRating(rating2); }

    // Output restaurant details
    System.out.println("\nRestaurant 1 Details:");
    System.out.println("Name: " + restaurant1.getName());
    System.out.println("Category: " + restaurant1.getCategory());
    System.out.println("Average Rating: " + restaurant1.getAverage());

    System.out.println("\nRestaurant 2 Details:");
    System.out.println("Name: " + restaurant2.getName());
    System.out.println("Category: " + restaurant2.getCategory());
    System.out.println("Average Rating: " + restaurant2.getAverage());

    scanner.close(); }}

```

OUTPUT:

```

Enter name for Restaurant 1: Eagle
Enter category for Restaurant 1: Family Dining
Enter name for Restaurant 2: Star
Enter category for Restaurant 2: Fine Dining
Enter rating (1-5) for Eagle: 4
Enter rating (1-5) for Eagle: 5
Enter rating (1-5) for Eagle: 45
Invalid rating. Please provide a number between 1 and 5.
Enter rating (1-5) for Eagle: 4

```

Enter rating (1-5) for Eagle: 5

Enter rating (1-5) for Star: 3

Enter rating (1-5) for Star: 5

Enter rating (1-5) for Star: 5

Enter rating (1-5) for Star: 5

Enter rating (1-5) for Star: 4

Restaurant 1 Details:

Name: Eagle

Category: Family Dining

Average Rating: 4.5

Restaurant 2 Details:

Name: Star

Category: Fine Dining

Average Rating: 4.4