CS23333-Object Oriented Programming Using Java-2023

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Status	Finished
Started	Sunday, 6 October 2024, 2:39 PM
Completed	Sunday, 6 October 2024, 3:03 PM
Duration	23 mins 50 secs

Question **1**

Correct

Marked out of 5.00

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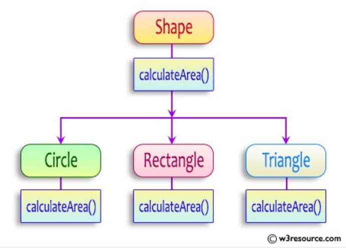
Create a base class Shape with a method called calculateArea(). Create three subclasses: Circle, Rectangle, and Triangle. Override the calculateArea() method in each subclass to calculate and return the shape's area.

In the given exercise, here is a simple diagram illustrating polymorphism implementation:



```
 abstract class Shape {
    public abstract double calculateArea() ;
    }
}
```

System.out.printf("Area of a Triangle :%.2f%n",((0.5)*base*height)); // use this statement

sample Input :

4   // radius of the circle to calculate area PI*r*r

5 // length of the rectangle

6 // breadth of the rectangle to calculate the area of a rectangle

4   // base of the triangle

3 // height of the triangle

OUTPUT:

Area of a circle :50.27
Area of a Rectangle :30.00
Area of a Triangle :6.00

For example:

Test	Input	Result
1	4 5 6 4 3	Area of a circle: 50.27 Area of a Rectangle: 30.00 Area of a Triangle: 6.00
2	7 4.5 6.5 2.4 3.6	Area of a circle: 153.94 Area of a Rectangle: 29.25 Area of a Triangle: 4.32

Answer: (penalty regime: 0 %)

```
import java.util.Scanner;

abstract class Shape {
    public abstract double calculateArea();
}

class Circle extends Shape {
    private double radius;

    public Circle(double radius) {
        this.radius = radius;
    }

    @Override
    public double calculateArea() {
        return Math.PI * radius * radius;
    }
}

class Rectangle extends Shape {
    private double length;
    private double breadth;

    public Rectangle(double length, double breadth) {
        this.length = length;
        this.breadth = breadth;
    }

    @Override
    public double calculateArea() {
        return length * breadth;
    }
}

class Triangle extends Shape {
    private double base;
    private double height;

    public Triangle(double base, double height) {
        this.base = base;
        this.height = height;
    }

    @Override
    public double calculateArea() {
        return 0.5 * base * height;
    }
}

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

        Circle circle = new Circle(scanner.nextDouble());
        System.out.printf("Area of a circle: %.2f%n", circle.calculateArea());

        Rectangle rectangle = new Rectangle(scanner.nextDouble(), scanner.nextDouble());
        System.out.printf("Area of a Rectangle: %.2f%n", rectangle.calculateArea());

        Triangle triangle = new Triangle(scanner.nextDouble(), scanner.nextDouble());
        System.out.printf("Area of a Triangle: %.2f%n", triangle.calculateArea());

        scanner.close();
    }
}
```

	Test	Input	Expected	Got	
	1	4 5 6 4 3	Area of a circle: 50.27 Area of a Rectangle: 30.00 Area of a Triangle: 6.00	Area of a circle: 50.27 Area of a Rectangle: 30.00 Area of a Triangle: 6.00	
	2	7 4.5 6.5 2.4 3.6	Area of a circle: 153.94 Area of a Rectangle: 29.25 Area of a Triangle: 4.32	Area of a circle: 153.94 Area of a Rectangle: 29.25 Area of a Triangle: 4.32	

Passed all tests!

Question **2**

Correct

Marked out of 5.00

Flag question

1. **Final Variable:**

- Once a variable is declared `final`, its value cannot be changed after it is initialized.
- It must be initialized when it is declared or in the constructor if it's not initialized at declaration.
- It can be used to define constants

final int MAX_SPEED = 120; // Constant value, cannot be changed

2. **Final Method:**

- A method declared `final` cannot be overridden by subclasses.
- It is used to prevent modification of the method's behavior in derived classes.

public final void display() {
    System.out.println("This is a final method.");
}

3. **Final Class:**

- A class declared as `final` cannot be subclassed (i.e., no other class can inherit from it).
- It is used to prevent a class from being extended and modified.
- public final class Vehicle {
      // class code
  }

Given a Java Program that contains the bug in it, your task is to clear the bug to the output.

you should delete any piece of code.

For example:

Test	Result
1	The maximum speed is: 120 km/h This is a subclass of FinalExample.

Answer: (penalty regime: 0 %)

Reset answer

```
class FinalExample {

    // Final variable
        final int maxSpeed = 120;

    // Final method
    public final void displayMaxSpeed() {
        System.out.println("The maximum speed is: " + maxSpeed + " km/h");
    }
}

class SubClass extends FinalExample {


    // You can create new methods here
    public void showDetails() {
        System.out.println("This is a subclass of FinalExample.");
    }
}

class prog {
    public static void main(String[] args) {
        FinalExample obj = new FinalExample();
        obj.displayMaxSpeed();

        SubClass subObj = new SubClass();
        subObj.showDetails();
    }
}
```

	Test	Expected	Got	
	1	The maximum speed is: 120 km/h This is a subclass of FinalExample.	The maximum speed is: 120 km/h This is a subclass of FinalExample.	

Passed all tests!

Question **3**

Correct

Marked out of 5.00

Flag question

As a logic building learner you are given the task to extract the string which has vowel as the first and last characters from the given array of Strings.

Step1: Scan through the array of Strings, extract the Strings with first and last characters as vowels; these strings should be concatenated.

Step2: Convert the concatenated string to lowercase and return it.

If none of the strings in the array has first and last character as vowel, then return no matches found

input1: an integer representing the number of elements in the array.

input2: String array.

Example 1:

input1: 3

input2: {"oreo", "sirish", "apple"}

output: oreoapple

Example 2:

input1: 2

input2: {"Mango", "banana"}

output: no matches found

Explanation:

None of the strings has first and last character as vowel.

Hence the output is no matches found.

Example 3:

input1: 3

input2: {"Ate", "Ace", "Girl"}

output: ateace

For example:

Input	Result
3 oreo sirish apple	oreoapple
2 Mango banana	no matches found
3 Ate Ace Girl	ateace

Answer: (penalty regime: 0 %)

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        
        String[] a = new String[n];
        for (int i = 0; i < n; i++) {
            a[i] = sc.next();
        }
        
        String result = e(a);
        System.out.println(result);
        sc.close();
    }
    
    public static String e(String[] array) {
        StringBuilder con = new StringBuilder();
        String vowels = "aeiouAEIOU";
        
        for (String str : array) {
            if (str.length() > 0 && vowels.indexOf(str.charAt(0)) != -1 && vowels.indexOf(str.charAt(str.length() - 1)) != -1) {
                con.append(str);
            }
        }
        
        if (con.length() == 0) {
            return "no matches found";
        } else {
            return con.toString().toLowerCase();
        }
    }
}
```

	Input	Expected	Got	
	3 oreo sirish apple	oreoapple	oreoapple	
	2 Mango banana	no matches found	no matches found	
	3 Ate Ace Girl	ateace	ateace	

Passed all tests!

Finish review

◄ Lab-08-MCQ

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