

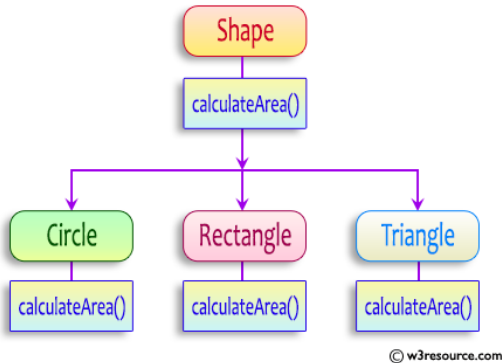
Question 1

Correct

Marked out of 5.00

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 %)

```

1 import java.util.Scanner;
2 abstract class Shape{
3     public abstract double calculateArea();
4 }
5 class Circle extends Shape{
6     private double radius;
7     public Circle(double radius){
8         this.radius = radius;
9     }
10    @Override
11    public double calculateArea(){
12        return Math.PI * radius*radius;
13    }
  
```

```

13     }
14 }
15 class Rectangle extends Shape{
16     private double length;
17     private double breadth;
18     public Rectangle(double length,double breadth){
19         this.length=length;
20         this.breadth=breadth;
21     }
22     @Override
23     public double calculateArea(){
24         return length * breadth;
25     }
26 }
27 class Triangle extends Shape{
28     private double base;
29     private double height;
30     public Triangle(double base,double height){
31         this.base=base;
32         this.height=height;
33     }
34     @Override
35     public double calculateArea(){
36         return 0.5*base*height;
37     }
38 }
39 public class Main{
40     public static void main(String[] args){
41         Scanner scanner = new Scanner(System.in);
42         double radius = scanner.nextDouble();
43         double length = scanner.nextDouble();
44         double breadth=scanner.nextDouble();
45         double base=scanner.nextDouble();
46         double height=scanner.nextDouble();
47         Shape circle=new Circle(radius);
48         Shape rectangle=new Rectangle(length,breadth);
49         Shape triangle = new Triangle(base,height);
50         System.out.printf("Area of a circle: %.2f\n", circle.calculateArea());
51         System.out.printf("Area of a Rectangle: %.2f\n", rectangle.calculateArea());
52         System.out.printf("Area of a Triangle: %.2f\n", triangle.calculateArea());

```

	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

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

```
1 public class FinalExample {
2     final int MAX_SPEED = 120;
3
4     public final void display() {
5         System.out.println("The maximum speed is: " + MAX_SPEED + " km/h");
6     }
7     public static void main(String[] args){
8         Subclass obj = new Subclass();
9         obj.display();
10        obj.showMessage();
11    }
12 }
13
14 class Subclass extends FinalExample {
15     public void showMessage() {
16         System.out.println("This is a subclass of FinalExample.");
17     }
18 }
19
```

	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

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 %)

```

1 import java.util.Scanner;
2 public class VowelStringConcatenation{
3     public static boolean isVowel(char c){
4         c= Character.toLowerCase(c);
5         return c == 'a' || c=='e' || c=='i' || c=='o' || c=='u';
6     }
7     public static String extractAndConcatenate(int numOfString, String[] arr){
8         StringBuilder result = new StringBuilder();
9         for(String str:arr){
10             if(str.length()>0 && isVowel(str.charAt(0)) && isVowel(str.charAt(str.length()-1))){
11                 result.append(str);
12             }
13         }
14         if(result.length() == 0){
15             return "no matches found";
16         }
17         return result.toString().toLowerCase();
18     }
19     public static void main(String[] args){

```

```

20     Scanner scanner = new Scanner(System.in);
21     int numOfStrings=scanner.nextInt();
22     scanner.nextLine();
23     String[] arr = new String[numOfStrings];
24     String inputLine = scanner.nextLine();
25     String[] inputStrings = inputLine.split(" ");
26     for(int i=0;i<numOfStrings;i++){
27         arr[i]=inputStrings[i];
28     }
29     String result = extractAndConcatenate(numOfStrings,arr);
30     System.out.println(result);
31     scanner.close();
32 }
33 }

```

	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! ✓



◀ Lab-08-MCQ

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