

# CS23333-Object Oriented Programming Using Java-2023

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Status	Finished
Started	Saturday, 5 October 2024, 3:45 PM
Completed	Saturday, 5 October 2024, 3:49 PM
Duration	4 mins 22 secs

Question **1**

Correct

Marked out of 5.00

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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
3 public class VowelStringExtractor {
4
5     // Method to extract strings with vowels as first and last characters
6     public static String extractVowelStrings(String[] stringArray) {
7         StringBuilder result = new StringBuilder();
8         String vowels = "aeiouAEIOU"; // String containing all vowels
9
10        // Iterate through the array of strings
11        for (String s : stringArray) {
12            // Check if the string is not empty and if both the first and last characters are vowels
13            if (s.length() > 0 && vowels.indexOf(s.charAt(0)) != -1 && vowels.indexOf(s.charAt(s.length() - 1)) != -1) {
14                result.append(s); // Append matching string to the result
15            }
16        }
17
18        // Return the concatenated string in lowercase or "no matches found"
19        return result.length() > 0 ? result.toString().toLowerCase() : "no matches found";
20    }
21
22    public static void main(String[] args) {
23        Scanner scanner = new Scanner(System.in);
24    }
```

```

25 // Input for the number of strings
26
27 int n = scanner.nextInt();
28 scanner.nextLine(); // Consume the newline character
29
30 // Input for the strings in one line
31
32 String input = scanner.nextLine();
33 String[] strings = input.split(" "); // Split input into an array
34
35 // Process and output the result
36 String result = extractVowelStrings(strings);
37 System.out.println(result);
38
39 scanner.close(); // Close the scanner
40 }
41 }
42

```

	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!

Question **2**

Correct

Marked out of  
5.00

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## 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 final class FinalExample {
2     // Final variable
3     final int MAX_SPEED = 120; // Constant value
4
5     // Final method
6     public final void display() {
7         System.out.println("The maximum speed is: " + MAX_SPEED + " km/h");
8     }
9 }
10
11 // Main class to test the final class
12 public class Test {
13     public static void main(String[] args) {
14         // Create an instance of FinalExample
15         FinalExample example = new FinalExample();
16         example.display();
17
18         // Uncommenting the following line will result in a compile-time error

```

```

19 // because FinalExample is a final class and cannot be subclassed.
20 // class SubclassExample extends FinalExample { }
21 System.out.println("This is a subclass of FinalExample.");
22 }
23 }
24
25
26

```

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

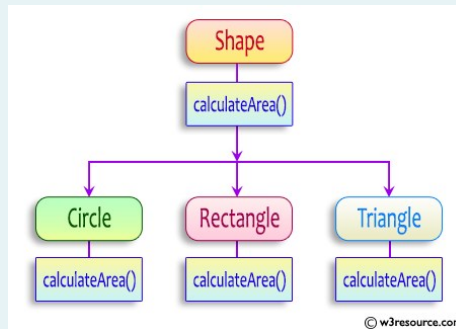
Correct

Marked out of 5.00

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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 %)

```

1 import java.util.Scanner;
2
3 // Abstract class Shape
4 abstract class Shape {
5     public abstract double calculateArea();
6 }
7
8 // Circle class
9 class Circle extends Shape {
10     private double radius;
11
12     public Circle(double radius) {
13         this.radius = radius;
14     }
15

```

```

16     @Override
17     public double calculateArea() {
18         return Math.PI * radius * radius; // Area of circle:  $\pi r^2$ 
19     }
20 }
21
22 // Rectangle class
23 class Rectangle extends Shape {
24     private double length;
25     private double breadth;
26
27     public Rectangle(double length, double breadth) {
28         this.length = length;
29         this.breadth = breadth;
30     }
31
32     @Override
33     public double calculateArea() {
34         return length * breadth; // Area of rectangle: length * breadth
35     }
36 }
37 // Triangle class
38 class Triangle extends Shape {
39     private double base;
40     private double height;
41
42     public Triangle(double base, double height) {
43         this.base = base;
44         this.height = height;
45     }
46
47     @Override
48     public double calculateArea() {
49         return 0.5 * base * height; // Area of triangle:  $0.5 * \text{base} * \text{height}$ 
50     }
51 }
52

```

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

Passed all tests!

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