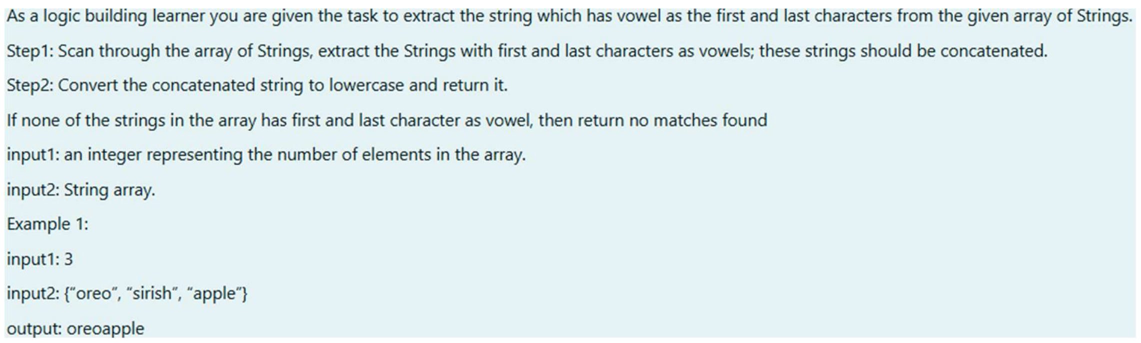
Week – 8

1.



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.

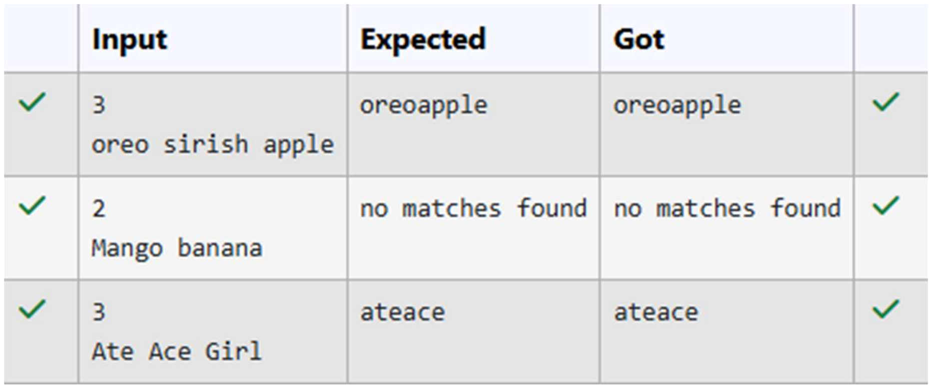
Example 1:

input1: 3

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

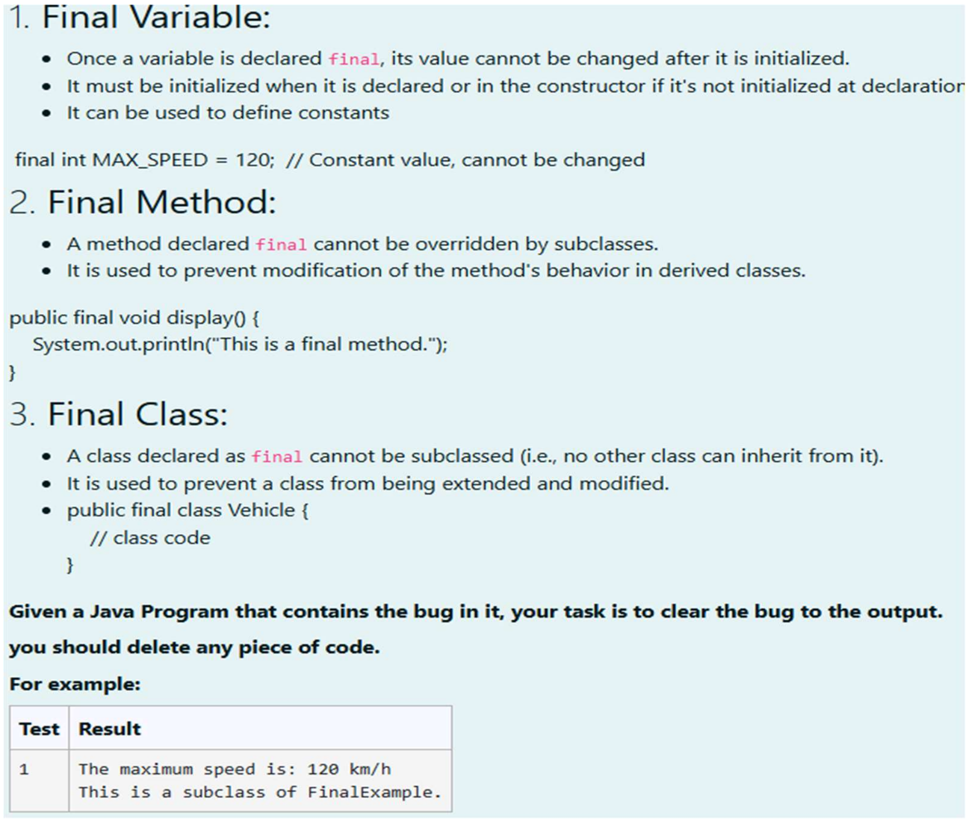
output: oreoapple

```
import java.util.*;
public class VowelStringExtractor {
  public static String extractVowelStrings(String[] stringArray) {
    StringBuilder result = new StringBuilder();
    String vowels = "aeiouAEIOU";

    for (String s : stringArray) {
      if (s.length() > 0 && vowels.indexOf(s.charAt(0)) != -1 && vowels.indexOf(s.charAt(s.length() - 1)) != -1) {
        result.append(s);
      }
    }

    return result.length() > 0 ? result.toString().toLowerCase() : "no matches found";
  }

  public static void main(String[] args) {
    Scanner scanner = new Scanner(System.in);
    int n = scanner.nextInt();
    scanner.nextLine();
    String input = scanner.nextLine();
    String[] strings = input.split(" ");
    String result = extractVowelStrings(strings);
    System.out.println(result);
    }
}
```



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

2.



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
  }

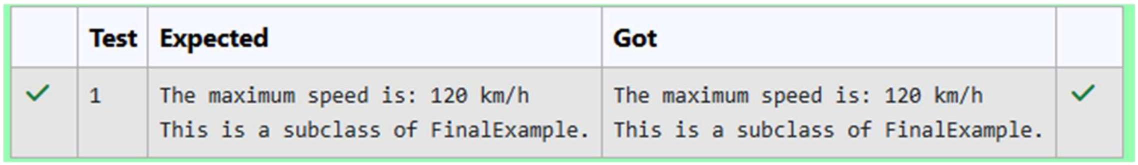
Given a Java Program that contains the bug in it, your task is to clear the bug to the output.

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.

```
class FinalExample {

    // Final variable
            final int maxSpeed = 120;

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

class SubClass extends FinalExample {

    public void displayMaxSpeed() {
        System.out.println("Cannot override a final method");
    }

    // 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();
    }
}
```

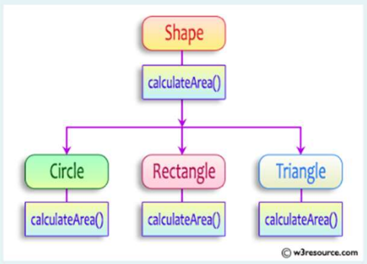


	Test	Expected	Got	
✓	1	The maximum speed is: 120 km/h This is a subclass of FinalExample.	The maximum speed is: 120 km/h This is a subclass of FinalExample.	✓

3.

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 :

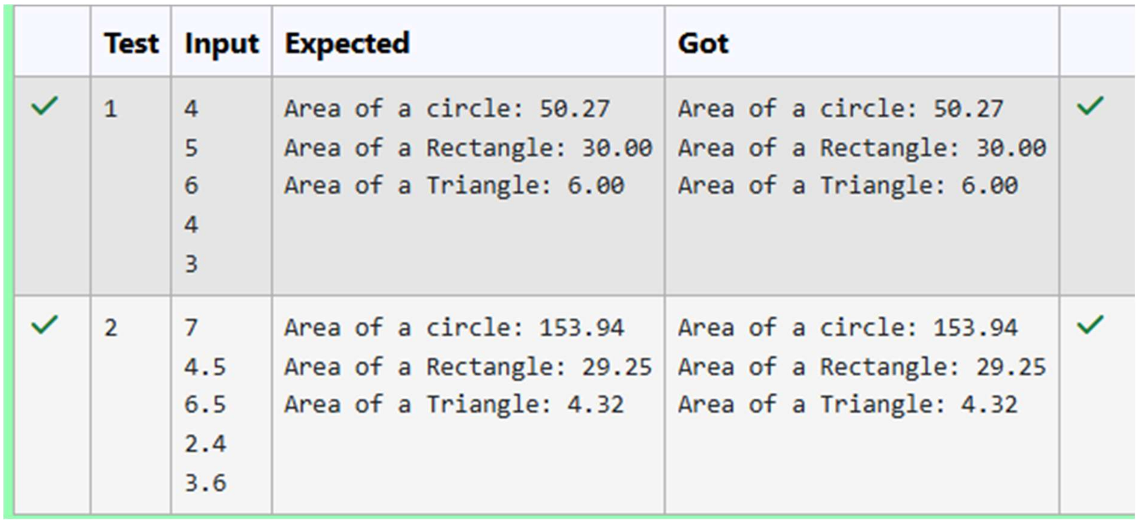
```
4   // radius of the circle to calculate area PI*r*r
5  //  length of the rectangle
6 // breadth of the rectangle to calculate the area of a rectangle
4   // base of the triangle
3  //  height of the triangle
```

OUTPUT:

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

```
import java.util.*;
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 ShapeTest {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        double radius = scanner.nextDouble();
        Circle circle = new Circle(radius);
        System.out.printf("Area of a circle: %.2f%n", circle.calculateArea());

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

        double base = scanner.nextDouble();
        double height = scanner.nextDouble();
        Triangle triangle = new Triangle(base, height);
        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	✓