

1. Implement java program to check given number is prime or not. Take number using command line arguments.

```
public class CheckPrimeNumber {  
  
    public static void main(String[] args) {  
  
        // Check if the user has provided a command line argument  
  
        if (args.length != 1) {  
  
            System.out.println("Usage: CheckPrimeNumber <number>");  
  
            System.exit(1);  
  
        }  
  
  
        // Get the number from the command line argument  
  
        int number = Integer.parseInt(args[0]);  
  
  
        // Check if the number is prime  
  
        boolean isPrime = true;  
  
        for (int i = 2; i <= Math.sqrt(number); i++) {  
  
            if (number % i == 0) {  
  
                isPrime = false;  
  
                break;  
  
            }  
  
        }  
  
  
        // Display the result  
  
        if (isPrime) {  
  
            System.out.println(number + " is a prime number.");  
  
        }  
  
    }  
}
```

```

        } else {

            System.out.println(number + " is not a prime number.");

        }

    }

}

```

2.Implement java program to find factorial of given number.

```

public class Factorial {

    public static void main(String[] args) {

        int number = 5;

        long factorial = 1;

        for (int i = 1; i <= number; i++) {

            factorial *= i;

        }

        System.out.println("Factorial of " + number + " is: " + factorial);

    }

}

```

3.Implement java to print the area of a rectangle by creating a class named 'Area' having two methods. First method named as 'setDim' takes length and breadth of rectangle as parameters and the second method named as 'getArea' returns the area of the rectangle. Length and breadth of rectangle are entered through keyboard

```

class Area {

    int length;

    int breadth;

```

```
void setDim(int len, int b) {
```

```
    length = len;
```

```
    breadth = b;
```

```
}
```

```
void getArea() {
```

```
    System.out.println("Area of a rectangle: " + (length * breadth));
```

```
}
```

```
}
```

```
public class CalArea {
```

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

```
        if (args.length != 2) {
```

```
            System.out.println("Please provide both length and breadth as command-line arguments.");
```

```
            return;
```

```
        }
```

```
        int len = Integer.parseInt(args[0]);
```

```
        int b = Integer.parseInt(args[1]);
```

```
        Area a = new Area();
```

```
        a.setDim(len, b);
```

```
        a.getArea();
```

```
}
```

```
}
```

4. Java Program to demonstrate the use of the parameterized constructor.

```
class Student {  
  
    private String name;  
  
    private int age;  
  
    // Parameterized constructor  
    public Student(String name, int age) {  
        this.name = name;  
        this.age = age;  
    }  
  
    // Method to display student information  
    public void displayInfo() {  
        System.out.println("Name: " + name);  
        System.out.println("Age: " + age);  
    }  
}  
  
public class Main {  
  
    public static void main(String[] args) {  
        // Create a Student object using the parameterized constructor  
        Student student1 = new Student("Alice", 20);  
    }  
}
```

```
// Display the information of the student

System.out.println("Student 1 Information:");

student1.displayInfo();


// Create another Student object using the parameterized constructor

Student student2 = new Student("Bob", 22);


// Display the information of the second student

System.out.println("\nStudent 2 Information:");

student2.displayInfo();

}

}
```

5. Write a Java Program to demonstrate the use of static variable, static block and static method.

```
public class StaticDemo {

    // Static variable

    static int staticVariable = 10;


    // Static block

    static {

        System.out.println("Static block is executed.");

        staticVariable = 20;

    }


    // Static method
```

```
static void staticMethod() {  
  
    System.out.println("Static method is called.");  
  
    System.out.println("Static variable value: " + staticVariable);  
  
}
```

```
public static void main(String[] args) {  
  
    System.out.println("Main method is called.");  
  
    System.out.println("Static variable value: " + staticVariable);  
  
  
    // Calling the static method  
    staticMethod();  
  
}  
}
```

6. Create abstract class shape with dim1, dim2 variables and abstract area() method. Class rectangle and triangle inherits shape class. Calculate area of rectangle and triangle

```
abstract class Shape {  
  
    double dim1;  
  
    double dim2;  
  
  
    Shape(double a, double b) {  
  
        dim1 = a;  
  
        dim2 = b;  
  
    }  
}
```

```
        abstract double area();
    }

    class Rectangle extends Shape {

        Rectangle(double a, double b) {

            super(a, b);

        }

        double area() {

            System.out.println("Area for Rectangle");

            return dim1 * dim2;

        }

    }
```

```
    class Triangle extends Shape {

        Triangle(double a, double b) {

            super(a, b);

        }

        double area() {

            System.out.println("Area for Triangle");

            return 0.5 * dim1 * dim2;

        }

    }
```

```
    public class AbstractAreas {
```

```

public static void main(String[] args) {

    Shape figref;

    Rectangle r = new Rectangle(3, 5);

    Triangle t = new Triangle(10, 8);

    figref = r;

    System.out.println("Area is " + figref.area());

    figref = t;

    System.out.println("Area is " + figref.area());

}
}

```

7. Create interface shape area() method. Class rectangle and triangle inherits shape class. Calculate area of rectangle and triangle

```

interface Shape {

    double compute(double a, double b);

}

class Rectangle implements Shape {

    public double compute(double l, double b) {

        return l * b;

    }

}

```



```

class Triangle implements Shape {

    public double compute(double b, double h) {

        return 0.5 * b * h;

    }

}

```

```

public class MainShape {

    public static void main(String[] args) {

        Rectangle rect = new Rectangle();

        double RArea = rect.compute(10, 20);

        System.out.println("The Area of the Rectangle is " + RArea);


        Triangle tri = new Triangle();

        double TArea = tri.compute(10, 20);

        System.out.println("The Area of the Triangle is " + TArea);

    }

}

```

8. Write a java Program for runtime exceptions- Unchecked Exceptions

```

public class UncheckedExceptionDemo {

    public static void main(String[] args) {

        int[] numbers = { 1, 2, 3 };

        int index = 3; // Trying to access an element out of bounds
    }

}

```

```

try {

    int result = numbers[index]; // This will cause an ArrayIndexOutOfBoundsException

    System.out.println("Result: " + result);

} catch (ArrayIndexOutOfBoundsException e) {

    System.out.println("An ArrayIndexOutOfBoundsException occurred.");

}

System.out.println("Program continues after the exception handling.");

}

}

```

9. Write a Java program to read text file and find number of vowels, number of words from it. Also find number of times 'a' occurred in text file

```

import java.io.File;

import java.util.Scanner;

public class TextFileAnalysis {

    public static void main(String[] args) throws java.io.FileNotFoundException {

        // Replace "sample.txt" with your file path

        File file = new File("sample.txt");

        Scanner scanner = new Scanner(file);

        int vowelCount = 0;

        int wordCount = 0;

        int aCount = 0;
    }
}

```

```

while (scanner.hasNextLine()) {

    String line = scanner.nextLine().toLowerCase();

    String[] words = line.split("\\s+");

    for (char c : line.toCharArray()) {

        if (c == 'a') {

            aCount++;

        } else if ("aeiou".contains(String.valueOf(c))) {

            vowelCount++;

        }

    }

    wordCount += words.length;

}

scanner.close();

System.out.println("Number of vowels: " + vowelCount);

System.out.println("Number of words: " + wordCount);

System.out.println("Number of times 'a' occurred: " + aCount);

}

}

```

10. Write a Java Program to Add button, text field & text area

```

import javax.swing.JButton;

```

```
import javax.swing.JFrame;

import javax.swing.JPanel;

import javax.swing.JTextArea;

import javax.swing.JTextField;


public class GUIExample {

    public static void main(String[] args) {

        // Create a JFrame (window)

        JFrame frame = new JFrame("Java GUI Example");


        // Create a JPanel to hold components

        JPanel panel = new JPanel();


        // Create a JTextField

        JTextField textField = new JTextField(20); // 20 columns wide


        // Create a JTextArea

        JTextArea textArea = new JTextArea(10, 20); // 10 rows, 20 columns


        // Create a JButton

        JButton button = new JButton("Click Me");


        // Add components to the panel

        panel.add(textField);

        panel.add(textArea);

        panel.add(button);
```

```
        // Add the panel to the frame
        frame.add(panel);

        // Set frame properties
        frame.setSize(400, 300);
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.setVisible(true);
    }
}
```

11. Write GUI program to demonstrate radiobutton.

```
import javax.swing.JFrame;
import javax.swing.JPanel;
import javax.swing.JRadioButton;
import javax.swing.ButtonGroup;
import javax.swing.JButton;
import javax.swing.JOptionPane;

public class RadioButton {
    public static void main(String[] args) {
        // Create a JFrame (window)
        JFrame frame = new JFrame("Radio Button Demo");

        // Create a JPanel to hold components
```

```
JPanel panel = new JPanel();

// Create a button group for radio buttons
ButtonGroup buttonGroup = new ButtonGroup();

// Create radio buttons
JRadioButton radioButton1 = new JRadioButton("Option 1");
JRadioButton radioButton2 = new JRadioButton("Option 2");

// Add radio buttons to the button group
buttonGroup.add(radioButton1);
buttonGroup.add(radioButton2);

// Create a button to perform an action
JButton submitButton = new JButton("Submit");

// Add components to the panel
panel.add(radioButton1);
panel.add(radioButton2);
panel.add(submitButton);

// Add the panel to the frame
frame.add(panel);

// Set frame properties
frame.setSize(300, 150);
```

```

frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);

frame.setVisible(true);


// Action listener for the submit button
submitButton.addActionListener(e -> {
    if (radioButton1.isSelected()) {
        JOptionPane.showMessageDialog(null, "You selected Option 1.");
    } else if (radioButton2.isSelected()) {
        JOptionPane.showMessageDialog(null, "You selected Option 2.");
    } else {
        JOptionPane.showMessageDialog(null, "Please select an option.");
    }
});
}
}

```

12. Write GUI program to find factorial of given number using applet.