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OOP Assignment 04

1. Generate 2 random alphanumeric strings, one using Random class from util package and other using Math package.

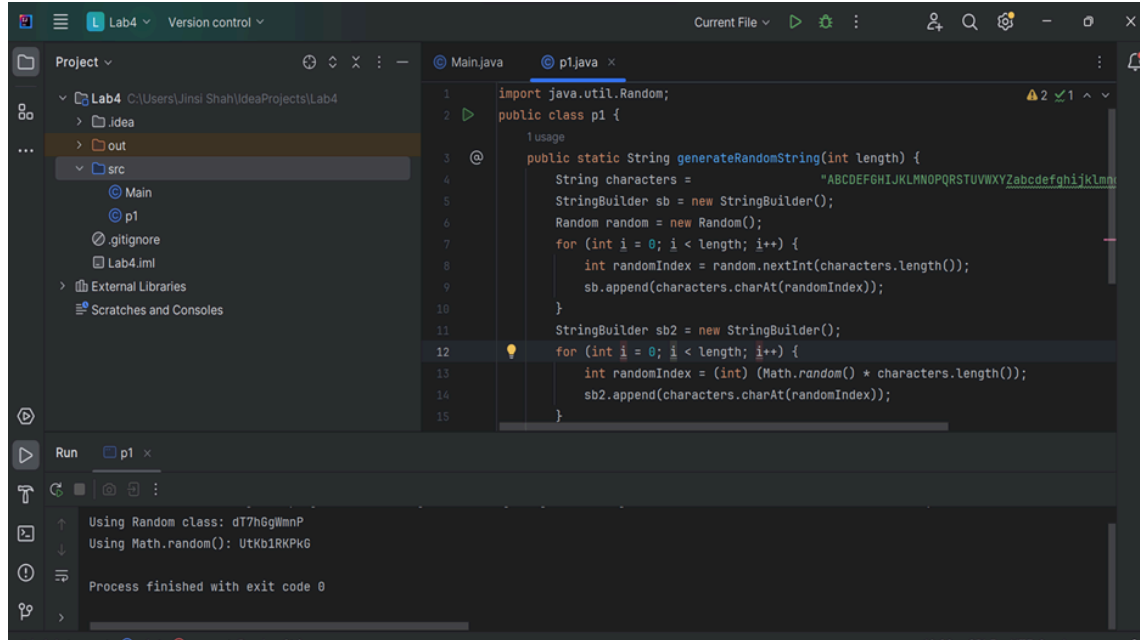
Code:

```
import java.util.Random;
public class p1 {
    public static String generateRandomString(int length) {
        String characters =
"ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789";
        StringBuilder sb = new StringBuilder();
        Random random = new Random();
        for (int i = 0; i < length; i++) {
            int randomIndex = random.nextInt(characters.length());
            sb.append(characters.charAt(randomIndex));
        }
        StringBuilder sb2 = new StringBuilder();
        for (int i = 0; i < length; i++) {
            int randomIndex = (int) (Math.random() * characters.length());
            sb2.append(characters.charAt(randomIndex));
        }
        return "Using Random class: " + sb.toString() + "\nUsing Math.random(): "
            + sb2.toString();
    }
    public static void main(String[] args) {
        int length = 10;
        System.out.println(generateRandomString(length));
    }
}
```

Output:

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2. Take a string input from the user and randomize it and add 5 numbers to it to create a password.

Code:

```
import java.util.Random;
import java.util.Scanner;
public class p2 {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a string: ");
        String input = scanner.nextLine();
        scanner.close();
        String randomizedString = randomizeString(input);
        String numbers = generateRandomNumbers(5);
        String password = randomizedString + numbers;
        System.out.println("Generated Password: " + password);
    }

    public static String randomizeString(String input) {
        char[] chars = input.toCharArray();
        Random random = new Random();
        for (int i = 0; i < chars.length; i++) {
            int randomIndex = random.nextInt(chars.length);
```

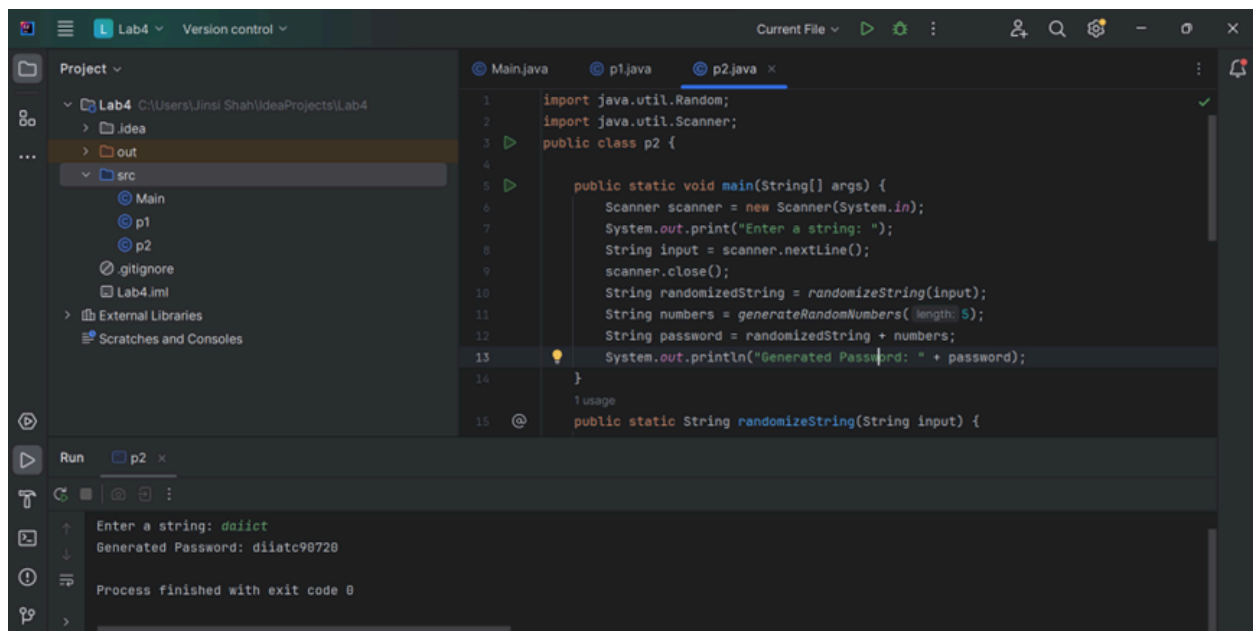
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```
        char temp = chars[i];
        chars[i] = chars[randomIndex];
        chars[randomIndex] = temp;
    }
    return new String(chars);
}

public static String generateRandomNumbers(int length) {
    StringBuilder sb = new StringBuilder();
    Random random = new Random();
    for (int i = 0; i < length; i++) {
        sb.append(random.nextInt(10));
    }
    return sb.toString();
}
}
```

Output:



```
import java.util.Random;
import java.util.Scanner;

public class p2 {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a string: ");
        String input = scanner.nextLine();
        scanner.close();
        String randomizedString = randomizeString(input);
        String numbers = generateRandomNumbers(5);
        String password = randomizedString + numbers;
        System.out.println("Generated Password: " + password);
    }

    // usage
    public static String randomizeString(String input) {
```

Run p2 x

Enter a string: daiict
Generated Password: daiatc90720
Process finished with exit code 0

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3. Take a sentence from the user and replace a word in that sentence with “Mississippi”. User should enter the word to be replaced. Do not use StringBuilder class.

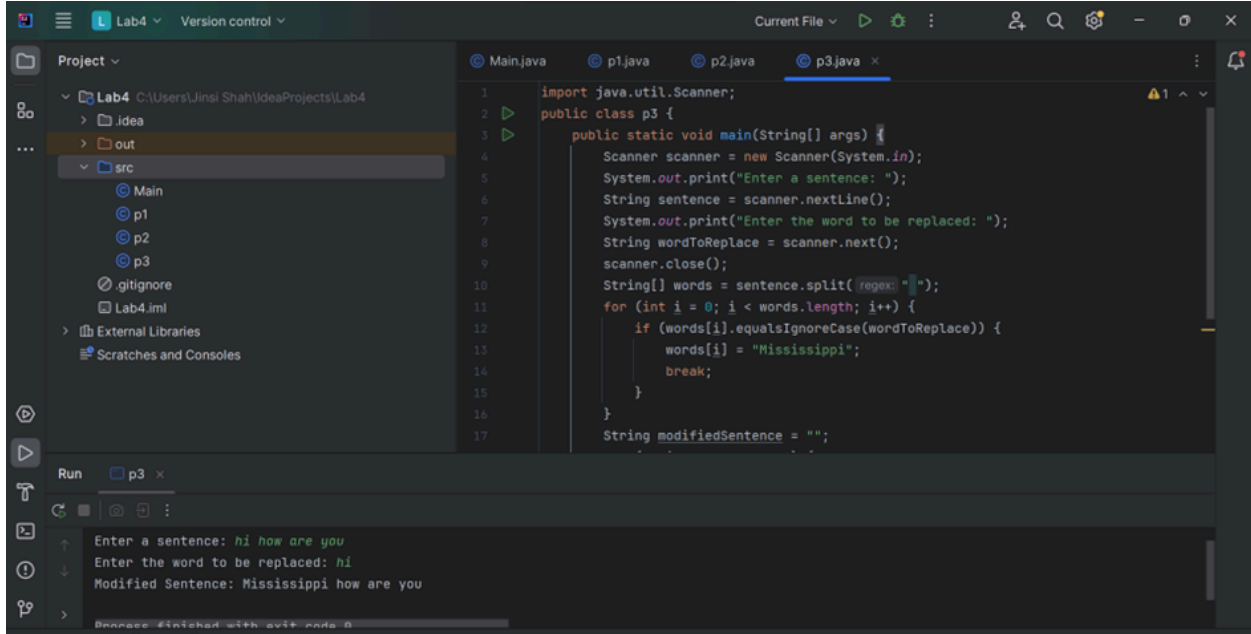
Code:

```
import java.util.Scanner;
public class p3 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a sentence: ");
        String sentence = scanner.nextLine();
        System.out.print("Enter the word to be replaced: ");
        String wordToReplace = scanner.next();
        scanner.close();
        String[] words = sentence.split(" ");
        for (int i = 0; i < words.length; i++) {
            if (words[i].equalsIgnoreCase(wordToReplace)) {
                words[i] = "Mississippi";
                break;
            }
        }
        String modifiedSentence = "";
        for (String word : words) {
            modifiedSentence += word + " ";
        }
        System.out.println("Modified Sentence: " + modifiedSentence.trim());
    }
}
```

Output:

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The screenshot shows an IDE with a project named 'Lab4'. The 'src' directory contains files 'Main', 'p1', 'p2', and 'p3'. The 'p3.java' file is open, showing the following code:

```
1 import java.util.Scanner;
2 public class p3 {
3     public static void main(String[] args) {
4         Scanner scanner = new Scanner(System.in);
5         System.out.print("Enter a sentence: ");
6         String sentence = scanner.nextLine();
7         System.out.print("Enter the word to be replaced: ");
8         String wordToReplace = scanner.next();
9         scanner.close();
10        String[] words = sentence.split(" ");
11        for (int i = 0; i < words.length; i++) {
12            if (words[i].equalsIgnoreCase(wordToReplace)) {
13                words[i] = "Mississippi";
14                break;
15            }
16        }
17        String modifiedSentence = "";
```

The Run console at the bottom shows the execution output:

```
Enter a sentence: hi how are you
Enter the word to be replaced: hi
Modified Sentence: Mississippi how are you
```

4. Take a sentence and a word from the user. Count the number of occurrences of that word in the sentence. Do not use StringBuilder class.

Code:

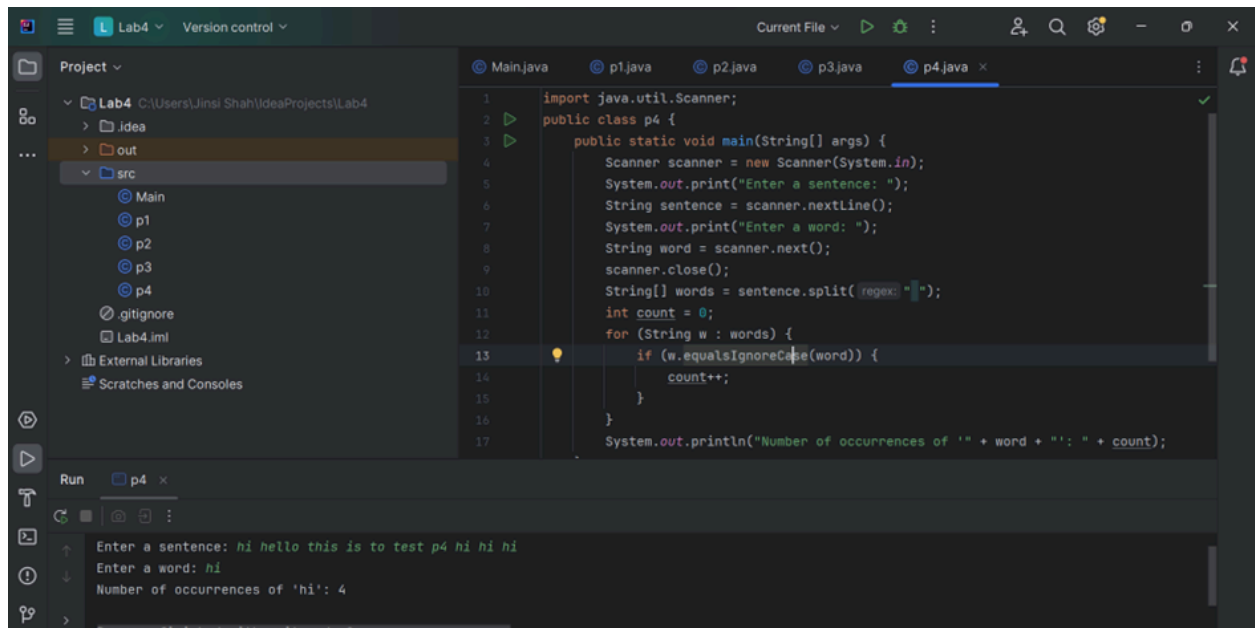
```
import java.util.Scanner;
public class p4 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a sentence: ");
        String sentence = scanner.nextLine();
        System.out.print("Enter a word: ");
        String word = scanner.next();
        scanner.close();
```

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```
String[] words = sentence.split(" ");
int count = 0;
for (String w : words) {
    if (w.equalsIgnoreCase(word)) {
        count++;
    }
}
System.out.println("Number of occurrences of '" + word + "': " + count);
}
```

Output:



The screenshot shows an IDE with a project named 'Lab4'. The source code for 'p4.java' is displayed, which implements a program to count the occurrences of a word in a sentence. The code uses a Scanner to read input, splits the sentence into words, and iterates through them to count matches. The output console shows the program's execution with the input sentence 'hi hello this is to test p4 hi hi hi' and the word 'hi', resulting in 4 occurrences.

```
1 import java.util.Scanner;
2 public class p4 {
3     public static void main(String[] args) {
4         Scanner scanner = new Scanner(System.in);
5         System.out.print("Enter a sentence: ");
6         String sentence = scanner.nextLine();
7         System.out.print("Enter a word: ");
8         String word = scanner.next();
9         scanner.close();
10        String[] words = sentence.split(" ");
11        int count = 0;
12        for (String w : words) {
13            if (w.equalsIgnoreCase(word)) {
14                count++;
15            }
16        }
17        System.out.println("Number of occurrences of '" + word + "': " + count);
18    }
19 }
```

Run p4 x

Enter a sentence: hi hello this is to test p4 hi hi hi
Enter a word: hi
Number of occurrences of 'hi': 4

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5. Use function overloading to create a method “Area” which calculates the area of the following figures :-

a. Rectangle

b. Circle

c. Ellipse

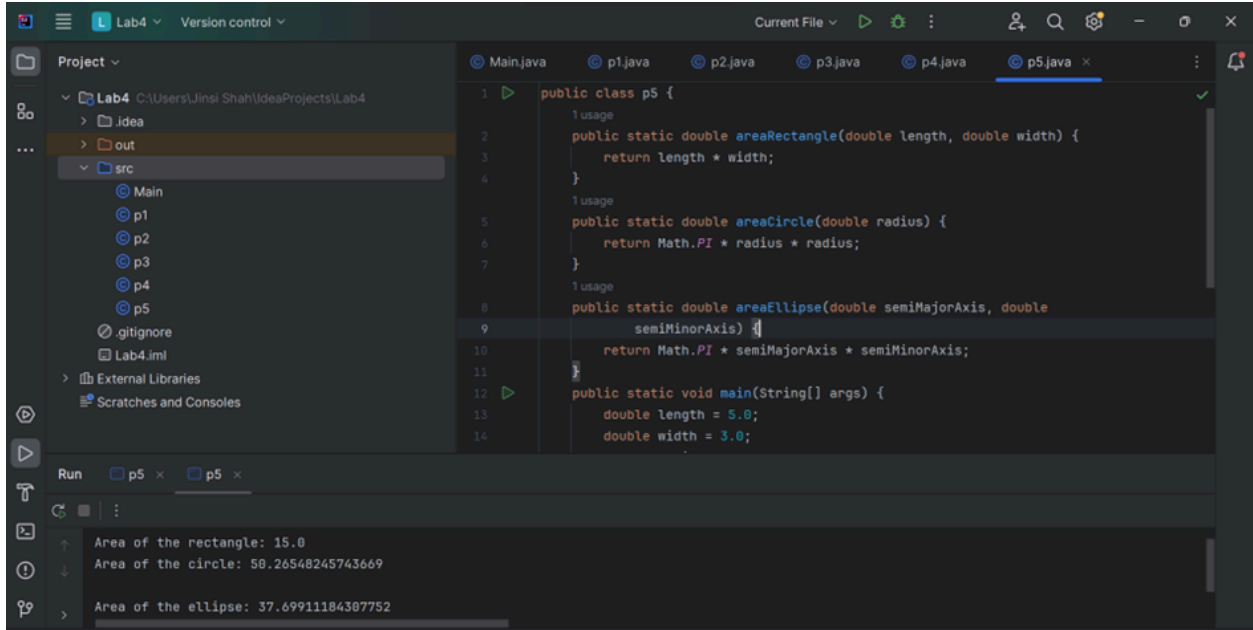
Code:

```
public class p5 {  
    public static double areaRectangle(double length, double width) {  
        return length * width;  
    }  
    public static double areaCircle(double radius) {  
        return Math.PI * radius * radius;  
    }  
    public static double areaEllipse(double semiMajorAxis, double  
        semiMinorAxis) {  
        return Math.PI * semiMajorAxis * semiMinorAxis;  
    }  
    public static void main(String[] args) {  
        double length = 5.0;  
        double width = 3.0;  
        double radius = 4.0;  
        double semiMajorAxis = 6.0;  
        double semiMinorAxis = 2.0;  
        double rectangleArea = areaRectangle(length, width);  
        System.out.println("Area of the rectangle: " + rectangleArea);  
        double circleArea = areaCircle(radius);  
        System.out.println("Area of the circle: " + circleArea+ "\n");  
        double ellipseArea = areaEllipse(semiMajorAxis, semiMinorAxis);  
        System.out.println("Area of the ellipse: " + ellipseArea);  
    }  
}
```

Output:

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The screenshot shows an IDE window with a project named 'Lab4'. The project structure includes a 'src' directory with files 'Main', 'p1', 'p2', 'p3', 'p4', and 'p5'. The 'p5.java' file is open, showing the following code:

```
1 public class p5 {  
2     1 usage  
3     public static double areaRectangle(double length, double width) {  
4         return length * width;  
5     }  
6     1 usage  
7     public static double areaCircle(double radius) {  
8         return Math.PI * radius * radius;  
9     }  
10    1 usage  
11    public static double areaEllipse(double semiMajorAxis, double  
12        semiMinorAxis) {  
13        return Math.PI * semiMajorAxis * semiMinorAxis;  
14    }  
15  
16    public static void main(String[] args) {  
17        double length = 5.0;  
18        double width = 3.0;  
19    }  
20 }
```

The Run console shows the output of the program:

```
Area of the rectangle: 15.0  
Area of the circle: 50.26548245743669  
Area of the ellipse: 37.69911184307752
```


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6. Create 3 functions :-

Add(int x, int y)

Add(double x, double y)

Add(String x, String y)

For int and double, return the sum of 2 values. For string return the concatenated string.

The name of the 3 functions must be the same(function overloading).

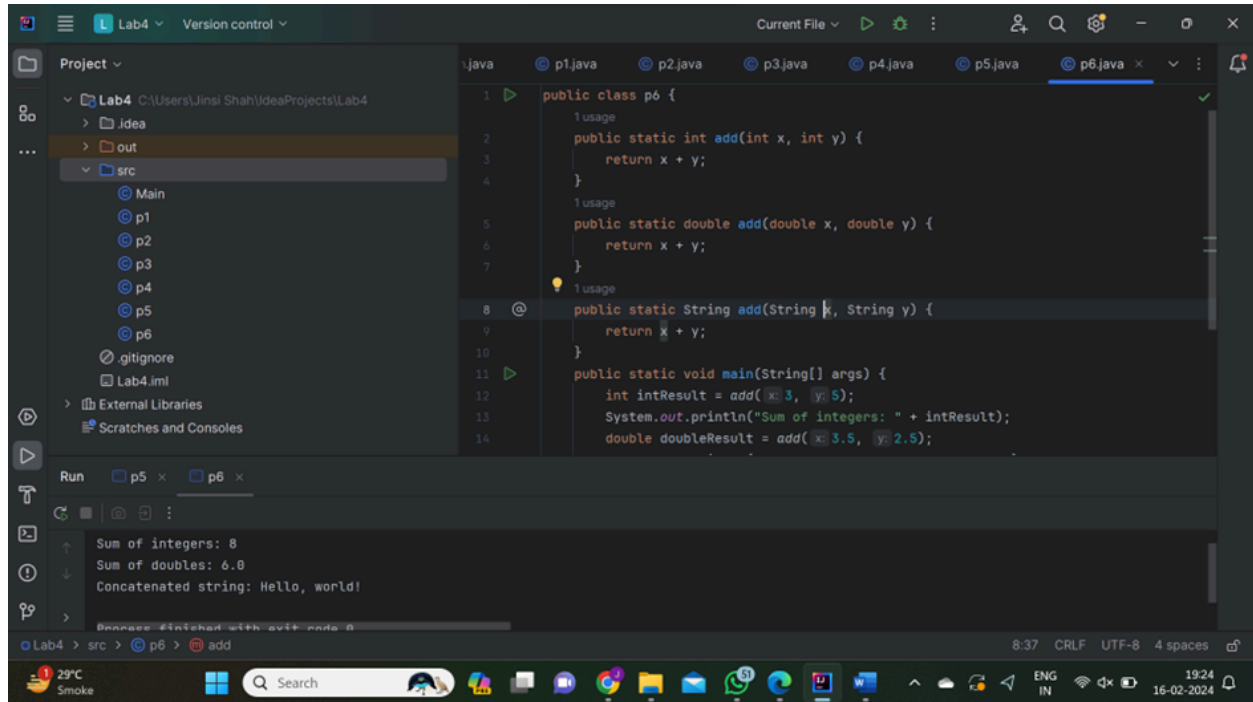
Code:

```
public class p6 {  
    public static int add(int x, int y) {  
        return x + y;  
    }  
    public static double add(double x, double y) {  
        return x + y;  
    }  
    public static String add(String x, String y) {  
        return x + y;  
    }  
    public static void main(String[] args) {  
        int intResult = add(3, 5);  
        System.out.println("Sum of integers: " + intResult);  
        double doubleResult = add(3.5, 2.5);  
        System.out.println("Sum of doubles: " + doubleResult);  
        String stringResult = add("Hello, ", "world!");  
        System.out.println("Concatenated string: " + stringResult);  
    }  
}
```

Output:

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7. Using awt package, draw the following figures after taking appropriate inputs from the user :-

- Rectangle
- Circle
- Ellipse

Code:

```
import java.awt.*;  
import java.util.Scanner;  
import javax.swing.*;  
public class Main extends JPanel{  
    private int shapeType;  
    private int x, y, width, height;  
    public Main(int shapeType, int x, int y, int width, int height) {  
        this.shapeType = shapeType;  
        this.x = x;  
        this.y = y;  
    }  
}
```

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```
        this.width = width;
        this.height = height;
    }
    @Override
    protected void paintComponent(Graphics g) {
        super.paintComponent(g);
        switch (shapeType) {
            case 1: // Rectangle
                g.drawRect(x, y, width, height);
                break;
            case 2: // Circle
                g.drawOval(x, y, width, height);
                break;
            case 3: // Ellipse
                g.drawOval(x, y, width, height);
                break;
        }
    }
}

public static void main(String[] args) {
    Scanner scanner = new Scanner(System.in);
    // Get shape type from the user
    System.out.println("Enter shape type (1: Rectangle, 2: Circle, 3: Ellipse): ");
    int shapeType = scanner.nextInt();
    // Get shape dimensions from the user
    System.out.println("Enter x-coordinate: ");
    int x = scanner.nextInt();
    System.out.println("Enter y-coordinate: ");
    int y = scanner.nextInt();
    System.out.println("Enter width: ");
    int width = scanner.nextInt();
    System.out.println("Enter height: ");
    int height = scanner.nextInt();
    scanner.close();
    // Create JFrame and add DrawingShapes panel
    JFrame frame = new JFrame();
    frame.setSize(500, 500);
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    Main panel = new Main(shapeType, x, y, width,height);
    frame.add(panel);
    frame.setVisible(true);
}
}
```

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Output:

