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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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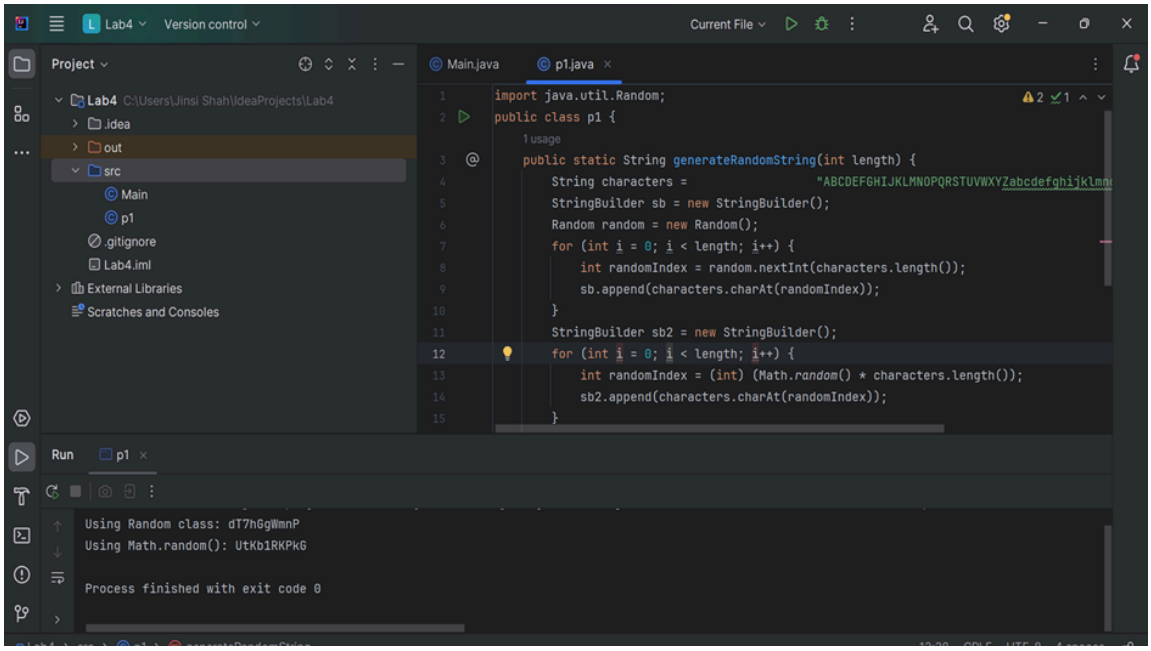

2. Take a string input from the user and randomize it and add 5 numbers to it to create a password.

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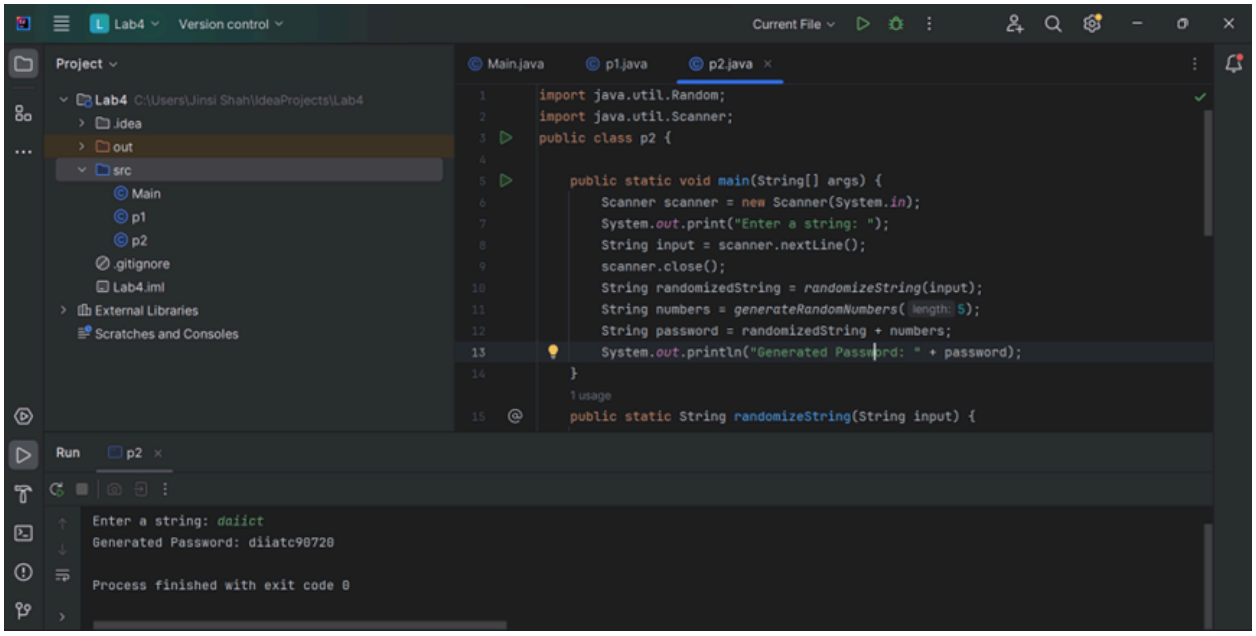
```
            char temp = chars[i];
            chars[i] = chars[randomIndex];
            chars[randomIndex] = temp;
        }
        return new String(chars);
    }
    public static String generateRandomNumbers(int length) {
        StringBuilder sb = new StringBuilder();
        Random random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

Output:



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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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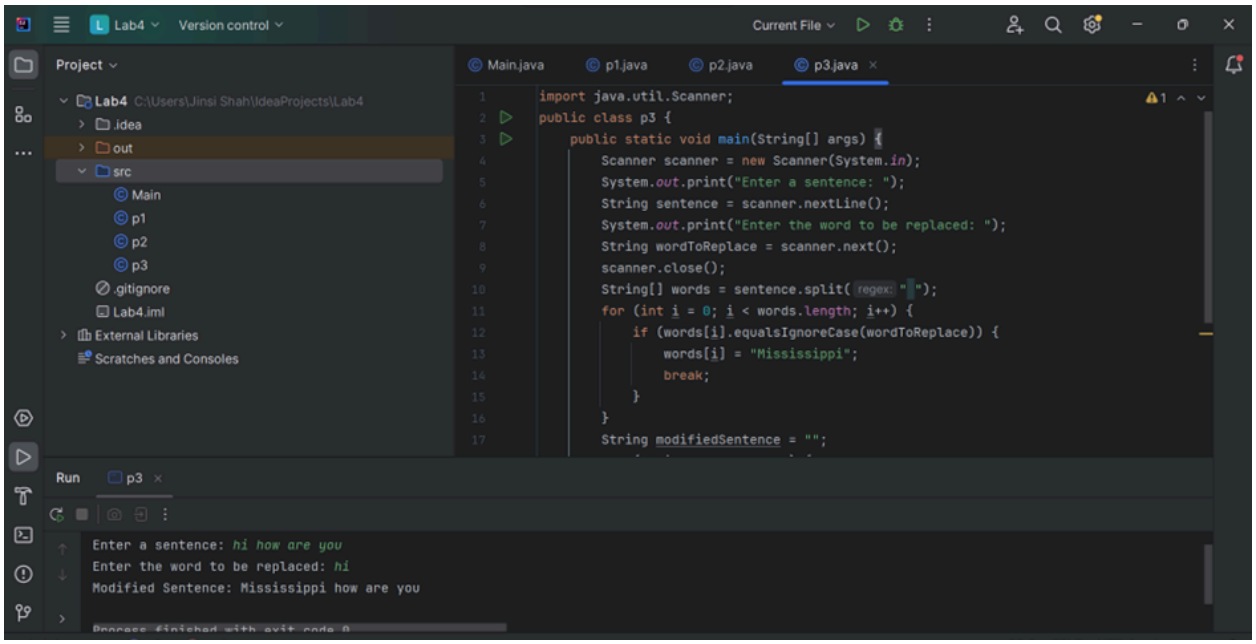

4. Take a sentence and a word from the user. Count the number of occurrences of that word in the sentence. Do not use StringBuilder class.

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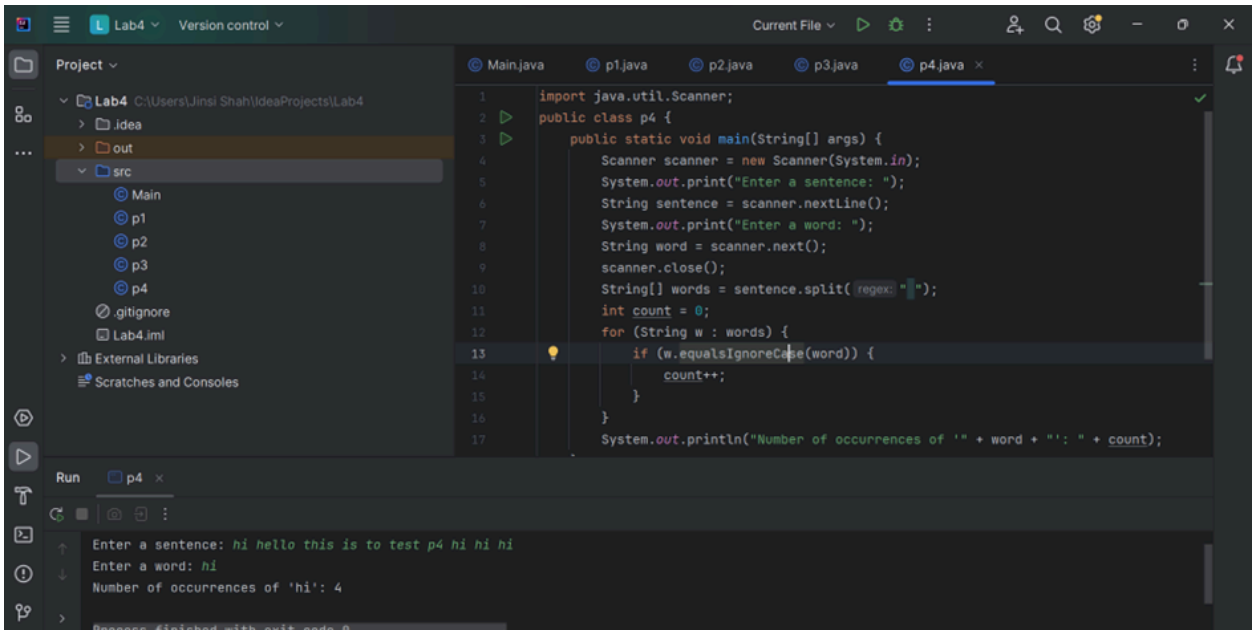
```
        String[] words = sentence.split(" ");
        int count = 0;
        for (String w : words) {
            if (w.equalsIgnoreCase(word)) {
                count++;
            }
        }
        System.out.println("Number of occurrences of '" + word + "': " + count);
    }
}
```

Output:



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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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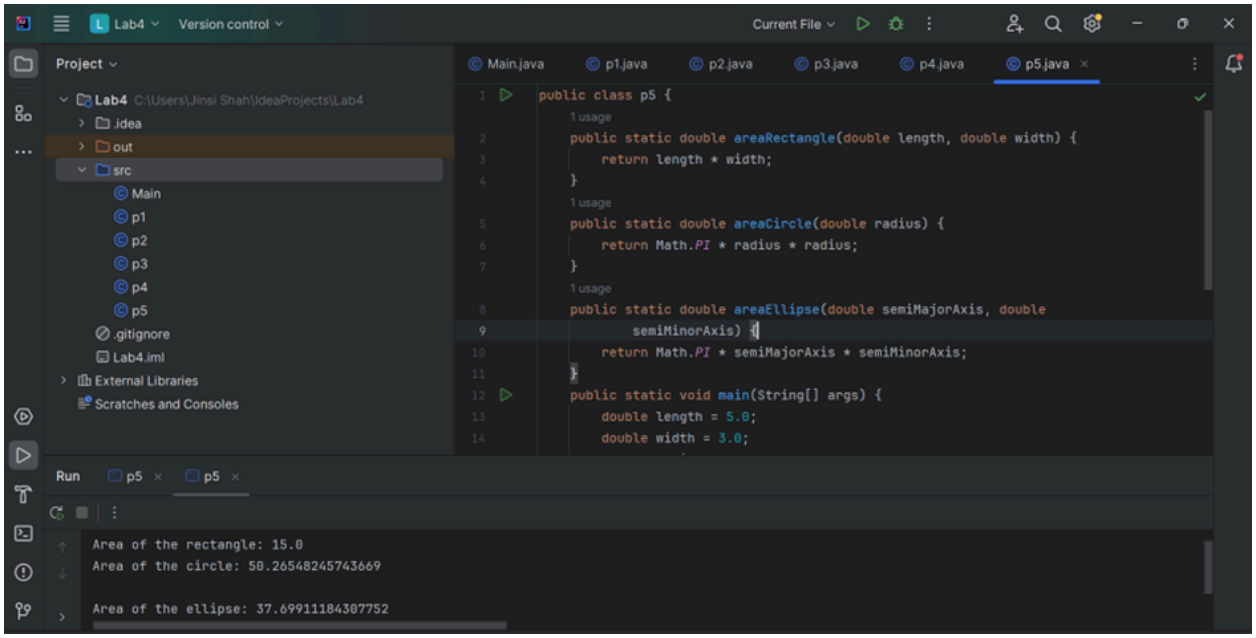

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6. Create 3 functions :-
Add(int x, int y)
Add(double x, double y)
Add(String x, String y)
For int and double, return the sum of 2 values. For string return the concatenated string. The name of the 3 functions must be the same(function overloading).

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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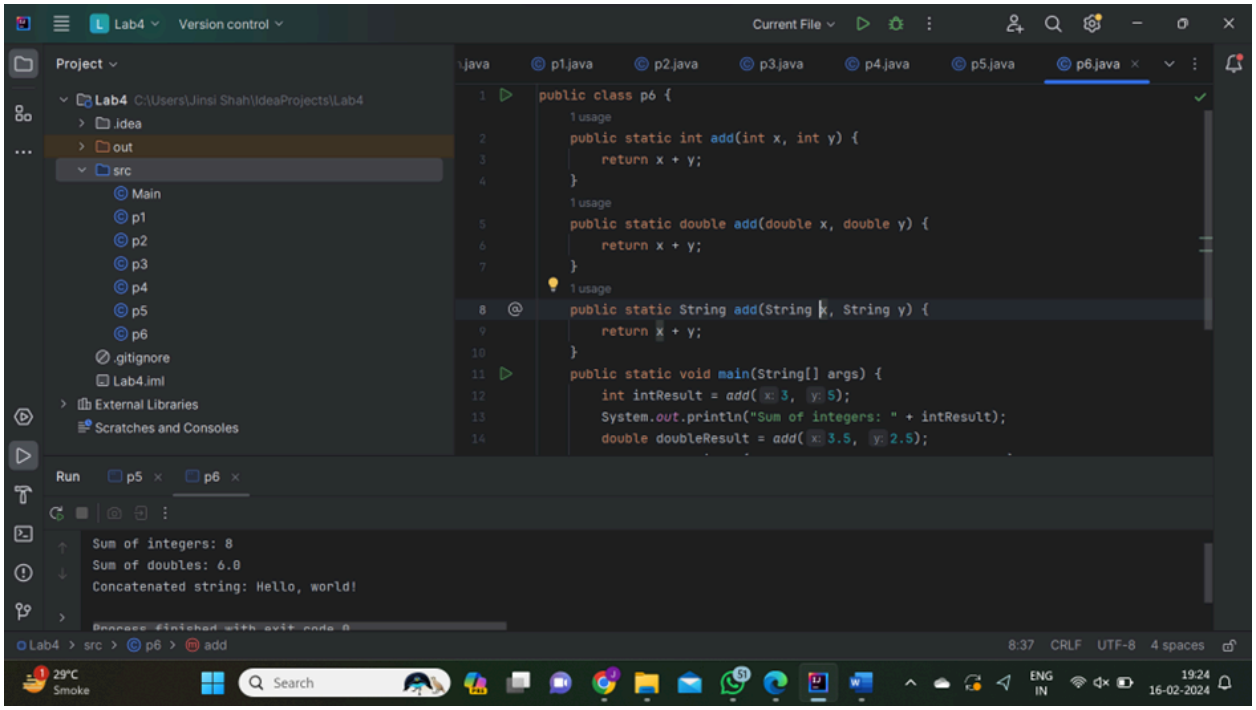

7. Using awt package, draw the following figures after taking appropriate inputs from the user :-
a. Rectangle
b. Circle
c. Ellipse

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: