DATASTRUCTURES AND ALGORITHMS

LAB 01 EC 4070

K.M.J.G.S.C.W. Bandara

2021E073

LAB 1

SEMESTER 4

EC4070

Q1.

```
import java.util.Scanner;

public class Calculator {
   private double nmb1;
   private double nmb2;
   private double sum;

   public Calculator() {
      nmb1 = 0;
      nmb2 = 0;
      sum = 0;
   }

   public void addition() {
      sum = nmb1 + nmb2;
   }

   public void subtraction() {
      sum = nmb1 - nmb2;
   }
   public void division() {
         sum = nmb1 / nmb2;
   }

   public void multiplication() {
      sum = nmb1 * nmb2;
   }




   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);
      Calculator calculator = new Calculator();
```

```
        System.out.print("Enter your first number : ");
        calculator.nmb1 = scanner.nextDouble();

        System.out.print("Enter your second number : ");
        calculator.nmb2 = scanner.nextDouble();

        System.out.print("Enter the op (+, -, *, /) : ");
        char op = scanner.next().charAt(0);

        switch (op) {
            case '+':
                calculator.addition();
                break;
            case '-':
                calculator.subtraction();
                break;
            case '/':
                calculator.division();
                break;
            case '*':
                calculator.multiplication();
                break;
            default:
                System.out.println("Invalid operator,try again");
                break;
        }

        System.out.println("sum: " + calculator.sum);

        scanner.close();
    }
}
```

C:\Users\SASINDU\Desktop\JAVA\lab1\Calculator.java - Notepad++

File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?

change.log | Calculator.java | Shape.java | Calculator.java

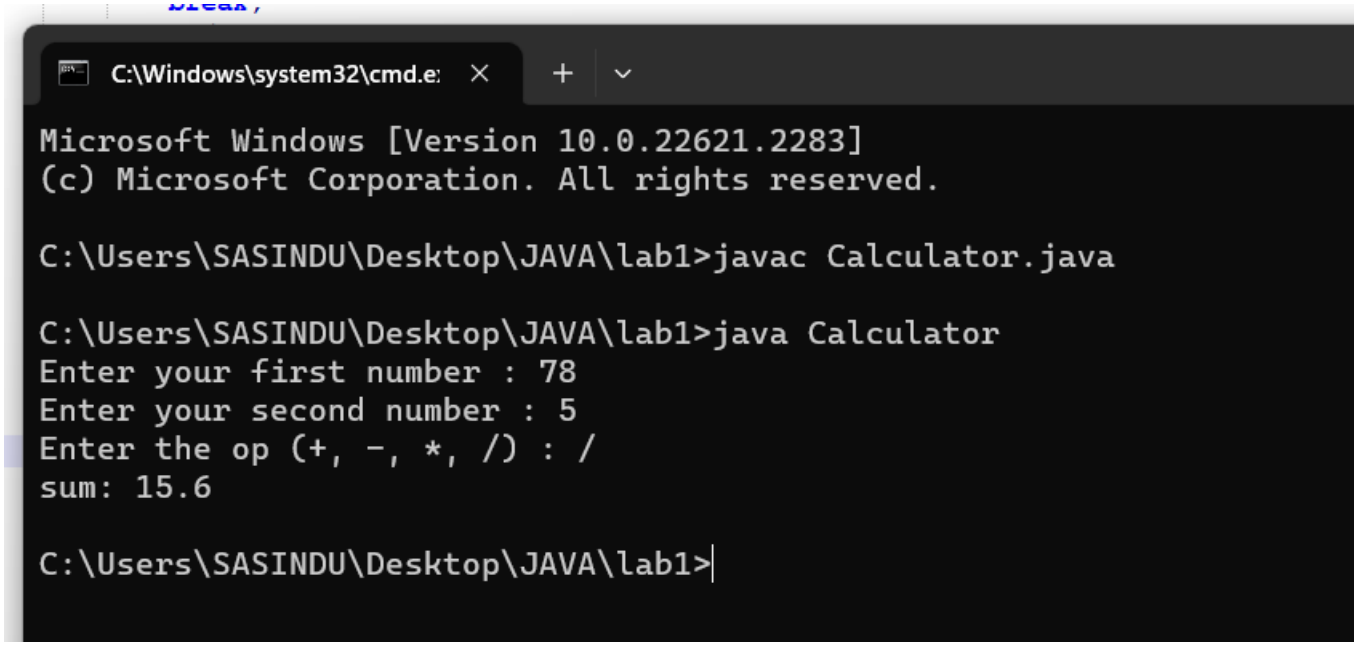
```java
import java.util.Scanner;

public class Calculator {
    private double nmb1;
    private double nmb2;
    private double sum;

    public Calculator() {
        nmb1 = 0;
        nmb2 = 0;
        sum = 0;
    }

    public void addition() {
        sum = nmb1 + nmb2;
    }

    public void subtraction() {
        sum = nmb1 - nmb2;
    }
    public void division() {
            sum = nmb1 / nmb2;
    }

    public void multiplication() {
        sum = nmb1 * nmb2;
    }



    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        Calculator calculator = new Calculator();

        System.out.print("Enter your first number : ");
        calculator.nmb1 = scanner.nextDouble();

        System.out.print("Enter your second number : ");
        calculator.nmb2 = scanner.nextDouble();

        System.out.print("Enter the op (+, -, *, /) : ");
```

C:\Users\SASINDU\Desktop\JAVA\lab1\Calculator.java - Notepad++

File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?

change.log | Calculator.java | Shape.java | Calculator.java

```java
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        Calculator calculator = new Calculator();

        System.out.print("Enter your first number : ");
        calculator.nmb1 = scanner.nextDouble();

        System.out.print("Enter your second number : ");
        calculator.nmb2 = scanner.nextDouble();

        System.out.print("Enter the op (+, -, *, /) : ");
        char op = scanner.next().charAt(0);

        switch (op) {
            case '+':
                calculator.addition();
                break;
            case '-':
                calculator.subtraction();
                break;
            case '/':
                calculator.division();
                break;
            case '*':
                calculator.multiplication();
                break;
            default:
                System.out.println("Invalid operator,try again");
                break;
        }

        System.out.println("sum: " + calculator.sum);

        scanner.close();
    }
}
```


C:\Windows\system32\cmd.e:
Microsoft Windows [Version 10.0.22621.2283]
(c) Microsoft Corporation. All rights reserved.
C:\Users\SASINDU\Desktop\JAVA\lab1>javac Calculator.java
C:\Users\SASINDU\Desktop\JAVA\lab1>java Calculator
Enter your first number : 78
Enter your second number : 5
Enter the op (+, -, *, /) : /
sum: 15.6
C:\Users\SASINDU\Desktop\JAVA\lab1>

Q2.

```
abstract class Shape {
    abstract double calculateArea();
    abstract double calculatePerimeter();
}

class Circle extends Shape {
    private double radius;

    public Circle(double radius) {
        this.radius = radius;
    }

    double calculateArea() {
        return Math.PI*radius*radius;
    }

    double calculatePerimeter() {
        return 2*Math.PI*radius;
    }
}

class Triangle extends Shape {
    private double s1, s2, s3;

    public Triangle(double s1, double s2, double s3) {
        this.s1 = s1;
        this.s2 = s2;
        this.s3 = s3;
    }

    double calculateArea() {
        double s = (s1 + s2 + s3) / 2;
        return Math.sqrt(s * (s - s1) * (s - s2) * (s - s3));
    }
```

```
    double calculatePerimeter() {
        return s1 + s2 + s3;
    }
}

class Rectangle extends Shape {
    private double length, width;

    public Rectangle(double length, double width) {
        this.length = length;
        this.width = width;
    }
   double calculatePerimeter() {
       return 2 * (length + width);
   }
   double calculateArea() {
       return length * width;
   }
}
public class Main {
    public static void main(String[] args) {
        Circle circle = new Circle(8);
        System.out.println("Circle Of Area: " + circle.calculateArea());
        System.out.println("Circle Of Perimeter: " + circle.calculatePerimeter());

        Triangle triangle = new Triangle(7,5,9);
        System.out.println("Triangle Of Area: " + triangle.calculateArea());
        System.out.println("Triangle Of Perimeter: " + triangle.calculatePerimeter());

        Rectangle rectangle = new Rectangle(4,7);
        System.out.println("Rectangle Of Area: " + rectangle.calculateArea());
        System.out.println("Rectangle Of Perimeter: " + rectangle.calculatePerimeter());
    }
}
```

C:\Users\SASINDU\Desktop\JAVA\1.2\main.java - Notepad++

File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?

change.log | Calculator.java | main.java | Calculator.java

```
37          return s1 + s2 + s3;
38      }
39  }
40
41  class Rectangle extends Shape {
42      private double length, width;
43
44      public Rectangle(double length, double width) {
45          this.length = length;
46          this.width = width;
47      }
48      double calculatePerimeter() {
49          return 2 * (length + width);
50      }
51      double calculateArea() {
52          return length * width;
53      }
54
55
56  }
57
58  public class Main {
59      public static void main(String[] args) {
60          Circle circle = new Circle(8);
61          System.out.println("Circle Of Area: " + circle.calculateArea());
62          System.out.println("Circle Of Perimeter: " + circle.calculatePerimeter());
63
64          Triangle triangle = new Triangle(7,5,9);
65          System.out.println("Triangle Of Area: " + triangle.calculateArea());
66          System.out.println("Triangle Of Perimeter: " + triangle.calculatePerimeter());
67
68          Rectangle rectangle = new Rectangle(4,7);
69          System.out.println("Rectangle Of Area: " + rectangle.calculateArea());
70          System.out.println("Rectangle Of Perimeter: " + rectangle.calculatePerimeter());
71      }
72  }
```

Java source file | length : 1,880 lines : 72 | Ln : 56 Col : 2 Pos : 1,163

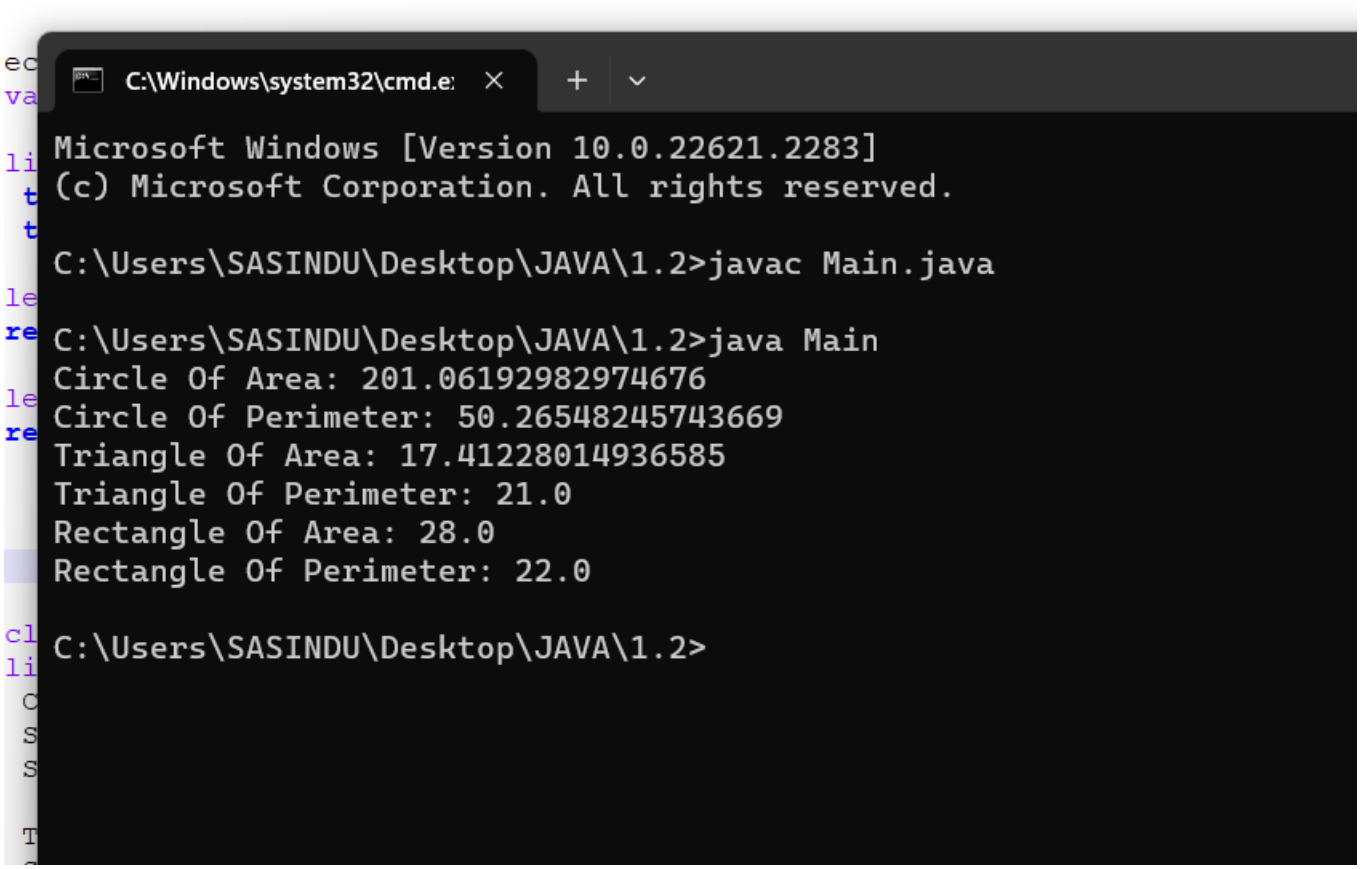
C:\Users\SASINDU\Desktop\JAVA\1.2\main.java - Notepad++

File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?

change.log | Calculator.java | main.java | Calculator.java

```
1   abstract class Shape {
2       abstract double calculateArea();
3       abstract double calculatePerimeter();
4   }
5
6   class Circle extends Shape {
7       private double radius;
8
9       public Circle(double radius) {
10          this.radius = radius;
11      }
12
13      double calculateArea() {
14          return Math.PI*radius*radius;
15      }
16
17      double calculatePerimeter() {
18          return 2*Math.PI*radius;
19      }
20  }
21
22  class Triangle extends Shape {
23      private double s1, s2, s3;
24
25      public Triangle(double s1, double s2, double s3) {
26          this.s1 = s1;
27          this.s2 = s2;
28          this.s3 = s3;
29      }
30
31      double calculateArea() {
32          double s = (s1 + s2 + s3) / 2;
33          return Math.sqrt(s * (s - s1) * (s - s2) * (s - s3));
34      }
35
36      double calculatePerimeter() {
37          return s1 + s2 + s3;
38      }
39  }
40
41  class Rectangle extends Shape {
```

Java source file | length : 1,880 lines : 72 | Ln : 56 Col : 2 Pos :


C:\Windows\system32\cmd.e:
Microsoft Windows [Version 10.0.22621.2283]
(c) Microsoft Corporation. All rights reserved.
C:\Users\SASINDU\Desktop\JAVA\1.2>javac Main.java
C:\Users\SASINDU\Desktop\JAVA\1.2>java Main
Circle Of Area: 201.06192982974676
Circle Of Perimeter: 50.265482457436669
Triangle Of Area: 17.41228014936585
Triangle Of Perimeter: 21.0
Rectangle Of Area: 28.0
Rectangle Of Perimeter: 22.0
C:\Users\SASINDU\Desktop\JAVA\1.2>