Lab 1 : Prelab

1. Object is a class that contain a set of data which known as state and behavior.
2. Private attribute can be access within the class while public attribute can be access across the classes.
3. CalculateCharge
4. noBill and price

Lab Activities: Correct the code

1.public void Art() is compilation error

Corrected code:

```
public Art(){
  name = “ ”;
  price = 0.00;
}
```

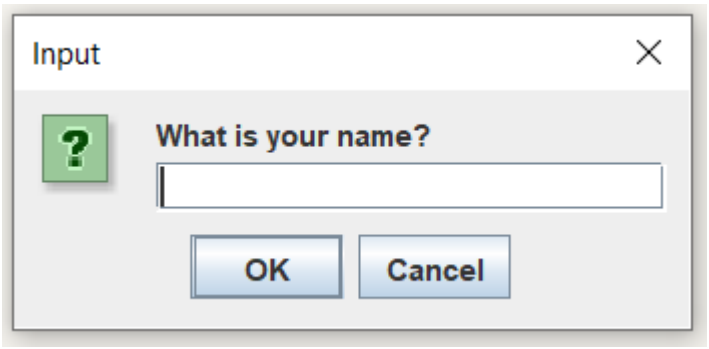
2.both are normal constructor therefore it will be compilation error

Corrected code:

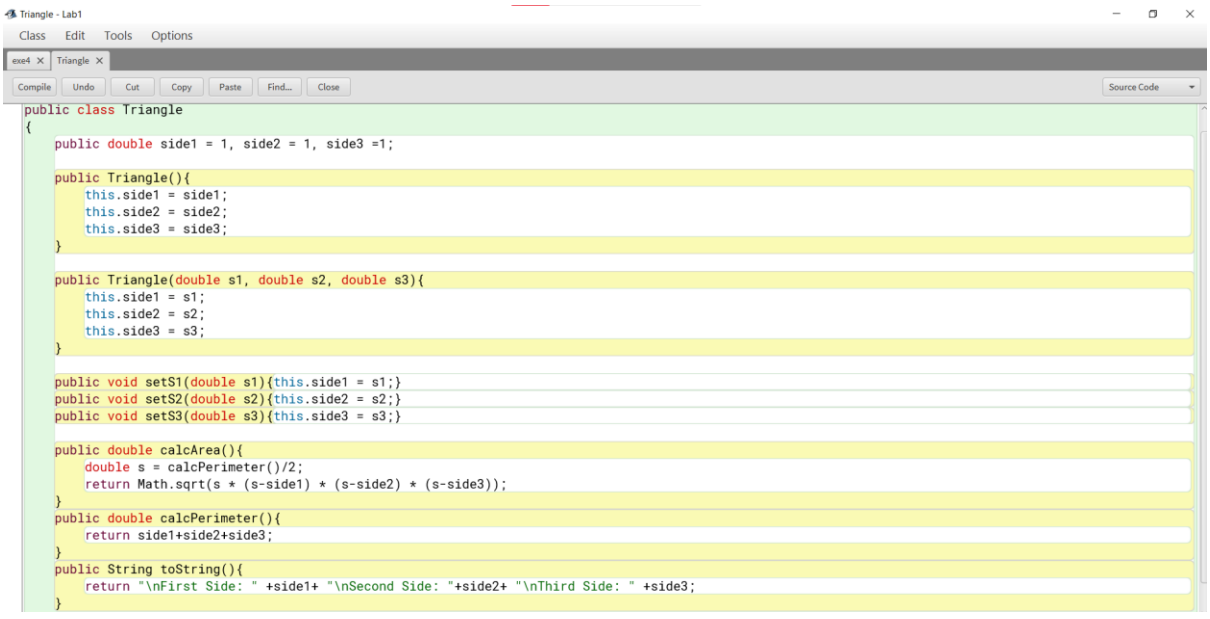
```
public Art(){
   this.name = “This product”;
   this.price = 0.00;
}
public Art(String name, double price){
   this.name = name;
   this.price = price;
}
```

Lab Exercise

1.Output



2.Triangle class



Triangle - Lab1

Class Edit Tools Options

exe4 Triangle

Compile Undo Cut Copy Paste Find... Close Source Code

```
public class Triangle
{
    public double side1 = 1, side2 = 1, side3 =1;

    public Triangle(){
        this.side1 = side1;
        this.side2 = side2;
        this.side3 = side3;
    }

    public Triangle(double s1, double s2, double s3){
        this.side1 = s1;
        this.side2 = s2;
        this.side3 = s3;
    }

    public void setS1(double s1){this.side1 = s1;}
    public void setS2(double s2){this.side2 = s2;}
    public void setS3(double s3){this.side3 = s3;}

    public double calcArea(){
        double s = calcPerimeter()/2;
        return Math.sqrt(s * (s-side1) * (s-side2) * (s-side3));
    }
    public double calcPerimeter(){
        return side1+side2+side3;
    }
    public String toString(){
        return "\nFirst Side: " +side1+ "\nSecond Side: "+side2+ "\nThird Side: " +side3;
    }
```

Main App – triangleApp

triangleApp - Lab1

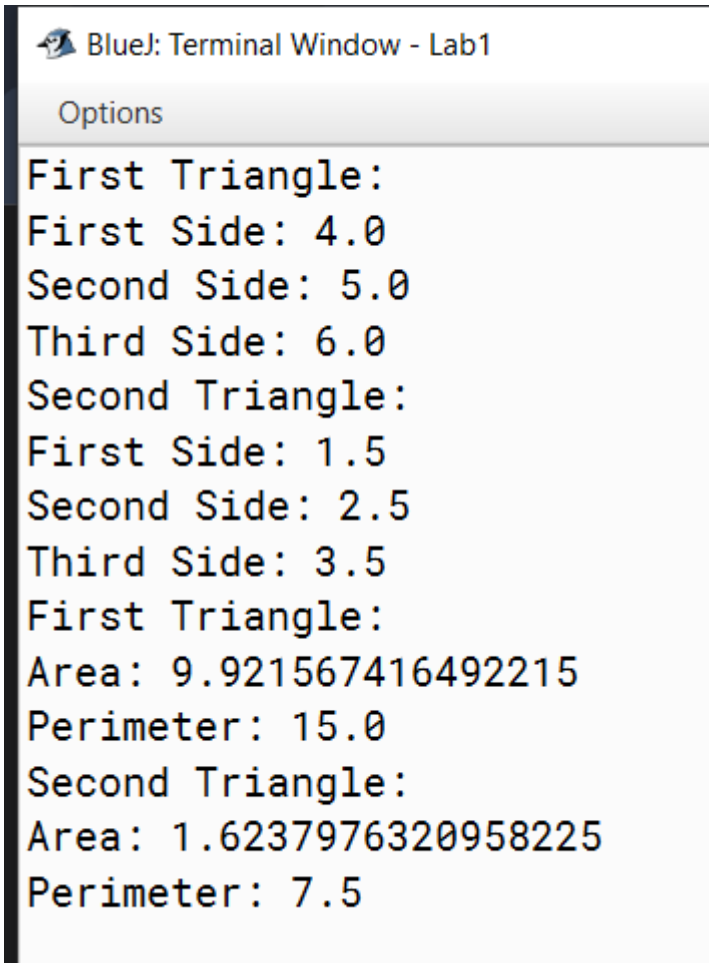
Class Edit Tools Options

exe4 × Triangle × triangleApp ×

Compile Undo Cut Copy Paste Find... Close

```
public class triangleApp
{
   public static void main(String args[]){
       Triangle t1, t2;

       t1 = new Triangle(4,5,6);
       t2 = new Triangle(1.5,2.5,3.5);

       System.out.println("First Triangle: " + t1.toString() + "\nSecond Triangle: " + t2.toString());

       double area1 = t1.calcArea();
       double area2 = t2.calcArea();
       double perimeter1 = t1.calcPerimeter();
       double perimeter2 = t2.calcPerimeter();

       System.out.println("First Triangle: \nArea: " + area1
                          +"\nPerimeter: "+ perimeter1 +"\nSecond Triangle: \nArea: "
                          + area2 + "\nPerimeter: " + perimeter2);
   }
}
```

The output:



PostLab Exercise

Answer for a to e :

```
import java.util.*;
public class studentApp
{
    public static void main(String args[]){
        Student s1 = new Student("Ahmad","2021050607","CS230",10,15,80);
        Student s2 = new Student("Nabil","2021010203","CS270",5,12,70);
        Student s3 = new Student("Sufian","2022200304","CS230",7,14,83);
        Student s4 = new Student("Amin","2024060217","CS110",8.5,14.6,71.5);

        double fM1 = 0, fM2 = 0, fM3 = 0, fM4 =0;

        fM1 = s1.calculateFinalMarks();
        fM2 = s2.calculateFinalMarks();
        fM3 = s3.calculateFinalMarks();
        fM4 = s4.calculateFinalMarks();

        String formatM1 = String.format("%.2f", fM1);
        String formatM2 = String.format("%.2f", fM2);
        String formatM3 = String.format("%.2f", fM3);
        String formatM4 = String.format("%.2f", fM4);

        System.out.println(s1.toString() + "\nFinal Marks: "+ formatM1);
        System.out.println(s2.toString() + "\nFinal Marks: "+ formatM2);
        System.out.println(s3.toString() + "\nFinal Marks: "+ formatM3);
        System.out.println(s4.toString() + "\nFinal Marks: "+ formatM4);

        Student topStudent = s1;
        double highestMarks = fM1;
```

```
        if (fM2 > highestMarks) {
            highestMarks = fM2;
            topStudent = s2;
        }
        if (fM3 > highestMarks) {
            highestMarks = fM3;
            topStudent = s3;
        }
        if (fM4 > highestMarks) {
            highestMarks = fM4;
            topStudent = s4;
        }

        System.out.println("\nStudent with the highest marks:");
        System.out.println(topStudent.toString() + "\nFinal Marks: " +
String.format("%.2f", highestMarks));
    }
}
```

Answer for f:

```
import java.util.*;

public class studentApp {
    public static void main(String args[]) {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter the number of students: ");
        int numOfStudents = input.nextInt();
        input.nextLine();
```

```
Student[] listStd = new Student[numOfStudents];
for (int i = 0; i < numOfStudents; i++) {
    System.out.println("Enter details for Student " + (i + 1) + ":");
    System.out.print("Name: ");
    String name = input.nextLine();

    System.out.print("ID: ");
    String id = input.nextLine();

    System.out.print("Program: ");
    String program = input.nextLine();

    System.out.print("Test score: ");
    double test = input.nextDouble();

    System.out.print("Assignment score: ");
    double assignment = input.nextDouble();

    System.out.print("Final exam score: ");
    double finalExam = input.nextDouble();
    input.nextLine(); // Consume the newline character

    // Create a Student object and store it in the array
    listStd[i] = new Student(name, id, program, test, assignment, finalExam);
}

Student topStudent = listStd[0];
Student lowStudent = listStd[0];
double highestMarks = listStd[0].calculateFinalMarks();
double lowestMarks = highestMarks;
double totalMarks = 0;
```

```
        for (int i = 0; i < numOfStudents; i++) {
            double finalMarks = listStd[i].calculateFinalMarks();
            totalMarks += finalMarks;

            if (finalMarks > highestMarks) {
                highestMarks = finalMarks;
                topStudent = listStd[i];
            }

            if (finalMarks < lowestMarks) {
                lowestMarks = finalMarks;
                lowStudent = listStd[i];
            }
        }

        double averageMarks = totalMarks / numOfStudents;

        System.out.println("\nStudent with the highest marks:");
        System.out.println(topStudent.toString() + "\nFinal Marks: " +
String.format("%.2f", highestMarks));

        System.out.println("\nStudent with the lowest marks:");
        System.out.println(lowStudent.toString() + "\nFinal Marks: " +
String.format("%.2f", lowestMarks));

        System.out.println("\nAverage of final marks: " + String.format("%.2f",
averageMarks));

        input.close();
    }
}
```