Experiment Number	4
Date of Experiment	16/01/2025
Date of Submission	17/01/2025
Name of Student	Shivansh Jha
Roll Number	2330335
Section	ECSc-6

- **Title of the experiment :**

  Constructors in Java

- **Aim of The experiment :**

  To learn Java programs related to constructors.

- **Programming Language used :**

  Java

- **Problem Statement & Solution :**

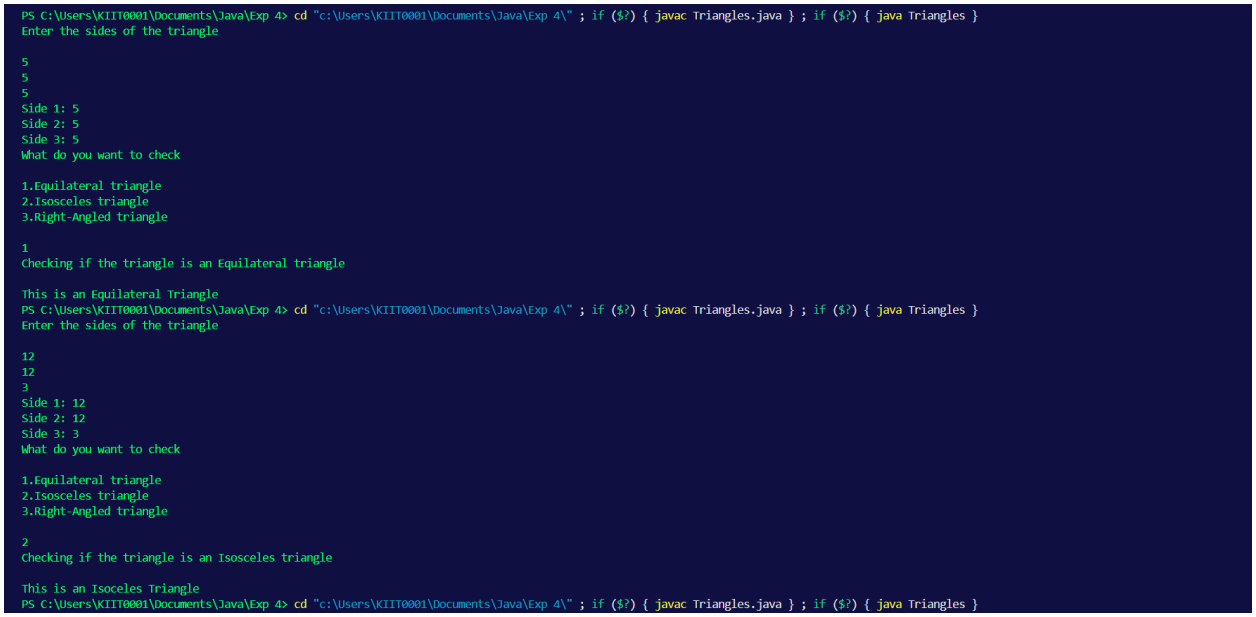
1. Create a class by name Triangle with the three sides a, b, and c as its member data. Include constructors and member methods to perform the following:
   1. to accept the sides of a triangle.
   2. to display the sides of a triangle.
   3. to find whether the triangle is an equilateral or an isosceles or right angled triangle.

Solution :

```
import java.util.*;
Import java.lang.math;
class Triangle {
    private int side1;
    private int side2;
    private int side3;

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

    public void Display() {
        System.out.println("Side 1: " + side1 + "\nSide 2: " + side2 + "\nSide 3: " + side3);
    }

    public void Equilateral() {
        if (side1 == side2 && side2 == side3) {
            System.out.println("This is an Equilateral Triangle");
        } else {
            System.out.println("This is not an Equilateral Triangle");
        }
    }

    public void Isoceles(){
        if(side1==side2 || side2==side3 || side1==side3){
            System.out.println("This is an Isoceles Triangle");
        }
        else{
            System.out.println("This is not an Isoceles Triangle");
        }
    }

    public void Right_Angle(){
        if(side1==Math.sqrt(Math.pow(side2, 2)+Math.pow(side3, 2))){
            System.out.println("The triangle is a right angle triangle\n");
```

```
        }
        else{
            System.out.println("The triangle is not a right angle triangle\n");
        }
    }

public class Triangles {
    public static void main(String[] args) {
        int s1, s2, s3;
        System.out.println("Enter the sides of the triangle\n");
        try (Scanner sc = new Scanner(System.in)) {
            s1 = sc.nextInt();
            s2 = sc.nextInt();
            s3 = sc.nextInt();
            Triangle t = new Triangle(s1, s2, s3);
            t.Display();
            System.out.println("What do you want to check\n");
           System.out.println("1.Equilateral triangle\n2.Isosceles triangle\n3.Right-Angled
           triangle\n");
            int ch = sc.nextInt();
            switch (ch)
            {
                case 1:
                    System.out.println("Checking if the triangle is an Equilateral triangle\n");
                    t.Equilateral();
                    break;
                case 2:
                    System.out.println("Checking if the triangle is an Isosceles triangle\n");
                    t.Isoceles();
                    break;
                case 3:
                    System.out.println("Checking if triangle is an equilateral triangle\n");
                    t.Right_Angle();
                    break;
                default:
                    System.out.println("The user choice is Invalid");
            }
        };
    }
```

Output :



2. A complex number is of the form x + iy where x is the real part and y is an imaginary part of the number. Design a Java class called Complex representing the complex number with member data x and y of the number.Include constructors and member methods to perform the following:

1. to accept and display a complex number
2. to find the sum of two complex numbers
3. to find the product of two complex numbers

Solution :

```
class Complex {
   double real;
   double complex;

   Complex(double r, double c) {
      real = r;
      complex = c;
   }

   void display()
   {
      System.out.println("The number is: " + String.format("%.2f", real) + " + i" +
String.format("%.2f", complex) + "\n");
   }

   void ComplexSum(double r1, double c1, double r2, double c2)
   {
      System.out.println("The Sum of two complex number is: " + String.format("%.2f",
(r1 + r2)) + " + i" + String.format("%.2f", (c1 + c2)) + "\n");
   }

   void ComplexDot(double r1, double c1, double r2, double c2) {
      System.out.println("The Dot product of two complex number is: " +
String.format("%.2f", (r1 * r2)) + " + i" + String.format("%.2f", (c1 * c2)) + "\n");
   }
}

public class ComplexSum {
   public static void main(String[] args) {
      Complex c = new Complex(5.98, 7.7);
      c.display();
      Complex c1 = new Complex(5.8, 7.79);
      c.ComplexSum(c1.real, c1.complex, c.real, c.complex);
      c.ComplexDot(c1.real, c1.complex, c.real, c.complex);
   }
}
```

Output :

3. Create a Java class called Account with the member data account number, name, balance. Using constructors and member methods, perform the following:

1. to accept and display the details of an account
2. to credit the account with some amount and display the message “A/C credited with Rs. XYZ and Balance: Rs. ABC” (where, XYZ is the amount credited and ABC is the new balance in the account).
3. to debit the account with some amount and display the message “A/C debited with Rs. XYZ and Balance: Rs. ABC” (where, XYZ is the amount debited and ABC is the new balance in the account).

Solution :

```
import java.util.*;

class Account {
    String name;
    int balance;
    int accountNumber;

    Account(String name, int accountNumber, int balance) {
        this.name = name;
        this.accountNumber = accountNumber;
        this.balance = balance;
    }

    void display() {
        System.out.println(" Name : " + name);
        System.out.println("Account Number: " + accountNumber);
        System.out.println("Account Balance: " + balance);
    }
```

```
    void credit(int amount) {
        balance += amount;
        System.out.println("A/C credited with Rs. " + amount + " and Balance: Rs. " +
balance);
    }

    void debit(int amount) {
        if (balance >= amount) {
            balance -= amount;
            System.out.println("A/C debited with Rs. " + amount + " and Balance: Rs. " +
balance);
        } else {
            System.out.println("Insufficient balance");
        }
    }
}

public class Bank
{
    public static void main(String[] args) {
        System.out.println("Enter your details");
        int x = 0;
        while(x==0)
        {
            try(Scanner sc  = new Scanner(System.in)){
                System.out.println("Enter your name: ");
                String s = sc.next();
                System.out.println("Enter your initial balance: ");
                int balance = sc.nextInt();
                System.out.println("Enter your account number: ");
                int accountNumber = sc.nextInt();
                Account a = new Account(s, accountNumber, balance);
                a.display();
                while(x==0){
                    System.out.println("1. Credit");
                    System.out.println("2. Debit");
                    System.out.println("3. Exit");
                    int choice = sc.nextInt();
                    switch (choice)
```

```
                {
                    case 1->{
                        System.out.println("Enter the amount you wish to credit: ");
                        int amount = sc.nextInt();
                        a.credit(amount);
                    }
                    case 2->{
                        System.out.println("Enter the amount you wish to debit: ");
                        int amount = sc.nextInt();
                        a.debit(amount);
                    }
                    case 3->{
                        System.out.println("Exiting the program\n");
                        x = 1;
                    }
                }
            }
        }
    }
}
```

Output :

```
PS C:\Users\KIIT0001\Documents\Java\Exp 4> java Bank.java
Enter your details
Enter your name: Shivansh
Enter your initial balance: 30000
Enter your account number: 2222
 Name : Shivansh
Account Number: 2222
Account Balance: 30000
1. Credit
2. Debit
3. Exit
1
Enter the amount you wish to credit:
50000
A/C credited with Rs. 50000 and Balance: Rs. 80000
1. Credit
2. Debit
3. Exit
2
Enter the amount you wish to debit:
1000000
Insufficient balance
1. Credit
2. Debit
3. Exit
2
Enter the amount you wish to debit:
10000
A/C debited with Rs. 10000 and Balance: Rs. 70000
1. Credit
2. Debit
3. Exit
3
Exiting the program

PS C:\Users\KIIT0001\Documents\Java\Exp 4>
```

- **Conclusion :**

  Learned to develop to develop Java programs using constructors.

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Faculty Signature