LAB-3

Using conditional statements and looping statements, construct a Java program for a scientific calculator. Your program should have a top-level menu like:

1. Arithmetic Calculations
2. Logarithmic Calculations
3. Trigonometry Calculations
4. Converter

Upon choosing an option, display a sub-menu for each top-menu and upon choosing an option from the sub-menu, read relevant data from the user and perform the corresponding operation and print the result. Your program should exit only when the user types your registration number.

CODE:

```
import java.util.Scanner;
import java.lang.Math;

public class q1
{
   public static void main(String args[])
   {
      int choice;
      Scanner in = new Scanner(System.in);

      while (true)
      {
         System.out.println("1.Arithmetic  2.Logarithmic  3.Trigonometric  4.Converter  5.Exit");
         System.out.print("Enter your choice: ");
         choice = in.nextInt();

         if (choice == 1)
         {
```

```
        System.out.println("1.Add   2.Sub   3.Mul   4.Div");
        System.out.print("Enter your choice: ");
        choice = in.nextInt();
        System.out.print("Enter two nos: ");
        int a = in.nextInt();
        int b = in.nextInt();
        switch (choice)
        {
            case 1:
                System.out.println("Sum: " + a + "+" + b + " = " + (a + b));
                break;

            case 2:
                System.out.println("Difference: " + a + "-" + b + " = " + (a - b));
                break;

            case 3:
                System.out.println("Product: " + a + "*" + b + " = " + (a * b));
                break;

            case 4:
                System.out.println("Quotient: " + a + "/" + b + " = " + (float) a / b);
                break;

            default:
                System.out.println("Invalid Input");
                break;

        }
    }
```

```
else if(choice==2)
{
   System.out.println("1.Natural Log   2.Log   3.Natural Antilog   4.Antilog");
   System.out.print("Enter your choice: ");
   choice = in.nextInt();

   double n,result,base, e=2.718281828459045;
   switch (choice)
   {
      case 1:
         System.out.print("Enter number: ");
         n = in.nextDouble();
         result=Math.log(n) / Math.log(e);
         result = Math.round(result*Math.pow(10,9))/Math.pow(10,9);
         System.out.println("Natural Log("+n+"): " + (result));
         break;

      case 2:
         System.out.print("Enter base: ");
         base = in.nextDouble();
         System.out.print("Enter number: ");
         n = in.nextDouble();
         result=Math.log(n) / Math.log(base);
         result = Math.round(result*Math.pow(10,9))/Math.pow(10,9);
         System.out.println("Log("+n+") with base "+base+" = " + (result));
         break;

      case 3:
         System.out.print("Enter number: ");
         n = in.nextDouble();
         result= Math.pow(e,n);
```

```
            result = Math.round(result*Math.pow(10,6))/Math.pow(10,6);
            System.out.println("Natural Antilog: e^("+n+") = " + (result));
            break;

        case 4:
            System.out.print("Enter base: ");
            base = in.nextDouble();
            System.out.print("Enter number: ");
            n = in.nextDouble();
            result=Math.pow(base,n);
            result = Math.round(result*Math.pow(10,6))/Math.pow(10,6);
            System.out.println("Antilog: "+base+"^("+n+") = " + (result));
            break;

        default:
            System.out.println("Invalid Input");
            break;

    }
}

else if(choice==3)
{
    System.out.println("1.Sin  2.Cos  3.Tan  4.Sin_Inverse  5.Cos_Inverse  6.Tan_Inverse");
    System.out.print("Enter your choice: ");
    choice = in.nextInt();

    double result,n,m;
    switch (choice)
    {
        case 1:
```

```
        System.out.print("Enter Angle in Degrees: ");
        n = in.nextDouble();
        m = Math.toRadians(n);
        result=Math.sin(m);
        result = Math.round(result*Math.pow(10,9))/Math.pow(10,9);
        System.out.println("Sin("+n+") = " + (result));
        break;

    case 2:
        System.out.print("Enter Angle in Degrees: ");
        n = in.nextDouble();
        m = Math.toRadians(n);
        result=Math.cos(m);
        result = Math.round(result*Math.pow(10,9))/Math.pow(10,9);
        System.out.println("Cos("+n+") = " + (result));
        break;

    case 3:
        System.out.print("Enter Angle in Degrees: ");
        n = in.nextDouble();
        m = Math.toRadians(n);
        result=Math.tan(m);
        result = Math.round(result*Math.pow(10,9))/Math.pow(10,9);
        System.out.println("Tan("+n+") = " + (result));
        break;

    case 4:
        System.out.print("Enter value: ");
        n = in.nextDouble();
        result=Math.asin(n);
        result = Math.toDegrees(result);
```

```
            result = Math.round(result*Math.pow(10,9))/Math.pow(10,9);
            System.out.println("Sin_Inv("+n+") = " + (result));
            break;

        case 5:
            System.out.print("Enter value: ");
            n = in.nextDouble();
            result=Math.acos(n);
            result = Math.toDegrees(result);
            result = Math.round(result*Math.pow(10,9))/Math.pow(10,9);
            System.out.println("Cos_Inv("+n+") = " + (result));
            break;

        case 6:
            System.out.print("Enter value: ");
            n = in.nextDouble();
            result=Math.atan(n);
            result = Math.toDegrees(result);
            result = Math.round(result*Math.pow(10,9))/Math.pow(10,9);
            System.out.println("Tan_Inv("+n+") = " + (result));
            break;

        default:
            System.out.println("Invalid Input");
            break;

    }
}

else if(choice==4)
{
```

```
System.out.println("1.Length   2.Weight   3.Temperature");
System.out.print("Enter your choice: ");
choice = in.nextInt();
double result;
switch (choice)
{
   case 1:
      double length;
      System.out.println("1.m to km   2.m to cm   3.cm to km   4.km to cm");
      System.out.print("Enter your choice: ");
      choice = in.nextInt();
      switch(choice)
      {
         case 1:
            System.out.print("Enter length in meter: ");
            length=in.nextDouble();
            result=length/1000;
            System.out.println("Converted Length:" + (result)+"km");
            break;

         case 2:
            System.out.print("Enter length in meter: ");
            length=in.nextDouble();
            result=length*100;
            System.out.println("Converted Length:" + (result)+"cm");
            break;

         case 3:
            System.out.print("Enter length in cm: ");
            length=in.nextDouble();
            result=(length/100)/1000;
```

```
        System.out.println("Converted Length:" + (result)+"km");
        break;

    case 4:
        System.out.print("Enter length in km: ");
        length=in.nextDouble();
        result=length*100*1000;
        System.out.println("Converted Length:" + (result)+"cm");
        break;
    default:
        System.out.println("Invalid Input");
        break;
}
break;

case 2:
double weight;
System.out.println("1.g to kg   2.g to mg   3.mg to kg   4.kg to mg");
System.out.print("Enter your choice: ");
choice = in.nextInt();
switch(choice)
{
    case 1:
        System.out.print("Enter weight in g: ");
        weight=in.nextDouble();
        result=weight/1000;
        System.out.println("Converted weight:" + (result)+"kg");
        break;

    case 2:
        System.out.print("Enter weight in g: ");
```

```
        weight=in.nextDouble();
        result=weight*1000;
        System.out.println("Converted weight:" + (result)+"mg");
        break;

    case 3:
        System.out.print("Enter weight in mg: ");
        weight=in.nextDouble();
        result=(weight/1000)/1000;
        System.out.println("Converted weight:" + (result)+"kg");
        break;

    case 4:
        System.out.print("Enter weight in kg: ");
        weight=in.nextDouble();
        result=weight*1000*1000;
        System.out.println("Converted weight:" + (result)+"mg");
        break;
    default:
        System.out.println("Invalid Input");
        break;
}
break;

case 3:
double temp;
System.out.println("1.celsius to fahrenheit   2.celsius to kelvin");
System.out.println("3.fahrenheit to celsius   4.fahreheit to kelvin");
System.out.println("5.kelvin to celsius       6.kelvin to fahrenheit");
System.out.print("Enter your choice: ");
choice = in.nextInt();
```

```
switch(choice)
{
   case 1:
      System.out.print("Enter temperature in celsius: ");
      temp=in.nextDouble();
      result=(((double)9/5)*temp)+32;
      result = Math.round(result*Math.pow(10,2))/Math.pow(10,2);
      System.out.println("Converted Temperature:" + (result)+" deg F");
      break;

   case 2:
      System.out.print("Enter temperature in celsius: ");
      temp=in.nextDouble();
      result=temp+273.15;
      result = Math.round(result*Math.pow(10,2))/Math.pow(10,2);
      System.out.println("Converted Temperature:" + (result)+" Kelvin");
      break;

   case 3:
      System.out.print("Enter temperature in fahrenheit: ");
      temp=in.nextDouble();
      result=(temp-32)*(double)5/9;
      result = Math.round(result*Math.pow(10,2))/Math.pow(10,2);
      System.out.println("Converted Temperature:" + (result)+" deg C");
      break;

   case 4:
      System.out.print("Enter temperature in fahrenheit: ");
      temp=in.nextDouble();
      result=((temp-32)*(double)5/9)+273.15;
      result = Math.round(result*Math.pow(10,2))/Math.pow(10,2);
```

```
                System.out.println("Converted Temperature:" + (result)+" Kelvin");
                break;

            case 5:
                System.out.print("Enter temperature in kelvin: ");
                temp=in.nextDouble();
                result=temp-273.15;
                result = Math.round(result*Math.pow(10,2))/Math.pow(10,2);
                System.out.println("Converted Temperature:" + (result)+" deg C");
                break;

            case 6:
                System.out.print("Enter temperature in kelvin: ");
                temp=in.nextDouble();
                result=((temp-273.15)*(double)9/5+32);
                result = Math.round(result*Math.pow(10,2))/Math.pow(10,2);
                System.out.println("Converted Temperature:" + (result)+" deg F");
                break;

            default:
                System.out.println("Invalid Input");
                break;
        }
        break;


      default:
        System.out.println("Invalid Input");
        break;
    }
}
```

```
        else if(choice==5)
        break;

        System.out.println();
        System.out.println();
    }
  }
}
```

OUTPUT:

```
C:\Gokul\VIT\SEM-4\CSE1007 - Java\Lab\Lab3>java q1
1.Arithmetic   2.Logarithmic   3.Trigonometric   4.Converter   5.Exit
Enter your choice: 1
1.Add   2.Sub   3.Mul   4.Div
Enter your choice: 3
Enter two nos: 8 6
Product: 8*6 = 48

1.Arithmetic   2.Logarithmic   3.Trigonometric   4.Converter   5.Exit
Enter your choice: 2
1.Natural Log   2.Log   3.Natural Antilog   4.Antilog
Enter your choice: 2
Enter base: 3
Enter number: 81
Log(81.0) with base 3.0 = 4.0

1.Arithmetic   2.Logarithmic   3.Trigonometric   4.Converter   5.Exit
Enter your choice: 3
1.Sin   2.Cos   3.Tan   4.Sin_Inverse   5.Cos_Inverse   6.Tan_Inverse
Enter your choice: 4
Enter value: 0.5
Sin_Inv(0.5) = 30.0

1.Arithmetic   2.Logarithmic   3.Trigonometric   4.Converter   5.Exit
Enter your choice: 4
1.Length   2.Weight   3.Temperature
Enter your choice: 3
1.celsius to fahrenheit   2.celsius to kelvin
3.fahrenheit to celsius   4.fahreheit to kelvin
5.kelvin to celsius       6.kelvin to fahrenheit
Enter your choice: 4
Enter temperature in fahrenheit: 38
Converted Temperature:276.48 Kelvin

1.Arithmetic   2.Logarithmic   3.Trigonometric   4.Converter   5.Exit
Enter your choice: 5

C:\Gokul\VIT\SEM-4\CSE1007 - Java\Lab\Lab3>
```