

LAB-3

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20BCE1182

1) 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.*;  
class Calculator  
{  
    public static void main(String arg[])  
    {  
        int x= 0, y=0;  
        Scanner sc=new Scanner(System.in);  
        while (true)  
        {  
            System.out.println("enter choice \n1.Arithmetic Caculations \n2.Logarithmic Calculations  
\n3.Trignometry Calculations \n4.Converter");  
            int choice = sc.nextInt();  
            if (choice == 1)  
            {  
                System.out.println("enter choice \n1.add \n2.sub \n3.mul \n4.div");  
                int ch=sc.nextInt();  
                switch(ch)  
                {
```

case 1:

```
System.out.println("enter two number");
x=sc.nextInt();
y=sc.nextInt();
x=x+y;
System.out.println("result is="+x);
break;
```

case 2:

```
System.out.println("enter two number");
x=sc.nextInt();
y=sc.nextInt();
x=x-y;
System.out.println("result is="+x);
break;
```

case 3:

```
System.out.println("enter two number");
x=sc.nextInt();
y=sc.nextInt();
x=x*y;
System.out.println("result is="+x);
break;
```

case 4:

```
System.out.println("enter two number");
x=sc.nextInt();
y=sc.nextInt();
x=x/y;
System.out.println("result is="+x);
break;
```

```
default:  
    System.out.println("invalid number");  
}  
  
}  
  
else if (choice == 2)  
{  
    System.out.println("Enter choice \n1.Natural log \n2.Log base 10 \n3.Log to any base");  
    int ch2 = sc.nextInt();  
    switch(ch2)  
    {  
        case 1:  
            System.out.println("Enter the number ");  
            double n1 = sc.nextDouble();  
            System.out.println("Math.log(" + n1 + ")=" + Math.log(n1));  
            break;  
  
        case 2:  
            System.out.println("Enter the number ");  
            double n2 = sc.nextDouble();  
            System.out.println("Math.log10(" + n2 + ")=" + Math.log(n2));  
            break;  
  
        case 3:  
            System.out.println("Enter the number");  
            int n3 = sc.nextInt();  
            System.out.println("Enter the base value");  
            int base = sc.nextInt();  
            double res = Math.log(n3)/Math.log(base);
```

```

        System.out.println("Log "+ n3 + " to the base " + base + " is " + res );
        break;

    default:
        System.out.println("invalid number");
    }

}

else if (choice == 3)
{
    System.out.println("Enter choice \n1.sin \n2.cos \n3.tan\n4.sin inverse\n5.cos
inverse\n6.tan inverse ");

    int ch1 =sc.nextInt();

    switch(ch1)

    {

        case 1:
            System.out.println("enter value in degrees ");
            double deg1 = sc.nextDouble();
            double rad1 = Math.toRadians(deg1);
            double sinval = Math.sin(rad1);

            System.out.println("sin(" + deg1 + ")=" + sinval);
            break;

        case 2:
            System.out.println("enter value in degrees ");
            double deg2 = sc.nextDouble();
            double rad2 = Math.toRadians(deg2);
            double cosval = Math.cos(rad2);
    }
}

```

```
System.out.println("cos(" + deg2 + ")=" + cosval);
break;
```

case 3:

```
System.out.println("enter value in degrees ");
double deg3 = sc.nextDouble();
double rad3 = Math.toRadians(deg3);
double tanval = Math.tan(rad3);
```

```
System.out.println("tan(" + deg3 + ")=" + tanval);
break;
```

case 4:

```
System.out.println("enter value ");
double val1 = sc.nextDouble();
System.out.println("The sin inverse value is " + Math.asin(val1));
break;
```

case 5:

```
System.out.println("enter value ");
double val2 = sc.nextDouble();
System.out.println("The cos inverse value is " + Math.acos(val2));
break;
```

case 6:

```
System.out.println("enter value ");
double val3 = sc.nextDouble();
System.out.println("The tan inverse value is " + Math.atan(val3));
break;
```

default:

```
System.out.println("invalid number");

}

}

else if (choice == 4)

{

    System.out.println("Enter choice \n1.Binary to Decimal Conversion \n2.Binary to Octal
Conversion \n3.Binary to Hexadecimal Conversion \n4.Decimal to Binary Conversion \n5.Decimal to
Octal Conversion \n6.Decimal to Hexadecimal Conversion \n7.Octal to Binary Conversion \n8.Octal
toDecimal Conversion \n9.Octal to Hexadecimal Conversion \n10Hexadecimal to Binary Conversion
\n11.Hexadecimal to Decimal Conversion \n12.Hexadecimal to OctalConversion ");

    int ch2 = sc.nextInt();

    switch(ch2)

    {

        case 1:

            System.out.println("Enter binary number ");

            int bin = sc.nextInt();

            int dec = 0;

            int n =0;

            while(true)

            {

                if(bin == 0)

                {

                    break;

                }else

                {

                    int t = bin%10;

                    dec += t*Math.pow(2,n);

                    bin = bin / 10;

                    n++;

                }

            }

    }

}
```

```
    }  
}  
  
System.out.println("The decimal value of " + dec);  
break;
```

case 2:

```
System.out.println("Enter binary number ");  
int bin1 = sc.nextInt();
```

```
String oct = Integer.toOctalString(bin1);
```

```
System.out.println("Octal value is " + oct );  
break;
```

case 3:

```
System.out.println("Enter the binary number");  
int bin2 = sc.nextInt();  
String hexa = Integer.toHexString(bin2);  
System.out.println("Hexadecimal value is " + hexa );  
break;
```

case 4 :

```
System.out.println("Enter the number ");  
int dec2 = sc.nextInt();  
int bin3[] = new int[40];  
int in = 0;  
while(dec2 > 0)  
{  
    bin3[in++] = dec2 % 2;  
    dec2 = dec2 / 2;  
}  
System.out.println("Binary value is ");
```

```
for (int i = in-1;i>=0;i--)  
{  
    System.out.print( bin3[i]);  
}  
  
break;  
  
case 5 :  
    System.out.println("Enter the number ");  
    int dec3 = sc.nextInt();  
    System.out.println(Integer.toOctalString(dec3));  
    break;  
  
case 6:  
    System.out.println("Enter the number ");  
    int dec4 = sc.nextInt();  
    System.out.println(Integer.toHexString(dec4));  
    break;  
  
case 7:  
    System.out.println("Enter the number ");  
    int num5 = sc.nextInt();  
    String res1 = Integer.toBinaryString(num5);  
    System.out.println(res1);  
    break;  
  
case 8:  
    System.out.println("Enter the number ");  
    int octa = sc.nextInt();  
    int decimal = 0;
```

```
int n1=0;
while (true)
{
if (octa == 0 )
{
    break;
}
else
{
    int temp = octa % 10 ;
    decimal += temp* Math.pow(8,n1);
    octa = octa / 10;
    n1++;
}
```

```
System.out.println("The decimal value is " + decimal );
}
break;
```

case 9:

```
String octa1 = sc.nextLine();
int dec9 = Integer.parseInt(octa1 , 8);
String hex9 = Integer.toHexString(dec9);
System.out.println("The hexadecimal value is " + hex9 );
break;
```

case 10:

```
System.out.println("\nEnter the number");
int num10 = Integer.parseInt(sc.nextLine(),16);
String bin10 = Integer.toBinaryString(num10);
System.out.println("The binary value is " + bin10);
```

```
        break;

    case 11:
        System.out.println("\nEnter the number");
        String hex11 = sc.next();
        int dec11 = Integer.parseInt(hex11 , 16);
        System.out.println("The decimal value is " + dec11);
        break;

    case 12:
        System.out.println("\nEnter the value ");
        String hex12 = sc.next();
        int dec12 = Integer.parseInt(hex12,16);
        String oct12 = Integer.toOctalString(dec12);
        System.out.println(" The octal value is " + oct12);
        break;

    default:
        System.out.println("\nInvalid number");
        break;
    }

}

}

}
```

Output :

```
C:\Windows\System32\cmd.exe
D:\SEM 4\CSE1007_LAB>javac Calculator.java
D:\SEM 4\CSE1007_LAB>java Calculator.java
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trigonometry Calculations
4.Converter
1
enter choice
1.add
2.sub
3.mul
4.div
1
enter two number
23
45
result is=68
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trigonometry Calculations
4.Converter
1
enter choice
1.add
2.sub
3.mul
4.div
2
enter two number
23
2
result is=21
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trigonometry Calculations
4.Converter
1
enter choice
1.add
2.sub
3.mul
4.div
3
enter two number
4
```

```
C:\Windows\System32\cmd.exe
```

```
5
result is=20
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trignometry Calculations
4.Converter
4
Enter choice
1.Binary to Decimal Conversion
2.Binary to Octal Conversion
3.Binary to Hexadecimal Conversion
4.Decimal to Binary Conversion
5.Decimal to Octal Conversion
6.Decimal to Hexadecimal Conversion
7.Octal to Binary Conversion
8.Octal toDecimal Conversion
9.Octal to Hexadecimal Conversion
10Hexadecimal to Binary Conversion
11.Hexadecimal to Decimal Conversion
12.Hexadecimal to OctalConversion
1
Enter binary number
110
The decimal value of 6
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trignometry Calculations
4.Converter
1
enter choice
1.add
2.sub
3.mul
4.div
4
enter two number
10
2
result is=5
```

```
C:\Windows\System32\cmd.exe
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trigonometry Calculations
4.Converter
2
Enter choice
1.Natural log
2.Log base 10
3.Log to any base
3
Enter the number
4
Enter the base value
5
Log 4 to the base 5 is 0.8613531161467861
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trigonometry Calculations
4.Converter
4
Enter choice
1.Binary to Decimal Conversion
2.Binary to Octal Conversion
3.Binary to Hexadecimal Conversion
4.Decimal to Binary Conversion
5.Decimal to Octal Conversion
6.Decimal to Hexadecimal Conversion
7.Octal to Binary Conversion
8.Octal toDecimal Conversion
9.Octal to Hexadecimal Conversion
10Hexadecimal to Binary Conversion
11.Hexadecimal to Decimal Conversion
12.Hexadecimal to OctalConversion
12

Enter the value
143
The octal value is 503
```

```
C:\Windows\System32\cmd.exe
```

```
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trignometry Calculations
4.Converter
4
Enter choice
1.Binary to Decimal Conversion
2.Binary to Octal Conversion
3.Binary to Hexadecimal Conversion
4.Decimal to Binary Conversion
5.Decimal to Octal Conversion
6.Decimal to Hexadecimal Conversion
7.Octal to Binary Conversion
8.Octal toDecimal Conversion
9.Octal to Hexadecimal Conversion
10Hexadecimal to Binary Conversion
11.Hexadecimal to Decimal Conversion
12.Hexadecimal to OctalConversion
6
Enter the number
17
11
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trignometry Calculations
4.Converter
4
Enter choice
1.Binary to Decimal Conversion
2.Binary to Octal Conversion
3.Binary to Hexadecimal Conversion
4.Decimal to Binary Conversion
5.Decimal to Octal Conversion
6.Decimal to Hexadecimal Conversion
7.Octal to Binary Conversion
8.Octal toDecimal Conversion
9.Octal to Hexadecimal Conversion
10Hexadecimal to Binary Conversion
11.Hexadecimal to Decimal Conversion
12.Hexadecimal to OctalConversion
3
Enter the binary number
111
Hexadecimal value is 6f
```

C:\Windows\System32\cmd.exe

```
Enter choice
1.sin
2.cos
3.tan
4.sin inverse
4.cos inverse
5.tan inverse
1
enter value in degrees
30
sin(30.0)=0.4999999999999994
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trignometry Calculations
4.Converter
2
Enter choice
1.Natural log
2.Log base 10
3.Log to any base
3
Enter the number
6
Enter the base value
7
Log 6 to the base 7 is 0.9207822211616018
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trignometry Calculations
4.Converter
3
Enter choice
1.sin
2.cos
3.tan
4.sin inverse
4.cos inverse
5.tan inverse
2
enter value in degrees
45
cos(45.0)=0.7071067811865476
```

```
Console Select C:\Windows\System32\cmd.exe
Enter choice
1.sin
2.cos
3.tan
4.sin inverse
5.cos inverse
6.tan inverse
6
enter value
0.34
The cos inverse value is 1.2238794292677349
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trignometry Calculations
4.Converter
3
Enter choice
1.sin
2.cos
3.tan
4.sin inverse
5.cos inverse
6.tan inverse
6
enter value
0.244
The cos inverse value is 1.3243079350218203
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trignometry Calculations
4.Converter
3
Enter choice
1.sin
2.cos
3.tan
4.sin inverse
5.cos inverse
6.tan inverse
5
enter value
0.533
The cos inverse value is 1.008654088525554
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trignometry Calculations
```

```
c:\ Select C:\Windows\System32\cmd.exe
4.Converter
4
Enter choice
1.Binary to Decimal Conversion
2.Binary to Octal Conversion
3.Binary to Hexadecimal Conversion
4.Decimal to Binary Conversion
5.Decimal to Octal Conversion
6.Decimal to Hexadecimal Conversion
7.Octal to Binary Conversion
8.Octal toDecimal Conversion
9.Octal to Hexadecimal Conversion
10.Hexadecimal to Binary Conversion
11.Hexadecimal to Decimal Conversion
12.Hexadecimal to OctalConversion
5
Enter the number
1434
2632
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trignometry Calculations
4.Converter
3
Enter choice
1.sin
2.cos
3.tan
4.sin inverse
5.cos inverse
6.tan inverse
4
enter value
0.25455555555
The sin inverse value is 0.2573880913922968
```

```
C:\Windows\System32\cmd.exe - java Calculator.java
```

```
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trignometry Calculations
4.Converter
4
Enter choice
1.Binary to Decimal Conversion
2.Binary to Octal Conversion
3.Binary to Hexadecimal Conversion
4.Decimal to Binary Conversion
5.Decimal to Octal Conversion
6.Decimal to Hexadecimal Conversion
7.Octal to Binary Conversion
8.Octal toDecimal Conversion
9.Octal to Hexadecimal Conversion
10Hexadecimal to Binary Conversion
11.Hexadecimal to Decimal Conversion
12.Hexadecimal to OctalConversion
6
Enter the number
1344
540
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trignometry Calculations
4.Converter
3
Enter choice
1.sin
2.cos
3.tan
4.sin inverse
5.cos inverse
6.tan inverse
5
enter value
0.3242
The cos inverse value is 1.240630397576417
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trignometry Calculations
4.Converter
4
Enter choice
1.Binary to Decimal Conversion
2.Binary to Octal Conversion
```

```
3.Binary to Hexadecimal Conversion
4.Decimal to Binary Conversion
5.Decimal to Octal Conversion
6.Decimal to Hexadecimal Conversion
7.Octal to Binary Conversion
8.Octal to Decimal Conversion
9.Octal to Hexadecimal Conversion
10.Hexadecimal to Binary Conversion
11.Hexadecimal to Decimal Conversion
12.Hexadecimal to OctalConversion
2
Enter binary number
110111
Octal value is 327037
```

```
enter choice
1.Arithmetic Caculations
2.Logarithmic Calculations
3.Trignometry Calculations
4.Converter
20BCE1182
```