Assignment 1

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LCS2020022

Q1) Write a Java code for designing a simple calculator with five arithmetic operators (addition, subtraction, multiplication, division, and modulo) and three logical operators (and, or, and not).

Code: Q1.java

```java
import java.util.Scanner;
public class Q1{
    public static void main(String arg[]){
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the number next to the operation: ");
        System.out.println("1. Addition");
        System.out.println("2. Subtraction");
        System.out.println("3. Multiplication");
        System.out.println("4. Division");
        System.out.println("5. AND");
        System.out.println("6. OR");
        System.out.println("7. NOT");
        int input = sc.nextInt();
        if(input == 1){
            System.out.println("Enter 2 numbers");
            int a = sc.nextInt();
            int b = sc.nextInt();
            System.out.println("Sum = " + (a+b));
        }
        else if(input == 2){
            System.out.println("Enter 2 numbers");
            int a = sc.nextInt();
            int b = sc.nextInt();
            System.out.println("Difference = " + (a-b));
        }
        else if(input == 3){
            System.out.println("Enter 2 numbers");
            int a = sc.nextInt();
            int b = sc.nextInt();
            System.out.println("Product = " + (a*b));
        }
        else if(input == 4){
            System.out.println("Enter 2 numbers");
            int a = sc.nextInt();
            int b = sc.nextInt();
            if(b==0){
                System.out.println("Denominator cannot be zero");
            }
            else{
                System.out.println("Division = " + (a/b));
            }
```

```java
        }
        else if(input == 5){
            System.out.println("Enter 2 boolean values (true or false)");
            boolean a = sc.nextBoolean();
            boolean b = sc.nextBoolean();
            System.out.println("Logical AND = " + (a & b));
        }
        else if(input == 6){
            System.out.println("Enter 2 boolean values (true or false)");
            boolean a = sc.nextBoolean();
            boolean b = sc.nextBoolean();
            System.out.println( "Logical OR = " + (a | b));
        }
        else if(input == 7){
            System.out.println("Enter a boolean value (true or false)");
            boolean a = sc.nextBoolean();
            System.out.println("Logical NOT = " + (!a));
        }
        else{
            System.out.println("Enter valid number");
        }
    }
}
```

Output:

```
hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ java Q1
Enter the number next to the operation:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. AND
6. OR
7. NOT
7
Enter a boolean value (true or false)
false
Logical NOT = true
```

```
hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ javac Q1.java

hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ java Q1
Enter the number next to the operation:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. AND
6. OR
7. NOT
1
Enter 2 numbers
-5 85
Sum = 80

hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ java Q1
Enter the number next to the operation:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. AND
6. OR
7. NOT
2
Enter 2 numbers
6 9
Difference = -3

hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ java Q1
Enter the number next to the operation:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. AND
6. OR
7. NOT
3
Enter 2 numbers
6 0
Product = 0
```

```
hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ java Q1
Enter the number next to the operation:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. AND
6. OR
7. NOT
4
Enter 2 numbers
25 5
Division = 5

hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ java Q1
Enter the number next to the operation:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. AND
6. OR
7. NOT
5
Enter 2 boolean values (true or false)
true false
Logical AND = false

hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ java Q1
Enter the number next to the operation:
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. AND
6. OR
7. NOT
6
Enter 2 boolean values (true or false)
true true
Logical OR = true
```

Q2) Write three parameterized constructors for adding two operands, three operands and four operands, respectively in

the Addition class and called them with from a main class
with three objects.

Code: Q2.java

```java
import java.util.Scanner;

class Addition{
    int a = 0 , b = 0 , c = 0, d = 0;
    Addition(int input1 , int input2){
        a = input1; b = input2;
        System.out.println(a+b);
    }
    Addition(int input1 , int input2, int input3){
        a = input1; b = input2; c = input3;
        System.out.println(a+b+c);
    }
    Addition(int input1 , int input2, int input3, int input4){
        a = input1; b = input2; c = input3; d = input4;
        System.out.println(a+b+c+d);
    }

}

public class Q2{
    public static void main(String arg[]){
        Addition a1 = new Addition(3,4);
        Addition a2 = new Addition(3,4,5);
        Addition a3 = new Addition(3,4,5,6);
    }
}
```

Output:

```
hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ javac Q2.java

hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ java Q2
7
12
18
```

Q3) Write a Java program to find the volume of three different
types of Boxes while taking height, width, and depth as inputs.
Write two separate programs using the help of methods and
parameterized constructors. Similarly, write the Java
programs to find the area of a circle and rectangle.

1. Volume of Box by Constructor

Code: Q3_BoxByConstructor.java

```java
import java.util.Scanner;

class Box{
    float height;
    float width;
    float depth;
    Box(float h , float w , float d){
        height = h;
        width = w;
        depth = d;
        System.out.println("Volume of box = " + (height*width*depth));
    }
}

public class Q3_BoxByConstructor{
    public static void main(String arg[]){
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter height: ");
        float a = sc.nextFloat();
        System.out.print("Enter width: ");
        float b = sc.nextFloat();
        System.out.print("Enter depth: ");
        float c = sc.nextFloat();

        Box b2 = new Box(a,b,c);

    }
}
```

Output:

```
hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ javac Q3_BoxByConstructor.java

hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ java Q3_BoxByConstructor
Enter height: 7.2
Enter width: 5.6
Enter depth: 9.5
Volume of box = 383.04
```

2. Volume of Box by Method

Code: Q3_BoxByMethod.java

```java
import java.util.Scanner;

class Box{
    float height;
```

```java
    float width;
    float depth;

    public void getData(float a,float b , float c){
        height = a;
        width = b;
        depth = c;
    }
    public void calculateVolume(){
        System.out.println("Volume of box = " + (height*width*depth));
    }
}

public class Q3_BoxByMethod {
    public static void main(String arg[]){
        Scanner sc = new Scanner(System.in);
        Box b1 = new Box();

        System.out.print("Enter height: ");
        float h = sc.nextFloat();
        System.out.print("Enter width: ");
        float w = sc.nextFloat();
        System.out.print("Enter depth: ");
        float d = sc.nextFloat();

        b1.getData(h,w,d);
        b1.calculateVolume();
    }
}
```

Output:

```
hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ javac Q3_BoxByMethod.java

hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ java Q3_BoxByMethod
Enter height: 2.5
Enter width: 7
Enter depth: 9.2
Volume of box = 161.0
```

3. Area of Circle by Constructor

Code: Q3_CircleByConstructor.java

```java
import java.util.Scanner;

class Circle{
    float radius;
    Circle(float a){
```

```
        radius = a;
        System.out.println("Area of Circle = " + (3.14f * radius *
radius));
    }
}

public class Q3_CircleByConstructor{
    public static void main(String arg[]){
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter radius: ");
        float r = sc.nextFloat();

        Circle c2 = new Circle(r);


    }
}
```

Output:

4. Area of Circle By Method

Code: Q3_CircleByMethod.java

```
import java.util.Scanner;

class Circle{
    float radius;

    public void getRadius(float a){
        radius = a;
    }
    public void calculateArea(){
        System.out.println("Area of circle = " + (3.14f * radius *
radius));
    }
}

public class Q3_CircleByMethod {
    public static void main(String arg[]){
        Scanner sc = new Scanner(System.in);
        Circle c1 = new Circle();

        System.out.print("Enter radius: ");
        float r = sc.nextFloat();

        c1.getRadius(r);
```

```
        c1.calculateArea();
    }
}
```

Output:

```
hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ javac Q3_CircleByMethod.java

hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ java Q3_CircleByMethod
Enter radius: 30
Area of circle = 2826.0002
```

5. Area of Rectangle by Constructor

Code: Q3_RectangleByConstructor.java

```java
import java.util.Scanner;

class Rectangle{
    float length;
    float breadth;
    Rectangle(float a , float b){
        length = a;
        breadth = b;
        System.out.println("Area of Rectangle = " + (length * breadth));
    }
}

public class Q3_RectangleByConstructor{
    public static void main(String arg[]){
        Scanner sc = new Scanner(System.in);

        System.out.print("Enter length: ");
        float a = sc.nextFloat();
        System.out.print("Enter breadth: ");
        float b = sc.nextFloat();

        Rectangle b2 = new Rectangle(a,b);

    }
}
```

Output:

```
hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ javac Q3_RectangleByConstructor.java

hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ java Q3_RectangleByConstructor
Enter length: 8
Enter breadth: 7
Area of Rectangle = 56.0
```

6. Area of Rectangle by Method

Code: Q3_RectangleByMethod.java

```java
import java.util.Scanner;

class Rectangle{
    float length;
    float breadth;

    public void getData(float a,float b){
        length = a;
        breadth = b;
    }
    public void calculateArea(){
        System.out.println("Area of Rectangle = " + (length * breadth));
    }
}

public class Q3_RectangleByMethod {
    public static void main(String arg[]){
        Scanner sc = new Scanner(System.in);
        Rectangle r1 = new Rectangle();

        System.out.print("Enter length: ");
        float l = sc.nextFloat();
        System.out.print("Enter breadth: ");
        float b = sc.nextFloat();

        r1.getData(l,b);
        r1.calculateArea();
    }
}
```

Output:

```
hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ javac Q3_RectangleByMethod.java

hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ java Q3_RectangleByMethod
Enter length: 7
Enter breadth: 6
Area of Rectangle = 42.0
```

Q4) Write a single program to find the value of the following operations:
10 & 50, 30 | 40, ~50, 60>>3, 70<<8, 55>>>2.

Code: Q4.java

```java
public class Q4{
    public static void main(String arg[]){
        System.out.println("10 & 50 = " + (10&50));
        System.out.println("30 | 50 = " + (30|50));
        System.out.println("~50 = " + (~50));
        System.out.println("60 >> 3 = " + (60>>3));
        System.out.println("70 << 8 = " + (70<<8));
        System.out.println("55 >>> 2 = " + (55>>>2));
    }
}
```

Output:

```
hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ javac Q4.java

hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ java Q4
10 & 50 = 2
30 | 50 = 62
~50 = -51
60 >> 3 = 7
70 << 8 = 17920
55 >>> 2 = 13
```

Q5) Write the Java programs to find the maximum and minimum number among four numbers using if-else statement and Ternary operator separately.

1. If-Else

Code: Q5_ByIfElse.java

```java
import java.util.Scanner;
public class Q5_ByIfElse{
    public static void main(String arg[]){
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter 4 numbers: ");
        int a = sc.nextInt();
        int b = sc.nextInt();
        int c = sc.nextInt();
        int d = sc.nextInt();
        int max = a , min = a;
        if(b>max){
            max=b;
        }
        else if(b<min){
            min=b;
        }
        if(c>max){
            max=c;
        }
        else if(c<min){
            min=c;
        }
        if(d>max){
            max=d;
        }else if(d<min){
            min=d;
        }
        System.out.println("Maximum = " + max);
        System.out.println("Minimum = " + min);
    }
}
```

Output:

```
hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ javac Q5_ByIfElse.java

hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ java Q5_ByIfElse
Enter 4 numbers: -6 3 8 7
Maximum = 8
Minimum = -6
```

2. Ternary Operator

Code: Q5_ByTernary.java

```
import java.util.Scanner;
public class Q5_ByTernary{
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter 4 numbers: ");
        int a = sc.nextInt();
        int b = sc.nextInt();
        int c = sc.nextInt();
        int d = sc.nextInt();
        int max = (a > b && a > c && a > d) ? a: ((b > c && b > d) ? b : (c
> d ? c : d));
        int min = (a < b && a < c && a < d) ? a: ((b < c && b < d) ? b : (c
< d ? c : d));
        System.out.println("Maximum = " + max);
        System.out.println("Minimum = " + min);
    }
}
```

Output:

```
hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ javac Q5_ByTernary.java

hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ java Q5_ByTernary
Enter 4 numbers: -17 -45 80 0
Maximum = 80
Minimum = -45
```

Q6) Write a Java program to find the value of following variables:

z=8,
a= z++ + ++z,
b= z-- + --z
c= z++,
d=++z,
e=z--,
f=--z

Code: Q6.java

```java
public class Q6{
    public static void main(String arg[]){
        int z = 8;
        int a = z++ + ++z;
        int b = z-- + --z;
        int c = z++;
        int d = ++z;
        int e = z--;
        int f = --z;
        System.out.println("Value of z before operations = " + z);
        System.out.println("a = " + a);
        System.out.println("b = " + b);
        System.out.println("c = " + c);
        System.out.println("d = " + d);
        System.out.println("e = " + e);
        System.out.println("f = " + f);
        System.out.println("Value of z after operations = " + z);
    }
}
```

Output:

```
hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ javac Q6.java

hp@LAPTOP-OJMHKA3Q MINGW64 ~/Desktop/CLG/Third Sem/APL/Assignment-1
$ java Q6
Value of z before operations = 8
a = 18
b = 18
c = 8
d = 10
e = 10
f = 8
Value of z after operations = 8
```