

# OBJECT ORIENTED PROGRAMMING LAB

ASSIGNMENT: 6

DATE: 04-04-2023

SLOT: L3+L4

MAX MARKS: 10

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1. Write a Java Program to implement Wrapper classes and their methods (include at least 10 methods).

INPUT:

**Boxing and Unboxing:**

```
import java.lang.Math;
public class WrapperEx
{
    public static void main(String[] args)
    {
        //Boxing
        int a=28;
        double b=0.8;
        float c=0.82f;
        boolean d=true;
        char e='k';
        byte f=8;
        Integer ob1=a;
        Double ob2=b;
        Float ob3=c;
        Boolean ob4=d;
        Character ob5=e;
        Byte ob6=f;
        System.out.println("Variable : "+a+" Object : "+ob1);
        System.out.println("Variable : "+b+" Object : "+ob2);
        System.out.println("Variable : "+c+" Object : "+ob3);
        System.out.println("Variable : "+d+" Object : "+ob4);
        System.out.println("Variable : "+e+" Object : "+ob5);
        System.out.println("Variable : "+f+" Object : "+ob6);
        // Unboxing
        int unwrapped_Int=ob1;
        double unwrapped_Double=ob2;
        float unwrapped_Float=ob3;
        boolean unwrapped_Boolean=ob4;
        char unwrapped_Character=ob5;
        byte unwrapped_Byte=ob6;
        System.out.println("Object : "+ob1+" Unwrapped_Int"+unwrapped_Int);
        System.out.println("Object : "+ob2+" Unwrapped_Double"+unwrapped_Double);
        System.out.println("Object : "+ob3+" Unwrapped_Float"+unwrapped_Float);
        System.out.println("Object : "+ob4+" Unwrapped_Boolean"+unwrapped_Boolean);
        System.out.println("Object : "+ob5+" Unwrapped_Character"+unwrapped_Character);
        System.out.println("Object : "+ob6+" Unwrapped_Byte"+unwrapped_Byte);
    }
}
```

## Methods:

```
//Random method
System.out.println("Random value using random() method : "+Math.random());
//Power finding
System.out.println("6 raised to the power of 3 (6^3) : "+Math.pow(6,3));
//Finding sine value of an angle by converting it in to radians
System.out.println("sine of 30 degrees : "+Math.sin(Math.toRadians(30)));
//Finding cosine value of an angle by converting it in to radians
System.out.println("cosine of 60 degrees : "+Math.cos(Math.toRadians(60)));
//Finding Tangent value of an angle by converting it in to radians
System.out.println("tangent of 45 degrees : "+Math.tan(Math.toRadians(45)));
//Finding Square root of a number
System.out.println("Square root of 64 : "+Math.sqrt(64));
//Finding minimum of two numbers
System.out.println("Smallest of 2 and 3 : "+Math.min(2,3));
//Finding maximum of two numbers
System.out.println("Largest of 2 and 3 : "+Math.max(2,3));
//Using ceil method
System.out.println("Ceil method of 2.03 gives : "+Math.ceil(2.03));
//Using floor method
System.out.println("Floor method of 2.03 gives : "+Math.floor(2.03));
}
```

## OUTPUT:

```
C:\22BCE9513>javac WrapperEx.java
C:\22BCE9513>java WrapperEx
Variable : 28 Object : 28
Variable : 0.8 Object : 0.8
Variable : 0.82 Object : 0.82
Variable : true Object : true
Variable : k Object : k
Variable : 8 Object : 8
Object : 28 Unwrapped_Int28
Object : 0.8 Unwrapped_Double0.8
Object : 0.82 Unwrapped_Float0.82
Object : true Unwrapped_Booleantrue
Object : k Unwrapped_Characterk
Object : 8 Unwrapped_Byte8
Random value using random() method : 0.7997897472977922
6 raised to the power of 3 (6^3) : 216.0
sine of 30 degrees : 0.49999999999999994
cosine of 60 degrees : 0.5000000000000001
tangent of 45 degrees : 0.9999999999999999
Square root of 64 : 8.0
Smallest of 2 and 3 : 2
Largest of 2 and 3 : 3
Ceil method of 2.03 gives : 3.0
Floor method of 2.03 gives : 2.0
```

2. Write a Java program that prints all real solutions to the quadratic equation  $ax^2+bx+c=0$ . Read in a, b, c and use the quadratic formula. If the discriminate  $b^2-4ac$  is negative, display a message stating that there are no real solutions.

## INPUT:

```

import java.util.Scanner;
import java.lang.Math;
class Sol_Quadratic
{
    public static void main(String[] args)
    {
        Scanner input =new Scanner(System.in);
        System.out.println("NOTE:The equation should be in the form of ax^2+bx+c.");
        System.out.print("Enter the value of a : ");
        double a=input.nextDouble();
        System.out.print("Enter the value of b : ");
        double b=input.nextDouble();
        System.out.print("Enter the value of c : ");
        double c=input.nextDouble();
        double det=(b*b)-(4*a*c);
        if (det<0)
        {
            System.out.println("The equation has no real roots");
        }
        else
        {
            double soln1=(-b+Math.sqrt(det))/(2*a);
            double soln2=(-b-Math.sqrt(det))/(2*a);
            System.out.println("The solutions of the equation are "+soln1+" and "+soln2);
        }
    }
}

```

#### OUTPUT:

```

C:\22BCE9513>javac Sol_Quadratic.java

C:\22BCE9513>java Sol_Quadratic
NOTE:The equation should be in the form of ax^2+bx+c.
Enter the value of a : 1
Enter the value of b : 5
Enter the value of c : 6
The solutions of the equation are -2.0 and -3.0

```