# Week-3 OOJ LAB

Q) Java program to find roots of quadratic equation.

Ans/

```
import java.util.scanner;
class quadraticequation1 {
    private static scanner sc;
    public static void main (string[] args)
    {
        double a,b,c;
        double root1, root2, imaginary, discriminant;
        sc = new scanner (System.in);

        system.out.print (" Please enter the valuees of
        a,b,c of quadratic equation: ");

        a = sc.nextDouble();
        b = sc.nextDouble();
        c = sc.nextDouble();

        discriminant = (b*b) - (4*a*c);

        if (discriminant >0)
        {
            root1 = (-b + Math.sqrt(discriminant) / (2*a));
            root2 = (-b - Math.Sqrt(discriminant) / (2*a));
            system.out.println("\n the discriminant is
            greater than 0 therefore, root1 = " + root+"
            root2 = "+root2);
```

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```
system.out.printf("\n Here discriminant is
    greater than 0, so roots are real and
    distinctive, therefore, root1=%.4f", root1);
system.out.printf("\n root2=%.4f", root2);
}
else if (discriminant == 0)
{
    root1 = root2 = -b/(2*a);
system.out.printf("\n Here discriminant is
equal to 0 so roots are real and equal,
    therfore, root1=%.4f", root1);
    system.out.printf("\n root2=%.4f", root2);
}
else if (discriminant < 0)
{
    system.out.println("\n Here discriminant is
less than 0, therfore, the roots are imaginary");
}
}
}
```

```
Microsoft Windows [Version 10.0.18363.1082]
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C:\Users\Aman Sinha>cd desktop

C:\Users\Aman Sinha\Desktop>cd OOJ lab

C:\Users\Aman Sinha\Desktop\OOJ lab>javac qe.java

C:\Users\Aman Sinha\Desktop\OOJ lab>java qe.java
 Please Enter the Values of a, b, c of Quadratic Equation : 2
4
6

 Here discriminant is less than 0 therefore,the roots are imaginary

C:\Users\Aman Sinha\Desktop\OOJ lab>javac qe.java

C:\Users\Aman Sinha\Desktop\OOJ lab>java qe.java
 Please Enter the Values of a, b, c of Quadratic Equation : 1
5
4

 Here discriminant is greater than 0 , so roots are real and distinctive, therefore, root1 = -3.5000
 root2 = -6.5000
C:\Users\Aman Sinha\Desktop\OOJ lab>java qe.java
 Please Enter the Values of a, b, c of Quadratic Equation : 1
4
4

 Here discriminant is equal to 0 so roots are real and equal, therefore, root1 = -2.0000
 root2 = -2.0000
C:\Users\Aman Sinha\Desktop\OOJ lab>
```

# Week 4. OOJ lab

```
import java.util.Scanner;
class Student{

 int i, n, sus1=0, sus2=0;
 double res;
 double mark[];
 int credits[];
 string name;
 string usn;
  int grade_point[];

 Void getdata(){

Scanner sc = new scanner(system.in);
System.out.println("Enter the total no of
subjects");
 n = sc.nextInt();
 credits = new int[n];
 marks = new double[n];
 gp = new int[n];
system.out.println("Enter your usn no :")
 usn = sc.next();
 system.out.println("Enter your name:");
 Name = sc.next();

 for(i=0; i<n; i++){

system.out.println("Enter your marks:");
          marks[i] = sc.nextDouble();
        }
```

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```
void printdata() {

System.out.println("Student details :");
System.out.println("USN:" + usn);
system.out.println("Name :" + name);

for (i=0; i<n; i++) {

System.out.println(" .your credits for
  subjects :" + credits[i]);
   system.out.println(" your marks
                    + marks[i]);

}
```

```
Void sgpa()

for(i=0; i<n; i++) {

if (marks[i] <= 100 && marks[i] >= 90)
    grade-point[i] = 10;
else if (marks[i] >= 80)
    grade-point[i] = 9;
else if (marks[i] >= 70)
    grade-point[i] = 8;
else if (marks[i] >= 60)
    grade-point[i] = 7;
else if (marks[i] >= 50);
    grade-point[i] = 6;
else if (marks[i] >= 40);
    grade-point[i] = 4;
```

```
else if (marks[i] < 40)
    grade_point[i] = 0;
}
    for (i=0; i<n; i++)
        res1 += credits[i];
    for (i=0; i<n; i++) {
      res2 += (credits[i] * grade_point[i]);
}
    res = (double)(res2 / res1);
  System.out.println("SGPA:" + res);
}
}
class Testj2

public static void main (String[] args) {
    student stu = new Student();
    stu.getdata();
    stu.printdata();
    stu.sgpa();
  }
}
```

```
C:\Users\Aman Sinha\Desktop\ooj>javac ooj2.java

C:\Users\Aman Sinha\Desktop\ooj>java Main
Enter USN of the student
1BM19CS22
Enter Name of the student
KUMAR
Enter no of subjects
5
Enter details of the subjects:
Enter credits allotted to the subject 1
4
Enter marks in the subject 1
66
Enter credits allotted to the subject 2
5
Enter marks in the subject 2
89
Enter credits allotted to the subject 3
4
Enter marks in the subject 3
78
Enter credits allotted to the subject 4
3
Enter marks in the subject 4
55
Enter credits allotted to the subject 5
4
Enter marks in the subject 5
80
Details of the Student
Name :KUMAR
USN: 1BM19CS22
SGPA of student 7.75

C:\Users\Aman Sinha\Desktop\ooj>
```

## Week-5 (Lab program 3)

```
import java.util.scanner;

class Book {
    string name, aurthor;
    double price;
    int num_pages;
    Scanner sc= new Scanner(sytem.in);

    Book() {
    }
    Book(string name, string aurthor, double price,
    int pages) {

    this.name= name;
    this.aurthor= aurthor;
    this.price = price;
    this.num_pages= pages;
    }

    Void setDetails() {
    system.out.print("Enter name of the book:");
    this.name= sc.nextLine();
    system.out.print("Enter the price:");
    this.price = sc.nextDouble();
    system.out.print("Enter the number of pages:");
    this.num_pages = sc.nextInt();
    }

    Void getDetails() {
```

```
system.out.println("Name:" + name);
system.out.println("Author:" + author);
system.out.println("Price:" + price);
system.out.println("Number of pages:" + Num_pages);
}

public string toString(){
return("Name " + name + "\n Author:" + author
    + "\n Price:" + price + "\n Number of pages:
    " + num_pages);
}
}

public class Labprog3{
    public static void main(string args[]){
     Int n;
     Book books[];
     Scanner sc = new scanner(system.in);
     System.out.print("Enter the no of books:");
     n = sc.nextInt();
     book = new Book[n];

for(int i=0;i<books.length;i++)
{
  system.out.println("Enter the details for book"
     + (i+1) + ":");
  books[i] = new Book();
  books[i].setDetails();
}
for(int i=0;i<books.length;i++){
 system.out.println("Details of book" + (i+1) + ":");
books[i].getdetails();
system.out.println();}}}
```

```
C:\Users\Aman Sinha\Desktop\book>java Labprog3
Enter number of books: 2
Enter details for book 1:
Enter name of the book: MODI JI
Enter the author of the book: AMIT JI
Enter the price: 200
Enter the number of pages: 100
Enter details for book 2:
Enter name of the book: MATHS
Enter the author of the book: KUMAR
Enter the price: 399
Enter the number of pages: 200
Details of book 1:
Name of the book: MODI JI
Author's name: AMIT JI
Price in Rupees: 200.0
Total number of pages: 100

Details of book 2:
Name of the book: MATHS
Author's name: KUMAR
Price in Rupees: 399.0
Total number of pages: 200
```

```java
import java.util.*;
class Matrix
{
    public static void main(String args[])
    {
        int m,n,i,j;
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the value of rows and coloumns:");
        m = sc.nextInt();
        n = sc.nextInt();
        int matrix[][]= new int[m][n];
        for(i=0;i<m;i++)
        {
            for(j=0;j<n;j++)
            {
                System.out.println("enter the element:"+i + j);
                matrix[i][j]= sc.nextInt();
            }
        }
        System.out.println("Inputted matrix:\n");
        for(i=0;i<m;i++)
        {
            for(j=0;j<n;j++)
            {
```

```
}
System.out.println("Inputted matrix:\n");
for(i=0;i<m;i++)
{
    for(j=0;j<n;j++)
    {
        System.out.print(matrix[i][j]+"\t");
    }
    System.out.println();
}
int transpose[][]= new int[n][m];
for(i=0;i<m;i++)
{
    for(j=0;j<n;j++)
    {
        transpose[j][i]=matrix[i][j] ;
    }
}
System.out.println("Transpose matrix:\n");
for(i=0;i<n;i++)
{
    for(j=0;j<m;j++)
    {
        System.out.print(transpose[i][j]+"\t");
    }
    System.out.println();
```

```
C:\Users\Aman Sinha\Desktop>javac Matrix.java

C:\Users\Aman Sinha\Desktop>java Matrix
Enter the value of rows and coloumns:
3
3
enter the element:00
1
enter the element:01
2
enter the element:02
3
enter the element:10
4
enter the element:11
5
enter the element:12
6
enter the element:20
7
enter the element:21
8
enter the element:22
9
Inputted matrix:

1       2       3
4       5       6
7       8       9
Transpose matrix:

1       4       7
2       5       8
3       6       9

C:\Users\Aman Sinha\Desktop>
```

```java
import java.util.Scanner;

public class CircleDemo {
    double radius = 0,area = 0,perimeter = 0;
    Scanner sc = new Scanner(System.in);
    void setDetails(){
        System.out.println("Enter the radius: ");
        this.radius = sc.nextDouble();
    }
    void findPerimeter() { this.perimeter = 2 * Math.PI * radius; }
    void findArea() { this.area = Math.PI * Math.pow(radius, 2); }

    void getDetails(){
        System.out.println("Radius: " + radius);
        System.out.format("Perimeter: %.2f\n",perimeter);
        System.out.format("Area: %.2f\n",area);
    }

    public static void main(String[] args) {
        CircleDemo crDemo = new CircleDemo();
        crDemo.setDetails();
        crDemo.findPerimeter();
        crDemo.findArea();
        crDemo.getDetails();
    }
}
```

```
Microsoft Windows [Version 10.0.18363.1139]
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C:\Users\Aman Sinha>cd desktop

C:\Users\Aman Sinha\Desktop>javac CircleDemo.java

C:\Users\Aman Sinha\Desktop>java CircleDemo
Enter the radius:
23
Radius: 23.0
Perimeter: 144.51
Area: 1661.90

C:\Users\Aman Sinha\Desktop>
```

```java
import java.util.Scanner;

public class CountString {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a string: ");
        String str = sc.nextLine();
        int v = 0,c = 0,s = 0;
        for(int i = 0;i<str.length();i++){
            char ch = str.charAt(i) ;
            if(ch == 'a'|| ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u' || ch == 'A' || ch == 'E' || ch == 'I' || ch == 'O' || ch == 'U'){
                v++;
            }else if(str.charAt(i) == ' '){
                s++;
            }else{
                c++;
            }
        }
        System.out.println("Number of vowels: " + v);
        System.out.println("Number of spaces: " + s);
        System.out.println("Number of consonants: " + c);
    }
}
```

```
C:\Users\Aman Sinha\Desktop>javac CountString.java

C:\Users\Aman Sinha\Desktop>java CountString
Enter a string:
GOODDAY
Number of vowels: 3
Number of spaces: 0
Number of consonants: 4

C:\Users\Aman Sinha\Desktop>
```

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## Week-8 (LAB) Program

4) import java.util.*;

abstract class shape {

int length, breadth, radius;
Scanner input = new Scanner (System.in);
abstract void printArea();
}

Class Rectangle extends Shape {

void printArea() {

System.out.println(" finding the Area of Rectangle");
system.out.println(" Enter Length & breadth: ");
Length = input.nextInt();
Bridth = input.nextInt();
System.out.println(" The area of rectangle is :"
+ length * Bradth);
}
}

Class Triangle extends Shape {

~~Class Rectangle~~ void printArea() {

System.out.println(" finding the area of Triangle");

```
system.out.println("Enter the base and height:");
base = input.nextInt();
height = input.nextInt();
system.out.println("The area of triangle is:"
                    + (base * height)/2);
}
}

class Circle extends Shape {

    void printArea() {
    system.out.println("Enter the radius");
    radius = input.nextInt();
    system.out.println("The area of circle is:
                    +(3.14f * radius * radius));
    }
}

Public class Abstract class Example {
    public static void main(string [] args) {
    Rectangle rec = new Rectangle();
        rec.printArea();
    Triangle Tri = new Triangle();
        Tri.printArea();
    Circle cir = new Circle();
        cir.printArea();
    }
}
```

```
_____Finding the Area of Rectangle_____
Enter length and breadth: 23
4
The area of Rectangle is: 92

_____Finding the Area of Triangle_____
Enter Base And Height: 23
54
The area of Triangle is: 621

_____Finding the Area of Cricle_____
Enter Radius: 67
The area of Cricle is: 14095.46


...Program finished with exit code 0
Press ENTER to exit console.
```

# Week 9 (Lab program 6) (Package)

INTERNALS.java :

```
package CIE;
import java.util.Scanner;
class STUDENTS {
    public void getName() {
        Scanner sc = new Scanner(System.in);
System.out.println("Enter the name of the studen
    ");
String name = sc.nextLine();
system.out.println("Enter the USN");
    int usn = sc.nextInt();
system.out.println("Enter the current semester");
    int sem = sc.nextInt();
}
}
public class INTERNALS extends students {
    public int[] getData() {
     super.getName();
     Scanner ss = new Scanner(System.in);
  Int[] Array = new int[5];
     System.out.println("Enter the cie-marks
      for the 5 subjects");
        for(int i=0; i<5; i++)
    {
        Array[i] = ss.nextInt();
    }
    return Array;
}
```

Externals.java →

```
package SEE;
import java.util.Scanner;
public class EXTERNALS {
    public int [] getData() {

        Scanner se = new Scanner (System.in);
int [] Arr = new int [5];
System.out.println("—— Enter the SEE marks for
    5 subjects ——————\n");
for (int x=0; x<5; x++)
    {
        Arr[x] = se.nextInt();
    }
return Arr;
}
}
```

Total Marks.java:

```
Import CIE.*;
Import SEE.*;
Import java.util.scanner;

public class TotalMarks {

    public static void main (string[] args) {

        Scanner st= new scanner(system.in);
        System.out.println(" - Enter the total no of
            students - ");
        int stud= st.nextInt();
        CIE.INTERNALS ci= new CIE.INTERNALS();
        SEE.EXTERNALS se= new SEE.EXTERNALS();

        for (int K=0; K<stud; K++) {

        int internal marks[]= ci.getData()
        int External marks[]= se.getDataa();

            int tms1 =0, tms2=0, tms3=0, tms4=0,
                tms5=0;

        tms1= internal marsk[0] + external Marks[0];
        tms2= internal marks[1]+ external Marks[1];
        tms3= internal marks[2]+ external Marks[2];
        tms4= internal marks[3]+ external marks[3];
        tms5= internal marks[4]+ external marks[4];
```

```
system.out.println("\n total marks for sub1 = "+tmS1);
system.out.println("\n total marks of subt 2 = \n" +tmS2);
system.out.println("\n total marks of sub 3 = \n" +tmS3);
system.out.println("\n total marks of sub 4 = \n" +tmS4);
system.out.println("\n total marks of sub 5 = \n" +tmS5);
```

}

}

}

```
C:\Users\Aman Sinha\Desktop\college assign\lab9>java T
======Enter the total number of students=======
3
---------Enter the name of the student---------

aman
----------Enter the USN----------
123
--------------Enter the current semester---------------
2
enter the cie marks for the 5 subjects
34
56
78
54
34
----------Enter the see marks of the 5 subjects---------


23
45
67
89
8

Total marks for the Sub1 is =
57
Total marks for the Sub2 is =
101
Total marks for the Sub3 is =
145
Total marks for the Sub4 is =
143
Total marks for the sub5 is
```

DATE :

## Week 10 (Lab prog 7)

```
class Generics <A, B>{
    A obj1;
    B obj2;

    Generics (A obj1, B obj2){
        this.obj1 = obj1;
        this.obj2 = obj2;

    }
    public void print(){
        System.out.println("\n" + this.obj1);
        System.out.println("\n" + this.obj2);

public class lab10{

    public static void main (String[] args){
    Generics <Integer, String> myobj1 = new Generics
            <Integer, String> ('90', " is my overall
    ~~Generics <char~~                    percentage");

    Generics <Character, Double> myObj2 = new
      Generics <Character, Double> ('Y' , 344.76f);
      myobj.print();
      myobj2.print();
    }
}
```

```
C:\Users\Aman Sinha\Desktop>java lab107

90

is my overall percentage

y

344.768

C:\Users\Aman Sinha\Desktop>
```

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# lab prog 8

```
import java.util.Scanner;

class wrongage extends Exception {

    public WrongAge() {

        string tostring(string a)
        {
        Return a;
        }
    }
}

Class father {

    int fathrage;

Father (int fa, int sa) throws wrong page {

    if (fa <= 0) {

    throw new WrongAge("father's age can
    never be equal to 0");
    }
    else {
        this.fathrage = fa;
    }
}
```

```
class son extends father {
  int sonage;

  Son (int fa, int sa) throws WrongAge {

  super (fa, sa);

  if (fa <= sa)
  {
  throw new Wrongage ("Father's Age can never be
    equal to or less than son's age");
  }

  else {
  this.sonage = sa;
  }
  }

  Void print() {

    System.out.println("Father's Age :" + fatherage);
    "      "      "      ("Son's Age :" + sonage);
  }

  public class lab10 {

    public static void main (String[] args) {
      int fa, sa;
      Scanner sc = new Scanner (System.in);
      System.out.println ("Enter father's age :");
        fa = sc.nextInt();
```

```
System.out.println("Enter son's age:");
sa = sc.nextInt();

try {

    Son son = new Son(fa, sa);

    son.print();

}
catch (WrongAge e) {

    System.out.println("Exception" + e);

}
}
```

```
C:\Users\Aman Sinha\Desktop>java lab10
Enter the age of Father:
0
Enter the age of son:
23
Exception WrongAge: Father's Age can never be equal to 0

C:\Users\Aman Sinha\Desktop>java lab10
Enter the age of Father:
20
Enter the age of son:
34
Exception WrongAge: Father's Age can never be equal to or less than Son's age

C:\Users\Aman Sinha\Desktop>java lab10
Enter the age of Father:
40
Enter the age of son:
13
Father's Age: 40
Son's Age: 13
```

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Week 12 ( lab prog 10)

```
public Prog1(){
    setlayout (new FlowLayout(1);
    Num1 = new TextField(1);
    Num2 = new TextField(1);
label result = new lable("Num1:", lable.RIGHT),
label error = new lable("Num2:", label.RIGHT);
    add(Num1);
    add(Num2);
    add(divide);
    divide.addActionListener(this);
    addWindowListener(new WinAdapter());
}

public void actionPerformed(ActionEvent ae){
    if(ae.getSource() == divide){
        try{
            int n1 = Integer.parseInt(Num1.getText());
            int n2 = Integer.parseInt(Num2.getText());
res = (float) n1/n2;
    }
    catch(NumberFormatException is not an
    integer,");
    }
    catch(ArithmeticException exception){
        res=0
        error = "You tried to divide by zero.";
    }
    Repaint();
```

```
    }
}
public void paint (Graphics g) {
    g.drawString ("Results: " + String.valueOf (x),
                  20, 100);
    g.drawString ("Error: " + error, 20, 150);
}
public static void main (String [] args) {
    prog1 p = new prog1 ();
    p.setSize (new Dimension (400, 400));
    p.setTitle ("Divide");
    p.setVisible (true);
}
}
class winAdapter extends WindowAdapter {
    public void windowClosing (WindowEvent
        we)
    {
    }
}
```

Divide

22 | 0 | Divide

Result: 0.0

Error: Entered number is not an integer

Divide

22 11 Divide

Result 2.0

Error

```java
import java.awt.*;
import java.awt.event.*;



class MyDialog extends  Dialog implements ActionListener{
    Prog1 p;
    MyDialog(Frame parent, String title){
        super(parent, title, false);
        setLayout(new FlowLayout());
        setSize(300,150);
        p = (Prog1)parent;
        Button b = new Button("OK");
        Label l = new Label("Error: " + p.error);
        add(l);
        add(b);
        b.addActionListener(this);
    }

    public void actionPerformed(ActionEvent ae){
        dispose();
    }
}


public class Prog1new extends Frame implements ActionListener{
    TextField Num1, Num2;
    Button divide = new Button("Divide");
    float res = 0;
```

```
TextField Num1, Num2;
Button divide = new Button("Divide");
float res = 0;
public String error = "";
public Prog1(){
    setLayout(new FlowLayout());
    Num1 = new TextField(1);
    Num2 = new TextField(1);
    Label Num1L = new Label("Num1: ", Label.RIGHT);
    Label Num2L = new Label("Num2: ", Label.RIGHT);
    add(Num1L);
    add(Num1);
    add(Num2L);
    add(Num2);
    add(divide);
    divide.addActionListener(this);
    addWindowListener(new WinAdapter());
}

public void actionPerformed(ActionEvent ae){
    if(ae.getSource() == divide){
        try{
            int n1 = Integer.parseInt(Num1.getText());
            int n2 = Integer.parseInt(Num2.getText());
            if(n2 <= 0){
                throw new ArithmeticException("Error");
            }
            res = (float)n1/n2;
```

```
            int n1 = Integer.parseInt(Num1.getText());
            int n2 = Integer.parseInt(Num2.getText());
            if(n2 <= 0){
                throw new ArithmeticException("Error");
            }
            res = (float)n1/n2;
            repaint();
        }catch(NumberFormatException exception){
            System.out.println(exception);
            res = 0;
            error = "Entered number is not an integer.";
            repaint();
        }catch(ArithmeticException exception){
            System.out.println(exception);
            res = 0;
            error = "You tried to divide by zero.";
            repaint();
        }
        if(res == 0){
            System.out.println(this.error);
            MyDialog d = new MyDialog(this, "Error");
            d.setVisible(true);
        }
    }
}

public void paint(Graphics g){
    g.drawString("Result: " + String.valueOf(res), 20, 100);
}
```

```
                System.out.println(this.error);
                MyDialog d = new MyDialog(this, "Error");
                d.setVisible(true);
            }
        }
    }

    public void paint(Graphics g){
        g.drawString("Result: " + String.valueOf(res), 20, 100);
    }

    public static void main(String[] args) {
        Prog1 p = new Prog1();
        p.setSize(new Dimension(400,400));
        p.setTitle("Divide");
        p.setVisible(true);
    }
}

class WinAdapter extends WindowAdapter{
    public void windowClosing(WindowEvent we){
        System.exit(0);
    }
}
```

Divide

Num1: 23 Num2: 23 Divide

Result 1.0

Divide

Result: 0.0

Num1: 23 Num2: 0 Divi

Error

Error: You tried to divide by zero. OK