

# OOJ LAB RECORD

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1BM19CS079

## LAB-1

Develop 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.

## OBSERVATION-

OOJ WEEK-3  
PROGRAMS  
LAB-1

1] Develop 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.

ALGORITHM

Step 1:- Start

Step 2:- Input the value of a, b, c

Step 3:- calculate  $D = (b*b - (4*a*c))$

Step 4:- If  $(D > 0)$   
Display roots are real, calculate the roots  
 $\Rightarrow r_1 = (-b + \sqrt{D}) / (2*a)$   
and  $r_2 = (-b - \sqrt{D}) / (2*a)$   
else if  $(D = 0)$   
Display roots are equal, calculate the roots  
 $\Rightarrow r_1 = r_2 = -b / (2*a)$   
else display 'there are no real roots'.

Step 5 :- Print  $r_1$  and  $r_2$

Step 6:- Stop

PROGRAM:-

```
import java.util. Scanner;  
import java. lang. Math;  
public class Math  
{  
    public static void main (String [] args) {  
        Scanner br = new Scanner (System.in);  
        int a,b,c;  
        double r1,r2,d;  
        char ch;  
        System.out.println (" Solution of Quadratic Equation  
                             - ax2 + bx + c ");  
        do  
        {  
            System.out.println (" Enter a: ");  
            a = br.nextInt();  
            System.out.println (" Enter b: ");  
            b = br.nextInt();  
            System.out.println (" Enter c: ");  
            c = br.nextInt();  
            d = (b*b) - (4*a*c);  
            if (d > 0)  
            {  
                r1 = (b + Math.sqrt(d)) / (2*a);  
                r2 = (b - Math.sqrt(d)) / (2*a);  
                System.out.println (" roots are -> r1 = " + r1 + " and  
                                     + " r2 = " + r2);  
            }  
            else if (d == 0)  
            {  
                r1 = r2 = -b / (2*a);  
                System.out.println (" roots are -> r1 = " + r1 + " and  
                                     + " r2 = " + r2);  
            }  
            else  
            {  
                System.out.println (" No real roots");  
            }  
        } while (ch != 'q');  
    }  
}
```

```

{
    d1 = (-b / (2 * a));
    System.out.println("roots are equal -1n" + "r1 = r2 = " + r1);
}
else
{
    System.out.println("there are no real roots");
}
System.out.println("1n" + "do you want to find another set
of roots? y/n? ");

char ch = br.next().charAt(0);
}
while (ch != 'y');
}

```

## OUTPUT-

```

Solution of Quadratic equation- ax^2+bx+c

enter a:
1
enter b:
2
enter c:
3
there are no real roots

do you want to find another set of roots? y/n?
y

enter a:
-1
enter b:
2
enter c:
3
roots are-
r1= -1.0
r2= 3.0

do you want to find another set of roots? y/n?

```

## LAB-2

Develop a Java program to create a class Student with members usn, name, an array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.

### OBSERVATION-

06-10-2020

OOJ WEEK-4  
PROGRAMS  
LAB-2

- 1) Develop a java program to create a class Student with members usn, name, an array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.

Algorithm :-

- Step 1:- Start
- Step 2:- Input student details i.e, usn, name, credits and marks (of each of 5 subjects in 2 different arrays)
- Step 3:- Display the student details
- Step 4:-  
if 5 marks > 90, g = 10  
else if 5 marks >= 80 & 5 marks < 90, g = 9  
else if 5 marks >= 70 & 5 marks < 80, g = 8  
else if 5 marks >= 60 & 5 marks < 70, g = 7  
else if 5 marks >= 50 & 5 marks < 60, g = 6  
else if 5 marks >= 40 & 5 marks < 50, g = 5  
else if 5 marks < 40, g = 0
- Step 5:- Get value of g and calculate sum of (g \* credits) (sum)  
Get to sum of credits (sum2)
- Step 6:- Calculate sgpa = sum / sum2
- Step 7:- Print sgpa of student

```
import java.util.*;
```

```
class Student {
```

```
    private String usn;
```

```
    private String name;
```

```
    private int aed[];
```

```
    private int marks[];
```

```
    private int n;
```

```
    void accept()
```

```
{
```

```
    Scanner s = new Scanner(System.in);
```

```
    System.out.println("Enter student details");
```

```
    System.out.println("USN of the student:");
```

```
    usn = s.next();
```

```
    System.out.println("Name of student:");
```

```
    name = s.next();
```

```
    System.out.println("Enter the number of subjects:");
```

```
    n = s.nextInt();
```

```
    aed = new int[n];
```

```
    marks = new int[n];
```

```
    System.out.println("Enter aed and marks attained by the  
student for each subject (out of 100)");
```

```
    for (int i = 0; i < n; i++)
```

```
{
```

```
        aed[i] = s.nextInt();
```

```
        marks[i] = s.nextInt();
```

```
}
```

```
}
```

```
void display()
```

```
{
```

```
    System.out.println("Student details: ");
```

```
    System.out.println("USN: " + usn);
```

```
    System.out.println("Name: " + name);
```

```
    System.out.println("Marks on each subject: ");
```

```
    for (int i = 0; i < n; i++)
```

```
{
```

```
        System.out.println("Subject " + (i+1) + ": " + marks[i]);
```

```
}
```

```
double calculate()
```

```
{
```

```
    int top = 0, tc = 0;
```

```
    for (int i = 0; i < n; i++)
```

```
{
```

```
        tc = tc + cred[i];
```

```
        if (marks[i] >= 50)
```

```
{
```

```
            top = top + ((marks[i] / 10 + 1) * cred[i]);
```

```
}
```

```
        else if (marks[i] >= 40 && marks[i] < 50)
```

```
{
```

```
            top = top + (4 * cred[i]);
```

```
}
```

```
}
```

```
    return (double) top / tc;
```

```
}
```

```

}
class Main
{
    public static void main(String ss[]) {
        Student s1 = new Student ();
        s1.accept ();
        s1.display ();
        System.out.println("SGPA: " + s1.calculate ());
    }
}

```

## OUTPUT-

```

Enter student details
USN of the student:
1BM19CS079
Name of student:
RIYA
Enter the number of subjects:
5
Enter credits and marks attained by the student in each subject(out of 100)
5
92
4
84
4
89
4
78
3
65
Student details:
USN:1BM19CS079
Name:RIYA
Marks in each subject:
Subject 1:92
Subject 2:84
Subject 3:89
Subject 4:78
Subject 5:65
SGPA: 8.75

```

## LAB-3

Create a class Book which contains four members: name, author, price, num\_pages. Include a constructor to set the values for the members. Include methods to set and get the details of the objects. Include a toString() method that could display the complete details of the book. Develop a Java program to create n book objects

## OBSERVATION-

13-10-2020

DOT WEEK - 5  
LAB PROGRAMS

### LAB-3

Create a class Book which contains four members: name, author, price, num\_pages. Include a constructor to set the values for the members. Include methods to set and get the details of the objects. Include a toString() method that could display the complete details of the book. Develop a Java program to create n book objects.

CODE:

```
import java.util.Scanner;  
class Book  
{  
    String name;  
    String author;  
    int price;  
    int num_pages;  
    void accept()  
{  
        Scanner xx = new Scanner(System.in);  
        System.out.println("ENTER DETAILS:");  
        System.out.println("Enter book name:");  
        name = xx.next();  
        System.out.println("Enter author:");  
        author = xx.next();  
        System.out.println("Enter price:");  
        price = xx.nextInt();  
        System.out.println("Enter number of pages:");  
        num_pages = xx.nextInt();  
    }  
}
```



```

public String toString()
{
    return ("book name = " + name + " \n book author = " + author
           + " \n book price = " + price + " \n number of pages = " + num_
           pages);
}

}

class Main
{
    public static void main (String ss[])
    {
        Scanner xx = new Scanner (System.in);
        System.out.println (" enter number of objects : ");
        int n = xx.nextInt();
        Book b[] = new Book [n];
        for (int i = 0; i < n; i++)
        {
            b[i] = new Book ();
            b[i].accept ();
        }
        System.out.println (" Book details: ");
        for (int i = 0; i < n; i++)
        {
            System.out.println (" Book " + (i+1));
            System.out.println (b[i].toString());
        }
    }
}

```

**OUTPUT-**

```
ENTER DETAILS-
enter book name:
abc
enter author:
cde
enter price:
200
enter number of pages:
400
ENTER DETAILS-
enter book name:
jkl
enter author:
asd
enter price:
350
enter number of pages:
500
Book details:
BOOK 1
book name= abc
  book author= cde
  book price= 200
number of pages= 400
BOOK 2
book name= jkl
  book author= asd
  book price= 350
number of pages= 500
...Disconnected from gdb...
```

## LAB-4

Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea( ). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea( ) that prints the area of the given shape.

## OBSERVATION-

3/11/2020

## WEEK 8 - OOT PROGRAMS

1)

```
import java.util.*;  
abstract class Shape
```

```
{
```

```
    int a, b;
```

```
    abstract void printArea();
```

```
}
```

```
class Rectangle extends Shape
```

```
{
```

```
    void printArea()
```

```
{
```

```
        Scanner s3 = new Scanner (System.in);
```

```
        System.out.println ("Enter length and breadth of the  
                             rectangle");
```

```
        a = s3.nextInt();
```

```
        b = s3.nextInt();
```

```
        double area;
```

```
        area = (double) a * b;
```

```
        System.out.println ("The area of Rectangle is " + area);
```

```
}
```

```
}
```

```
class Triangle extends Shape
```

```
{
```

```
    void printArea()
```

```
{
```

```
        Scanner s2 = new Scanner (System.in);
```

```
        System.out.println ("Enter base length and height of the  
                             triangle");
```

```
        a = s2.nextInt();
```

```
        b = s2.nextInt();
```

```

double area;
area = (double) 0.5 * a * b;
System.out.println("The area of Triangle is " + area);
}
}

```

```

class Circle extends Shape
{

```

```

    void printArea()
    {
        Scanner ss = new Scanner(System.in);
        System.out.println("Enter radius of the circle");
        a = ss.nextInt();
        double area;
        area = (double) 3.14 * a * a;
        System.out.println("The area of Circle is " + area);
    }
}

```

```

class ShapeMain
{

```

```

    public static void main(String args[])
    {
        int ch;
        Scanner ss = new Scanner(System.in);
        Rectangle r = new Rectangle();
        Triangle t = new Triangle();
        Circle c = new Circle();
        while (true) {
            System.out.println("Enter the choice of shape whose area has to be calculated");
            System.out.println("1. Rectangle\n2. Triangle\n3. Circle\n4. Exit");

```

```

ch = ss.nextInt();
switch(ch)
{
case 1:
    r.printArea();
    break;
case 2:
    t.printArea();
    break;
case 3:
    c.printArea();
    break;
case 4:
    System.exit(0);
    break;
default:
    System.out.println("Invalid choice");
}
}
}
}
}

```

**OUTPUT-**

```

Enter the choice of shape whose area has to be calculated
1.Rectangle
2.Triangle
3.Circle
4.Exit
1
Enter length and breadth of the rectangle
4 5
The area of Rectangle is 20.0
Enter the choice of shape whose area has to be calculated
1.Rectangle
2.Triangle
3.Circle
4.Exit
2
Enter base length and height of the triangle
7 9
The area of Triangle is 31.5
Enter the choice of shape whose area has to be calculated
1.Rectangle
2.Triangle
3.Circle
4.Exit
3
Enter radius of the circle
8
The area of Circle is 200.96
Enter the choice of shape whose area has to be calculated
1.Rectangle
2.Triangle
3.Circle
4.Exit
4

```

## LAB-5

Develop a Java program to create a class Bank that maintains two kinds of account for its customers, one called savings account and the other current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed. Create a class Account that stores customer name, account number and type of account. From this derive the classes Curr-acct and Sav-acct to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks:

- Accept deposit from customer and update the balance.
- Display the balance.
- Compute and deposit interest
- Permit withdrawal and update the balance
- Check for the minimum balance, impose penalty if necessary and update the balance

## OBSERVATION-

```
1] Import java.util.Scanner;
   abstract class Account {
       String cName, accType;
       long accNo;
       double bal;
       final double minBal = 1000.0;
       Account (String cName, long accNo, double bal, String accType) {
           this.accNo = accNo;
           this.cName = cName;
           this.bal = bal;
           this.accType = accType;
       }
       abstract void addBal (double amt);
       abstract void dispBal();
       abstract void with Bal (double amt);
   }

   3
   class Curr-acc extends Account {
       Curr-acc (String cName, long accNo, double Bal) {
           super (cName, accNo, bal, "Current");
           System.out.println ("Name: " + cName + " \n accNo: " + accNo
                               + " \n bal: " + bal + " \n type: "
                               + accType);
       }

       3
       void addBal (double amt) {
           this.bal += amt;

       }

       3
       void dispBal() {
           System.out.println (" your balance is: " + this.bal);
       }
   }
```

```
void checkBal () {
```

```
    if (this.bal < minBal) {
```

```
        System.out.println ("Insufficient balance, penalty  
imposed");
```

```
        this.bal = this.bal * 0.02;
```

```
    }
```

```
}
```

```
void withBal (double amt) {
```

```
    this.bal = -amt;
```

```
    checkBal();
```

```
}
```

```
}
```

```
class Sav - acct extends Accounts {
```

```
    Sav - acct (String cName, long accNo, double bal) {
```

```
        Super (cName, accNo, bal, "Savings");
```

```
        System.out.println ("name: " + cName + " | accno: "  
+ " | bal: " + bal + " | type: " + accType);
```

```
}
```

```
void addBal (double amt) {
```

```
    this.bal += amt;
```

```
    addIntr();
```

```
}
```

```
void addIntr () {
```

```
    this.bal += this.bal * 0.07;
```

```
}
```

```
void dispBal () {
```

```
    System.out.println ("Your balance is: " + this.balance);
```

```
}
```



```
void withBal (double amt) {
```

```
    this.bal = amt;
```

```
}
```

```
}
```

```
class Bank {
```

```
    public static void main (String [] args) {
```

```
        Scanner sc = new Scanner (System.in);
```

```
        double amt;
```

```
        System.out.println ("Enter your details");
```

```
        System.out.println ("Name");
```

```
        String x = sc.next();
```

```
        System.out.println ("Account Number:");
```

```
        long y = sc.nextLong();
```

```
        for (;;) {
```

```
        {
```

```
            System.out.println ("Type of account: 1. Current account  
                2. Savings account 3. Exit");
```

```
            int t = sc.nextInt();
```

```
            if (t == 1) {
```

```
                System.out.println ("The current account provides  
                    cheque book facility but no interest.");
```

```
                curr_act = new curr_act (x, y, 50000);
```

```
                for (;;) {
```

```
                    System.out.println ("1: Deposit 2: Display Balance 3:  
                        Withdraw 4: Exit");
```

```
                    int ch = sc.nextInt();
```

```
                    switch (ch) {
```

case 1:

```
System.out.println("Enter the amount to be added:");  
amt = sc.nextDouble();  
c.addBal(amt);  
break;
```

case 2:

```
c.display();  
break;
```

case 3:

```
System.out.println("Enter the amount to be withdrawn:");  
amt = sc.nextDouble();  
c.withBal(amt);  
break;
```

case 4: System.exit(0);

default: System.out.println("Invalid choice! Try again!");

}

}

}

else if (t == 2) {

System.out.println("The Savings account provides compound interest and withdrawal facilities but no cheque book facility.");

Sav-act s = new Sav-act(x, y, 5000);

for(;;) {

System.out.println("1. Deposit\n2. Display Balance\n3. Withdraw\n4. Exit");

```
int ch = sc.nextInt();
```

Switch (ch) {

case 1:

system.out.println ("Enter the amount to be added : ");

```
amt = sc.nextDouble();
```

```
    s.addBot (amt);
```

```
break;
```

case 2;

~~$$f_{\text{display}}$$~~

```
g.disposeBall();
```

break;

case 3:

System.out.println("Enter the amount to be withdrawn:");

$$\text{amt} = \text{bc.nextDouble}();$$

S. with Bal (amt);

beat;

case 4: `system, exit(0);`

default: System.out.println("Invalid choice! Try again");

 $y^3$ 

y

else if (t == 3)

```
System.out.println(0);
```

else

System.out.println ("Invalid choice! Try again");

y

g

3

## OUTPUT-

```
Enter your details:
Name:
abc
Account Number:
123
Type of account:
1.Current account
2.Savings account
3.Exit
1
The current account provides cheque book facility but no interest.
Name: abc      accno: 123      bal: 50000.0      type: Current
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
1
Enter the amount to be added:
1000
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
2
Your balance is: 51000.0
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
3
Enter the amount to be withdrawn:
50500
Insufficient balance, penalty imposed
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
2
Your balance is: 490.0
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
4
```

```
c:\users\win10\documents\java\100 programs\java bank
Enter your details:
Name:
fgh
Account Number:
789
Type of account:
1.Current account
2.Savings account
3.Exit
2
The savings account provides compound interest and withdrawal facilities but no cheque book facility.
name: fgh      accno: 789      bal: 5000.0      type: Savings
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
1
Enter the amount to be added:
1000
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
2
Your balance is: 6420.0
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
3
Enter the amount to be withdrawn:
100
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
2
Your balance is: 6320.0
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
4
```