

LAB PROGRAM: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 discriminant $b^2 - 4ac$ is negative, display a message stating that are no real solutions.

→ import java.util.Scanner
class Quadratic {

```
public static void main (String [] args)
Scanner s = new Scanner (System.in);
System.out.println ("Enter the value of a\n");
double root1, root2;
double a = s.nextDouble ();
System.out.println ("Enter the value of b\n");
double b = s.nextDouble ();
System.out.println ("Enter the value of c\n");
double c = s.nextDouble ();
double dis = (b * b) - (4 * a * c);
if (dis > 0)
{
    root1 = (-b + Math.sqrt (dis)) / (2 * a));
    root2 = (-b - Math.sqrt (dis)) / (2 * a));
    System.out.println ("Two distinct real roots exists : ");
    System.out.println ("root1 = " + root1 + " root2 = " + root2);
}
else if (dis == 0)
{
    root1 = root2 = (-b) / (2 * a));
    System.out.println ("In two equal & real roots exists : ");
    System.out.println ("root1 = " + root1 + " root2 = " + root2);
}
```

}

else {

 System.out.println ("No real solution exists");

} else if (d < 0) { // two distinct real solutions

 System.out.println ("Two distinct real solutions");

 double p = (-b - sqrt)/2*a;

ALGORITHM

QUESTION 32. Write an algorithm to find the roots of quadratic equation.

Steps

(1). Input the value of a, b, c

(2). calculate $d = b^2 - 4ac$ according to the formula

(3). If ($d < 0$) then no real solution else 3 cases

Display that there are no real solutions

else if ($d = 0$)

Display that roots are equal

Calculate $\sigma_1 = \sigma_2 = -b/2a$

else

Display roots are real & calculate

$\sigma_1 = -b + d/2a$ and $\sigma_2 = -b - d/2a$

(4). Print σ_1 & σ_2

(5). End program algorithm.

$$\begin{aligned} d &= b^2 - 4ac \\ &= (ba)^2 - 4ac \\ &= (ba)^2 - 4ac \\ &= ((a+b)^2 - 4ab) - 4ac \\ &= ((a+b)^2 - 4ab - 4ac) \end{aligned}$$

```
PS C:\Users\dashr\OneDrive\Desktop\Roshni 00J Lab> javac Quadratic.java  
PS C:\Users\dashr\OneDrive\Desktop\Roshni 00J Lab> java Quadratic  
enter the value of a
```

2

```
enter the value of b
```

4

```
enter the value of c
```

```
-6  
two distinct real roots exists: root1 =-2.0 root2 =-6.0
```

```
PS C:\Users\dashr\OneDrive\Desktop\Roshni 00J Lab> ■
```

Quadratic - Notepad

```
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import java.util.Scanner;
class Quadratic{
    public static void main(String[] args){
        Scanner s = new Scanner (System.in);
        System.out.println("enter the value of a\n");
        double root1, root2;
        double a = s.nextDouble();
        System.out.println("enter the value of b\n");
        double b = s.nextDouble();
        System.out.println("enter the value of c\n");
        double c = s.nextDouble();
        double dis = (b*b)-(4*a*c);
        if (dis>0)
            { root1 = (-b + Math.sqrt(dis)/(2*a));
              root2 = (-b - Math.sqrt(dis)/(2*a));
              System.out.println("two distinct real roots exists: root1 ="+ root1 +" root2 =" +root2);
            }
        else if (dis==0)
            { root1 = root2 =(-b/(2*a));
              System.out.println("\n two real and equal roots exists: root1 ="+ root1 +" root2 =" +root2);
            }
        else{ System.out.println("\n no real solution exists");
            }
    }
}
```

I

LAB PROGRAM : 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 of a method to calculate SGPA of a student.

→ import java.util.Scanner;

class Student

{

private String USN;

private String name;

private int n;

private double SGPA = 0;

private int total credits = 0;

private int credits[];

private double marks[];

Scanner ss = new Scanner(System.in);

void details()

{

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

USN = ss.nextLine();

System.out.println("Enter Name of the student");

name = ss.nextLine();

System.out.println("Enter no. of objects");

n = ss.nextInt();

credits = new int[n];

marks = new double[n];

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

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

{

System.out.println("Enter credits allotted to the subject "+(i+1))

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```

credits[i] = ss.nextInt();
System.out.println("Enter marks in the subject "+(i+1));
marks[i] = ss.nextInt();
calculate(credits[i], marks[i], i);
}
}

void calculate(int credit, double mark, int j)
{
    totalCredits = totalCredits + credit;
    if (mark >= 90 && mark <= 100)
        SGPA = SGPA + (10 * credit);
    else if (mark >= 80 && mark <= 89)
        SGPA = SGPA + (9 * credit);
    else if (mark >= 70 && mark <= 79)
        SGPA = SGPA + (8 * credit);
    else if (mark >= 60 && mark <= 59)
        SGPA = SGPA + (7 * credit);
    else if (mark >= 50 && mark <= 49)
        SGPA = SGPA + (6 * credit);
    else if (mark >= 40 && mark <= 39)
        SGPA = SGPA + (5 * credit);
    else
        System.out.println("Failed in subject "+(j+1));
}
}

void display()
{
    System.out.println("Details of the student");
    System.out.println("USN: "+USN);
    System.out.println("Name: "+name);
    System.out.println("SGPA of student "+(SGPA/totalCredits));
}
}

```

```
class Main1
{
    public static void main(String args[])
    {
        Student s1 = new Student();
        s1.Details();
        s1.Display();
    }
}
```

```
PS C:\Users\dashr\OneDrive\Desktop\Roshni OOD Lab> javac Main1.java
PS C:\Users\dashr\OneDrive\Desktop\Roshni OOD Lab> java Main1
Enter USN of the student
1bm19cs133
Enter Name of the student
roshni
Enter no of subjects
3
*Enter details of the subjects:*
Enter credits allotted to the subject 1
3
Enter marks in the subject 1
89
Enter credits allotted to the subject 2
3
Enter marks in the subject 2
80
Enter credits allotted to the subject 3
5
Enter marks in the subject 3
90
Details of the Student
USN: 1bm19cs133
Name :roshni
SGPA of Student 9.454545454545455
PS C:\Users\dashr\OneDrive\Desktop\Roshni OOD Lab>
```



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

```
    private String USN;
    private String name;
    private int n;
    private double SGPA = 0;
    private int totalCredits = 0;
    private int credits[];
    private double marks[];
```

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

```
    void Details()
```

```
{  
    System.out.println("Enter USN of the student");  
    USN = ss.nextLine();  
    System.out.println("Enter Name of the student");  
    name = ss.nextLine();  
    System.out.println("Enter no of subjects");  
    n = ss.nextInt();  
    credits = new int[n];  
    marks = new double[n];  
    System.out.println("*Enter details of the subjects: *");  
    for(int i=0;i<n;i++)  
    {  
        System.out.println("Enter credits allotted to the subject "+(i+1));  
        credits[i] = ss.nextInt();  
        System.out.println("Enter marks in the subject "+(i+1));  
        marks[i] = ss.nextInt();  
        Calculate(credits[i],marks[i],i);  
    }  
}
```

```
    void calculate(int credit,double mark,int j)  
    {  
        totalCredits = totalCredits + credit;  
        if(mark>=90&&mark<=100)
```

```
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void Calculate(int credit,double mark,int j)
{
    totalCredits = totalCredits + credit;
    if(mark>=90&&mark<=100)
        SGPA = SGPA + (10*credit);
    else if(mark>=80 && mark<=89)
        SGPA = SGPA + (9*credit);
    else if(mark>=70&&mark<=79)
        SGPA = SGPA + (8*credit);
    else if(mark>=60&&mark<=69)
        SGPA = SGPA + (7*credit);
    else if(mark>=50 && mark<=59)
        SGPA = SGPA + (6*credit);
    else if(mark>=40&&mark<=49)
        SGPA = SGPA + (5*credit);
    else
        System.out.println("Failed in Subject "+(j+1));
}

void Display()
{
    System.out.println("Details of the Student");
    System.out.println("USN: "+USN);
    System.out.println("Name :"+name);
    System.out.println("SGPA of Student "+(SGPA/totalCredits));
}

class Main1
{
    public static void main(String args[])
    {
        Student s1 = new Student();
        s1.Details();
        s1.Display();
    }
}
```