Lab Program 1:

Develop a Java program that prints all real solutions to the quadratic equation ax2+bx+c = 0. Read in a, b, c and use the quadratic formula. If the discriminate b2
-4ac is negative, display a message stating that there are no
real solutions.

Code:

```
import java.util.Scanner;
import java.lang.Math;
class qe
{
  public static void main(String xx[])
 {
  Scanner s=new Scanner (System.in);
  double a,b,c,d,r1,r2;
  System.out.println("Enter values of a,b and c");
  a=s.nextDouble();
  b=s.nextDouble();
  c=s.nextDouble();
  if(a==0)
  { System.out.println("a shouldn't be 0");}
  else
  {
  d=(b*b)-(4*a*c);
  if(d>0)
  {
    System.out.println("Roots are real and distinct");
    r1= (-b+Math.sqrt(d))/(2*a);
    r2= (-b-Math.sqrt(d))/(2*a);
```

```
    System.out.print("R1:"+r1+" R2:"+r2);
   }
  else if(d==0)
   {
    System.out.println("Roots are real and equal");
    r1=(-b)/(2*a);
    System.out.println("Roots are "+r1);
    }
  else
     { System.out.println("Roots are imaginary");
       r1=(-b)/(2*a);
       r2=Math.sqrt(Math.abs(d))/(2*a);
       System.out.println("R1:"+r1+"+i"+r2+" R2:"+r1+"-i"+r2);
        }
  }
}
}
```

Lab1_java - Notepad

File Edit View

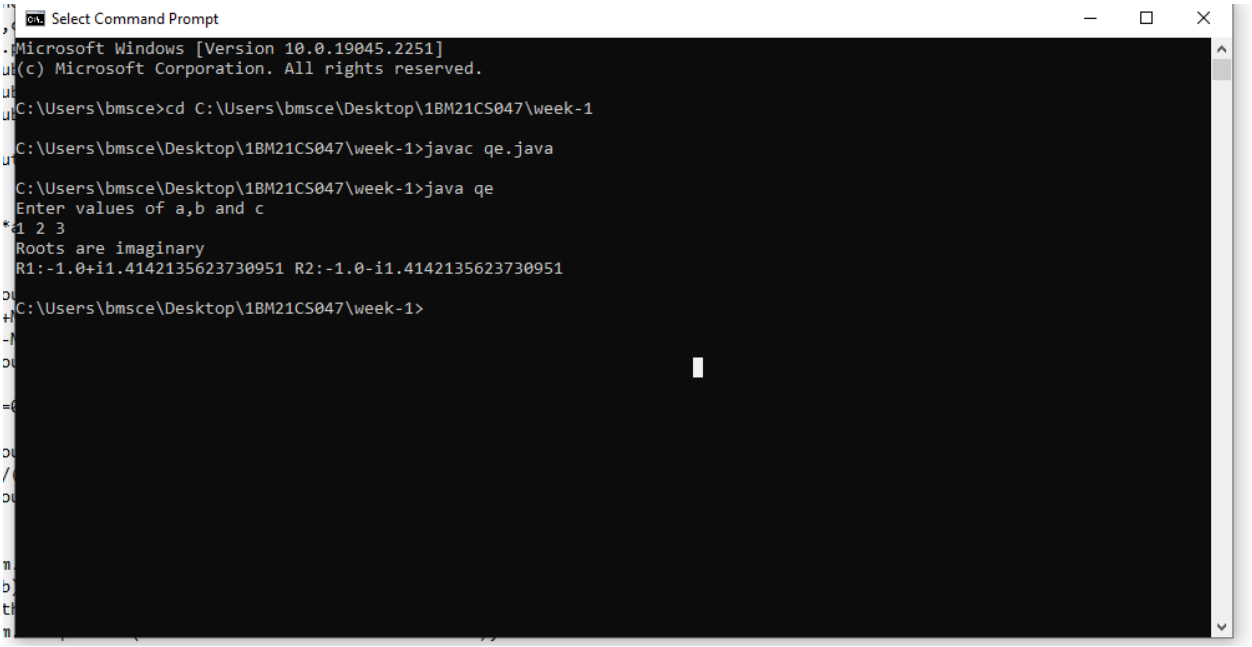
```
import java.util.Scanner;
import java.lang.Math;
class qe
{
  public static void main(String xx[])
 {
  Scanner s=new Scanner (System.in);
  double a,b,c,d,r1,r2;
  System.out.println("Enter values of a,b and c");
  a=s.nextDouble();
  b=s.nextDouble();
  c=s.nextDouble();
  if(a==0)
  { System.out.println("a shouldn't be 0");}
  else
  {
  d=(b*b)-(4*a*c);
  if(d>0)
  {
     System.out.println("Roots are real and distinct");
     r1= (-b+Math.sqrt(d))/(2*a);
     r2= (-b-Math.sqrt(d))/(2*a);
     System.out.print("R1:"+r1+" R2:"+r2);
    }
  else if(d==0)
    {
     System.out.println("Roots are real and equal");
     r1=(-b)/(2*a);
     System.out.println("Roots are "+r1);
     }
  else
      { System.out.println("Roots are imaginary");
       r1=(-b)/(2*a);
       r2=Math.sqrt(Math.abs(d))/(2*a);
       System.out.println("R1:"+r1+"+i"+r2+" R2:"+r1+"-i"+r2);
        }
  }
}
}
```

Ln 1, Col 1 100% Windows (CRLF) UTF-8

Outputs:

Command Prompt

```
Microsoft Windows [Version 10.0.19045.2251]
(c) Microsoft Corporation. All rights reserved.

C:\Users\bmsce>cd C:\Users\bmsce\Desktop\1BM21CS047\week-1

C:\Users\bmsce\Desktop\1BM21CS047\week-1>javac qe.java

C:\Users\bmsce\Desktop\1BM21CS047\week-1>java qe
Enter values of a,b and c
0 20 30
a shouldn't be 0

C:\Users\bmsce\Desktop\1BM21CS047\week-1>java qe
Enter values of a,b and c
1 2 1
Roots are real and equal
Roots are -1.0

C:\Users\bmsce\Desktop\1BM21CS047\week-1>java qe
Enter values of a,b and c
1 2 3
Roots are imaginary

C:\Users\bmsce\Desktop\1BM21CS047\week-1>java qe
Enter values of a,b and c
1 5 3
Roots are real and distinct
R1:-0.6972243622680054 R2:-4.302775637731995
C:\Users\bmsce\Desktop\1BM21CS047\week-1>
```



1. Program to find the roots of quadratic equation

```
import java.util.Scanner;
import java.lang.Math;
Class qe
  {
   public static void main (String xx[])
   {
     Scanner s= new Scanner (System.in);
     double a,b,c,d,r1,r2;
     System.out.println("Enter values of a,b and c");
     a = s.nextDouble();
     b = s.nextDouble();
     c = s.nextDouble();
     if (a==0)
     { System.out.println(" a shouldn't be 0");}
     else
     {
       d=(b*b)-(4*a*c);
       if (d>0)
       {
         System.out.println("Root are real and distinct");
         r1 = (-b+Math.sqrt(d)) / (2*a);
         r2 = (-b-Math.sqrt(d)) / (2*a);
         System.out.println("R1: "+r1+" R2:"+r2);
       }
      else if (d==0)
      {
        System.out.println("Roots are real and equal");
        r1 = (-b)/(2*a);
        System.out.println("Roots are "+r1);
      }
     else
      System.out.println("Roots are imaginary");
        r1 = (-b)/(2*a);
        r2 = Math.sqrt(Math.abs(d))/(2*a);
   }
}
```

Output :

```
Enter values of a, b and c.
0 20 30
a Shouldn't be 0.

Enter values of a, b and c.
1 2 1
Roots are real and equal.
Roots are -1.0

Enter values of a, b and c.
1 2 3
Roots are imaginary.
R1: -1.0+i1.4142135623730951 R2:-1.0-i1.4142135623730951
Enter values of a, b and c
1 5 3
Roots are real and distinct
R1: -0.6972243622680054 R2: -4.302775637731995
```

18/11/22