Lab Program 1:

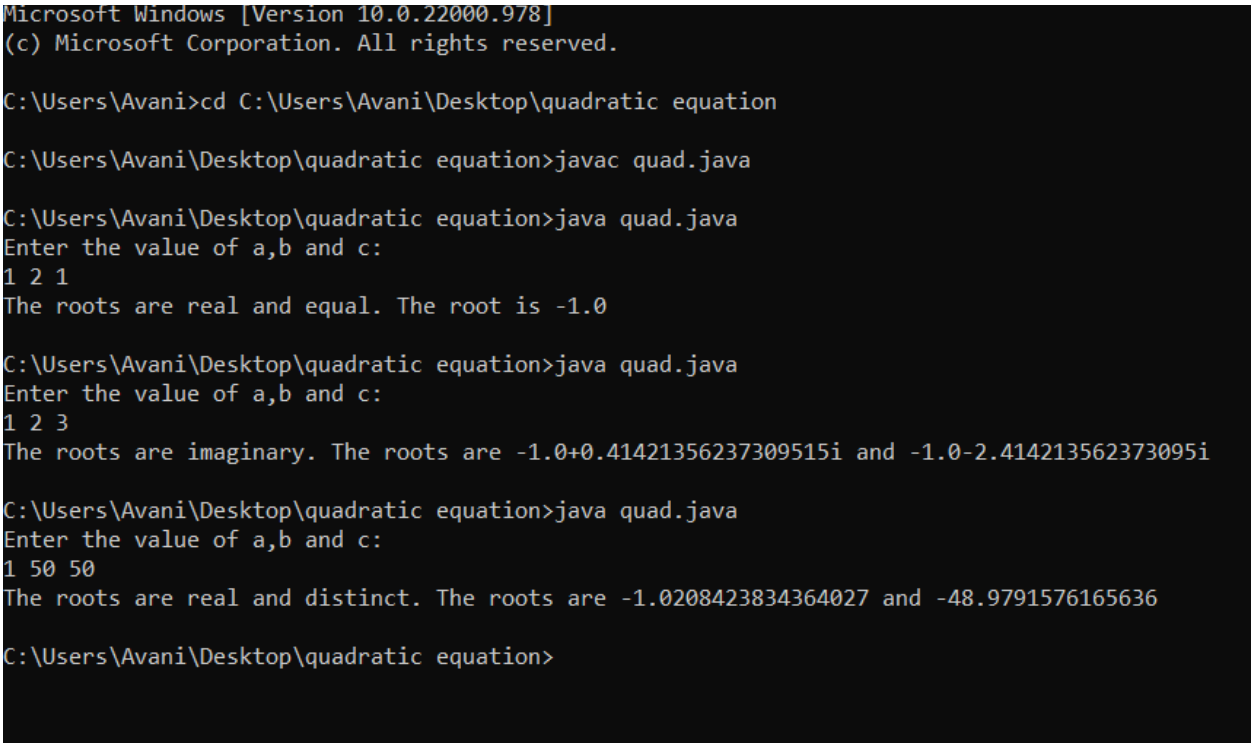
Develop a Java program that prints all real solutions to the quadratic equation ax2+bx+c = 0. Read in a, b, c and use the quadratic formula. If the discriminate b2-4ac is negative, display a message stating that there are no real solutions.

CODE

```
import java.util.Scanner;

class quadeqn
{
 public static void main(String args[])
 {
  double a,b,c;
  double d,r,r1,r2;
  Scanner ss=new Scanner(System.in);
  System.out.println("Enter the value of a,b and c:");
  a=ss.nextDouble();
  b=ss.nextDouble();
  c=ss.nextDouble();
  if(a==0)
  {
   System.out.println("It is not a quadratic equation.");
  }
   else
  {
   d=b*b-(4*a*c);
   if(d==0)
{
r=(-b)/(2*a);
System.out.println("The roots are real and equal. The root is "+r);
}
   else if(d>0)
{
r1=(-b+Math.pow(d,0.5))/(2*a);
r2=(-b-Math.pow(d,0.5))/(2*a);
System.out.println("The roots are real and distinct. The roots are "+r1+" and "+r2);
}
   else
{
      r=((-b)/(2*a));
r1=(-b+Math.pow((Math.abs(d)),0.5))/(2*a);
r2=(-b-Math.pow((Math.abs(d)),0.5))/(2*a);
System.out.println("The roots are imaginary. The roots are "+r+"+"+r1+"i and "+r+r2+"i");
}
  }
 }
}
```

OUTPUT


Microsoft Windows [Version 10.0.22000.978]
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C:\Users\Avani>cd C:\Users\Avani\Desktop\quadratic equation
C:\Users\Avani\Desktop\quadratic equation>javac quad.java
C:\Users\Avani\Desktop\quadratic equation>java quad.java
Enter the value of a,b and c:
1 2 1
The roots are real and equal. The root is -1.0
C:\Users\Avani\Desktop\quadratic equation>java quad.java
Enter the value of a,b and c:
1 2 3
The roots are imaginary. The roots are -1.0+0.414213562373095i and -1.0-2.4142135623730951
C:\Users\Avani\Desktop\quadratic equation>java quad.java
Enter the value of a,b and c:
1 50 50
The roots are real and distinct. The roots are -1.0208423834364027 and -48.9791576165636
C:\Users\Avani\Desktop\quadratic equation>