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 discriminate $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.

```
import java.util.Scanner;
class Quadratic
{
  int a, b, c;
  double r1, r2, d;
   void getd()
  {
    Scanner s = new Scanner(System.in);
    System.out.println("Enter the coefficients of
                                    a, b, c");
     a = s.nextInt();
     b = s.nextInt();
     c = s.nextInt();
  }
void compute()
   {
      while(a==0)
```

```
{
    System.out.println ("Not a quadratic equation");
    System.out.println ("Enter a non zero value for
                         a:");
    Scanner s = new Scanner (System.in);
    a = s.nextInt ();
}
    d = b*b - 4*a*c;
    if (d == 0)
{
    r1 = (-b) / 2*a);
    System.out.println ("Roots are real and equal");
    System.out.println ("Root1 = Root2 = " + r1);
}
    else if (d > 0)
{
    r1 = ((-b) + (Math.sqrt(d))) / (double) (2*a);
    r2 = ((-b) - (Math.sqrt(d))) / (double) (2*a);
    System.out.println ("Roots are real and
                         distinct");
    System.out.println ("Root 1 = " + r1 + " Root 2 = " + r2);
}
    else if (d < 0)
{
    System.out.println ("Roots are imaginary");
    r1 = (-b) / (2*a);
    r2 = Math.sqrt(-d) / (2*a);
    System.out.println ("Root 1 = " + r1 + " + i " + r2);
    System.out.println ("Root 1 = " + r1 + " - i " + r2);
}
}
}
```

```
class QuadraticMain
{
  public static void main (String args[]
  {
    Quadratic q = new Quadratic();
    q.getInd();
    q.compute();
  }
}
```

Output :-

Enter coefficients of a, b, c

4 5 6

Roots are imaginary

Root 1 = 0.0 + i1.0583268704497216470449

Root 2 = 0.0 - i1.0583268721647044 9

Enter coefficients of a, b, c

1 -2 1

Roots are real and equal

Root 1 = Root 2 = 1.0

Enter coefficients of a, b, c

1 -3 2

Roots are ~~are~~ real and distinct

Root 1 = 2.0 Root 2 = 1.0