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.**

```
import java.io.*;
import java.util.*;
import java.lang.*;
public class quadratic
{
 private static double a;
 private static double b;
 private static double c;
 public static void read()
 {
 Scanner sc=new Scanner(System.in);
 System.out.println("Enter the Co-Effcient a");
 a=sc.nextDouble();
 System.out.println("Enter the Co-Effcient b");
 b=sc.nextDouble();
 System.out.println("Enter the Co-Effcient c");
 c=sc.nextDouble();
 System.out.println("THANK YOU FOR ENTERRING THE CO-EFFCIENTS");
 }
 public static void calc()
 {
 read();
 double d=b*b-4*a*c;
 if(d>0)
 {
 System.out.println("ROOTS ARE REAL AND DISTINCT");
 System.out.println("FIRST ROOT IS " + (-b+Math.sqrt(d))/(2*a));
 System.out.println("FIRST ROOT IS " + (-b-Math.sqrt(d))/(2*a));
 }
 else if(d==0)
 {
 System.out.println("Roots are equal");
 System.out.println("ROOTS ARE " + (-b)/(2*a));
 }
 else
 {
 System.out.println("ROOTS ARE IMAGINARY");
 System.out.println("ROOTS ARE " + -b/(2*a) + "+" +"i" + (Math.sqrt(-d))/(2*a));
 System.out.println("ROOTS ARE " + -b/(2*a) + "-" +"i" + (Math.sqrt(-d))/(2*a));
```

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

output:

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.

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

output: