Java Week 1:

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Question: 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.

Code:

```
import java.util.Scanner;
public class QuadraticEquations{
   public static void main(String[] arg) {
      Scanner scanner = new Scanner(System.in);
      System.out.print("Enter a: ");
      double a = scanner.nextDouble();
      System.out.print("Enter b: ");
      double b = scanner.nextDouble();
      System.out.print("Enter c: ");
      double c = scanner.nextDouble();
      double d = b * b - 4 * a * c;
      if (d > 0) {
         double root1 = (-b + Math.sqrt(d)) / (2 * a);
         double root2 = (-b - Math.sqrt(d)) / (2 * a);
         System.out.println("Real Roots");
         System.out.println("Root 1: " + root1);
         System.out.println("Root 2: " + root2);
      }
         else if (d == 0) {
```

```
            double root = -b / (2 * a);
            System.out.println("Roots are real and equal");
            System.out.println("Root: " + root);
        }
            else {
            System.out.println("Roots are complex");
        }
        scanner.close();
    }
}
```

Output:

```
D:\1bm23cs006>javac QuadraticEquations.java

D:\1bm23cs006>java QuadraticEquations
Enter a: 12
Enter b: 10
Enter c: 9
aaryan
Roots are complex

D:\1bm23cs006>java QuadraticEquations
Enter a: 2
Enter b: 4
Enter c: 2
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Roots are real and equal
Root: -1.0

D:\1bm23cs006>java QuadraticEquations
Enter a: 2
Enter b: 8
Enter c: 2
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Real Roots
Root 1: -0.2679491924311228
Root 2: -3.732050807568877

D:\1bm23cs006>
```