Assignment: Algorithm Design for Analyzing a Quadratic Equation

Objective:

The goal of this assignment is to practice algorithmic thinking, problem-solving, and the use of **Decision (If/Else)** structures. You will design an algorithm that analyzes a standard quadratic equation and determines the nature of its real roots.

Your Task:

You must deliver your algorithm in two formats:

1. A complete **Flowchart** (designed in Flowgorithm).

2. A step-by-step **Textual Algorithm** (pseudocode).

Your algorithm must clearly show:

- **Start:** The beginning of the process.
- **Input:** The specific information you must get from the user (the coefficients a, b, and c).
- **Process:** The logical steps and calculations needed to analyze the equation.
- **Output:** The final result you will display to the user (the number of real roots).
- **End:** The end of the process.

The Problem:

Design a single algorithm that solves the following problem: **"Creation of the algorithm that shows how many roots a quadratic equation has"**

Required Inputs:

- Coefficient **a** (a Real number)
- Coefficient **b** (a Real number)
- Coefficient **c** (a Real number)

Mathematical Background (Hint):

To solve this, you must use the **discriminant (delta)**. The formula for the discriminant is:
`delta = b*b - 4*a*c`

The value of the discriminant tells you how many real roots the equation has:

1. If **delta > 0**, the equation has **two distinct (different) real roots**.
2. If **delta = 0**, the equation has **one real root** (or two equal real roots).
3. If **delta < 0**, the equation has **no real roots**.

Your algorithm must use **Decision (If/Else)** structures (likely nested) to check these three conditions.

Example (How to think about the algorithm):

Algorithm: Analyzing a Quadratic Equation

1. Start

2. Declare Real variables: `a`, `b`, `c`, `delta`.

3. Output: “Please enter coefficient a:”

4. Input: `a`.

5. Output: “Please enter coefficient b:”

6. Input: `b`.

7. Output: “Please enter coefficient c:”

8. Input: `c`.

9. Process: Calculate the `delta` using the formula.

10. **Decision:** Check if `delta > 0`.

- **True:** Output “The equation has two distinct real roots.”
- **False:** (This means delta is 0 or less than 0)
    - **Nested Decision:** Check if `delta == 0`.
        - **True:** Output “The equation has one real root.”
        - **False:** (This means delta *must* be less than 0) * Output “The equation has no real roots.”

11. End

Your final flowchart should visually represent this logic. Good luck!