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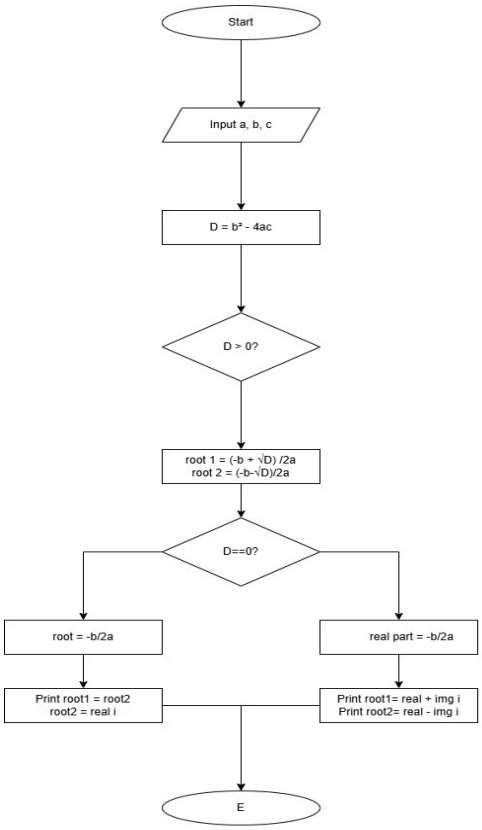
PPS 1.2.1

Algorithm: Roots of a Quadratic Equation

1. **Start.**
2. **Input:** Read three space-separated coefficients: a, b, and c.
3. **Calculate Discriminant:** Compute D = b^2 - 4ac.
4. **Evaluate Nature of Roots:**
    - **Case 1: If D > 0 (Real and Different Roots)**
        - Calculate root1 = {-b + √D}2a
        - Calculate root2 = {-b - √D} 2a
        - Print root1 and root2 formatted to 2 decimal places.
    - **Case 2: If D = 0 (Real and Equal Roots)**
        - Calculate root = {-b}2a
        - Print root1 = root2 = {calculated root}.
    - **Case 3: If D < 0 (Imaginary Roots)**
        - Calculate the real part: real_part = {-b}2a
        - Calculate the imaginary part: part = -D {2a}
5. **Stop.**

Flowchart:



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2.1.1. Roots of a Quadratic Equation 12:17

Write a program to find the roots of a quadratic equation, given its coefficients a, b, and c. Use the quadratic formula: $\frac{\left(-b \pm \sqrt{b^2 - 4ac}\right)}{2a}$

The discriminant $D = b^2 - 4ac$ determines the nature of the roots:

- If $D > 0$: Roots are real and different
- If $D = 0$: Roots are real and the same
- If $D < 0$: Roots are imaginary

Input Format:

- Three space-separated integers representing the coefficients a, b, and c, respectively.

Output Format:

- If roots are real and different, print:

```
root1 = <Root1>
root2 = <Root2>
```

- If roots are the same, print:

```
root1 = root2 = <Root1>
```

Explorer | quadratic... | Submit | Debugger

```
1  import math
2
3  a,b,c =map(float,input("").split())
4
5  d=(b**2)-(4*a*c)
6
7  if d>0:
8      root1=(-b+math.sqrt(d))/(2*a)
9      root2=(-b-math.sqrt(d))/(2*a)
10     print(f"root1 = {root1:.2f}")
11     print(f"root2 = {root2:.2f}")
12
13 elif d==0:
14     root=-b/(2*a)
15     print(f"root1 = root2 = {root:.2f}")
16
17 else:
18     real_part=-b/(2*a)
19     imaginary_part=math.sqrt(-d)/(2*a)
20     print(f"root1 = {real_part:.2f}+{imaginary_part:.2f}i")
21     print(f"root2 = {real_part:.2f}-{imaginary_part:.2f}i")
```