

## **Algorithm:**

1. Start

**2.** Input coefficients **a**, **b**, and **c**

3. Calculate the discriminant

$$D=b^2-4ac \quad D = b^2 - 4ac \quad D=b^2-4ac$$

**4.** If **D > 0**

5. Roots are real and different

**6.** Else if **D = 0**

7. Roots are real and same

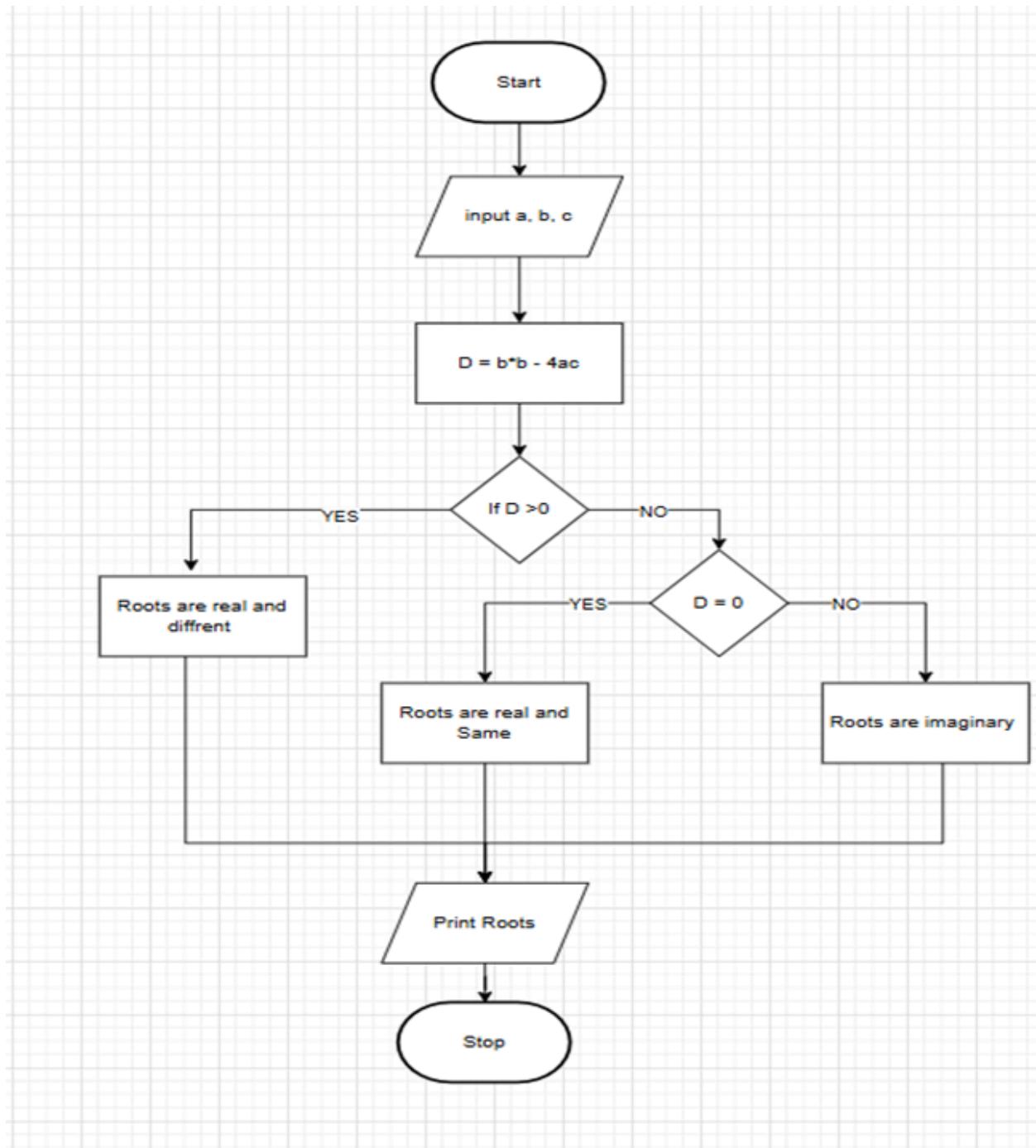
**8.** Else (**D < 0**)

9. Roots are imaginary

10. Print the nature of roots (and roots if required)

11. Stop

## Flowchart:



## CODE TANTRA EXECUTION:

CODETANTRA [Home](#)

2.1.1. Roots of a Quadratic Equation 90.35

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

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>
```

    - If roots are imaginary, print:  

```
root1 = <RealPart>+<ImaginaryPart>i
root2 = <RealPart>-<ImaginaryPart>i
```

      - All values should be formatted to two decimal places.

Sample Test Cases

Explorer quadratic... Submit

```
import math
a, b, c = map(int, input().split())
d = b*b - 4*a*c
if d > 0:
    root1 = (-b + math.sqrt(d)) / (2*a)
    root2 = (-b - math.sqrt(d)) / (2*a)
    print(f"root1 = {root1:.2f}")
    print(f"root2 = {root2:.2f}")
elif d == 0:
    root = -b / (2*a)
    print(f"root1 = root2 = {root:.2f}")
else:
    real = -b / (2*a)
    imag = math.sqrt(-d) / (2*a)
    print(f"root1 = {real:.2f}{(imag:.2f)i}")
    print(f"root2 = {real:.2f}{-(imag:.2f)i}")
```

Average time: 0.006 s Maximum time: 0.010 s  
6.50 ms 10.00 ms 3 out of 3 shown test case(s) passed

Test case 1 Debug Expected output: 1 -> 6 Actual output: 1 -> 6  
root1 = 3.00 root1 = 3.00  
root2 = 2.00 root2 = 2.00

Test case 2 Test cases 3 ms

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