

2.1.1. Roots of a Quadratic Equation

Algorithm: To Find the Roots of a Quadratic Equation

Step 1: Start

Step 2: Read the values of a, b and c

Step 3: Calculate the discriminant

$$D = b * b - 4 * a * c$$

Step 4: Check the value of D

If $D > 0$, then

$$\text{root1} = (-b + \sqrt{D}) / (2 * a)$$

$$\text{root2} = (-b - \sqrt{D}) / (2 * a)$$

Print root1 and root2

Else if $D = 0$, then

$$\text{root} = -b / (2 * a)$$

Print root1 = root2 = root

Else

$$\text{real_part} = -b / (2 * a)$$

$$\text{imaginary_part} = \sqrt{-D} / (2 * a)$$

Print

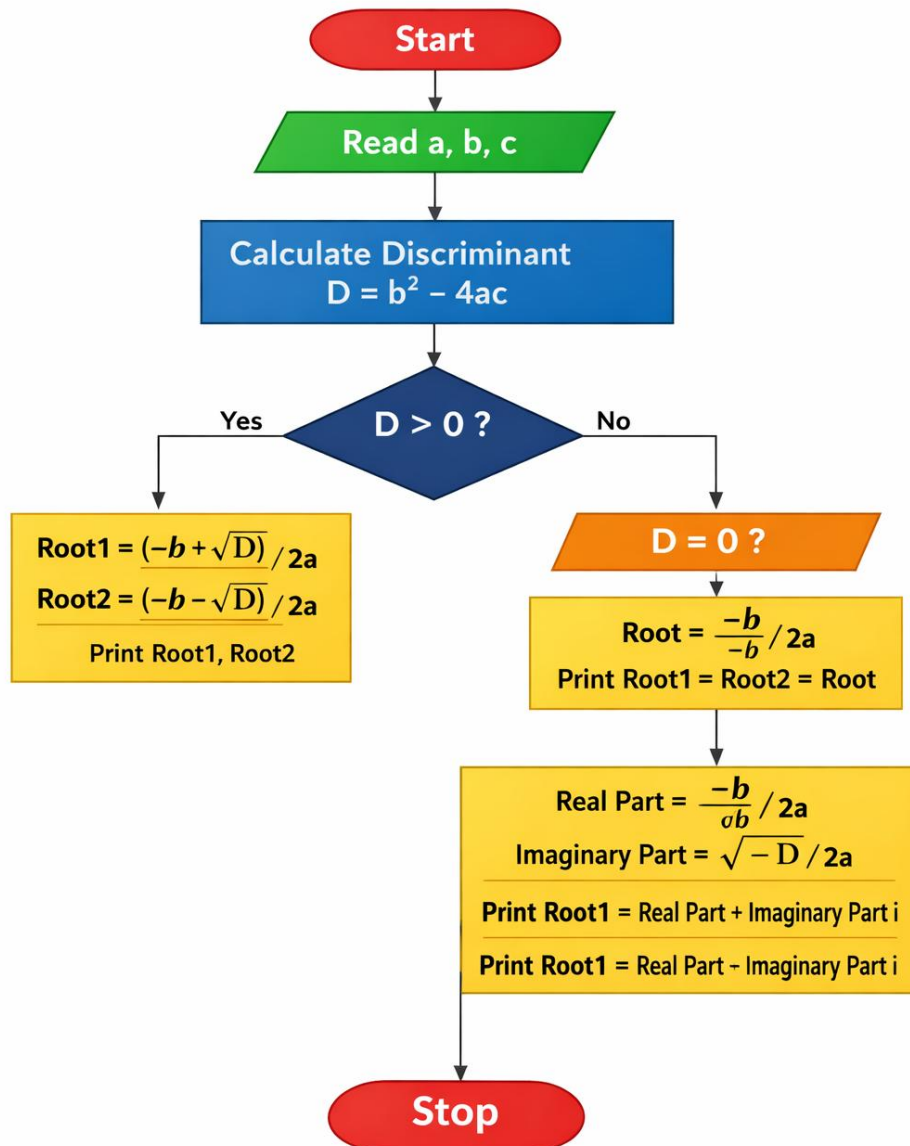
$$\text{root1} = \text{real_part} + \text{imaginary_part} i$$

$$\text{root2} = \text{real_part} - \text{imaginary_part} i$$

Step 5: Stop

Flowchart:-

To Find the Roots of a Quadratic Equation



2.1.1. Roots of a Quadratic Equation

21:16

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>
```

Sample Test Cases

Explorer

quadratic...

```
1 import math
2
3 a, b, c = map(int, input().split())
4
5 D = b * b - 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 else:
17     real_part = -b / (2 * a)
18     imaginary_part = math.sqrt(-D) / (2 * a)
19     print(f"root1 = {real_part:.2f}+{imaginary_part:.2f}i")
20     print(f"root2 = {real_part:.2f}-{imaginary_part:.2f}i")
21
22
```

Terminal

Test cases