

EXPERIMENT - 2

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2.1.1 Roots of Quadratic Equation

ALGORITHM

1. Start
2. Import the math library.
3. Read three integers a, b, and c (coefficients of the quadratic equation).
4. Calculate the discriminant

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

5. If $D > 0$:

Calculate two real and different roots using:

$$\frac{-b+\sqrt{D}}{2a}, \frac{-b-\sqrt{D}}{2a}$$

Print both roots up to 2 decimal places.

- 6 Else if $D == 0$:

Calculate the single repeated root:

$$\frac{-b}{2a}$$

Print the root twice up to 2 decimal places.

- 7 Else ($D < 0$):

Calculate real part:

$$\frac{-b}{2a}$$

Calculate imaginary part:

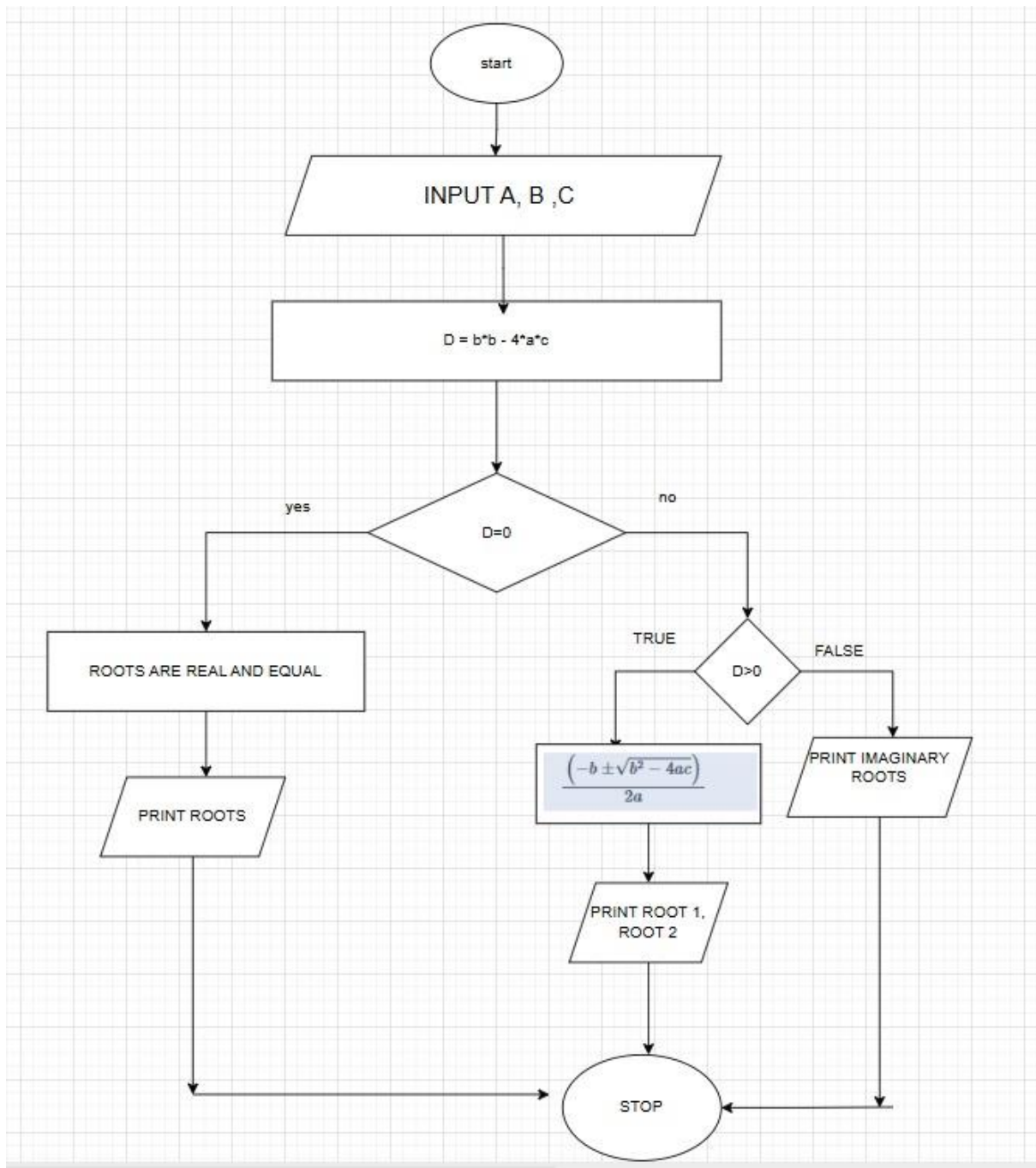
$$\frac{\sqrt{-D}}{2a}$$

Print both complex roots up to 2 decimal places.

- 8 Stop

FLOWCHART

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PHYTHON CODE

```
import math
```

```
a, b, c = map(int, input().split())
```

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

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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")
```

EXECUTION

2.1.1. Roots of a Quadratic Equation

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

Execution Results:

Average time: 0.006 s, Maximum time: 0.008 s, 3 out of 3 shown test case(s) passed, 3 out of 3 hidden test case(s) passed.

Test case 1: Expected output: 1 -5 6, Actual output: 1 -5 6, root1 = -3.00, root2 = -2.00.

Test case 2: Expected output: 1 -5 6, Actual output: 1 -5 6, root1 = -3.00, root2 = -2.00.