

Experiment – 2

2.1.1 Roots of a Quadratic Equation

- Algorithm

STEP 1 : Start

STEP 2 : Input a, b, c

STEP 3 : Calculate

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

STEP 4 : if $D > 0$

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

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

else if $D == 0$

$$\text{root1} = \text{root2} = (-b) / (2*a)$$

else

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

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

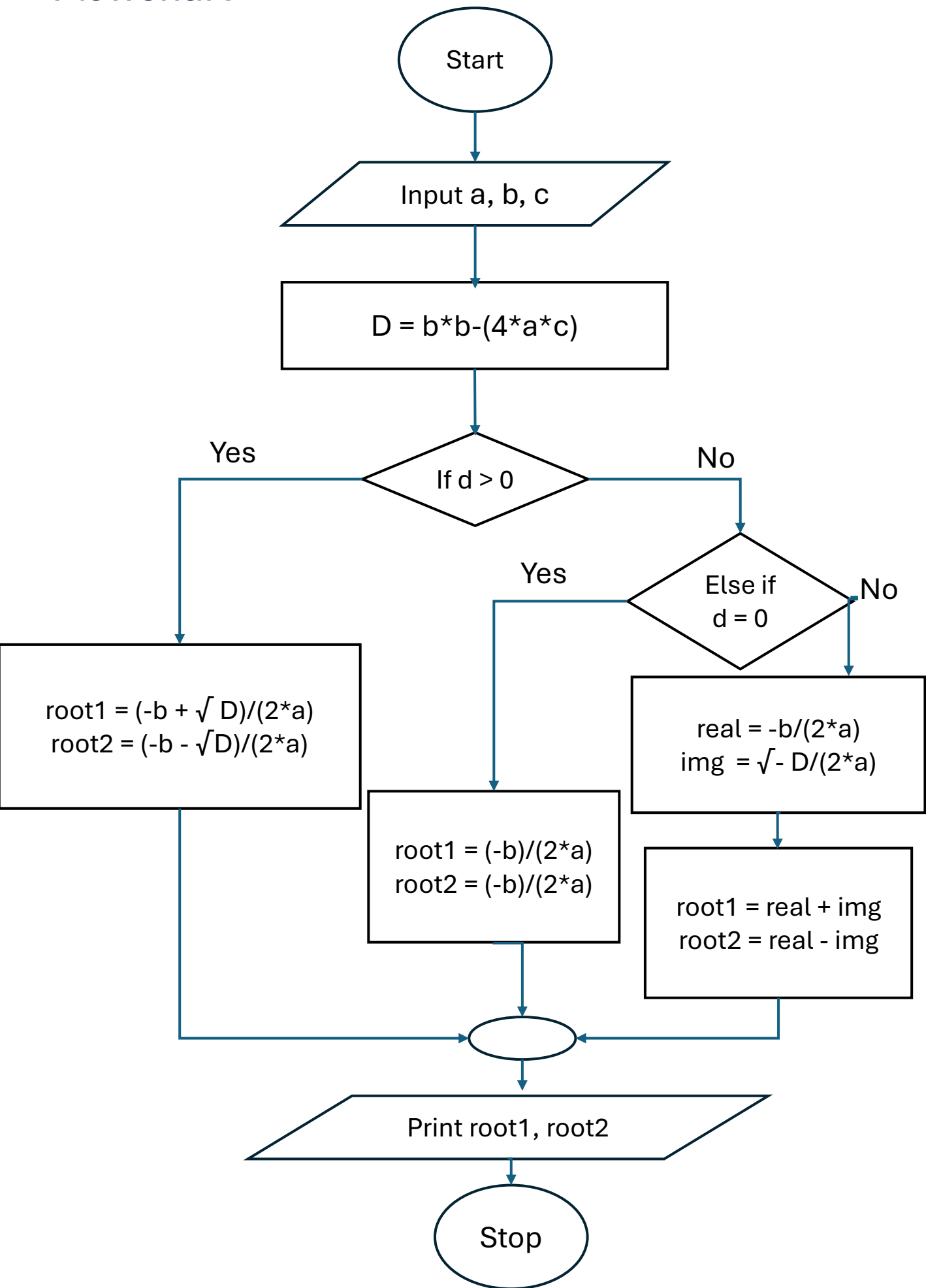
$$\text{root1} = \text{real} + \text{imaginary}$$

$$\text{root2} = \text{real} - \text{imaginary}$$

STEP 5 : Print root1, root2

• Flowchart

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• Code

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```
a,b,c =map(float,input().split())
d=(b*b)-(4*a*c)
sqrtd=d**0.5
root1=(-b+sqrtd)/(2*a)
root2=(-b-sqrtd)/(2*a)
if d > 0:
    print(f"root1 = {root1:.2f}")
    print(f"root2 = {root2:.2f}")
elif d==0:
    print(f"root1 = root2 = {root1:.2f}")
else:
    print(f"root1 = {root1.real:.2f}{root1.imag:+.2f}i")
    print(f"root2 = {root2.real:.2f}{root2.imag:+.2f}i")
```

• Execution

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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>
```

- If roots are imaginary, print:

```
Sample Test Cases
```

quadratic...

```
1 a,b,c =map(float,input().split())
2 d=(b*b)-(4*a*c)
3 sqrtd=d**0.5
4 root1=(-b+sqrtd)/(2*a)
5 root2=(-b-sqrtd)/(2*a)
6 if d > 0:
7     print(f"root1 = {root1:.2f}")
8     print(f"root2 = {root2:.2f}")
9 elif d==0:
10    print(f"root1 = root2 = {root1:.2f}")
11 else:
12    print(f"root1 = {root1.real:.2f}{root1.imag:+.2f}i")
13    print(f"root2 = {root2.real:.2f}{root2.imag:+.2f}i")
```

Average time
0.010 s
10.00 ms

Maximum time
0.025 s
25.00 ms

3 out of 3 shown test case(s) passed
3 out of 3 hidden test case(s) passed

Test case 1 25 ms

Test case 2 5 ms

Test case 3 8 ms

Terminal

Test cases