Experiment 2.1.1

Roots of an experiment

Algorithm : Step 1 : Start.

Step 2 : Read three space-separated integers a, b, and c.

Step 3 : Calculate the discriminant.

D=b*b -4*a*c

Step 4 : Check the value of the discriminant .

- Case1: If D > 0 (Real and different roots)
Print: root1,root2.
- Case 2: If D == 0 (Real and same roots)
Print : root1=root2.
- Case 3: If D < 0 (Imaginary roots)
Print : Root = root 1 + imaginary
Root = root 2 + imaginary

Step 5 : Stop.

Code:

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


D = (b*b) - (4*a*c)
sqrD = D ** 0.5


if D > 0:

    root1 = (-b + sqrD) / (2*a)

    root2 = (-b - sqrD) / (2*a)

    print("root1 = " f"{root1:.2f}")

    print("root2 = " f"{root2:.2f}")
```

```python
elif D == 0:

    root1 = root2 = -b / (2*a)

    print("root1 = root2 = " f"{root1:.2f}")


else:

    real = (-b) / (2*a)

    imaginary = sqrD / (2*a)

    print(f"root1 = {real:.2f}+{imaginary:.2f}i")

    print(f"root2 = {real:.2f}-{imaginary:.2f}i")
```
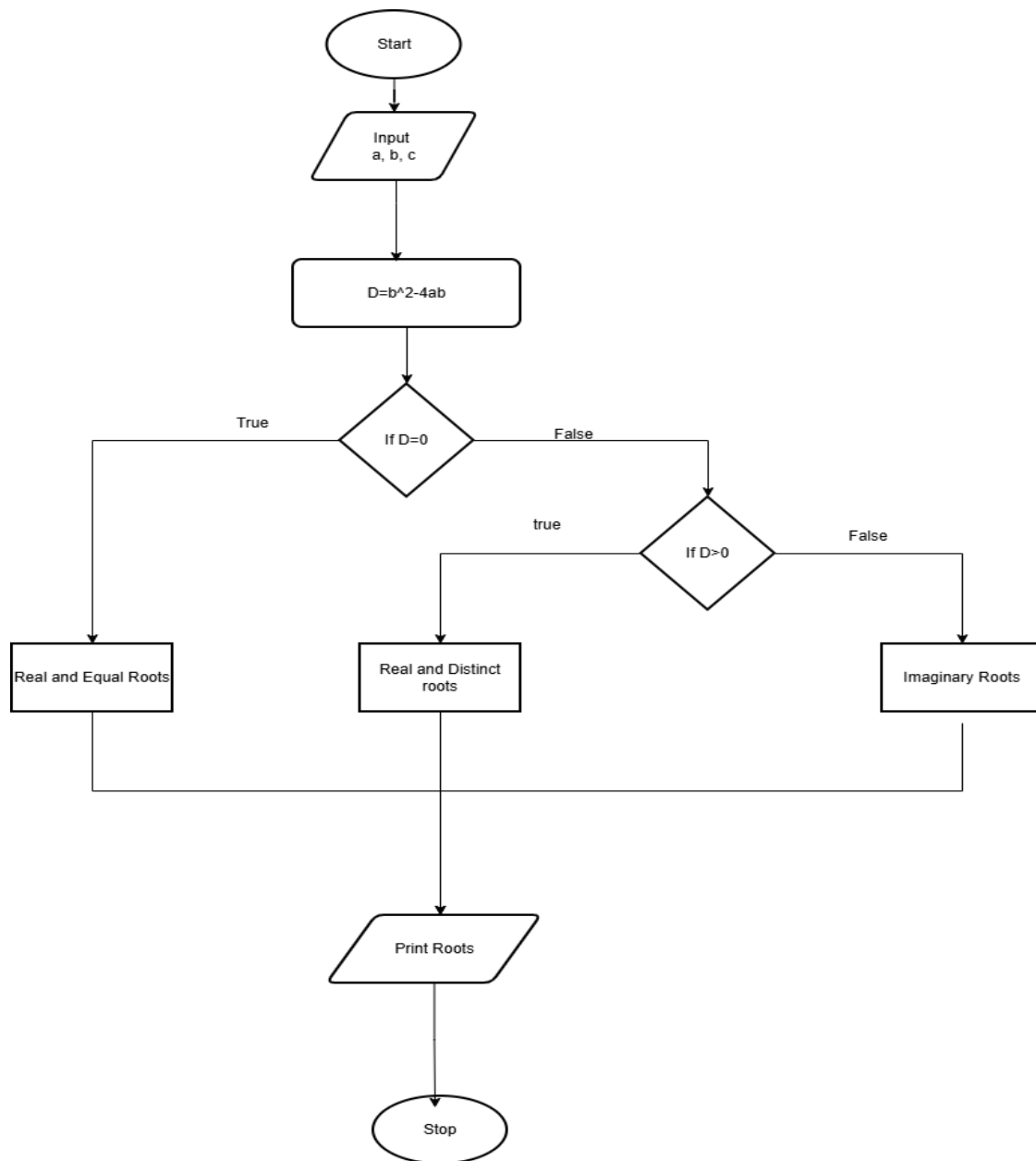
FlowChart:

Start

Input
a, b, c

$D=b^2-4ab$

If D=0

True → Real and Equal Roots

False → If D>0

true → Real and Distinct roots

False → Imaginary Roots

Print Roots

Stop

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:

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

- All values should be formatted to two decimal places.

Sample Test Cases +

quadratic...

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

Average time	Maximum time	✓ 3 out of 3 shown test case(s) passed
0.004 s	0.016 s	✓ 3 out of 3 hidden test case(s) passed
4.00 ms	16.00 ms	

✓ Test case 1 18 ms 🗑 Debug

Expected output	Actual output
1 -5 6	1 -5 6
root1 = 3.00↵	root1 = 3.00↵
root2 = 2.00↵	root2 = 2.00↵

✓ Test case 2 3 ms

▶ Terminal ⊞ Test cases

‹ Prev   Reset   Submit   Next ›