

# EXPERIMENT - 2

Name : Kanhaiya Tyagi

PRN : 25070521157

## 2.1.1 Roots of Quadratic Equation

### ALGORITHM

Step 1 :-Start

Step 2 :- Import the math library.

Step 3 :- Read three integers a, b, and c (coefficients of the quadratic equation).

Step 4 :-Calculate the discriminant

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

Step 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.

Step 6 :- Else if D == 0:

Calculate the single repeated root:

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

Print the root twice up to 2 decimal places.

Step 7 :- Else (D < 0):

Calculate real part:

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

Calculate imaginary part:

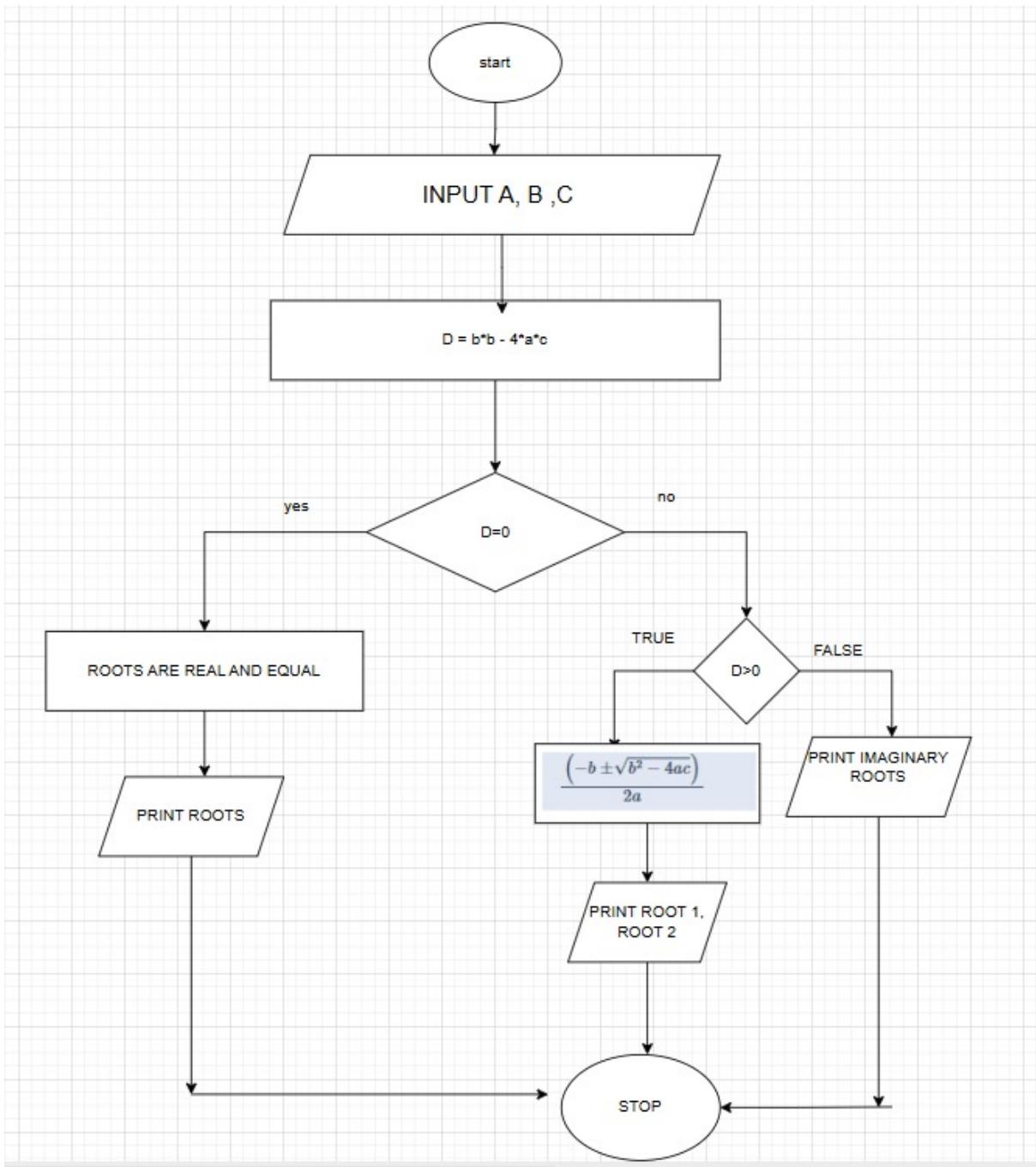
$$\frac{\sqrt{-D}}{2a}$$

Print both complex roots up to 2 decimal places.

Step 8 :- Stop

### FLOWCHART

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## PYTHON 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

The screenshot shows the CodeTantra IDE interface. The top bar includes the logo, user name 'karhaya.tyag.bat025@stnagpuriau.edu.in', 'Support', and 'Logout'. The main area has tabs for 'quadratic...' and 'quadratic...'. The code editor contains a Python script for solving quadratic equations. The code uses map to convert input strings to floats, calculates the discriminant D, and then uses if-else statements to determine the nature of the roots based on the value of D. It prints the roots in different formats depending on whether they are real or complex numbers. Below the code editor are sections for 'Input Format', 'Output Format', and sample test cases. The 'Test cases' section shows two passed test cases and three hidden test cases. The bottom of the screen has navigation buttons for 'Prev', 'Reset', 'Submit', and 'Next'.

```
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")
```