Date 14/8/25

Expt. No. 6

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Title : Roots of a quadratic eqⁿ.

Aim : Write a program in python to find the roots of a quadratic equation using Python.

Requirements : Python interpreter (3+)

Theory :

A quadratic eqⁿ is in the form $ax^2 + bx + c = 0$, where a, b and c are constants. The roots are calculated using the quadratic formula :

$$\text{root 1} = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

$$\text{root 2} = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

The term inside the square root $(b^2 - 4ac)$ is called the discriminant (D) :

- If $D > 0$ → two real & distinct roots.
- If $D = 0$ → two real and equal roots.
- If $D < 0$ → two complex roots.

output :-

Enter coefficient a : 1

Enter coefficient b : 5

Enter coefficient c : 6

The roots are (-2+0j) and (-3+0j)

Syntax / code :-

```
import cmath  # for complex no. support

a = float(input("Enter coefficient a: "))
b = float(input("Enter coefficient b: "))
c = float(input("Enter coefficient c: "))

# calculate the discriminant
D = (b**2) - (4*a*c)

# find two solutions
root1 = (-b + cmath.sqrt(D)) / (2*a)
root2 = (-b - cmath.sqrt(D)) / (2*a)

print(f"The roots are {root1} and {root2}")
```

Title : Prime Numbers in a given range.

Aim : To write a python program to print all prime numbers inside a range provided by the user.

Requirements : Python interpreter (python 3+)

Theory : A prime number is a natural number greater than 1 that has no positive divisors other than 1 and itself.

To find prime numbers in a range:

1. Get the starting and ending values from the user
2. Check each number in the range to see if it is prime.
3. If the number has no divisors other than 1 and itself, print it.

Output:

```
Enter the start of the range : 10
Enter the end of the range : 30

prime numbers between 10 and 30 are :
11 13 17 19 23 29
```

Syntax / code :

```
start = int(input("Enter the start of the range: "))

end = int(input("Enter the end of the range: "))

print(f"Prime numbers between {start} and {end} are :")

for num in range(start, end+1):
    if num > 1: # prime numbers are greater
                # than 1.
        for i in range(2, int(num**0.5)+1):
            if num % i == 0:
                break
        else:
            print(num, end = " ")
```