**1️⃣ Prime Number Checks**

**A. Java – Variations**

**1. Simple loop (1 to num)**

int num = 7;

int count = 0;

if(num < 2){

System.out.println("Not prime");

} else {

for(int i = 1; i <= num; i++){

if(num % i == 0){

count++;

}

}

if(count == 2){

System.out.println("Prime");

} else {

System.out.println("Not prime");

}

}

**2. Efficient loop (2 to num/2)**

int num = 29;

boolean isPrime = true;

if(num < 2){

isPrime = false;

} else {

for(int i = 2; i <= num/2; i++){

if(num % i == 0){

isPrime = false;

break;

}

}

}

if(isPrime){

System.out.println("Prime");

} else {

System.out.println("Not Prime");

}

**3. Efficient loop using function**

public static boolean isPrime(int num){

if(num < 2) return false;

for(int i = 2; i <= num/2; i++){

if(num % i == 0) return false;

}

return true;

}

int num = 31;

if(isPrime(num)){

System.out.println("Prime");

} else {

System.out.println("Not Prime");

}

**B. Python – Variations**

**1. Simple for loop (2 to num-1)**

num = 7

if num < 2:

print("Not Prime")

else:

for i in range(2, num):

if num % i == 0:

print("Not Prime")

break

else:

print("Prime")

**2. Using flag variable**

num = 13

is\_prime = True

if num < 2:

is\_prime = False

else:

for i in range(2, num):

if num % i == 0:

is\_prime = False

break

if is\_prime:

print("Prime")

else:

print("Not Prime")

**3. Function version**

def is\_prime(num):

if num < 2:

return False

for i in range(2, num):

if num % i == 0:

return False

return True

num = 19

print("Prime" if is\_prime(num) else "Not Prime")

**4. Pythonic one-liner**

num = 17

print("Prime" if num > 1 and all(num % i != 0 for i in range(2, num)) else "Not Prime")

**2️⃣ Even/Odd Checks**

**A. Java**

int num = 7;

if(num % 2 == 0){

System.out.println("Even");

} else {

System.out.println("Odd");

}

**Works for:** positive, negative, zero.

**B. Python**

num = 7

if num % 2 == 0:

print("Even")

else:

print("Odd")

**Alternative Pythonic one-liner**

num = 7

print("Even" if num % 2 == 0 else "Odd")