Shri Vile Parle Kelavani Mandal's

INSTITUTE OF TECHNOLOGY

DHULE (M.S.)

DEPARMENT OF COMPUTER ENGINEERING

Subject : Competitive Programmimg Lab

Name : Jaykishan Natwar Varma **Roll No. :** 68

Class : TY. Comp. Engg. **Batch :** T4 **Division:**

Expt. No. : **Date :**

Title : How Many Fibs?

Remark

Signature

ASSIGNMENT/EXPERIMENT: _____		
Date of Performance:	**Date of Submission:**	
Marks Split Up	**Maximum Marks**	**Marks Obtained**
Performance/Conduction	**3**	
Report Writing	**3**	
Attendance	**2**	
Viva/Oral	**2**	
Total Marks	**10**	
Signature of Subject Teacher		

Title: How Many Fibs?

Aim: Recall the definition of the Fibonacci numbers: f1 := 1 f2 := 2 fn := fn−1 + fn−2 (n ≥ 3) Given two numbers a and b, calculate how many Fibonacci numbers are in the range [a, b].

Language used: Python

Platform Used: Pycharm, VS code etc.

Sample Input: The input contains several test cases. Each test case consists of two non-negative integer numbers a and b. Input is terminated by a = b = 0. Otherwise, a ≤ b ≤ 10100. The numbers a and b are given with no superfluous leading zeros.

Sample Output: For each test case output on a single line the number of Fibonacci numbers fi with a ≤ fi ≤ b.

Example:

Sample Input :

10 100

1234567890 9876543210

0 0

Sample Output:

5

4

Algorithm/Flowchart:

1. **Generate Fibonacci Numbers**: Start by generating Fibonacci numbers up to the maximum possible value of b (since we don't know how large b can be). Use an iterative approach to generate Fibonacci numbers until you exceed b.
2. **Identify Fibonacci Numbers in Range**: Once you have a list of Fibonacci numbers, iterate through this list to count how many Fibonacci numbers fall within the range [a, b].
3. **Efficient Generation using Iteration**: Use an iterative approach to generate Fibonacci numbers until you reach or exceed b. Store these Fibonacci numbers in a list.
4. **Count Fibonacci Numbers in Range**: Traverse through the list of generated Fibonacci numbers and count how many of them are within the range [a, b].

Code:

```
def count_fibonacci_in_range(a, b):
    if a > b:
        return 0

    fibonacci_numbers = [0, 1]
    next_fib = 1

    # Generate Fibonacci numbers until we exceed b
    while next_fib <= b:
        next_fib = fibonacci_numbers[-1] + fibonacci_numbers[-2]
        fibonacci_numbers.append(next_fib)

    # Count Fibonacci numbers in the range [a, b]
    count = 0
    for fib in fibonacci_numbers:
        if a <= fib <= b:
            count += 1
        elif fib > b:
            break

    return count

# Example usage:
if __name__ == "__main__":
    a = int(input("Enter the start of the range (a): "))
    b = int(input("Enter the end of the range (b): "))

    result = count_fibonacci_in_range(a, b)
    print(f"Number of Fibonacci numbers in range [{a}, {b}]: {result}")
```

Input:-

10 100

1234567890 9876543210

0 0

Output:-

5

4

Conclusion: In this way we implement The How Many Fibs? Problem using loops and conditional statements.