ExperimentNo.:-1

Write a program non-recursive and recursive program to calculate Fibonacci numbers and analyze their time and space complexity.

# 1)Non-RecursiveProgram Source Code:-

In[1]:

nterms**=**int(input("Howmanyterms?"))

*#firsttwoterms*

n1,n2**=**0,1

count**=**0

*#checkifthenumberoftermsisvalid*

**if**nterms**<=**0: print("Pleaseenterapositiveinteger")

*#ifthereisonlyoneterm,returnn1*

**elif**nterms**==**1:

print("Fibonacci sequence upto",nterms,":") print(n1)

*#generatefibonaccisequence*

**else**:

print("Fibonaccisequence:")

**while** count **<** nterms: print(n1) nth**=**n1**+**n2*# update values*

n1 **=** n2 n2**=**nth count**+=**1

Howmanyterms?7 Fibonaccisequence:

0

1

1

2

3

5

8

# 1.RecursiveProgram Source Code:-

In[2]:

**def**fibonacci(n): **if**n**<=**0:

**return**[] **elif**n**==**1:

**return**[0] **elif**n**==**2:

**return**[0,1] **else**:

seq**=**fibonacci(n**-**1) seq**.**append(seq[**-**1]**+**seq[**-**2]) **return**seq

nterms**=**int(input("Howmanyterms?"))

*#checkifthenumberoftermsisvalid*

**if**nterms**<=**0:

print("Pleaseenterapositiveinteger")

**else**:

print("Fibonaccisequence:") fib\_sequence**=**fibonacci(nterms) **for** num **in** fib\_sequence:

print(num)

|  |  |
| --- | --- |
|  | Howmanyterms?7  Fibonaccisequence: |
| 0 |
| 1 |
| 1 |
| 2 |
| 3 |
| 5 |
| 8 |
| In[]: |  |