**TASK 01**

**FIBONACCI SERIES**

**1. Initial Conditions:**

The Fibonacci series starts with two initial conditions:

1. F(0) = 0

2. F(1) = 1

**2. Recurrence Relationship:**

The core of the Fibonacci series is the recurrence relationship:

F(n) = F(n-1) + F(n-2)

This formula states that to find the nth Fibonacci number, you add the (n-1)th and (n-2)th Fibonacci numbers.

**3. Generating the Sequence:**

Applying the recurrence relationship, we can generate the Fibonacci sequence:

0, 1, 1, 2, 3, 5, 8, 13, 21, 34,……………

F(2) = F(1) + F(0) = 1 + 0 = 1

F(3) = F(2) + F(1) = 1 + 1 = 2

F(4) = F(3) + F(2) = 2 + 1 = 3

F(5) = F(4) + F(3) = 3 + 2 = 5

- ... and so on.

**4. Properties and Patterns**

The Fibonacci sequence exhibits various interesting properties and patterns. For example, the ratio of consecutive Fibonacci numbers converges to the golden ratio (*ϕ*≈1.618)

The Fibonacci sequence appears in nature in patterns like the arrangement of leaves, petals, and pinecones.

**5. Applications:**

Fibonacci numbers have applications in computer science, particularly in algorithms and data structures.

They are also used in financial markets for technical analysis.

**6. General Formula:**

There exists a general formula to directly compute the nth Fibonacci number using the golden ratio:



where *ϕ* is the golden ratio.

In summary, the Fibonacci series is a fascinating mathematical sequence with wide-ranging applications and intriguing properties, making it a subject of interest in various disciplines.