DATA STRUCTURE - FIBONACCI SERIES

Fibonacci Series generates subsequent number by adding two previous numbers. Fibonacci series starts from two numbers − F_0 & F_1. The initial values of F_0 & F_1 can be taken 0, 1 or 1, 1 respectively.

Fibonacci series satisfies the following conditions −

$$F_n = F_{n-1} + F_{n-2}$$

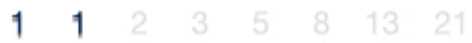
So a Fibonacci series can look like this −

F_8 = 0 1 1 2 3 5 8 13

or, this −

F_8 = 1 1 2 3 5 8 13 21

For illustration purpose, fibonacci of F_8 is displayed below −



Fibonacci Iterative Algorithm

First we try to draft iterative algorithm for Fibonacci series.

```
Procedure Fibonacci(n)
   declare f0, f1, fib, loop

   set f0 to 0
   set f1 to 1

   display f0, f1

   for loop ← 1 to n

      fib ← f0 &plus; f1
```

```
      f0 ← f1
      f1 ← fib

      display fib
   end for

end procedure
```

To see the implementation of above algorithm in c programming language, click here.

Fibonacci Recursive Algorithm

Now we shall learn how to create recursive algorithm Fibonacci series. The base criteria of recursion.

```
START
Procedure Fibonacci(n)
   declare f0, f1, fib, loop

   set f0 to 0
   set f1 to 1

   display f0, f1

   for loop ← 1 to n

      fib ← f0 &plus; f1
      f0 ← f1
      f1 ← fib

      display fib
   end for

END
```

To see the implementation of above algorithm in c programming language, click here.