Fibonacci Series Using Recursion

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Fibonacci series generates the 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 −

```
Fn = Fn-1 + Fn-2
```

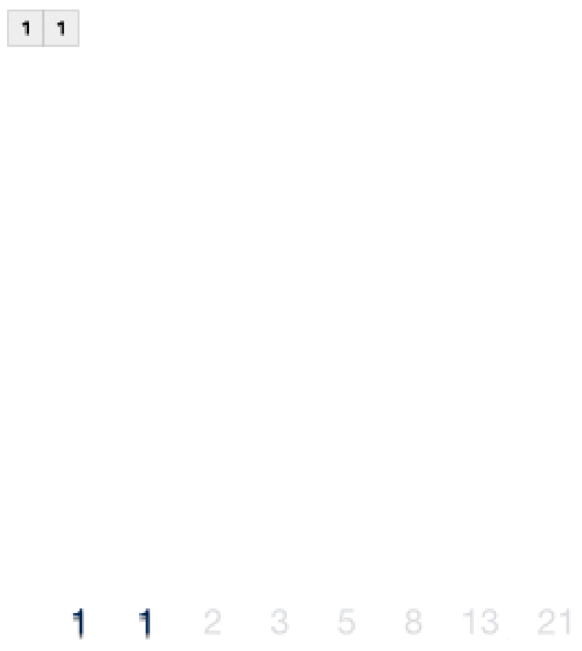
Hence, a Fibonacci series can look like this −

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 as −



Fibonacci Iterative Algorithm

First we try to draft the iterative algorithm for Fibonacci series.

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

   set f0 to 0
   set f1 to 1

   <b>display f0, f1</b>

   for loop ← 1 to n

      fib ← f0 + f1
      f0 ← f1
      f1 ← fib

      <b>display fib</b>
   end for
end procedure
```

Fibonacci Recursive Algorithm

Let us learn how to create a 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 + f1
      f0 ← f1
      f1 ← fib

      display fib
   end for

END
```

Example

Following are the implementations of the above approach in various programming languages −

C | C++ | Java | Python

```c
#include <stdio.h>
int fibbonacci(int n) {
   if(n == 0){
      return 0;
   } else if(n == 1) {
      return 1;
   } else {
      return (fibbonacci(n-1) + fibbonacci(n-2));
   }
}
int main() {
   int n = 5;
   printf("Number is: %d", n);
   printf("\nFibonacci series upto number %d are: ", n);
   for(int i = 0;i<n;i++) {
      printf("%d ",fibbonacci(i));
   }
}
```

Output

```
Number is: 5
Fibonacci series upto number 5 are: 0 1 1 2 3
```