4a. Write a C program to generate the 'Fibonacci' series for 'n' positions, take 'n' as an input from the user.

Description:

This program generates the Fibonacci series up to n terms, where n is provided by the user. The Fibonacci series is a sequence of numbers where each number is the sum of the two preceding ones, starting from 0 and 1.

Fibonacci Series Formula:

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

where,

- F(0) = 0
- F(1) = 1
- F(2) = F(0) + F(1) = 0 + 1 = 1
- F(3) = F(1) + F(2) = 1 + 1 = 2
- and so on…

Example:

Enter the position in Fibonacci series (n): 5

The nth number in the Fibonacci series is: 3

Algorithm:

Step 1: Start

Step 2: Declare integer variables n, first = 0, second = 1, next, and i.

Step 3: Prompt the user to enter the number of terms (n).

Step 4: Read and store the value of n.

Step 5: Print the first two Fibonacci numbers (first and second).

Step 6: Use a loop to generate the remaining Fibonacci numbers:
• **For** i = 3 to n:

• Compute next = first + second.

• Print next.

• Update first = second.

• Update second = next.

Step 7: Stop

Source Code:

```
#include <stdio.h>
int main()
{
  int i,term1=0,term2=1,n,fib;

  printf("Enter the position in Fibonacci series (n):\n");
  scanf("%d",&n);

  if( n <= 0) {
    printf("Enter a number greater than 0\n");
    return 0;
  }
  else if( n == 1) {
      fib = 0;
  }
  else if ( n == 2 ) {
    fib = 1;
  }
  else {
     for (int i = 2; i < n; i++)
     {
        fib = term1 + term2;
        term1 = term2;
        term2 = fib;
     }
  }
  printf("The nth number in the Fibonacci series is:%d\n",fib);
  return 0;
}
```

Sample Output:

```
Enter the position in Fibonacci series (n):
5
The nth number in the Fibonacci series is: 3


Enter the position in Fibonacci series (n):
12
The nth number in the Fibonacci series is: 89
```