

Factorial Program in C

Factorial Program in C: Factorial of n is the *product of all positive descending integers*. Factorial of n is denoted by $n!$. For example:

1. $5! = 5*4*3*2*1 = 120$
2. $3! = 3*2*1 = 6$

. Let's see the 2 ways to write the factorial program.

- Factorial Program using loop(Without Recursion)
- Factorial Program using recursion

Factorial Program using loop

1. `#include<stdio.h>`
2. `int main()`
3. `{`
4. `int i,fact=1,number;`
5. `printf("Enter a number: ");`
6. `scanf("%d",&number);`
7. `for(i=1;i<=number;i++){`
8. `fact=fact*i;`
9. `}`
10. `printf("Factorial of %d is: %d",number,fact);`
11. `return 0;`
12. `}`

Output:

```
Enter a number: 5
Factorial of 5 is: 120
```

Factorial Program using recursion in C

Let's see the factorial program in c using recursion.

```
1. #include<stdio.h>
2.
3. long factorial(int n)
4. {
5.     if (n == 0)
6.         return 1;
7.     else
8.         return(n * factorial(n-1));
9. }
10.
11. void main()
12. {
13.     int number;
14.     long fact;
15.     printf("Enter a number: ");
16.     scanf("%d", &number);
17.
18.     fact = factorial(number);
19.     printf("Factorial of %d is %ld\n", number, fact);
20.     return 0;
21. }
```

Output:

```
Enter a number: 6
Factorial of 5 is: 720
```

Fibonacci Series in C

Fibonacci Series in C: In case of fibonacci series, *next number is the sum of previous two numbers* for example 0, 1, 1, 2, 3, 5, 8, 13, 21 etc. The first two numbers of fibonacci series are 0 and 1.

There are two ways to write the fibonacci series program:

- Fibonacci Series without recursion
- Fibonacci Series using recursion

Fibonacci Series in C without recursion

Let's see the fibonacci series program in c without recursion.

```
1. #include<stdio.h>
2. int main()
3. {
4.     int n1=0,n2=1,n3,i,number;
5.     printf("Enter the number of elements:");
6.     scanf("%d",&number);
7.     printf("\n%d %d",n1,n2);//printing 0 and 1
8.     for(i=3;i<=number;++i)//loop starts from 2 because 0 and 1 are already printed
9.     {
10.    n3=n1+n2;
11.    printf(" %d",n3);
12.    n1=n2;
13.    n2=n3;
14. }
15. return 0;
16. }
```

Output:

```
Enter the number of elements:15
0 1 1 2 3 5 8 13 21 34 55 89 144 233 377
```

Fibonacci Series using recursion in C

Let's see the fibonacci series program in c using recursion

```
1. #include<stdio.h>
4. void printFibonacci(int n){
5.     static int n1=0,n2=1,n3;
6.     if(n>0){
7.         n3 = n1 + n2;
8.         n1 = n2;
9.         n2 = n3;
10.        printf("%d ",n3);
11.        printFibonacci(n-1);
12.    }
13.}
14.int main(){
15.    int n;
16.    printf("Enter the number of elements: ");
17.    scanf("%d",&n);
18.    printf("Fibonacci Series: ");
19.    printf("%d %d ",0,1);
20.    printFibonacci(n-2);//n-2 because 2 numbers are already printed
21.    return 0;
22. }
```

Output:

```
Enter the number of elements:15
0 1 1 2 3 5 8 13 21 34 55 89 144 233 377
```