

# C++ Recursion

## C++ Recursion Function

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A function is called a recursion function if a call is made to the same function from within the body of the function.

In this tutorial, we shall learn how to write a recursion function with the help of example C++ programs.

### Example – Factorial using Recursion

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In the following example, we shall write recursion function instead of looping techniques, to find the factorial of a number.

#### C++ Program

```
#include <iostream>
using namespace std;

/*
 * Recursion function to calculate factorial of a number
 */
int factorial(int n) {
    if (n==0) {
        return 1;
    } else {
        return n * factorial(n - 1);
    }
}

int main() {
    cout << factorial(4) << "\n";
    cout << factorial(5) << "\n";
    cout << factorial(6) << "\n";
}
```

#### Output

```
24
120
720
```

#### Explanation

```

factorial(4) = 4 * factorial(3)
           \
           factorial(3) = 3 * factorial(2)
                   \
                   factorial(2) = 2 * factorial(1)
                           \
                           factorial(1) = 1 * factorial(0)
                                   |
                                   (1)

```

## Example – Find sum of first N numbers

In this example, we shall find the sum of first N natural numbers using recursion function.

### C++ Program

```

#include <iostream>
using namespace std;

/*
 * Recursion function to calculate
 * sum of first n natural numbers
 */
int sumOfN(int n) {
    if (n==1) {
        return 1;
    } else {
        return n + sumOfN(n - 1);
    }
}

int main() {
    cout << sumOfN(4) << "\n";
    cout << sumOfN(6) << "\n";
}

```

### Output

```

10
21

```

## Conclusion

In this [C++ Tutorial](#), we learned how to use recursion technique with functions in C++.

◆ C++ Tutorial

◆ C++ Hello World Program

◆ C++ If Else

◆ C++ Switch

◆ C++ Ternary Operator

◆ C++ Logical Operations

◆ C++ Arithmetic Operations

◆ C++ While Loop

◆ C++ Do-While Loop

◆ C++ For Loop

◆ C++ ForEach

◆ C++ Continue

◆ C++ Break

◆ C++ Comments

⇒ **C++ Recursion**

◆ C++ Try Catch

◆ C++ String Operations

◆ C++ Array Operations

◆ C++ Vector Operations

◆ C++ Input Output Operations

◆ C++ Class

◆ C++ Programs