

# C++ Programming

## Basics

By @curious-programmer

### Introduction :

C++ is an object oriented programming language. It is an extension of C programming language.

C++ is a powerful general purpose programming language. It can be used to develop operating system, browsers, games and so on.

C++ supports different way of programming like procedural, object-oriented, functional and so on. This makes C++ powerful as well as flexible.

## Basic syntax :

```
# include <iostream>
using namespace std;
// main method. where the program execution
// starts.
int main() {
    // This is where you write your code
    return 0;
}
```

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## Output in C++ :

```
Cout << "HelloWorld!";
```

Cout is used to print anything which is written inside " " on the screen.

## Input in C++ :

```
Cin >> value;
```

Cin is used to take input and store it in variable.

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## comments in C++:

single line comment:

// this is single line comment

multi-line comment

/\* this is multiline comment.  
Span multiple line.

\*/

## conditions and if statement :

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```
if (Condition) {  
    // Block of Code  
}
```

C++ if Statement tests the condition. it is executed if the condition is true:

example: int a = 20;

```
if (a > 15) {  
    cout << "a is greater than 15";  
}
```

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## if-else statement :

the C++ if-else statement also tests the condition. it executes if block if condition is true otherwise else block is executed.

```
if (s > 7) {  
    cout << "s is greater than 7";  
}  
else {  
    cout << "7 is greater than s";  
}
```

## else-if statement:

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the C++ if-else ladder statement executes one condition from multiple statements.

```
if (s > 7) {  
    cout << "s is greater than 7";  
}  
elseif (s == 7) {  
    cout << "s is equal to 7";  
}  
else {  
    cout << "7 is greater than s";  
}
```

## Switch Case Statement :

A switch statement allows you to test an expression against a variety of cases. If the match is found, the code within begins to run. A case can be ended

switch (grade) {

{

Case A :

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```
cout << "expert";  
break;
```

Case B :

```
cout << "intermidiator";  
break;
```

Case C :

```
cout << "Beginner";  
Break;
```

default :

```
cout << "Invalid In";  
break;
```

}

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Arrays :

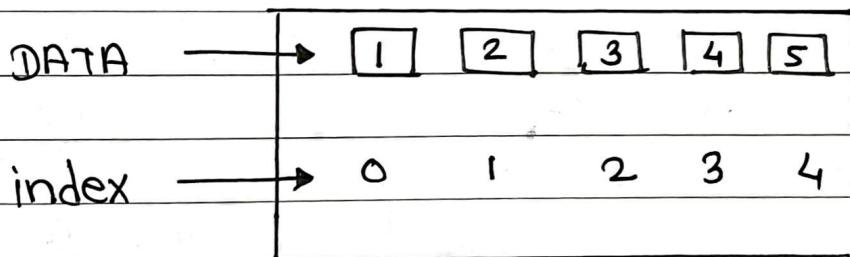
Arrays :

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array in C++ is a group of similar type of elements that have contiguous memory location

In C++ STD::Array is a container that encapsulates fixed size arrays. In C++, array index start from 0.

We can store fixed set of element in C++ array.



example : program to print an array

```
#include <iostream>
using namespace std;
int main () {
    string str[3] = {"Apple", "Banana", "mango"};
    for (int i=0; i<4; i++)
    {
        cout << str[i] + " ";
    }
    return 0;
}
```

## functions :

The functions in c++ language is also known as procedure or subroutine in other programming languages.

every function has a name that is used to refer to it when it is called. A function typically contains the following parts:

- Return value
- parameters
- Declaration

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example:

```
#include <iostream>
using namespace std;
int sum(int a, int b) { → Declaration
    return a+b;
}
int main() {
    int num1 = 10;
    int num2 = 30;
    sum(num1, num2); → calling a function
}
```

# C++ BASIC PROGRAMS

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## I) Fibonacci Series in C++

```
→ #include<iostream>
using namespace std;
int main()
{
    int n1, n2, n3, i, number;
    n1 = 0;
    n2 = 1;
    cout << "enter the number of elements : ";
    cin >> number;
    cout << n1 << n2 << " ";
    // printing 0 & 1
    for(i=2 ; i<number ; i++)
    {
        n3 = n1+n2;
        cout << n3 << " ";
        n1 = n2;
        n2 = n3;
    }
    return 0;
}
```

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**output :**

enter the numbers of element : 10

0 1 1 2 3 5 8 13 21 34

**2) prime number program in C++.**

→ #include <iostream>

using namespace std;

int main()

{

int n, i, m=0, flag=0;

cout << "enter number to check prime:";

cin >> n;

m = n/2;

for(i = 2; i <= m; i++)

{

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if(n % i == 0)

{

cout << "number is not prime." << endl;

flag = 1;

break;

}

}

if(flag == 0) {

cout << "number is prime." << endl;

}

return 0;

}

output:

enter a number to check prime : 20  
number is not prime

enter a numbers to check prime: 17  
number is prime

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palindrome numbers in C++

the palindrome number is same after reverse.

example: 121, 32123, 2372732

→ #include <iostream>

using namespace std;

int main()

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{

    int n, r, sum = 0, temp;

    cout << "enter the number = ";

    cin >> n;

    temp = n;

    while(n > 0)

{

        r = n % 10;

        sum = (sum \* 10) + r;

        n = n / 10

}

```
if (temp == sum)
    cout << "number is palindrome." ;
else
    cout << "number is not palindrome." ;
return 0;
}
```

### Output :

```
enter the number = 12321
Number is palindrome
```

```
enter the number = 120
number is not palindrome
```

### 4) Factorial program in C++

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```
#include <iostream>
using namespace std;
int main()
{
    int i, fact, number;
    cout << "enter any number:" ;
    cin >> number;

    for (i = 1; i <= number; i++)
    {
        fact = fact * i;
    }
    cout << "factorial of " << number << " is: "
        << fact << endl;
    return 0;
}
```

**Output :**

enter any number: 5  
factorial of 5 is: 120

5) C++ Program to swap two numbers without using third variable:

```
→ #include <iostream>
using namespace std;
int main()
{
    int a = 20, b = 50;
    cout << "Before swap a = " << a << " b = " << b;
    a = a+b || a = 70 (20+50)
    b = a-b || b = 50 (70-50)
    a = a-b || a = 50 (70-20)
    cout << "After swap a = " << a << " b = " << b;
    return 0;
}
```

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**Output :**

Before swap a = 20, b = 50  
After swap b = 20, a = 50  
after swap a = 50, b = 20

Q) C++ program to print half star pyramid pattern:

```
#include <iostream>
using namespace std;
int main()
{
    int n,j,i;
    cout << "enter the number of rows:" ;
    cin >>n;
    for (i=1; i<=n; i++)
    {
        for (j=1, j<=i ,j++)
        {
            cout << "* ";
        }
        cout << "\n";
    }
    return 0;
}
```

Output :

enter number rows: 5

```
*
**
* *
* * *
* * * *
* * * * *
```

## 7] C++ program for full \* pyramid

→ # include <iostream>

using namespace std;

int main()

{

int rows, i, j, spaces;

Cout << "enter number rows : ";

Cin >> rows;

for(i=0 ; i<=rows ; i++)

{

    for (spaces = i ; spaces < rows ;  
          spaces++)

{

    Cout << " ";

}

    for (j=1 ; j<=2\*(2\*i-1) ; j++)

{

        Cout << "\*";

}

        Cout << "\n";

}

    return 0;

}

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8) **output :**

enter number of rows : 7

\*  
\* \*  
\* \* \*  
\* \* \* \*  
\* \* \* \* \*  
\* \* \* \* \* \*

8) **Sum of digit program C++;**

```
→ #include <iostream>
using namespace std;
int main()
{
    int n, sum = 0, m;
    cout << "enter a numbers : ";
    cin >> n;
    while (n > 0)
    {
        m = n % 10;
        sum = sum + m;
        n = n / 10;
    }
    cout << "sum is = " << sum << endl;
    return 0;
}
```

OUTPUT:

enter a number = 55  
sum is 10

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