

# C++ Programming

## Basics

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### 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;
```

```
}
```

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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 << "5 is greater than 7";  
}  
else {  
    cout << "7 is greater than 5";  
}
```

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## else-if statement:

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

```
if (s > 7) {  
    cout << "5 is greater than 7";  
}  
elseif (s == 7) {  
    cout << "5 is equal to 7";  
}  
else {  
    cout << "7 is greater than 5";  
}
```



## 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 << "intermediator" ;
```

```
    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.

DATA	→	1	2	3	4	5
index	→	0	1	2	3	4

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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## ] 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 &lt;iostream&gt;

using namespace std;

int main()

{

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

cout &lt;&lt; "enter number to check prime :";

cin &gt;&gt; n;

m = n/2;

for(i=2; i&lt;=m; i++)

{

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if(n%i == 0)

{

cout &lt;&lt; "number is not prime" &lt;&lt; endl;

flag = 1;

break;

}

}

if (flag==0) {

cout &lt;&lt; "number is prime." &lt;&lt; endl;

}

return 0;

}

output:

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

enter a number to check prime: 17  
number is prime

### ③ palindromic 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 number 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 = 20 (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;
}
```

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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=1; i<=rows; i++)

{

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

{

cout << " ";

}

for (j=1; j<=2\*(i-1); j++)

{

cout << "\*";

}

cout << "\n";

}

return 0;

}

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Q7

output :

enter number of rows : 7

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

Q8

Sum of digit program C++;

→ #include <iostream>

using namespace std;

int main()

{

int n, sum = 0, m;

cout << "enter a number : ";

cin >> n;

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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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