

## TUTORIAL 1: BASIC OF C++

C++ is a **middle-level programming** language developed by Bjarne Stroustrup starting in 1979 at Bell Labs.

- **Requirements** : A text editor, like Notepad, to write C++ code
- A compiler, like GCC, to translate the C++ code into a language that the computer will understand.

### CODE:

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

int main() {
    cout << "Hello World!";
    return 0;
}
```

In C++ standard library , we do not need to use ".h" symbol with #include directives.  
This is because C++ library are modern, type safe version. It also contain namespace std::, which is not compatible with older .h style.  
.h version is C style

**Line 1:** #include <iostream> is a header file library that lets us work with **input and output objects**, such as **cout** (used in line 5). Header files add functionality to C++ programs.

**Line 2:** using **namespace std** means that we **can use names for objects and variables from the standard library**.

### Omitting Namespace

You might see some C++ programs that runs without the standard namespace library. The using namespace std line can be omitted and replaced with the std keyword, followed by the **::** operator for some objects:

### CODE:

```
#include <iostream>
int main() {
    std::cout << "Hello World!";
    return 0;
}
```

## SCOPE RESOLUTION OPERATOR

:: here it is scope resolution operator.

### USE:

- 1) To access a global variable when there is a local variable with same name:

```
#include<iostream>
using namespace std;
int x; // Global x
int main()
```

```
{  
int x = 10; // Local x  
  
cout << "Value of global x is " << ::x;  
  
cout << "\nValue of local x is " << x;  
  
return 0;  
}
```

## OUTPUT:

Value of global x is 0

Value of local x is 10

Some other use:

- 2) To define a function outside a class.
- 3) In case of multiple Inheritance

In C++;

The **cout** object, together with the **<< operator**, is used to output values/print text.

```
#include <iostream>  
  
using namespace std;  
  
int main() {  
  
    cout << "Hello World!";  
  
    cout << "I am learning C++";  
  
    return 0;  
}
```

## NEW LINE:

For new line we can use “**\n**” or **endl**. See below example

```
cout << "Hello World!" << endl;  
  
cout << "Hello World! \n\n";
```

## COMMENTS:

For single line comment use : //

For Multiline comments use : /\* and \*/

Some interesting code for expanding view of C++

```
#include<iostream>
```

```
using namespace std;
```

```
int main()
```

```
{
```

```
    int x,y,z;
```

```
    x=y=z=10;
```

```
    cout<<x+y+z;
```

```
    return 0;
```

```
}
```

## Rules for Identifiers: Identity of variable (name of variable)

Names can contain letters, digits and underscores

Names must begin with a letter or an underscore (\_)

Names are case sensitive (myVar and myvar are different variables)

Names cannot contain whitespaces or special characters like !, #, %, etc.

Reserved words (like C++ keywords, such as int) cannot be used as names

## C++ Constants

When you do not want others (or yourself) to change existing variable values, use the const keyword (this will declare the variable as "constant", which means unchangeable and read-only)

```
const int myNum = 15; // myNum will always be 15
```

```
myNum = 10; // error: assignment of read-only variable 'myNum'
```

## C++ User Input

You have already learned that **cout** is used to output (print) values. Now we will use **cin** to get user input.

**cin** is a predefined variable that reads data from the keyboard with the extraction operator (>>).

Example:

```
int x;
```

```
cout << "Type a number: "; // Type a number and press enter
```

```

cin >> x; // Get user input from the keyboard
cout << "Your number is: " << x; // Display the input value

```

### Good To Know

cout is pronounced "see-out". Used for output, and uses the insertion operator (<<)

cin is pronounced "see-in". Used for input, and uses the extraction operator (>>)

### Lets create simple calculator

```

#include<iostream>
using namespace std;

int main()
{
    //Create simple calculator
    int x,y;

    cout << "Enter First digit : ";
    cin >> x;
    cout << "\nEnter Second digit : ";
    cin >> y;
    cout << "\nSum = " << x+y;
    return 0;
}

```

## Basic Data Types

The data type specifies the size and type of information the variable will store:

Data Type    Size    Description

Bool	1 bit	Stores true or false values (0/1)
char	1 byte	Stores a single character/letter/number, or ASCII values
int	2 or 4 bytes	Stores whole numbers, without decimals
float	4 bytes	Stores fractional numbers, containing one or more decimals. Sufficient for storing 6-7 decimal digits

double	8 bytes	Stores fractional numbers, containing one or more decimals. Sufficient for storing 15 decimal digits
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### float vs. double

The precision of a floating point value indicates how many digits the value can have after the decimal point. The precision of float is only six or seven decimal digits, while double variables have a precision of about 15 digits. Therefore it is safer to use double for most calculations.

## One example with character datatype

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

int main()
{
    //Create simple calculator
    char a = 65, b = 66, c = 67;
    cout << a;
    cout << b;
    cout << c;

    return 0;
}
```

**OUTPUT:** ABC

## String Types

The string type is used to store a sequence of characters (text). This is **not a built-in type**, but it behaves like one in its most basic usage. String values must be surrounded by double quotes:

### Example

```
string greeting = "Hello";
cout << greeting;
```

To use strings, you must include an additional header file in the source code, the <string> library:

#### Example

```
// Include the string library
```

```
#include <string>
```

```
// Create a string variable
```

```
string greeting = "Hello";
```

```
// Output string value
```

```
cout << greeting;
```