

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;

}
```

NOTE : C++ is combination of High level + Low level programming language, that cause famous as middle level programming language.

In High level programming language is more focus on abstract, easy to read and write but far from actual Hardware / machine Architecture.

Low level programming language is more closer to machine / machine code, C++ is super set of C that cause it is also part of low level language.

C++ supports OOP with all features making it high level programming language.

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;
```



Correction :

string library not required for storing string in C++; you can do basic operation like storing string and display in terminal without any string lib.

But string library is required for performing operation on string.