

First C++ Program -

```
#include <iostream.h>
using namespace std;
void main()
{
    cout << "Hello this is C++";
}
```

- **Header files** - Header files are included at the beginning just like in C program. Here iostream is a header file which provides us with input & output streams. Header files contained predeclared function libraries, which can be used by users for their ease.
- **Namespace std** - Using namespace std, tells the compiler to use standard namespace. Namespace collects identifiers used for class, object and variables. Namespace can be used by two ways in a program, either by the use of using statement at the beginning, like we did in above mentioned program or by using name of namespace as prefix before the identifier with scope resolution (::) operator.

C++ Basic Input / Output -

- C++ I/O operation is using the stream concept. Stream is the sequence of bytes or flow of data. It makes the performance fast.
- If bytes flow from main memory to device like printer, display screen, or a network connection etc, this is called as **output operation**.
- If bytes flow from device like printer, display screen, or a network connection etc to main memory, this is called as **input operation**.

- I/O Library Header Files –

Header File	Function and Description
<iostream>	It is used to define the cout, cin and cerr objects, which correspond to standard output stream, standard input stream and standard error stream, respectively.
<iomanip>	It is used to declare services useful for performing formatted I/O, such as setprecision and setw .
<fstream>	It is used to declare services for user-controlled file processing.

Standard output stream (cout) -

- The cout is a predefined object of ostream class. It is connected with the standard output device, which is usually a display screen. The cout is used in conjunction with stream *insertion operator* (<<) to display the output on a console.

```
#include <iostream.h>
void main()
{
    cout << "Hello this is C++";
}
```

Standard input stream (cin) -

- The cin is a predefined object of istream class. It is connected with the standard input device, which is usually a keyboard. The cin is used in conjunction with stream *extraction operator* (>>) to read the input from a console.

```
#include <iostream.h>
using namespace std;
void main( )
{
    int age;
    cout << "Enter your age: ";
    cin >> age;
    cout << "Your age is: " << age << endl;
}
```

Standard end line (endl) -

- The cin is a predefined object of istream class. It is connected with the standard input device, which is usually a keyboard. The cin is used in conjunction with stream *extraction operator* (>>) to read the input from a console.

```
#include <iostream.h>
using namespace std;
void main( )
{
    int age;
    cout << "Enter your age: ";
    cin >> age;
    cout << "Your age is: " << age << endl;
}
```

C++ Variable -

- A variable is a name of memory location. It is used to store data. Its value can be changed and it can be reused many times. It is a way to represent memory location through symbol so that it can be easily identified.
- **Syntax -** *type variable_list;*
- **Rules for defining variables -**
 1. A variable can have alphabets, digits and underscore.
 2. A variable name can start with alphabet and underscore only. It can't start with digit.
 3. No white space is allowed within variable name.
 4. A variable name must not be any reserved word or keyword e.g. char, float etc.

Practical Session on C++

- Extension of C language is .c
- Extension of C++ language is .cpp
- In C language -> stdio.h
- In C++ language -> iostream.h
- In both programming language -> conio.h (common)
- In C language -> printf
- In C++ language -> cout
- In C language -> scanf
- In C++ language -> cin

- There is no concept of Format Specifier in C++
 - %d, %f,%c -> Format Specifier
- There are specially 3 types of header files –
 - iostream -> cout/cin/cerr/clog
 - iomanip -> setprecision/setw
 - fstream -> file processing
- Insertion Operator – cout - <<
- Extraction Operator – cin - >>

Hello World Printing

```
#include<iostream.h>
```

```
void main()
```

```
{
```

```
    cout<<"hello world";
```

```
}
```

Variable Declaration & Initialization

```
#include<iostream.h>  
#include<conio.h>
```

```
void main()  
{  
    int a = 100;           //Variable declaration & initialization  
  
    cout<<"Value of a= "<<a;  
}
```

$$C + OOP = C++$$

- Sum of digits of a 3-digit number -
- 123
- $1+2+3 = 6$
- $123\%10 = 3$ as a remainder

```
#include<iostream.h>
```

```
#include<conio.h>
```

```
void main()
```

```
{
```

```
    int n,p,q,r, sum = 0;
```

```
    cout<<"Enter the number: ";
```

```
    cin>> n;
```

```
    p = (n % 10);
```

```
    q = (n / 10) % 10;
```

```
    r = (n / 10) / 10;
```

```
    sum = (p + q + r);
```

```
    cout<<"Required Sum of digit is: "<<sum;
```

```
}
```