

1. OVERVIEW

C++ is a statically typed, compiled, general-purpose, case-sensitive, free-form programming language that supports procedural, object-oriented, and generic programming.

C++ is regarded as a **middle-level** language, as it comprises a combination of both high-level and low-level language features.

C++ was developed by Bjarne Stroustrup starting in 1979 at Bell Labs in Murray Hill, New Jersey, as an enhancement to the C language and originally named C with Classes but later it was renamed C++ in 1983.

C++ is a superset of C, and that virtually any legal C program is a legal C++ program.

Note: A programming language is said to use static typing when type checking is performed during compile-time as opposed to run-time.

Object-Oriented Programming

C++ fully supports object-oriented programming, including the four pillars of object-oriented development:

- Encapsulation
- Data hiding
- Inheritance
- Polymorphism

Standard Libraries

Standard C++ consists of three important parts:

- The core language giving all the building blocks including variables, data types and literals, etc.
- The C++ Standard Library giving a rich set of functions manipulating files, strings, etc.
- The Standard Template Library (STL) giving a rich set of methods manipulating data structures, etc.

The ANSI Standard

The ANSI standard is an attempt to ensure that C++ is portable; that code you write for Microsoft's compiler will compile without errors, using a compiler on a Mac, UNIX, a Windows box, or an Alpha.

The ANSI standard has been stable for a while, and all the major C++ compiler manufacturers support the ANSI standard.

Learning C++

The most important thing while learning C++ is to focus on concepts.

The purpose of learning a programming language is to become a better programmer; that is, to become more effective at designing and implementing new systems and at maintaining old ones.

C++ supports a variety of programming styles. You can write in the style of Fortran, C, Smalltalk, etc., in any language. Each style can achieve its aims effectively while maintaining runtime and space efficiency.

Use of C++

C++ is used by hundreds of thousands of programmers in essentially every application domain.

C++ is being highly used to write device drivers and other software that rely on direct manipulation of hardware under real-time constraints.

C++ is widely used for teaching and research because it is clean enough for successful teaching of basic concepts.

Anyone who has used either an Apple Macintosh or a PC running Windows has indirectly used C++ because the primary user interfaces of these systems are written in C++.

2. ENVIRONMENT SETUP

Try it Option Online

You really do not need to set up your own environment to start learning C++ programming language. Reason is very simple, we have already set up C++ Programming environment online, so that you can compile and execute all the available examples online at the same time when you are doing your theory work. This gives you confidence in what you are reading and to check the result with different options. Feel free to modify any example and execute it online.

Try the following example using our online compiler option available at <http://www.compileonline.com/>

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

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

For most of the examples given in this tutorial, you will find **Try it** option in our website code sections at the top right corner that will take you to the online compiler. So just make use of it and enjoy your learning.

Local Environment Setup

If you are still willing to set up your environment for C++, you need to have the following two softwares on your computer.

Text Editor

This will be used to type your program. Examples of few editors include Windows Notepad, OS Edit command, Brief, Epsilon, EMACS, and vim or vi.

Name and version of text editor can vary on different operating systems. For example, Notepad will be used on Windows and vim or vi can be used on windows as well as Linux, or UNIX.

The files you create with your editor are called source files and for C++ they typically are named with the extension .cpp, .cp, or .C.

A text editor should be in place to start your C++ programming.

C++ Compiler

This is an actual C++ compiler, which will be used to compile your source code into final executable program.

Most C++ compilers don't care what extension you give to your source code, but if you don't specify otherwise, many will use .cpp by default.

Most frequently used and free available compiler is GNU C/C++ compiler, otherwise you can have compilers either from HP or Solaris if you have the respective Operating Systems.

Installing GNU C/C++ Compiler:

UNIX/Linux Installation

If you are using **Linux** or **UNIX** then check whether GCC is installed on your system by entering the following command from the command line:

```
$ g++ -v
```

If you have installed GCC, then it should print a message such as the following:

```
Using built-in specs.
Target: i386-redhat-linux
Configured with: ../configure --prefix=/usr .....
Thread model: posix
gcc version 4.1.2 20080704 (Red Hat 4.1.2-46)
```

If GCC is not installed, then you will have to install it yourself using the detailed instructions available at <http://gcc.gnu.org/install/> .

Mac OS X Installation

If you use Mac OS X, the easiest way to obtain GCC is to download the Xcode development environment from Apple's website and follow the simple installation instructions.

Xcode is currently available at developer.apple.com/technologies/tools/.

Windows Installation

To install GCC at Windows you need to install MinGW. To install MinGW, go to the MinGW homepage, www.mingw.org, and follow the link to the MinGW download page. Download the