Basics of C++

C ++ is an object oriented programming language, C ++ was developed by Jarney Stroustrup at AT & T Bell lab, USA in early eighties. C ++ was developed from c and simula 67 language. C ++ was early called ‘C with classes’.

Why Use C++

- C++ is one of the world's most popular programming languages.
- C++ can be found in today's operating systems, Graphical User Interfaces, and embedded systems.
- C++ is an object-oriented programming language which gives a clear structure to programs and allows code to be reused, lowering development costs.
- C++ is portable and can be used to develop applications that can be adapted to multiple platforms.
- C++ is fun and easy to learn!
- As C++ is close to C, C# and Java, it makes it easy for programmers to switch to C++ or vice versa.

Difference between C and C++

C++ was developed as an extension of C, and both languages have almost the same syntax.

The main difference between C and C++ is that C++ supports classes and objects, while C does not.

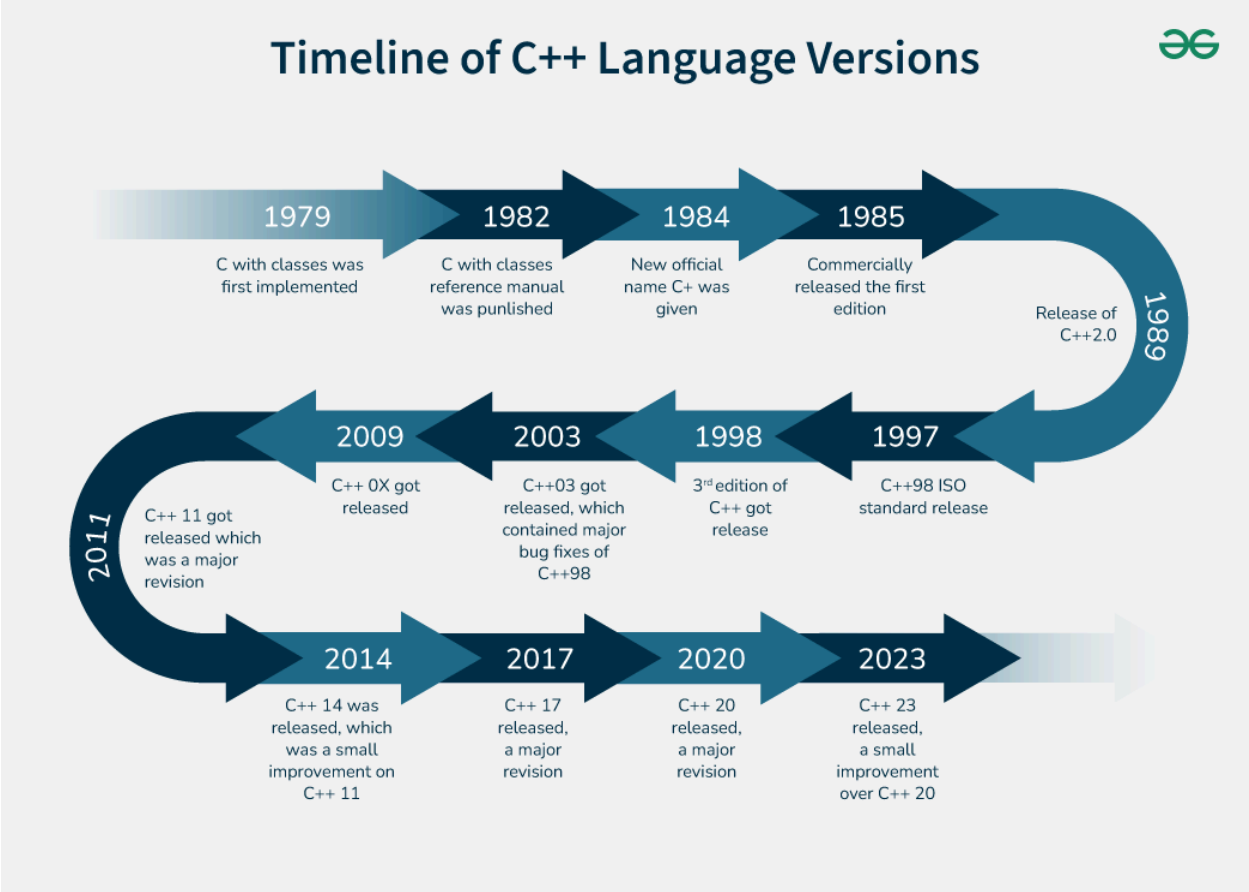
Features of C++

The main features C++ programming language are as follows:

- **Simple**: It is a simple language in the sense that programs can be broken down into logical units and parts, and has a rich library support and a variety of datatypes.
- **Machine Independent**: C++ code can be run on any machine as long as a suitable compiler is provided.
- **Low-level Access:** C++ provides low-level access to system resources, which makes it a suitable choice for system programming and writing efficient code.
- **Fast Execution Speed**: C++ is one of the fastest high-level languages. There is no additional processing overhead in C++, it is blazing fast.
- **Object-Oriented**: One of the strongest points of the language which sets it apart from C. Object-Oriented support helps C++ to make maintainable and extensible programs. i.e. large-scale applications can be built.

History of C++

C++ is an object-oriented, **middle-level** programming language developed by Bjarne Stroustrup at Bell Labs in 1979, originally called "**C with Classes**" and renamed to C++ in 1983. It extended C by adding features like classes, inheritance, and type checking to support **object-oriented programming**. Over time, it evolved through standards like C++98, C++11, C++17, C++20, and the latest C++23, adding modern features for performance and safety. Today, C++ remains widely used in system software, game engines, competitive programming, and high-performance applications



Difference Between C and C++

C and C++ are both popular programming languages, but they differ in several key aspects including programming paradigms, features, syntax, and use cases.

Aspect	C Language	C++ Language
Developed By	Dennis Ritchie	Bjarne Stroustrup
Year of Development	1972	1979
Programming Paradigm	Procedural Programming Language	Object-Oriented + Procedural Programming
Approach	Top-down	Bottom-up
Code Organization	Focuses on functions	Focuses on objects and classes
Classes & Objects	Not supported	Supported
Inheritance	Not supported	Supported
Encapsulation	Not supported	Supported
Polymorphism	Not supported	Supported
Function Overloading	Not supported	Supported
Operator Overloading	Not supported	Supported
Templates	Not supported	Supported
Exception Handling	Not supported	Supported using `try`, `catch`, `throw`
Standard I/O	Uses `printf()` and `scanf()` from `stdio.h`	Uses `cout` and `cin` from `iostream`
Namespace	Not available	Available (`namespace`)

Memory Allocation	Uses `malloc()`, `calloc()`, `free()`	Uses `new` and `delete`
Standard Libraries	Limited standard libraries	Rich Standard Template Library (STL)
Speed	Slightly faster compilation due to simplicity	Slightly slower compilation, more features
Compatibility	Cannot run C++ code	Can run most C code (C++ is mostly a superset of C)
Use Cases	System programming, embedded systems, operating systems	Game development, GUI apps, simulations, object-oriented systems
File Extension	`.c`	`.cpp`