C vs. C++

What is C?

C is a structural or procedural oriented programming language which is machine-independent and extensively used in various applications.

C is the basic programming language that can be used to develop from the operating systems (like Windows) to complex programs like Oracle database, Git, Python interpreter, and many more. C programming language can be called a god's programming language as it forms the base for other programming languages. If we know the C language, then we can easily learn other programming languages. C language was developed by the great computer scientist Dennis Ritchie at the Bell Laboratories. It contains some additional features that make it unique from other programming languages.

What is C++?

C++ is a special-purpose programming language developed by **Bjarne Stroustrup** at Bell Labs circa 1980. C++ language is very similar to C language, and it is so compatible with C that it can run 99% of C programs without changing any source of code though C++ is an object-oriented programming language, so it is safer and well-structured programming language than C.

Let's understand the differences between C and C++.

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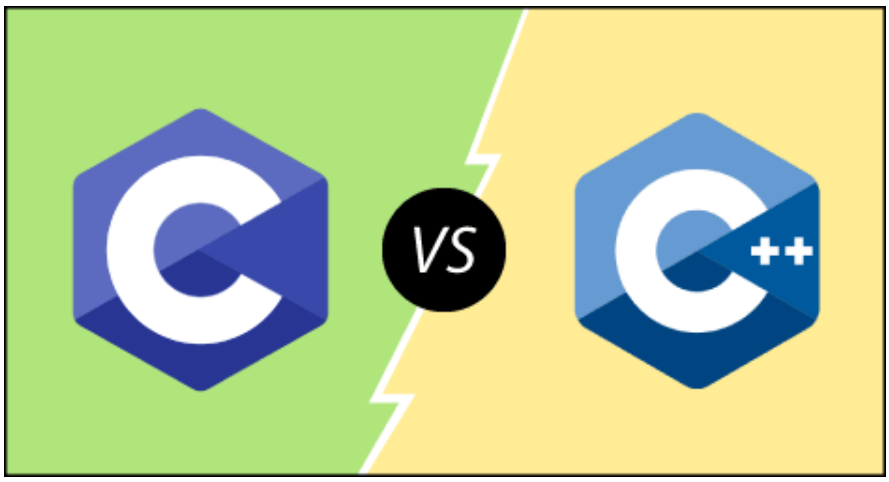

The following are the differences between C and C++:

- **Definition**
  C is a structural programming language, and it does not support classes and objects, while C++ is an object-oriented programming language that supports the concept of classes and objects.
- **Type of programming language**
  C supports the structural programming language where the code is checked line by line, while C++ is an object-oriented programming language that supports the concept of classes and objects.
- **Developer of the language**
  Dennis Ritchie developed C language at Bell Laboratories while Bjarne Stroustrup developed the C++ language at Bell Labs circa 1980.
- **Subset**
  C++ is a superset of C programming language. C++ can run 99% of C code but C language cannot run C++ code.
- **Type of approach**
  C follows the top-down approach, while C++ follows the bottom-up approach. The top-down approach breaks the main modules into tasks; these tasks are broken into sub-tasks, and so on. The bottom-down approach develops the lower level modules first and then the next level modules.
- **Security**
  In C, the data can be easily manipulated by the outsiders as it does not support the encapsulation and information hiding while C++ is a very secure language, i.e., no outsiders can manipulate its data as it supports both encapsulation and data hiding. In C language, functions and data are the free entities, and in C++ language, all the functions and data are encapsulated in the form of objects.
- **Function Overloading**
  Function overloading is a feature that allows you to have more than one function with the same ...es in the parameters. C does not support the function overloading, while C++ ...nction overloading.

- **Function Overriding**
  Function overriding is a feature that provides the specific implementation to the function, which is already defined in the base class. C does not support the function overriding, while C++ supports the function overriding.
- **Reference variables**
  C does not support the reference variables, while C++ supports the reference variables.
- **Keywords**
  C contains 32 keywords, and C++ supports 52 keywords.
- **Namespace feature**
  A namespace is a feature that groups the entities like classes, objects, and functions under some specific name. C does not contain the namespace feature, while C++ supports the namespace feature that avoids the name collisions.
- **Exception handling**
  C does not provide direct support to the exception handling; it needs to use functions that support exception handling. C++ provides direct support to exception handling by using a try-catch block.
- **Input/Output functions**
  In C, scanf and printf functions are used for input and output operations, respectively, while in C++, cin and cout are used for input and output operations, respectively.
- **Memory allocation and de-allocation**
  C supports calloc() and malloc() functions for the memory allocation, and free() function for the memory de-allocation. C++ supports a new operator for the memory allocation and delete operator for the memory de-allocation.
- **Inheritance**
  Inheritance is a feature that allows the child class to reuse the properties of the parent class. C language does not support the inheritance while C++ supports the inheritance.
- **Header file**
  C program uses **<stdio.h>** header file while C++ program uses **<iostream.h>** header file.

Let's summarize the above differences in a tabular form.

No.	C	C++
1)	C follows the **procedural style programming.**	C++ is multi-paradigm. It supports both **procedural and object oriented.**
2)	Data is less secured in C.	In C++, you can use modifiers for class members to make it inaccessible for outside users.
	top-down approach.	C++ follows the **bottom-up approach.**

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4)	C does not support function overloading.	C++ supports function overloading.
5)	In C, you can't use functions in structure.	In C++, you can use functions in structure.
6)	C does not support reference variables.	C++ supports reference variables.
7)	In C, **scanf() and printf()** are mainly used for input/output.	C++ mainly uses stream **cin and cout** to perform input and output operations.
8)	Operator overloading is not possible in C.	Operator overloading is possible in C++.
9)	C programs are divided into **procedures and modules**	C++ programs are divided into **functions and classes.**
10)	C does not provide the feature of namespace.	C++ supports the feature of namespace.
11)	Exception handling is not easy in C. It has to perform using other functions.	C++ provides exception handling using Try and Catch block.
12)	C does not support the inheritance.	C++ supports inheritance.

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