

Introduction of C

What is C Programming Language?

C is a general-purpose programming language that is extremely popular, simple, and flexible to use. It is a **structured programming language that is machine-independent** and extensively used to write various applications, Operating Systems like Windows, and many other complex programs like Oracle database, Git, Python interpreter, and more.

It is said that 'C' is a god's programming language. One can say, C is a base for the programming. If you know 'C,' you can easily grasp the knowledge of the other programming languages that uses the concept of 'C'

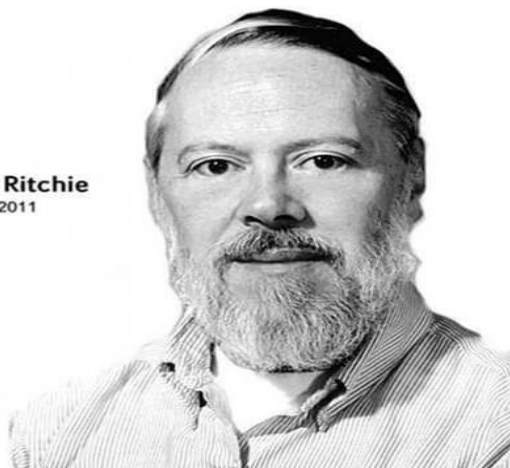
History of C language

The base or father of programming languages is **'ALGOL.'** It was first introduced in 1960. 'ALGOL' was used on a large basis in European countries. 'ALGOL' introduced the concept of structured programming to the developer community.

In 1967, a new computer programming language was announced called as **'BCPL'** which stands for **Basic Combined Programming Language**. BCPL was designed and developed by Martin Richards, especially for writing system software. This was the era of programming languages.

Just after three years, in 1970 a new programming language called **'B'** was introduced by Ken **Thompson** that contained multiple features of 'BCPL.' This programming language was created using UNIX operating system at AT&T and Bell Laboratories. Both the 'BCPL' and 'B' were system programming languages.

Dennis Ritchie
1941-2011



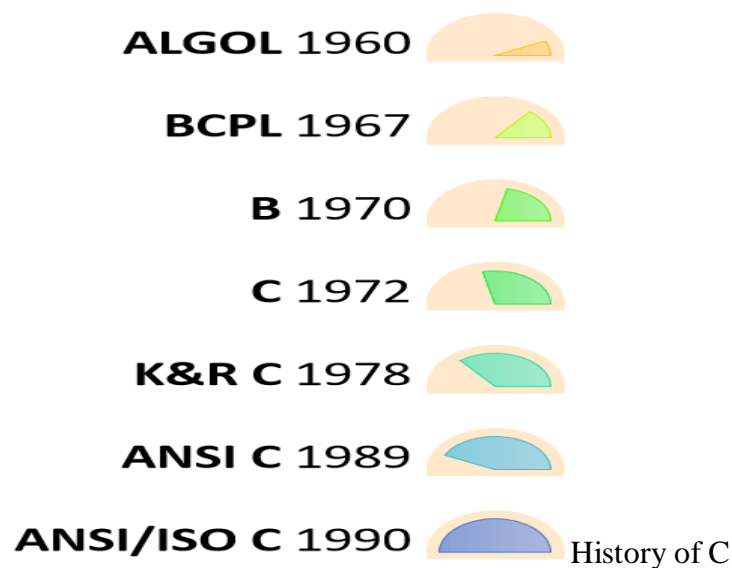
In 1972, a great computer **scientist Dennis Ritchie** created a new programming language called **'C' at the Bell Laboratories**. It was created from 'ALGOL', 'BCPL' and 'B' programming

languages. 'C' programming language contains all the features of these languages and many more additional concepts that make it unique from other languages.

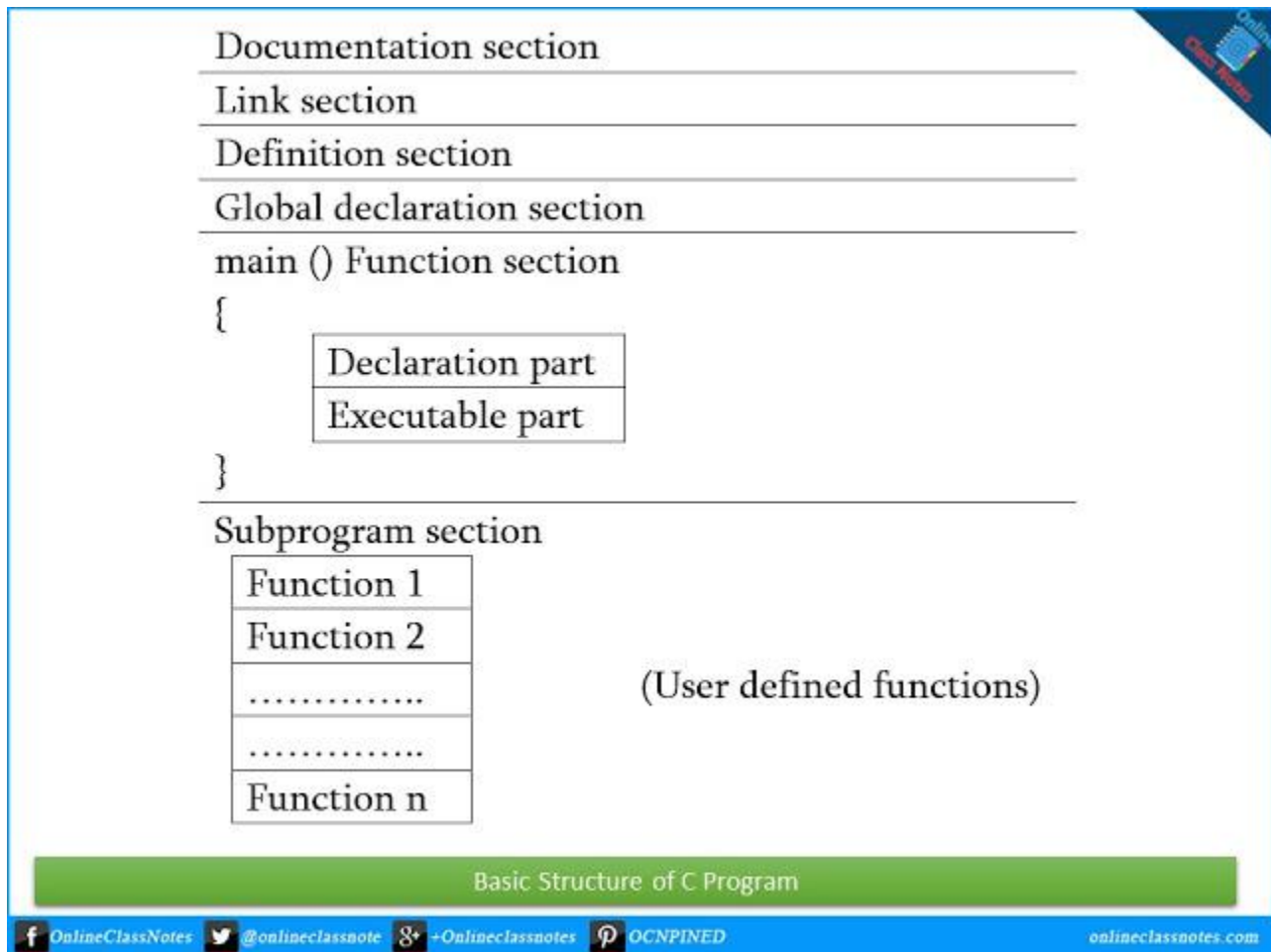
'C' is a powerful programming language which is strongly associated with the UNIX operating system. Even most of the **UNIX operating system** is coded in 'C'. Initially 'C' programming was limited to the UNIX operating system, but as it started spreading around the world, it became commercial, and many compilers were released for cross-platform systems.

Today 'C' runs under a **variety of operating systems and hardware platforms**. As it started evolving many different versions of the language were released. At times it became difficult for the developers to keep up with the latest version as the systems were running under the older versions.

To assure that 'C' language will remain standard, American National Standards Institute (ANSI) defined a commercial standard for 'C' language in 1989. Later, it was approved by the International Standards Organization (ISO) in 1990. 'C' programming language is also called as 'ANSI C'.



Basic Structure of C program



Basic Structure of a C Program

Documentation section

The documentation section consists of a set of comment lines giving the name of the program, the author and other details, which the programmer would like to use later.

Link section

The link section provides instructions to the compiler to link functions from the system library such as using the [#include directive](#).

Definition section

The definition section defines all symbolic constants such using the [#define directive](#).

Global declaration section

There are some variables that are used in more than one function. Such variables are called global variables and are declared in the global declaration section that is outside of all the functions. This section also declares all the user-defined functions.

main () function section

Every C program must have one main function section. This section contains two parts; declaration part and executable part

Declaration part

The declaration part declares all the variables used in the executable part.

Executable part

There is at least one statement in the executable part. These two parts must appear between the opening and closing braces. The program execution begins at the opening brace and ends at the closing brace. The closing brace of the main function is the logical end of the program. All statements in the declaration and executable part end with a semicolon.

Subprogram section

If the program is a multi-function program then the subprogram section contains all the user-defined functions that are called in the main () function. User-defined functions are generally placed immediately after the main () function, although they may appear in any order.

Example:

Structure of C Program	
Header	#include <stdio.h>
main()	int main() {
Variable declaration	int a = 10;
Body	printf("%d ", a);
Return	return 0; }

C Basic commands	Explanation
#include <stdio.h>	This command includes standard input output header file(stdio.h) from the C library before compiling a C program
int main()	It is the main function from where C program execution begins.
{	Indicates the beginning of the main function.
/*_some_comments_*/	Whatever written inside this command “/* */” inside a C program, it will not be considered for compilation and execution.
printf(“Hello_World!”);	This command prints the output on the screen.

getch();	This command is used for any character input from keyboard.
return 0;	This command is used to terminate a C program (main function) and it returns 0.
}	It is used to indicate the end of the main function.

Code:

```
#include<stdio.h>
```

```
int main()
```

```
{
```

```
    printf("Hellow World");
```

```
    return 0;
```

```
}
```

Where is C used? Key Applications

1. 'C' language is widely used in embedded systems.
2. It is used for developing system applications.
3. It is widely used for developing desktop applications.
4. Most of the applications by Adobe are developed using 'C' programming language.
5. It is used for developing browsers and their extensions. Google's Chromium is built using 'C' programming language.
6. It is used to develop databases. MySQL is the most popular database software which is built using 'C'.
7. It is used in developing an operating system. Operating systems such as Apple's OS X, Microsoft's Windows, and Symbian are developed using 'C' language. It is used for developing desktop as well as mobile phone's operating system.
8. It is used for compiler production.
9. It is widely used in IOT applications.

Why learn C Language?

As we studied earlier, 'C' is a base language for many programming languages. So, learning 'C' as the main language will play an important role while studying other programming languages. It shares the same concepts such as data types, operators, control statements and many more. 'C'

can be used widely in various applications. It is a simple language and provides faster execution. There are many jobs available for a 'C' developer in the current market.

'C' is a structured programming language in which program is divided into various modules. Each module can be written separately and together it forms a single 'C' program. This structure makes it easy for testing, maintaining and debugging processes.

'C' contains 32 keywords, various data types and a set of powerful built-in functions that make programming very efficient.

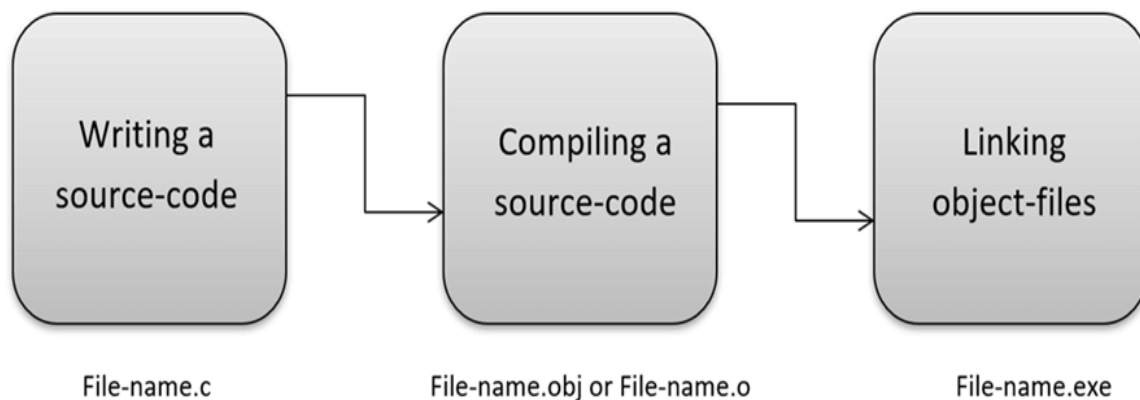
Another feature of 'C' programming is that it can extend itself. A 'C' program contains various functions which are part of a library. We can add our features and functions to the library. We can access and use these functions anytime we want in our program. This feature makes it simple while working with complex programming.

Various compilers are available in the market that can be used for executing programs written in this language.

It is a highly portable language which means programs written in 'C' language can run on other machines. This feature is essential if we wish to use or execute the code on another computer.

How C Programming Language Works?

C is a compiled language. A compiler is a special tool that compiles the program and converts it into the object file which is machine readable. After the compilation process, the linker will combine different object files and creates a single executable file to run the program. The following diagram shows the execution of a 'C' program



Nowadays, various compilers are available online, and you can use any of those compilers. The functionality will never differ and most of the compilers will provide the features required to execute both 'C' and 'C++' programs.

Following is the list of popular compilers available online:

- Clang compiler
- MinGW compiler (Minimalist GNU for Windows)
- Portable 'C' compiler
- Turbo C
- Code Blocks

Summary

- 'C' was developed by Dennis Ritchie in 1972.
- It is a robust language.
- It is a low programming level language close to machine language
- It is widely used in the software development field.
- It is a procedure and structure oriented language.
- It has the full support of various operating systems and hardware platforms.
- Many compilers are available for executing programs written in 'C'.
- A compiler compiles the source file and generates an object file.
- A linker links all the object files together and creates one executable file.
- It is highly portable.