

# Learn CODE: Start with C

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## The Best C Tutorial for Beginners ( Is It Worth Learning C?)

C is the 'Mother of all programming languages' and is the most prominent programming languages. If you want to step your foot forward to conquer the realm of programming, you have come to the right place. For a novice at programming, C is the best language to start off with. In this C tutorial, you will be learning:

- What is C
- Why C is important
- C's features, pros, and cons
- What is the need to explore this language?

C is one of the most primitive languages as it is closely associated with low-level languages. It is a well-established fact that C is a high-level programming language that lies at the low-level end spectrum of a high-level language. Hence, a strong foundation in C is a must if you want to develop a career in programming.

It is the base to learn problem-solving and programming as it involves developing a logistical approach to solving the most basic problems you have encountered in your mathematics textbook in elementary school or day to day real-life situations which require a specific algorithm to be solved.

Excited to explore the C Tutorial for Beginners? Let's begin.

# 1. What is C Programming Language?

*C is a procedural programming language as well as a general-purpose programming language that was developed by **Dennis Ritchie at AT&T's Bell laboratories in 1972**. It is an **amazing and simple language** that helps you develop complex software applications with ease. It is considered as the mother of all languages. C is a high-level programming language that provides support to a low-level programming language as well.*

C consists of a series of concepts ranging from variables, functions, operators, scope and much more. We would be exploring all of these topics in detail in our next C tutorial.

First of all, let us start by understanding some of the basic terms related to C.

## 2. Understanding C Language

From the above definition, we understood what is C programming but,

- What is a procedural programming language?

A procedural language follows well-organized architecture by specifying all the steps that the computer must take to obtain the desired output. Programming languages like C, Fortran, BASIC, Pascal, and C++ follow procedural programming. It is a programming paradigm consisting of a set of a computational hierarchy of steps to execute a program.

- What is meant by a high-level and a low-level programming language?

A **high-level language** is similar to the human language and is easy to understand and write. High-level language focuses more on arithmetic operations, program efficiency, and simplicity in coding. In other words, a high-level programming language is in contrast to machine-level languages. It is in close association with the language we converse in, that is, the human language. We use it in developing the program in an easy and understandable way.

A **low-level language** is a very machine friendly language. Therefore, writing programs in a low-level language is very complex for humans.

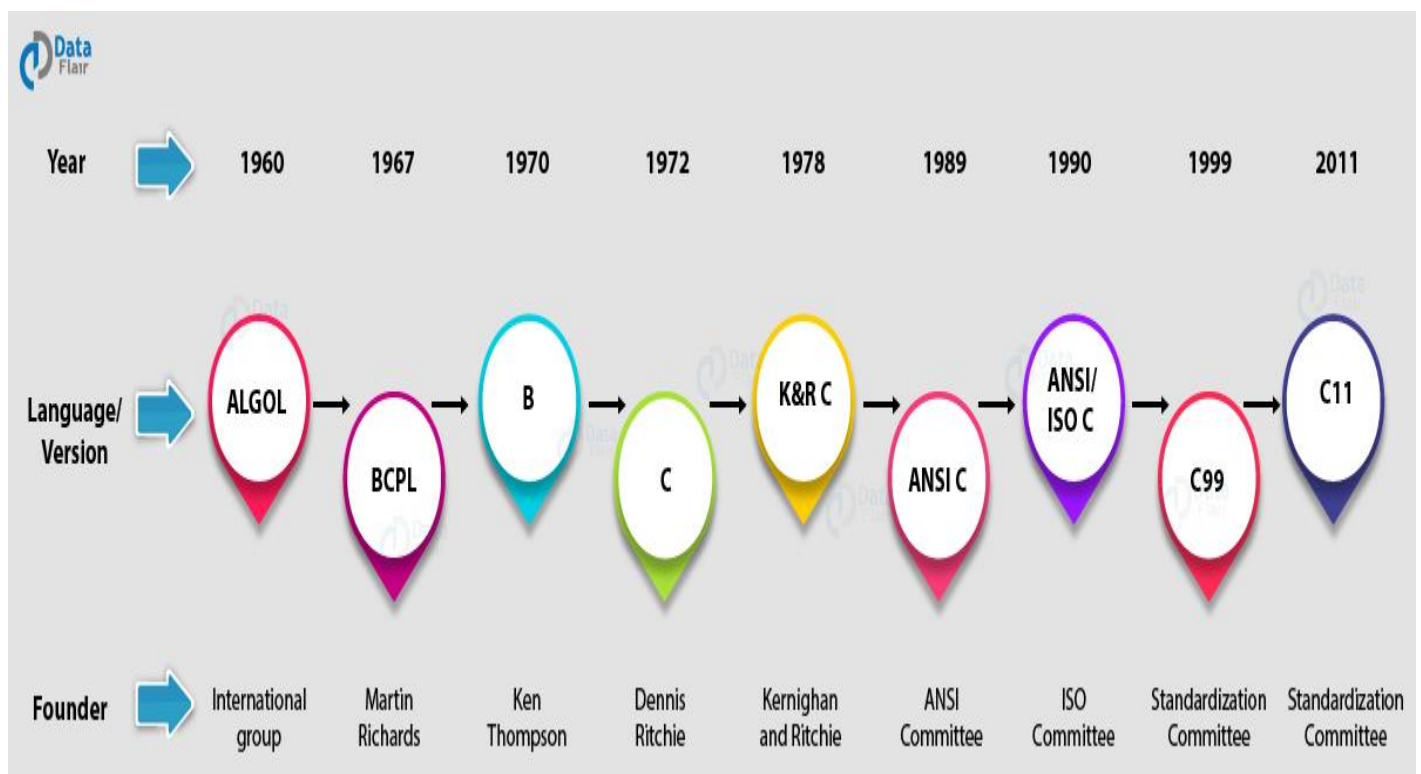
### 3. History of C

After the introduction of the C language, previously developed programming languages like ALGOL, COBOL, B soon lost its significance and drastically shook their well-established niche in the domain of programming.

C was developed by Dennis Ritchie in 1972. Ritchie aimed at improving B language as it was considered slow and lacked features such as byte addressability. The development of C language was followed by the origin of Unix, the first operating system implemented in a high-level language.

In 1978, Ritchie and Kernighan published the first edition of the book “The C programming language” referred to as the K&R C version of the C language. The second and improved version of the book was published by ANSI (American National Standard Institute) C standard in 1989. C grew into new and improved versions over the years. The latest version of C language is C18, extending no new features but simply certain technical corrections to anomalies in C11.

Given below is an image of the detailed history of how C evolved.



(This Picture Collected from DataFlair)

### 4. Why C?

The C tutorial for beginners is incomplete without the knowledge of why C programming is used. C language was developed due to various reasons that made it a very specific and convenient programming language.

The **C compiler** supports both assembly language features and high-level language and hence, it is best suitable for writing both system applications and most of the business packages. It is a portable language and hence, once the code is written, it can run on any computer system. C is basically used for developing Operating Systems. The first Operating System developed using C was Unix. Although, assembly language provides relatively higher speed and maximum control over the program it lacks portability.

From the above discussion, we inferred that the main strength of C is its capability of being functional on any computer architecture along with great flexibility and reliability. Moreover, the vast library functions pre-defined in C makes it an optimal choice for programming. Although assembly language has extremely powerful programs, it proves it be of great inconvenience when it comes to creating large applications.

## 5. Why should beginners learn the C language?

C is the most basic language and almost all programming languages are derived from C. Other programming languages inherited their features from C and hence C is called the mother of all programming languages.

If you learn C, it becomes easy for you to learn programming languages like Ruby, Python, PHP, C++, JAVA, Lua and more.

## 6. What is a Compiler in C?

Till now, in this C tutorial, we heard the term compilers many times, but what are compilers in C? Why are they used? Let's get the answers to these questions:

A compiler is a computer program that converts our program code to machine understandable code(binary code). The C compiler is a software application for converting the code to make it machine-friendly.

We have already discussed that a high-level programming language is machine independent and easily understandable by humans. Therefore, there is a need to convert a low-level language to a high-level language. The process of compilation is referred to as the conversion of a high-level language to low-level language.

## 7. How to Write a Program in C?

Now, taking a break from the theoretical portion, we are now moving towards the practical approach. First of all, we will start with the simplest program to print a message.

```
1.#include <stdio.h>
2.int main()
3.{
4.// printf() displays the string inside quotation
5.printf("Welcome to Learn CODE: Start with C!");
6.return 0;
7.}
```

**Output – Welcome to Learn CODE: Start with C!**

### Understanding every line of code

- **#include <stdio.h>** – It includes a preprocessor command. By this command, we add all the files and content of stdio.h in the program.
- **int main()** – Execution of any C program begins with this step.
- **printf()** – It sends the formatted output to the screen.
- **return 0** – This statement shows the end status, that is, the function returns whatever argument passed in return. Here, 0 is passed as the return value which means that the function returns NULL value.

## 8. Features of C Programming

There are various features or we can say reasons to learn C programming that make it popular in the technical and well as management industries. The *salient features of the C language* include:

1. **Simple and efficient** – The syntax style is easy to comprehend. We can use C to design applications that were previously designed by assembly language.
2. **Memory Management** – It allows you to allocate memory at the runtime, that is, it supports the concept of dynamic memory allocation.
3. **Dynamic Memory Allocation**- When you are not sure about the memory requirements in your program and want to specify it at the run time, that is, when you run your program, you can do it manually.

4. **Pointers** – C language provides a pointer that stores the memory address as its value. Pointers are useful in storing and accessing data from memory. We will study this in detail in our upcoming tutorials.
5. **Case Sensitive** – It is pretty clear that lowercase and uppercase characters are treated differently in C. It means that if you write “program” and “Program”, both of them would connote different meanings in C. The ‘p’ in “program” is in lowercase format whereas, the ‘P’ in Program is in uppercase format.
6. **Compiler Based** – C is a compiler based language, that is, to execute a code we first need to compile it.
7. **Structure Oriented/Modular** – C is a structured programming language. This means you can divide your code and task within a function to make it interactive. These functions also help in code reusability.

## 9. Applications of C Language

There is no meaning of mastering the C language, until and unless you know its real-time uses. Following are some of the applications of [C](#):

1. It is used in the development of **Operating Systems** and **Embedded Softwares**. For example, the Unix Kernel was born out of C as discussed earlier.
2. It comes in handy when designing a compiler for other programming languages.
3. Data structures and algorithms are implemented in C
4. It acts as a base language to develop new languages. For instance, C++ was developed from C.
5. Computer applications can be developed using C.
6. Firmware is designed for electrical, industrial and communication appliances using C.

## 10. Advantages of C Programming Language

In this section, we are going to list all the benefits of C for the user:

1. **Portable** – It is easy to install and operate and the result file is a .exe file that is easy to execute on any computer without any framework.
2. **Compiles faster** – C has a faster compiler that can compile 1000 lines of code in seconds and optimize the code to give speedy execution.
3. **User-defined functions** – C has many header files that define a lot of functions, making it easier for you to code. You can also create your functions; these are called user-defined functions (UDFs).
4. **C has a lower level of abstraction** – C is a very clear and descriptive language. You can, in a way, directly see into the machine without any conceptual hiding and so learning C first makes the concepts very clear for you to proceed.

**Note:** Abstraction means Data Hiding

## 11. Companies Using C

Almost all the companies that work on firmware, gaming, networking, graphics use C. Some of the companies that use C to write algorithms are :



*(This Picture Collected from DataFlair)*

## 12. Career Aspects in C Programming Language

Up till now, in this C tutorial, we learned all the basic concepts of C programming. But, what about its career opportunities?

C language is always in demand and you can grab a list of opportunities for your career growth. Many people talk about moving to advanced languages like Java, and Python. But, the core of every machine remains the same – C.

There are **dozens of jobs available** if you are clear with your programming concepts.

- Companies that work on embedded programming can be an excellent option.
- If you are interested in Robotics and other security devices or electronic devices, you should learn c programming to develop basic algorithms for various microcontrollers.
- You can become a Software Engineer or a Team Leader if you are good at Data Structures.



You don't need to search for career possibilities, just be confident about what you learn and implement, using logic and proper application of all the protocols of a programming language.

Hence, you can build your desired career if you excel in it what you study.

### Salary Prospects

*"The more you learn, the more you earn."*

This comes to be the first concern as of now. Yes, money is important but at the starting of your career whether you are a student or someone looking to learn new technology, focus on the ways that can help you grow.

## 13. Summary

C is considered as the mother of all programming languages as it has built a strong base for all programming languages like Java, Python, C++, etc. Let us summarise what we have learned in this C tutorial. We understood the history of C language, and also how it became so popular. We also discussed some of the basic features, advantages, and limitations that the C language possesses. At last, we discussed the career and salary prospects in C language.

Hopefully, C tutorial for beginners helped you to develop a basic understanding of the C programming language. Please share your feedback in the comment section below.

Bismillah Hir Rahmanir Rahim



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