Introduction and History of C Language

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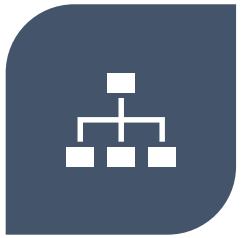
Topics

INTRODUCTION TO C LANGUAGE,

CHARACTERISTICS OF C LANGUAGE

IMPORTANCE OF C LANGUAGE

HISTORY OF C LANGUAGE



STRUCTURE OF C PROGRAM

Introduction to C Language:

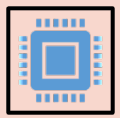
- C is a general-purpose, structured and low-level programming language that was created by Dennis Ritchie at Bell Labs in 1972.
- C was influenced by B, BCPL and ALGOL 68 languages, and influenced many other languages such as C++, Java, Python and Rust.
- C was designed to be portable across different platforms and operating systems, and to provide direct access to hardware features such as memory management and input/output.
- C was initially used to write system software such as Unix operating system kernel, device drivers and compilers. Later it was also used for application software such as databases, games and web servers.
- C has been standardized by ANSI (American National Standards Institute) in 1989 and by ISO (International Organization for Standardization) in 1990. The latest standard is C17 (or ISO/IEC 9899:2018), published in 2018.
- C is one of the most widely used and popular programming languages in the world. It ranks among the top two languages in the TIOBE index, a measure of programming language popularity.
- C supports multiple programming paradigms such as imperative, procedural and structured programming. It also supports some features of object-oriented and generic programming through extensions or libraries.

Characteristics of C Language:

C is a structured language with a clear set of rules for coding and organization.

C is a mid-level language, which means it provides low-level access to system resources while still allowing for higher-level programming constructs.

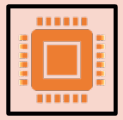
C is a fast and efficient language that can be used to create high-performance applications.



C is a portable language, meaning that code written in C can be compiled and run on a wide variety of platforms and operating systems.

C is a flexible language that allows for both procedural and object-oriented programming paradigms.

Importance of C Language:



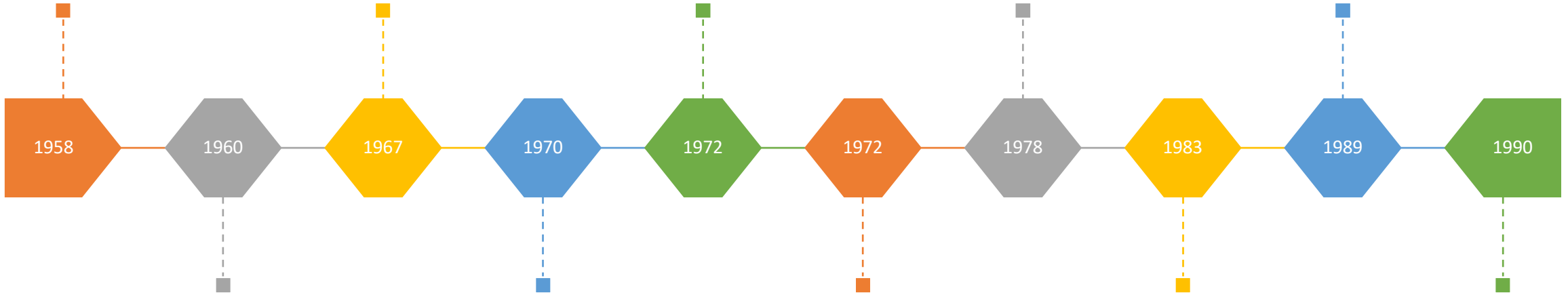
C is still widely used today, particularly in the development of system software, such as operating systems, device drivers, and embedded systems.

C is an important language for computer science students to learn because it provides a solid foundation for understanding how computers work at a low level.

Knowledge of C can help in the understanding of other languages, such as C++, Java, and Python, as they are all based on C syntax and structure.

C is often used in competitive programming and coding competitions due to its speed and efficiency.

History of C Language:



ALGOL 58 is developed, introducing many concepts used in modern programming languages.

CPL (Combined Programming Language) is developed, introducing high-level data types and control structures.

BCPL (Basic Combined Programming Language) is developed, introducing curly braces and other syntax used in C.

Ken Thompson at Bell Labs develops B, a simplified version of BCPL.

Dennis Ritchie at Bell Labs develops C, building on the concepts of B and adding new data types and a compiler.

UNIX Ritchie rewrites the UNIX operating system in C, demonstrating the language's effectiveness for system programming.

Brian Kernighan and Ritchie publish "The C Programming Language", which becomes widely popular.

The American National Standards Institute (ANSI) forms a committee to standardize C (ANSI C).

The International Organization for Standardization (ISO) adopts ANSI C as an international standard (ISO C).

C++ is developed as an extension of C, adding object-oriented programming features.

Basic Structure of a C Program

01: document section

02: Definition Section

03: Main Function

04: Preprocessor/ Link Section

05: Global Declaration Section

06: User Defined Function Section

07: Main Function Declaration Section

```c
/*
 * Program Name: Basic Structure of C Program
 * Author: Prof. Muhammad Iqbal Bhat
 * Date: 25/03/2023
 * Description: This program demonstrates the basic structure of a C program.
 */

#include <stdio.h>   // Include the standard input-output library
#define PI 3.14159   // Define a constant value for PI
int globalVar = 10;   // Global variable declaration
void printSum(int num1, int num2);   // Function declaration

int main() {   // Start the main function

    int num1 = 5;   // Variable declaration and initialization
    int num2 = 7;
    printf("Hello, world!\n");   // Print "Hello, world!" to the console
    printf("The value of PI is: %f\n", PI);   // Print the value of PI to the console
    printf("The value of the global variable is: %d\n", globalVar);   // Print the value of the global variable to the console
    printSum(num1, num2);   // Call the user-defined function to print the sum of num1 and num2
    return 0;   // Indicate that the program has ended successfully
}

void printSum(int num1, int num2) {   // User-defined function to print the sum of two numbers
    int sum = num1 + num2;   // Calculate the sum of the two numbers
    printf("The sum of %d and %d is: %d\n", num1, num2, sum);   // Print the sum to the console
}
```

Documentation Section

Pre-processor/link Section

Definition Section

Global Declaration Section

Function Declaration Section

Main function Entry

Local Variable Declaration Entry

Main function Body

Function Definition Section

Questions?