The C is a Language which is developed by Dennis Ritchie for creating system applications that directly interact with the hardware devices such as drivers, kernels, etc.

We can say:-

1. Mother language
2. System programming language
3. Procedure-oriented programming language
4. Structured programming language
5. Mid-level programming language

**1) C as a mother language**

C language is considered as the mother language of all the modern programming languages because most of the compilers, JVMs, Kernels, etc. are written in C language.

**2) C as a system programming language**

C language is a system programming language because it can be used to do low-level programming (for example driver and kernel).

**3) C as a procedural language**

A procedural language specifies a series of steps for the program to solve the problem.

**4) C as a structured programming language**

Structure means to break a program into parts or blocks.

**5) C as a mid-level programming language**

C is a middle-level language because it supports the feature of both low-level and high-level languages.

**History of C Language**

C programming language was developed in 1972 by Dennis Ritchie at bell laboratories of AT&T (American Telephone & Telegraph), located in the U.S.A.

**Features of C Language**

1) Simple

2) Machine Independent or Portable

3) Mid-level programming language

4) structured programming language

5) Rich Library

6) Memory Management

7) Fast Speed

8) Pointers

9) Recursion

10) Extensible

**How to install C**

1) Download Turbo C++ software and install

**First C Program**

#include <stdio.h>

int main(){

printf("Hello C Language");

return 0;

}

Line 1. #include <stdio.h> includes the standard input output library functions. The printf() function is defined in stdio.h .

Line 2. int main() The main() function is the entry point of every program in c language.

Line 3. printf() The printf() function is used to print data on the console.

Line 4. return 0 The return 0 statement, returns execution status to the OS. The 0 value is used for successful execution and 1 for unsuccessful execution.

press ctrl+f9 keys compile and run the program directly.

press alt+f9 keys compile the program directly.

**Compilation process in c**

What is a compilation?

The compilation is a process of converting the source code into object code.The compiler checks the source code for the syntactical or structural errors, and if the source code is error-free, then it generates the object code.

**printf() and scanf() in C**

The printf() function is used for output

The scanf() function is used for input. It reads the input data from the console.

**Variables in C**

A variable is a name of the memory location. It is used to store data

**Rules for defining variables**

=>A variable can have alphabets, digits, and underscore.

=>A variable name can start with the alphabet, and underscore only. It can't start with a digit.

=>No whitespace is allowed within the variable name.

=>A variable name must not be any reserved word or keyword, e.g. int, float, etc.

**Types of Variables in C**

There are many types of variables in c:

=>local variable

=>global variable

=>static variable

=>automatic variable

=>external variable

**Local Variable**

A variable that is declared inside the function or block is called a local variable.

void function1(){

int x=10;//local variable

}

**Global Variable**

A variable that is declared outside the function or block is called a global variable.

int value=20;//global variable

void function1(){

int x=10;//local variable

}

**Static Variable**

A variable that is declared with the static keyword is called static variable.

void function1(){

int x=10;//local variable

static int y=10;//static variable

x=x+1;

y=y+1;

printf("%d,%d",x,y);

}

**Automatic Variable**

All variables in C that are declared inside the block, are automatic variables by default. We can explicitly declare an automatic variable using auto keyword.

void main(){

int x=10;//local variable (also automatic)

auto int y=20;//automatic variable

}

**External Variable**

We can share a variable in multiple C source files by using an external variable.

#include "myfile.h"

#include <stdio.h>

void printValue(){

printf("Global variable: %d", global\_variable);

}

Data Types in C

There are the following data types in C language.

|  |  |
| --- | --- |
| Types | Data Types |
| Basic Data Type | int, char, float, double |
| Derived Data Type | array, pointer, structure, union |
| Enumeration Data Type | Enum |
| Void Data Type | Void |

|  |  |  |
| --- | --- | --- |
| **Data Types** | **Memory Size** | **Range** |
| **Char** | 1 byte | −128 to 127 |
| signed char | 1 byte | −128 to 127 |
| unsigned char | 1 byte | 0 to 255 |
| **short** | 2 byte | −32,768 to 32,767 |
| signed short | 2 byte | −32,768 to 32,767 |
| unsigned short | 2 byte | 0 to 65,535 |
| **Int** | 2 byte | −32,768 to 32,767 |
| signed int | 2 byte | −32,768 to 32,767 |
| unsigned int | 2 byte | 0 to 65,535 |
| **short int** | 2 byte | −32,768 to 32,767 |
| signed short int | 2 byte | −32,768 to 32,767 |
| unsigned short int | 2 byte | 0 to 65,535 |
| **long int** | 4 byte | -2,147,483,648 to 2,147,483,647 |
| signed long int | 4 byte | -2,147,483,648 to 2,147,483,647 |
| unsigned long int | 4 byte | 0 to 4,294,967,295 |
| **Float** | 4 byte |  |
| **double** | 8 byte |  |
| **long double** | 10 byte |  |

A list of 32 keywords in the c language is given below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| auto | break | case | char | const | continue | default | do |
| double | else | enum | extern | float | for | goto | if |
| int | long | register | return | short | signed | sizeof | static |
| struct | switch | typedef | union | unsigned | void | volatile | while |

integer denote as %d

float denote as %f

char denote as %c

string denote as %s

double denote as %lf