Learning Objectives

- What is C Language and its importance
- To understand various data types
- To understand working function of input and output statements in C
- To understand working function of Branching statements in C
- To understand working function of Looping statements in C
- To Understand differences between Break and Continue

2.0 Introduction

'C' is high level language and is the upgraded version of another language (Basic Combined Program Language). C language was designed at Bell laboratories in the early 1970's by Dennis Ritchie. C being popular in the modern computer world can be used in Mathematical Scientific, Engineering and Commercial applications

The most popular Operating system UNIX is written in C language. This language also has the features of low level languages and hence called as "System Programming Language"

Features of C language

- Simple, versatile, general purpose language
- It has rich set of Operators
- Program execution are fast and efficient
- Can easily manipulates with bits, bytes and addresses
- Varieties of data types are available
- Separate compilation of functions is possible and such functions can be called by any C program
- Block- structured language
- Can be applied in System programming areas like operating systems, compilers & Interpreters, Assembles, Text Editors, Print Spoolers, Network Drivers, Modern Programs, Data Bases, Language Interpreters, Utilities etc.

2.1 Character Set

The character set is the fundamental raw-material for any language. Like natural languages, computer languages will also have well defined character-set, which is useful to build the programs.

The C language consists of two character sets namely – source character set execution character set. Source character set is useful to construct the statements in the source program. Execution character set is employed at the time of execution of h program.

1. Source character set : This type of character set includes three types of characters namely alphabets, Decimals and special symbols.

i. Alphabets : A to Z, a to z and Underscore(_)

ii. Decimal digits : 0 to 9

iii. Special symbols: + - * / ^ % = & ! ( ) { } [ ] " etc

2. Execution character set : This set of characters are also called as non-graphic characters because these are invisible and cannot be printed or displayed directly.

These characters will have effect only when the program being executed. These characters are represented by a back slash (\) followed by a character.

Execution character	Meaning	Result at the time of execution
\ n	End of a line	Transfers the active position of cursor to the initial position of next line
\ 0 (zero)	End of string	Null
\ t	Horizontal Tab	Transfers the active position of cursor to the next Horizontal Tab
\ v	Vertical Tab	Transfers the active position of cursor to the next Vertical Tab
\ f	Form feed	Transfers the active position of cursor to the next logical page
\ r	Carriage return	Transfers the active position of cursor to the initial position of current line

2.2 Structure of a 'C' Program

The Complete structure of C program is

The basic components of a C program are:

- main()
- pair of braces { }
- declarations and statements
- user defined functions

Preprocessor Statements: These statements begin with # symbol. They are called preprocessor directives. These statements direct the C preprocessor to include header files and also symbolic constants in to C program. Some of the preprocessor statements are

#include<stdio.h>: for the standard input/output functions

#include<test.h>: for file inclusion of header file Test.

#define NULL 0: for defining symbolic constant NULL = 0 etc.

Global Declarations: Variables or functions whose existence is known in the main() function and other user defined functions are called global variables (or functions) and their declarations is called global declaration. This declaration should be made before main().

main(): As the name itself indicates it is the main function of every C program. Execution of C program starts from main (). No C program is executed without main() function. It should be written in lowercase letters and should not be terminated by a semicolon. It calls other Library functions user defined functions. There must be one and only one main() function in every C program.

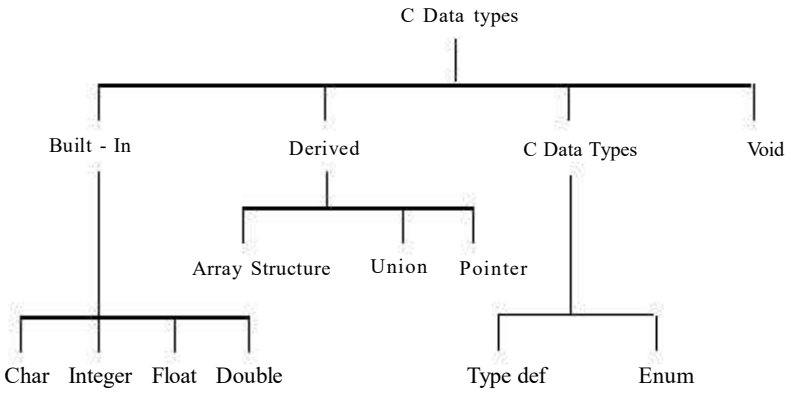
Braces: Every C program uses a pair of curly braces ({,}0. The left brace indicates beginning of main() function. On the other hand, the right brace indicates end of the main() function. The braces can also be used to indicate the beginning and end of user-defined functions and compound statements.

Declarations: It is part of C program where all the variables, arrays, functions etc., used in the C program are declared and may be initialized with their basic data types.

Statements: These are instructions to the specific operations. They may be input-output statements, arithmetic statements, control statements and other statements. They are also including comments.

User-defined functions: These are subprograms. Generally, a subprogram is a function, and they contain a set of statements to perform a specific task. These are written by the user; hence the name is user-defined functions. They may be written before or after the main() function.

2.3 Data Types in 'C'



The built-in data types and their extensions is the subject of this chapter. Derived data types such as arrays, structures, union and pointers and user defined data types such as typedef and enum.

Basic Data Types

There are four basic data types in C language. They are Integer data, character data, floating point data and double data types.

a. Character data: Any character of the ASCII character set can be considered as a character data types and its maximum size can be 1 byte or 8 byte long. 'Char' is the keyword used to represent character data type in C.

Char - a single byte size, capable of holding one character.

b. Integer data: The keyword 'int' stands for the integer data type in C and its size is either 16 or 32 bits. The integer data type can again be classified as

1. Long int - long integer with more digits
2. Short int - short integer with fewer digits.
3. Unsigned int - Unsigned integer

4. Unsigned short int – Unsigned short integer

5. Unsigned long int – Unsigned long integer

As above, the qualifiers like short, long, signed or unsigned can be applied to basic data types to derive new data types.

int - an Integer with the natural size of the host machine.

c. Floating point data: - The numbers which are stored in floating point representation with mantissa and exponent are called floating point (real) numbers. These numbers can be declared as 'float' in C.

float – Single – precision floating point number value.

d. Double data : - Double is a keyword in C to represent double precision floating point numbers.

double - Double – precision floating point number value.

Data Kinds in C

Various data kinds that can be included in any C program can fall in to the following.

a. Constants/Literals

b. Reserve Words Keywords

c. Delimeters

d. Variables/Identifiers

a. Constans/Literals: Constants are those, which do not change, during the execution of the program. Constants may be categorized in to:

- Numeric Constants
- Character Constants
- String Constants

1. Numeric Constants

Numeric constants, as the name itself indicates, are those which consist of numerals, an optional sign and an optional period. They are further divided into two types:

(a) Integer Constants (b) Real Constants

a. Integer Constants