Chapter -3 : Introduction to 'C' Language

History
- C was invented and first implemented by Dennis Ritchie on DEC PDP-11 that used the UNIX operating system.
- C is the result of a development process that started with an older language called BCPL.
- ANSI established a committee in the beginning of 1983 to create a standard for C, which was implemented in 1987.

Character Set
- A character set is the mapping of characters to binary values.
- In 8 bit character sets, the values range from 0-255 and one character will be mapped to each of these values.

C Language Character Set
- These are the characters that C recognizes.
- Letters (upper case and lower case)
    - A B C D E … and so on.
    - a b c d e … and so on.
- Digits
    - 0 1 2 3 … and so on.
- Special Characters (punctuation etc), space (also known as blank)
    - ' " ( ) * + - / : = ! & $; <> % ? , . ^ # @ ˜ ' { } [ ] \ |

Identifiers
- In C the names that are used to reference variables, functions, labels and various other userd efined objects are called identifiers.
- The length of an identifier in C can vary from one to several characters.
- In most cases the first character must be a letter or an underscore, and subsequent characters can be a letter, number or an underscore.

Variables
- A variable is a named data storage location in user computer's memory.
- To use variables in the user C program, he must know how to create variable names.
- In C, variable names must adhere to the following rules:
    - The name can contain letters, digits, and the underscore character (_).
    - The first character of the name must be a letter. The underscore is also a legal first character, but its use is not recommended.
    - Case matters (that is, upper- and lowercase letters). Thus, the names **count** and **Count** refer to two different variables.
    - C keywords can't be used as variable names. A keyword is a word that is part of the C language

Variable Name	Legality
Percent	Legal
y2x5_fg7h	Legal
annual_profit	Legal
_1990_tax	Legal but not advised.
saving#account	Illegal: Contain the illegal character #.
double	Illegal: Is a C Keyword.
9winter	Illegal: First character is a digit.

Data Type

- Two types of built-in data types:
    - Fundamental data types (int, char, double, float, void, pointer).
    - Derived data types (array, string, structure).
- It is a way of representing data storage formats.
- There are five basic data types in C.

char	for character
int	for integer
float	for floating point
double	for double precision floating point
void	the type with no values

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Fundamental data types

- void – used to denote the type with no values.
    - void cannot be used to define a variable.
    - void, in C, is a type that has no size.
    - Thus, if one was to declare a variable of type "void", the compiler would not know how much memory to allocate for it.
    - Therefore void cannot be used to define a variable.

- int – used to denote an integer type.

- char – used to denote a character type.
    - Values of type char are restricted to the defined ASCII characters.

- float, double – used to denote a floating point type.
    - The range of types float and double is usually given in digits of precision.
    - The magnitude of type float and double depend upon the method used to represent the floating point numbers.
    - Type void is used to explicitly declare a function as returning no value

- int *, float *, char * – used to denote a pointer type, which is a memory address type.

Derived data types

- Array – a finite sequence (or table) of variables of the same data type.
- String – an array of character variables.
- Structure – a collection of related variables of the same and/or different data types.
- The structure is called a record and the variables in the record are called members or fields.

Simple 'C' programs

- The 'Hello World' introduction

  ➤ The best way to learn a computer language is to start writing short programs that work and then gradually add complexity.

  ➤ The traditional first C program prints out "hello, world" and looks something like this:

```c
#include <stdio.h>
int main()
{
   /* my first program in C */
   printf("Hello, World! \n");
   return 0;
}
```

Assignment

1. Define Data Type. Name the various types of data type.

2. What is Identifiers?

3. Write a program to display your name and data of birth.

4. Write a program to display 1 2 3 4 5.

5. Write a program to display A B C D E