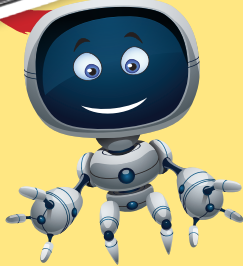# 9 C-Language

In this chapter, you will learn about :
- *Know the concept of C language*
- *Know the uses of constants, variables and keywords*
- *Know the uses of data types*
- *Understand the programming in C language*

C is a programming language developed at AT & T's bell laboratory of USA in 1972. It was designed and written by a scholar named Dennis Ritchie. In the late seventies C began to replace the more familiar languages of that time like PL-II, ALGOL etc.

WHERE C STANDS

Let us now see how does C differ or how 'C' can be compared with other programming languages. All the programming languages can be divided into two categories :

(a) Problem Oriented Languages or High Level Languages

These languages have been designed to give a better programming efficiency *i.e.* faster program development. HLL is the short form of high level language.

Examples of languages falling in this category are BASIC, C++ and Java.

(b) Machine Oriented Language or Low Level Language

These languages have been designed to give a better machine efficiency *i.e.* faster program execution. Examples of languages falling in this category are assembly language and machine language.

C stands in between the machine level and high level language. That is why it is often called a middle level language, since it was designed to have both, a relatively good programming effeciency (as compared to machine oriented language) and a relatively good machine efficiency (as compared to problem oriented language).

THE C CHARACTER SET

A character denotes any alphabet, digit or special symbol used to represent information. Following table shows the valid alphabets, numbers and symbols that are allowed in C.

Alphabets

A, B, C, ... Y, Z

a, b, c .... y, z

Digits

0, 1, 2, 3, ... 9

Special Symbols

–, $, @, ! ....

Constants, Variables and Keywords

The alphabets, numbers and special symbols, when properly combined, form constants, variables and keywords.

Constant

A constant is a quantity that doesn't change. This quantity can be stored as a location in the memory of the computer.

Variable

A variable can be considered, as a name given to the location in memory where this constant is stored. Normally, the content of the variable can change.

Keywords

A keyword is a reserve word which is used for specific use.

How to declare data type ?

Data Type	Keywords	Type Specifiers
1. Integer e.g. (1, 22, 864) (whole number values are called integers)	int	%d
2. Float e.g. 1.2, 3.67 (Fractional values are called floating values)	float	%f
3. Character e.g. a, b, A, B (Single alphabet is called character)	char	%c

C–INSTRUCTIONS

There are basically four types of instructions in C—

1. Type declaration instruction
2. Input/output instruction
3. Arithmetic instruction
4. Control instruction

1. Type declaration instruction — To declare the type of variable used in a C-program.

2. Input/output instruction — To perform the function of supplying input data to a program and obtaining the output result from it.

3. Arithmetic instruction — To perform arithmetic operations on constants and variables.

4. Control Instruction — To control the sequence of execution of various statements in a C–program.

HOW TO OPEN THE C LANGUAGE ?

Follow the given steps :

Step 1 : Open the Start menu

Step 2 : Points the Program option.

Step 3 : Click on Turbo C option.

THE FIRST C PROGRAM

Each instruction in a C program is written as a separate statement. Therefore, a complete C program will comprise of a series of statements. These statements must appear in the same order in which we wish them to be executed, unless of course the logic of the problem demand a deliberate jump or transfer of control to a statement, which is out of sequences.

RULES FOR WRITING A PROGRAM

1. Blank spaces may be inserted between two words to improve the readability of the statement. However, no blank spaces are allowed within a variable, constants or keywords.

2. Usually, all statements are entered in small case letters.

3. C has no specific rules for the position at which a statement is to be written. That's why it is often called a 'free form language'.

4. Any C statement always ends with a (;) semicolon.

   Let us now write down a simple C program to calculate sum of two numbers.

Program Writing

```
/*calculation of two numbers*/
#include<stdio.h>
#include<conio.h>
void main()
{
int a,b,S;
clrscr();
printf("Enter the value of a & b");
scanf("%d%d",&a,&b);
S=a+b;
printf("%d",s);
getch();
}
```

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TIPS ABOUT THE PROGRAM

1. Comment about the program should be enclosed within / * */. For example, first statement in our program is a comment.

2. C program is nothing but a combination of functions. main( ) is one function. Empty parentheses after main are necessary.

3. Header file is necessary in every program, because the function runs after including them like clrscr( ) and getch( ) work with conio.h.

4. printf( ) :– It is a function which is used to print on the screen the value contained in a variable. The general form of printf( ); is–

    printf ("format specifies", list of variables);
    e.g.– int s;

    printf ("%d",s);

5. Scanf( ) :- It is a function which is used to take value (i.e. input) for variable.

6. The first print statement outputs the message ("Enter the value A & B) on the screen. Here we have not used only variables in print ( ) which means that using variables in printf ( ) is optional.

Example : Make a program for calculation of simple interest :

```
#include<stdio.h>
#include<conio.h>
void main( )
{
float p,r,q,t,s,i,j;
clrscr();
printf ("Enter the value of p, q, r, t");
scanf("%f%f%f%f",&p,&q,&r,&t);
SI = p*r*t/100;
printf("%f",SI);
getch( );
}
```

Points to Remember

- C is a programming language developed at AT & T's Bell laboratory in 1972.
- C stands between two categories – Machine oriented language and Problem oriented language.
- A variable can be considered as a name given to the location in memory where this constant is stored.
- Function is a pre-defined instruction.
- Each statement in a C–program is written as a separate statement.

A. Tick (✓) the correct option :

1. Pre-defined instruction is called _____.

   (a) Function ☐   (b) Statement ☐   (c) Variable ☐

2. Int is the keyword for _____.

   (a) Integer ☐   (b) Float ☐   (c) Character ☐

3. C language was developed at _____

   (a) ET & T ☐   (b) AT & T ☐   (c) SUN ☐

   (d) MICROSOFT ☐

4. C is a _____.

   (a) HLL ☐   (b) Programming language ☐   (c) Assembly language ☐

5. _____ is a reserve word which is used for specific purpose.

   (a) Constant ☐   (b) Variable ☐   (c) Keywords ☐

B. Fill in the blanks :

1. _____ is a famous programming language.

2. C was designed and written by a scholar named _____.

3. HLL stands for _____.

4. A _____ can be considered as a name given to the location in memory where this constant is stored.

5. _____ is a pre–defined instruction.

C. Write (T) for true and (F) for False :

1. C language was developed in 1972 at AT & T's bell laboratory. ☐

2. A variable is a quality that doesn't change. ☐

3. A keyword is a reserve word which is used for specific use. ☐

4. %d is the type specifier for character data type. ☐

5. Any C statement always ends with a (;) semicolon. ☐

6. Scanf () is used to print the values contained in a variable on the screen. ☐

7. Function is a predefined instruction. ☐

D. Answer the following questions :

1. Define C language.

2. Justify the place where C language stands.

3. What is the difference between problem oriented language and machine oriented language?

4. What is the difference between variable and constant?

5. Define data type.

6. Write any three rules for writing a C–program.

ACTIVITY
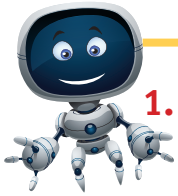
1. Write the output of following program :

a.
```
# include < stdio. h >
# include < conio. h >
Void main ( )
{
int num 1,num 2;
printf ("Enter two numbers");
scanf ("%d");
scanf ("%d");
printf ("This num1 and this num2");
getch();
}
```

Output

b.
```
# include < stdio. h >
# include < conio. h >
Void main ( )
{
int x, a, b, c;
printf ("Enter a, b, c value");
scanf ("%d%d%d", &a, &b, &c);
x = a + b + c  + 4ac;
printf ("%d", x);
getch();
}
```

2. Make a program of given equations :

a. $x = a + b$

b. $x = a - b$

c. $x = a \times b$

d. $x = a^2 + b^2$

e. $x = a^2 + 4ac + c$