Introduction - C Programming

4 min read
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1. What is C?

- C is a programming language developed at AT & T's Bell Laboratories of USA in 1972 by Dennis Ritchie.
- Any programming Language can be divided in to two categories.
  - Problem oriented (High level language)
  - Machine oriented (Low level language)

  But C is considered as a `Middle level Language`.
- C is `modular`, `portable`, `reusable`.

2. Feature of C Program

- **Structured language**
  - It has the ability to divide and hide all the information and instruction.
  - Code can be partitioned in C using functions or code block.
  - C is a well structured language compare to other.
- **General purpose language**

    - Make it ideal language for system programming.
    - It can also be used for business and scientific application.
    - ANSI established a standard for c in 1983.
    - The ability of c is to manipulate bits,byte and addresses.
    - It is adopted in later 1990.
- **Portability**
    - Portability is the ability to port or use the software written .
    - One computer C program can be reused.
    - By modification or no modification.
- **Code Re-usability & Ability to customize and extend**
    - A programmer can easily create his own function
    - It can can be used repeatedly in different application
    - C program basically collection of function
    - The function are supported by 'c' library
    - Function can be added to 'c' library continuously
- **Limited Number of Key Word**
    - There are only 32 keywords in 'C'
    - 27 keywords are given by ritchie
    - 5 is added by ANSI
    - The strength of 'C' is lies in its in-built function
    - Unix system provides as large number of C function
    - Some function are used in operation .
    - Other are for specialized in their application

3. C program structure

```
pre-processor directives
global declarations


main()
{
    local variable deceleration
    statement sequences
    function invoking
}
```

4. C Keywords

Keywords are the words whose meaning has already been explained to the C compiler. There are only 32 keywords available in C. The keywords are also called ‘Reserved words’.

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

5. C Character Set

A character denotes any alphabet, digit or special symbol used to represent

information. Following are the valid alphabets, numbers and special symbols allowed in C.

- `Alphabets` - A, B, ..., Y, Z a, b, ..., y, z
- `Digits` - 0, 1, 2, 3, 4, 5, 6, 7, 8, 9
- `Special symbols` - ~ ‘ ! @ # % ^ & * ( ) _ - + = | \ { } [ ] : ; " ' < > , . ? /

6. Rules for Writing, Compiling and Executing the C program

- C is case sensitive means variable named "COUNTER" is different from a variable named "counter".
- All keywords are lowercased.
- Keywords cannot be used for any other purpose (like variable names).
- Every C statement must end with a `;`. Thus ;acts as a statement terminator.
- First character must be an alphabet or underscore, no special symbol other than an underscore, no commas or blank spaces are allowed with in a variable, constant or keyword.
- Blank spaces may be inserted between two words to improve the readability of the statement. However, no blank spaces are allowed within a variable, constant or keyword.
- Variable must be declared before it is used in the program.
- File should be have the extension .c
- Program need to be compiled before execution.

7. Data types & Placeholders

- C has 5 basic built-in data types.
- Data type defines a set of values that a variable can store along with a set of operations that can be performed on it.
- A variable takes different values at different times.
- General form for declaring a variable is:
  type name;
- An example for using variables comes below:

```c
#include<stdio.h>
main()
{
    int sum;
    sum=12;
    sum=sum+5;
    printf("Sum is %d",sum);
}
```

`printf` function will print the following:
Sum is 17
In fact `%d` is the placeholder for integer variable value that its name comes after double quotes.

- Common data types are:
  - `int` - integer
  - `char` - character
  - `long` - long integer
  - `float` - float number
  - `double` - long float
- Other placeholders are:

```
Placeholders        Format
%c                  Character
%d                  Signed decimal integer
%i                  Signed decimal integer
%e                  Scientific notation[e]
%E                  Scientific notation[E]
%f                  Decimal floating point
%o                  unsigned octal
%s                  String of character
%u                  unsigned decimal integer
%x                  unsigned Hexadecimal (lower)
%X                  unsigned Hexadecimal (upper)
%p                  dispaly a pointer
%%                  print a %
```

8. Control characters (Escape sequences)

Certain non printing characters as well as the backslash () and the apostrophe('), can be expressed in terms of escape sequence.

- `\a` - Bell
- `\n` - New line
- `\r` - Carriage return
- `\b` - Backspace
- `\f` - Formfeed
- `\t` - Horizontal tab
- `\"` - Quotation mark
- `\v` - Vertical tab
- `\'` - Apostrophe

- `\\` - Backslash
- `\?` - Question mark
- `\0` - Null

9. Receiving input values from keyboard

`scanf` function used to receiving input from keyboard.
General form of scanf function is :

```
scanf("Format string",&variable,&variable,...);
```

`Format string` contains placeholders for variables that we intend to receive from keyboard. A `&` sign comes before each variable name that comes in variable listing. Character strings are exceptions from this rule. They will not come with this sign before them.

Note: You are not allowed to insert any additional characters in format string other than placeholders and some special characters. Entering even a space or other undesired character will cause your program to work incorrectly and the results will be unexpected. So make sure you just insert placeholder characters in scanf format string. The following example receives multiple variables from keyboard.

```
float a;
int n;
scanf("%d%f",&n,&a);
```

Pay attention that scanf function has no error checking capabilities built in it. Programmer is responsible for validating input data (type, range etc.) and preventing errors

10 . Quiz

Test what you learn from this tutorial. **Click here to give a quiz based on this tutorial.**

11. Examples

EXAMPLE STATEMENT FOR INTRODUCTION TO C LANGUAGE
1. Print Hello World
2. Print Value of an Integer
3. Addition of Two Number

Next - Expression & Operators Precedence

Primary C Programming

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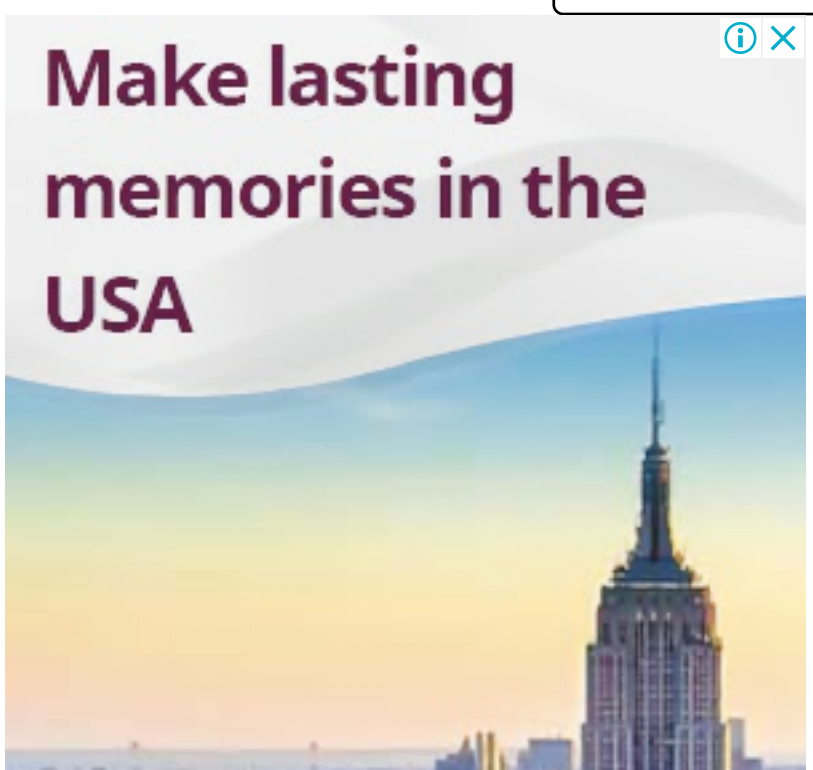

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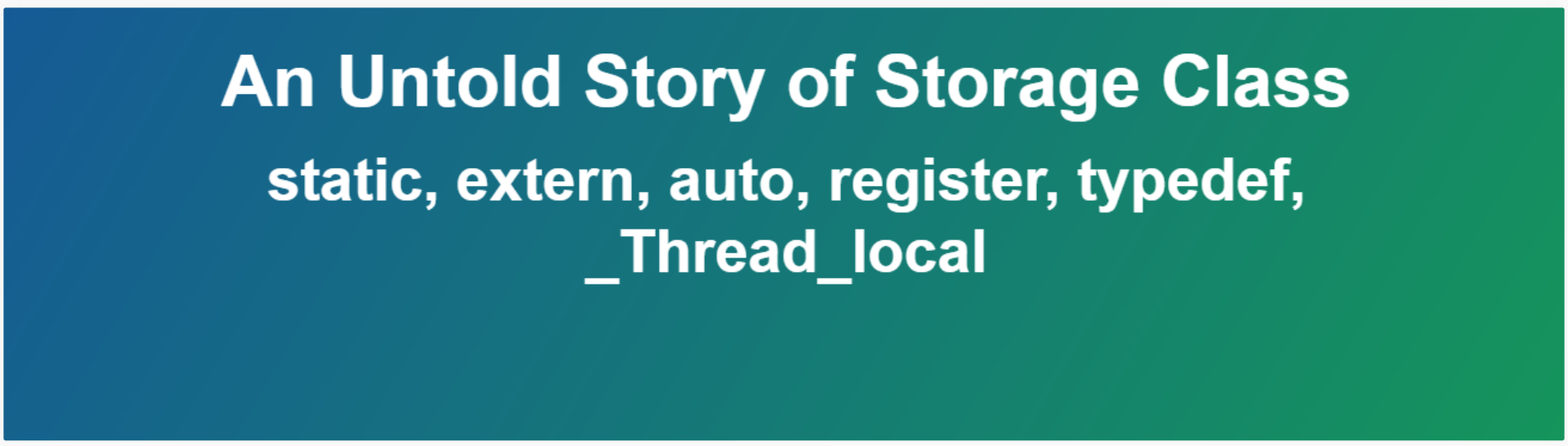

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An Untold Story of Storage Class in C Programming Language

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Simple and Static Assertion (assert) in C Programming Language

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