Introduction to C

MNNIT Computer Club

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What is C?

C is a programming language developed at AT & T Bell Laboratories of USA in 1972, designed and written by Dennis Ritchie.

Why C ??

OS Kernels Written in C

- Once you master C programming, you can easily learn another specified language.
- Arbitrary memory address access and pointer arithmetic is an important feature that makes C a perfect fit for *system programming* (operating systems and embedded systems).
  - Windows, Mac OS X, Linux are mostly written in C
  - The world's most popular databases, including Oracle Database, MySQL, MS SQL Server, and PostgreSQL, are coded in C
  - Language of robotics
- C is fast

Basic Terminology

- **Keywords:** These are reserved words of the C language. For example **int, float, if, else, for, while** etc.
- **Identifiers:** Identifiers are used to name variables, functions etc. Ex: **x1, x2, x3, x_1, If**
- **Constants:** Constants like 13, 'a', 1.3e-5 etc**.**
- **Function:** A function is a group or sequence of C statements that are executed together.
- **Header Files:** are files with some functions defined(declared) in them.

Basic Terminology(Contd...)

- **String Literal:** A sequence of characters enclosed in double quotes as "...". For example "13" is a string literal and not number 13.
- **TASK: 'a' and "a" are different or same?**
- **Escape Sequences:** Some special character are represented as two characters in single quotes. '\n' = newline, '\t'= tab, '\\' = backlash, '\"' = double quotes.

Data Types-Primitive

Integral Types: Integers are stored in various sizes. They can be signed or unsigned.

char   Stored as 8 bits. Unsigned 0 to 255. Signed -128 to 127.

short int Stored as 16 bits. Unsigned 0 to 65535. Signed -32768 to 32767.

int   Same as either short or long int.

long int   Stored as 32 bits. Unsigned 0 to çUnsigned 0 to 4294967295. Signed -2147483648 to 2147483647

Data Types-Primitive(Contd...)

Floating Point Numbers: Floating point numbers are rational numbers. Always signed numbers.

float: Approximate precision of 6 decimal digits. Typically stored in 4 bytes with 24 bits of signed mantissa and 8 bits of signed exponent.

double: Approximate precision of 14 decimal digits. Typically stored in 8 bytes with 56 bits of signed mantissa and 8 bits of signed exponent.

void: This is used as return type for the functions that don't return anything.

Besides, there are user-defined data-types like struct, enum, union, etc.

Operators

An operator is a symbol that tells computer to perform certain mathematical or logical manipulations.

- **Arithmetic operators**
- **Relational operators**
- **Logical operators**
- **Bitwise operators**
- **Special Operators**
    a. **Conditional** operators (ternary operators)
    b. **Increment/decrement operators**.

Arithmetic Operators

There are:

- + - Addition
- - - Subtraction
- * - Multiplication
- / - Division
- % - Modulus

Relational Operators

To test the relationship between 2 variables/constants. Return 0 if false else 1.

- \> - Greater than
- \>= - Greater than or equal to
- < - Less than
- <= - Less than or equal to
- == - Equal to
- != Not equal to

Logical Operators

To combine expressions containing relational operators. Return 0 if combined expression is false else 1.

- && - Logical AND
- || - Logical OR
- ! - Logical NOT

Bitwise Operators

To perform bitwise operations:

- ~ - 1's Complement
- & - Bitwise AND
- | - Bitwise OR
- ^ - Bitwise XOR
- >> - Right Shift
- << - Left Shift

Increment/Decrement Operators

These are of 2 types:

- Post-increment Operator- i++;
- Pre-increment Operator- ++i;

For details see code...

Thank You