Algol-60 → CPL → BCPL → C → C++ → java

- Algol-60: Algorithm language, 1960
- CPL: Combined programming language
- BCPL: Basic CPL, 1960 (developed by Martin Richard)
- B: invented by Ken Thomson
- C++: Bjarne Stroustrup, 1980, MRI → 1982
- java: James Gosling, 1990, MKU 1995

C Fundamentals :

Introduction :

→ C language has been designed and developed by **Dennis Ritchie** at AT & T's Bell laboratories of USA in the year 1972.
(AT & T → American Telecom & Telegraph.)

→ It was first implemented on a DEC PDP-11 machine in UNIX operating system.

→ C is popular because it is reliable, simple and easy to use.

→ C is an offspring of the "Basic Combined programming language" (BCPL) called "B" developed in the year 1960 at Cambridge university.

→ BCPL was developed by Martin Richards and called B, which was invented by Ken Thomson. Then B led to the developement of C.

→ C is often called a middle-level language. It does not mean that C is not powerful and robust for writing programs like in Fortran, pascal etc, nor does it imply that C is similar to assembly language.

→ As a middle-level language, C allows the manipulation of bits, bytes and addresses – the basic elements with which the computer functions.

→ Despite this, C code is also portable. Portability means that it is easy to adapt software written for one type of computer or operating system to another type.

→ C is a structured language, but technically not a block structured language because block structured language permits procedures or functions can be declared inside other

procedures or functions. C does not allow the creation of function within functions. So it cannot formally be called block Structured.

→ C is similar in many ways to other structural languages such as pascal, Fortran etc. A structured language allow variety of programs in small modules. It is easy for testing, debugging, testing and maintenance if a language is structured one. It provides loop constructs like while, do-while, and for

→ C has the simplicity of a high level language as well as the power of a low level language. This aspect of C makes it suitable for writing both application programs and system programs. Hence it is an excellent, efficient and general-purpose language for most of the applications.

[Application Software:

→ It is the set of programs necessary to carryout operations for a user's application.

→ For example: programs to solve a set of equations, business problems, process examination result etc.

System Software:

→ System software is a set of one or more programs that are basically designed to control the operation of a computer system.

→ For example, operating system, language translators, linker, loader etc.]

About ANSI C Standard :

→ For many years there was no standard version of C language.

→ Due to this reason, portability feature of C language was not provided from one computer to another.

→ To overcome this discrepancy, a committee was set up in the Summer of 1983 to create a standard C version that is popularly known as ANSI (American National Standard Institute) standard.

→ This committee created a draft standards for the C language.

→ This Standardization process took about six years for defining the standard for the C language.

→ The ANSI C Standard was adopted in December of 1989 and the first copy of C language was introduced in the market in 1990.

→ Thus ANSI C is internationally recognized as a standard C language.

Overview of Compilers and Interpreters:

→ A program is a set of instructions for performing a particular task.

→ These instructions are just like English words.

→ The computer interprets the instructions as a 1's and 0's.

→ A program can be written in assembly language as well as high level language. This written program is called as source program.

→ This source program is to be converted to the machine language which is called as object program.

Either an interpreter or a compiler will do this activity.

a) Interpreters :

→ An interpreter reads only one line of a source program at a time and converts it to object codes.

→ In case of any errors, the same will be idicated instantly.

→ The program written with an interpreter can easily be read and understood by the other users as well. So security is not provided. Anyone can modify the source code. Hence it is easier than compiler.

→ But the disadvantage is that, it consumes more time for converting a source program to an object program.

b) Compilers :

→ A compiler reads the entire program and converts it to the object code.

→ It provides errors not of one line but errors of the entire program.

→ Only error free programs are executed by the compiler.

→ It consumes little time for converting a source program to an object program.

→ When the program length for any application is large, compilers are preferred.

Assignment : what do you mean by structured programming ?

Soln A technique for organizing and coding computer programs in which a hierarchy of modules is used, having a single entry and a single exit point and in which controll is passed downward through the structure without unconditional branches to higher levels of the structure, is called structured programming approach.

Assignment : when a program is said to be structured ?

Soln A computer program is said to be structured if it has a modular design and uses only the three types of logical structures sequences, decisions, and loops.

Sequences : Statements are executed one after another.

Decisions : One of the two blocks of program code is executed based on a test for some condition.

Loops (iteration) : One or more statements are executed repeatedly as long as a specified condition is true.

Assignments : what are the characteristics of 'C' language ?

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2) It was first implemented on a DEC PDP-11 machine in UNIX operating system.

3) C is popular because it is reliable, simple and easy to use.

4) C is an offspring of the Basic Combined programming language (BCPL).

5) C is often called middle-level language. It does not mean that C is not powerful and robust for writing programs

like in FORTRAN, PASCAL etc. nor does it imply that C is similar to assembly language.

6) As a middle-level language, C allows the manipulation of bits, bytes and addresses - the basic elements with which the computer functions.

7) C code is portable. Portability means that it is easy to adapt software written for one type of computer or operating system to another type.

8) C is a structured language, but technically not a block structured language.

9) C is easy for testing, debugging and maintenance.

10) C provides loop constructs like while, do-while and for.

11) C has the simplicity of a high level language as well as the power of a low level language. This aspect of C makes it suitable for writing both application programs and system programs.

12) C is an excellent, efficient and general-purpose language for most of the applications.

Assignment: What do you mean by source program and object pgm?

Soln: Source program: A program can be written in assembly language as well as high level language. This written program is called as source program.

Object program: The source program is to be converted to the machine language which is called as object program.