Fundamentals of C Language (3rd part)

Q. What is a text editor ?

A text editor is a program which is used to type and edit your computer program or document. Commonly used editors are Turbo, NE(Norton Editor)Vi editor(Used in UNIX system)

Q. What is an operating system ?

An operating system is a collection of programs used to connect the user with the electronic hardware. The OS programs actuate and control the activities of a computer.

Q.: What are assemblers, compilers and interpreters?

Solution:
Assembler: An assembler is a computer program or translator which translates an assembly language program into a machine language program.

Compiler: Compiler translates a source program, written in high-level language into machine language. Compiler takes the whole program at the input and check for errors. So, it is fast in the speed. Most of the high level languages are compiled language.

One of the feature of the compiler that, it will convert the source program in the object program. So, every time no need of source program.

Interpreter: Interpreter translates each statement of the source program into a sequence of machine level instructions. Interpreters takes the input line by line and check for the errors. So, it is slower than compiler. Interpreter always need the source program every time.

Q. : What do you understand by compilation and execution of a program?

Solution: To translate the entire source code of a program from a high-level language into object code prior to execution of the program is known as compilation. A program that performs this task is known as compiler. When the object code made after compilation, the object code is linked with other library code, which are needed for execution of the program. The resulting code is known as executable code. If some error(s) occur during linking, debug them and compile the program again. After successful compilation we get file with **.obj** extension and after linking a file with **.exe** will be created. After executing the **.exe** file the result is obtained.

Q. What is the Function and Subroutine:

Solution:

Function: Function is the set of statements which can perform particular operation and called in the program whenever needed.

- Function always return value
- Function return value therefore it can be assign to the variable at the right side.

Subroutine: Subroutine is also same as function in sense set of statements to perform particular task.

- It always perform task, never return any value.
- The output of the subroutine will never assigned to the variable.

Q.8: State the differences between compiler and interpreter. State the advantages and disadvantages of machine level language, assembly language and high level language.

Solution:

The following table lists the differences between a Compiler and an Interpreter.

	Compiler	Interpreter
1	Scans the entire program first and then translates it into machine code	Translates the program line by line.
2	Converts the entire program to machine code; when all the syntax errors are removed execution takes place.	Each time the program is executed, every line is checked for syntax error and then converted to equivalent machine code.
3	Slow for debugging	Good for fast debugging
4	Execution time is less	Execution time is more

Advantage of Machine Language:

It is faster in execution since the computer directly executing it.

Disadvantage of Machine Language:

It is difficult to understand and develop a program using machine language. Anybody going through this program for checking will have a difficult task understanding what will be achieved when this program is executed. Nevertheless, the computer hardware recognizes only this type of instruction code.

Advantage of Assembly Language:

Writing a program in assembly language is more convenient than in machine language. Instead of binary sequence, as in machine language, it is written in the form of symbolic instructions. Therefore, it gives a little more readability.

Disadvantage of Assembly Language:

Assembly language (program) is specific to a particular machine architecture. Assembly languages are designed for specific make and model of a microprocessor. It means that assembly language programs written for one processor will not work on a different processor if it architecturally different. That is why the assembly language program is not portable.

Assembly language is not as fast as machine language. It has to be first translated into machine (binary) language code.

Advantage of High-level Programming Language:

There are four main advantages of high-level programming languages. These are:

(i) **Readability:** Programs written in these languages are more readable than assembly and machine language.

(ii) **Portability:** Programs could be run on different machines with little or no change. We can, therefore, exchange software leading to creation of program libraries.

(iii) **Easy debugging:** Errors could be removed (debugged).

(iv) **Easy Software development:** Software could easily be developed. Commands of programming language are similar to natural language (ENGLISH).

Q. Give the difference between testing and debugging of a program.

Solution:
Testing and debugging are two separate tasks. The differences between these two processes are outlined in Table 1:

Table 1: Differences between Testing and Debugging

Testing	Debugging
1. Testing is the process in which a program is validated.	Debugging is a process in which program errors are removed.
2. Testing is complete when all desired verifications in terms of the specifications have been performed	Debugging is a process that ends only temporarily, because subsequent execution of a program may uncover other errors thereby restarting the debugging process.
3. Testing can and should be planned. It is a definable task in which the how and what to test can be specified. Testing can be scheduled to take place at a specific time in the development cycle.	Debugging is a reactive procedure, which stems from testing. It cannot be planned ahead of time. The best that can be done is to establish guidelines of how to debug and develop a list of "what to look for."
4. Testing can begin in the early stages of the development effort. Of course, the test themselves must be run near the end of a project, but the decisions of what to test, how to test, with what kind of data can and should be completed before the coding is started.	Debugging, on the other hand, cannot begin until the end of the development cycle, because it requires an executable program.

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