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Languages, Operating Systems, and Software Packages

Translator

- A **translator** or **programming language processor** is a generic term that can refer to anything that converts code from one computer language into another.
- Different types of translators
- **Compiler**
- **Interpreter**
- **Assembler**

Compiler :

- A compiler is a translator used to convert high-level programming language to low-level programming language.
- converts the whole program in one session and reports errors detected after the conversion.
- The compiler takes time to do its work as it translates high-level code to lower-level code all at once and then saves it to memory.

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- A compiler is processor-dependent and platform-dependent.
- It has been addressed by alternate names as the following: special compiler, cross-compiler and, source-to-source compiler.

Interpreter :

- The interpreter is similar to a compiler, it is a translator used to convert high-level programming language to low-level programming language.
- The difference is that it converts the program one line of code at a time and reports errors when detected, while also doing the conversion.

Cont…

- An interpreter is faster than a compiler as it immediately executes the code upon reading the code.
- It is often used as a debugging tool for software development as it can execute a single line of code at a time.
- An interpreter is also more portable than a compiler as it is processor-independent.

Assembler :

- An assembler is a translator used to translate assembly language into machine language.
- It has the same function as a compiler for the assembly language but works like an interpreter.
- Assembly language is difficult to understand as it is a low-level programming language.

Cont…

- An assembler translates a low-level language, such as an assembly language to an even lower-level language, such as the machine code.

Types of Languages :

- The computer language is defined as code or syntax which is used to write programs or any specific applications.
- The computer language is used to communicate with computers.
- Broadly the computer language can be classified into three categories assembly language, machine language, and high-level language.

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- The machine language is considered as oldest computer language among all three.
- For computer language processing the system needs compiler and interpreter to convert the language in computer language so that it can be processed by a machine.

Different Types of Computer Language

1. Machine Language

- The machine language is sometimes referred to as machine code or object code which is set of binary digits 0 and 1.
- These binary digits are understood and read by a computer system and interpret it easily.
- It is considered a native language as it can be directly understood by a central processing unit (CPU).

Cont…

- The operating system defines how the program should write so that it can be converted to machine language and the system takes appropriate action.
- The computer programs and scripts can also be written in other programming languages like C, C++, and JAVA. However, these languages cannot be directly understood by a computer system so there is a need for a program that can convert these computer programs to machine language.

Cont…

- The compiler is used to convert the programs to machine language which can be easily understood by computer systems. The compiler generates the binary file and executable file.

Assembly Language

- The assembly language is considered a low-level language for microprocessors and many other programmable devices.
- The assembly language is also considered as second-generation language.
- The first generation language is machine language. The assembly language is mostly famous for writing an operating system and also in writing different desktop applications.

Cont…

- The operations carried out by programmers using assembly language are memory management, registry access, and clock cycle operations.
- The drawback of assembly language is the code cannot be reused and the language is not so easy to understand
- The assembly language is considered a group of other languages.

Cont…

- The other name of assembly language is assembly code. For any processor, the most used programming language is assembly language.
- In assembly language, the programmer does the operation which can be directly executed on a central processing unit (CPU).
- The operations performed using the assembly language is very fast.

High-Level Language

- The development of high-level language was done when the programmers face the issue in writing programs as the older language has portability issues which mean the code written in one machine cannot be transferred to other machines.
- The high-level language is easy to understand and the code can be written easily as the programs written are user-friendly in a high-level language.

Cont…

- The other advantage of code written in a high-level language is the code is independent of a computer system which means the code can be transferred to other machines.
- The development of higher-level language is done for a programmer to write a human-readable program that can be easily understood by any user.

Cont…

- The syntax used and the programming style can be easily understood by humans if it is compared to low-level language.
- The only requirement in a high-level language is the need of compiler. As the program written in a high-level language is not directly understood by the computer system. Before the execution of high-level programs, it needs to be converted to machine level language. The examples of high-level language are C++, C, JAVA, FORTRAN, Pascal, Perl, Ruby, and Visual Basic.