



Computer Fundamentals

Program Translators

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Program Translators

- Computers only understand [machine code](#) ([binary](#)), this is an issue because programmers prefer to use a variety of high and [low-level](#) programming languages instead.
- To get around the issue, the [high-level](#) and low-level program code ([source code](#)) needs to pass through a [translator](#).
- Source code is the code that is input to a translator and executable code is the code that is output from the translator.
- A translator will convert the source code into machine code ([object code](#)).
- There are 3 types of system software used for translating the code that a programmer writes into a form that the computer can execute(i.e, machine code)

1. Assemblers

- Assembler is a computer program which is used to translate program written in assembly language into machine language.
- The translated program is called as object program.
- Assembler checks each instruction for its correctness and generates Diagnostic messages if there are mistakes in the program.
- Various steps of assembling are:
 - Input source program in assembly language through an input device
 - Use assembler to produce object program in machine language
 - Execute the program

2. Compilers

- A compiler is a program that translates a program written in high level languages to executable machine language.
- The process of transferring high level languages source program into object code is a lengthy and complex process as compared to assembling.
- Compilers have Diagnostic capabilities and prompt the programmer with appropriate error message while compiling a high level languages program.
- The corrections are to be incorporated in the program whenever needed, and the program has to be recompiled.
- The process is repeated until the program becomes mistake free and translated to an object code.
- Thus the job of a compiler includes the following
 - To translate HLL source program to machine code.
 - To trace variables in the program.
 - To include linkage for subroutines.
 - To allocate memory for storage of program and variables.
 - To generate error messages, if there are errors in the program

3. Interpreters

- An interpreter is a program which translates statements of a program into machine code.
- It translates only one statement of the programme at a time.
- It reads only one statement of program, again translates it and executes it .
- Then it reads the next statement of the program again translates it and executes it.
- In this way it proceeds further till all the statements are translated and executed.
- on the other hand a compiler goes through the entire program and then translates the entire program into machine codes. A compiler is 5 to 25 times faster than an interpreter
- By the compiler, the machine codes are saved permanently for future reference.
- On the other hand the machine codes produced by interpreter are not saved .
- An interpreter is a small program as compared to compiler
- It occupies less memory space so it can be used in a smaller system which has a limited memory space