Assembly Language Program Development Tools

1. Editor

- An editor is a program which allows you to create a file containing the assembly language statements for your program.
Example: PC-Write, Wordstar.

- As you type in your program, the editor stores the ASCII codes for the letters and numbers in successive RAM locations.

- When you have typed in all your program, you then save the file on the hard disk. This file is called *source file* and the extension is *.asm*.

2. Assembler

- An assembler program is used to translate the assembly language mnemonics for instructions to corresponding binary codes. When you run the assembler, it reads the source file of your program from the disk where you have saved it after editing.

- On the first pass through the source program, the assembler determines the displacement of named data items, the offset of labels, etc. and puts this information in a symbol table.

- On the second pass through the source program, the assembler produces the binary code for each instruction and inserts the offsets, etc. that it calculated during the first pass.

- The assembler generates 2 files on the floppy disk or hard disk. The first file is called object file (*.obj*).

- The second file generated by assembler is called the assembler list file and is given extension (*.lst*).

3. Linker

- A linker is a program used to join several object files into one large object file.

- The linker produces a link file which contains the binary codes for all the combined modules. The linker also produces a link map file which contains the address information about the linked files (*.exe*).

4. Locator

- A locator is a program used to assign the specific address of where the segments of object code are to be loaded into memory.

- A locator program called EXE2BIN comes with the IBM PC Disk Operating System (DOS). EXE2BIN converts a *.exe* file to a *.bin* file which has physical addresses.

5. Debugger

- A debugger is a program which allows you to load your object code program into system memory, execute the program and troubleshoot or debug it.

- The debugger allows you to look at the contents of registers and memory locations after your program runs.

- It allows you to change the contents of registers and memory locations and re-run the program.

- Some debuggers allow you to stop execution after each instruction so that you can check or alter after each register contents.

- A debugger also allows you to set a breakpoint at any point in your program. If you insert a breakpoint at any point in your program, the debugger will run the program up to the instruction where you put the breakpoint and then stop the execution.

6. Emulator

- An emulator is a mixture of hardware and software.

- It is used to test and debug the hardware and software of an external system, such as the prototype of a microprocessor based instrument. Part of the hardware of an emulator is a multiwire cable which connects the host system to the system being developed.