

Assembly Programming

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Subject: Computer Organization

Topic: Assembly language program: Functional concepts

Teaching Methodology: Technology and Innovative methods of teaching



Fig.1. Innovative method of learning assembly programming

What is a programming language?

- A tool for instructing machines
- A notation for algorithms
- A means for communication among programmers
- A tool for experimentation
- A means for controlling computer-controlled gadgets
- A means for controlling computerized devices

- A way of expressing relationships among concepts
- A means for expressing high-level designs
- All of the above!
 - And more

A Layered View of the Computer

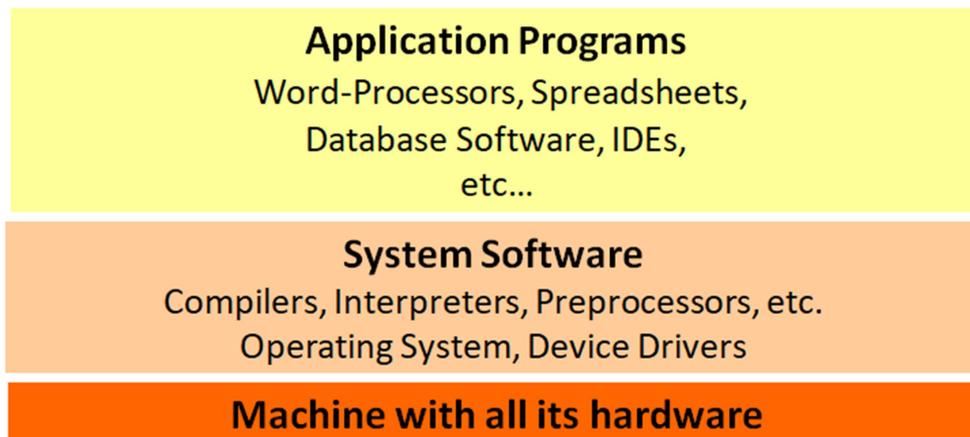


Fig.2. Layers Computer software

Computer Languages

- Machine Language
 - Uses binary code
 - Machine-dependent
 - Not portable
- Assembly Language
 - Uses mnemonics
 - Machine-dependent
 - Not usually portable
- High-Level Language (HLL)
 - Uses English-like language
 - Machine independent
 - Portable (but must be compiled for different platforms)
 - Examples: Pascal, C, C++, Java, Fortran, . . .

Assembly language

- A symbolic representation of the machine language of a specific processor.

- Is converted to machine code by an assembler.
- Usually, each line of assembly code produces one machine instruction (One-to-one correspondence).
- Programming in assembly language is slow and error-prone but is more efficient in terms of hardware performance.
- Mnemonic representation of the instructions and data
- **Example:**

```

Load Price
Add Tax
Store Cost

```

Example: To add to numbers using Turbo C

```

#include<stdio.h>
void main() {
    int a = 10, b = 20, c;
    asm {
        mov ax,a
        mov bx,b
        add ax,bx
        mov c,ax
    }
    printf("c= %d",c);
}

```

Output:

C=30

Web Ref: <https://www.javatpoint.com/assembly-program-in-c#:~:text=Let%27s%20see%20a%20simple%20assembly%20program%20code%20to,add%20ax%2Cbx%20mov%20c%2Cax%20%7D%20printf%28%22c%3D%20%25d%22%2Cc%29%3B%20%7D>