

# Ch. 1: Computer System

part II

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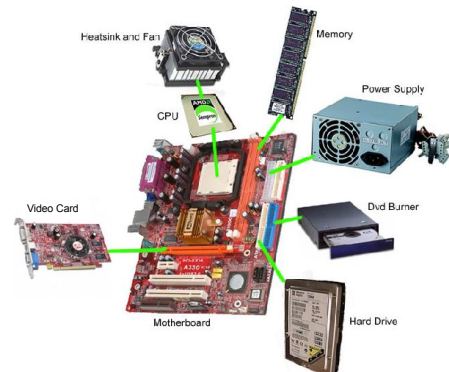
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## Computer Hardware Revisited



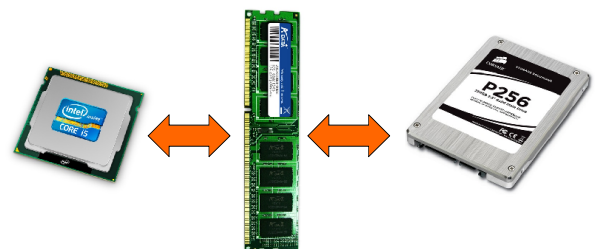
2

## A Motherboard (Mainboard)

- The **Motherboard** is the primary circuit board of a personal computer containing the circuitry for the central processing unit, keyboard, mouse and monitor, together with slots for other devices.

3

## RAM and HDD



4

## Software

- **Computer software, or just software, is any set of machine-readable instructions (most often in the form of a computer program) that directs a computer's processor to perform specific operations.**

5

## Software Classification

### • **System Software**

- Operating System
- Language Translator
- Utility Software

### • **Application Software**

- Special Purpose Software
- Package Software

6

## Programming Language

- **A programming language is an artificial language designed to communicate instructions to a machine, particularly a computer.**
- Programming language generations
  - **Machine Language**
  - **Assembly Language**
  - **High-level Language**
  - **Very High-level Language**
  - **Natural Language**

7

Ref: [http://www.webopedia.com/TERM/F/fourth\\_generation\\_language.html](http://www.webopedia.com/TERM/F/fourth_generation_language.html)

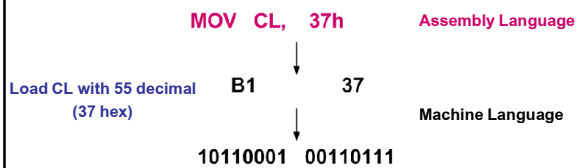
## Machine Language: 1GLs

- **In binary form (digital code).**
- **The only language which CPU (Machine) can execute (understand),**
- Referring to any memory location in RAM.
- Using very detailed instructions.
- Machine Dependent

8

### Assembly Language: 2GLs

- A symbolic language. A group of binary code equals one symbol
  - Symbolic programming language
- Translated into machine language by an **Assembler**



9

### High Level Language: 3GLs

- Meaningful language and more programmer-friendly.
- it may use natural language elements
  - e.g. include, case, do, if, else, for, goto
- To be translated by a **Compiler** or an **Interpreter**
- For example, FORTRAN, BASIC, Pascal, C, Java

10

### Very High Level Language: 4GLs

- Designed to reduce
  - programming effort
  - the time it takes to develop software,
  - and the cost of software development.
- User specify **what** needs to be done without having to specify **how** it is to be done
- For example, Python, Ruby

11

### Natural Language: 5GLs

- Developed by the *Expert System* technology and *Artificial Intelligence (AI)*
- Enabling computers to derive meaning from human or natural language input.
- Need to deal with “flaws” of Natural Language
  - Ambiguity (“Free whales”)
  - Context
  - Incompleteness

12

## Translator

Program translator translates source code of programming language into machine language-instruction code

### 1. Assembler

- An assembler translates the symbolic codes of programs of an assembly language into machine language instructions

13

## Translator

### 2. Interpreter

- Interpreter directly executes the program from its source code. Due to this, every time the source code should be inputted to the interpreter. In other words, each line is converted into the object codes.

### 3. Compiler

- Compilers are the translators, which translate all the instructions of the program into machine codes, which can be used again and again

14

Ref: [http://my.safaribooksonline.com/book/programming/c/9788131760314/basics-and-introduction-to-c/section\\_1\\_7](http://my.safaribooksonline.com/book/programming/c/9788131760314/basics-and-introduction-to-c/section_1_7)

## System Software

- **Software designed to operate the computer hardware and to provide a platform for running application software**

### ➤ Utility Software

- small, powerful programs with a limited capability, they are usually operated by the user to maintain a smooth running of the computer system
- e.g. Anti-virus software, Backup software, Disk defragmenter, File manager, Network utility

15

## System Software

### ➤ Operating System

- **a collection of software that manages computer hardware resources**
- Provides common services for computer programs.
- The operating system acts as an intermediary between programs and the computer hardware
- For example, **Microsoft Windows, OS X, Solaris, Linux**

16

## Application Software

- **Application software is all the computer software that causes a computer to perform useful tasks**
- 
- **Special Purpose Software**
    - Special Purpose application software is very specific in its use for example engineering related application.
  - **Package Software**
    - A collection of computer programs —usually application software or programming software— of related functionality
    - For example MS office Suite

17

## Peopleware

- ❖ **Peopleware can refer to anything that has to do with the role of people in the development or use of computer software and hardware systems**

### Peopleware classification

- **Administrative staff**
- **Technical staff**
- **Operational staff**

18

## Peopleware

### Administrative Staff

- **Manage resources to maximize benefits to the organization**
- **Determine planning & standards within the organization**
- **Example**
  - Manager
  - Chief Officer

19

## Peopleware

### Technical staff

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• <b>Responsibilities</b> <ul style="list-style-type: none"> <li>• System Analysis &amp; Design</li> <li>• Problem Solving</li> <li>• Program Design and Coding</li> <li>• Technical Support</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• <b>Example:</b> <ul style="list-style-type: none"> <li>• System Analyst</li> <li>• Programmer</li> <li>• Software Engineer</li> <li>• Network Administrator</li> <li>• Computer Technician</li> </ul> </li> </ul> |
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20

## Peopleware

### Operational staff

- **Uses provided software or packages**
- **Technical knowledge not required**
- **Perform non-technical tasks in an organization**
  - User / End User
  - Computer Operator
  - Data Entry Operator

21