Introduction to Computer Application I
Summary

- Introduction to the computer
- Hardware development
- Software development
  - Language Programming
  - Operating System
  - Software Application
    - Presentation
    - Multimedia
    - Internet
    - Image Processing
Introduction to the computer

» Definition
» Electronic Data processing & Data Processing Cycle
» Computer System
DEFINITION

Computer is:
an electronic device that can receive data input and process it to get the result as an information

EDP is a manipulation from a row data to a useful Information

Data Processing Cycle

INPUT → PROCESS → OUTPUT

COMPUTER SYSTEM

Hardware  Software  Brainware
- **Computer System**: A collection of hardware and software components designed to provide an effective tool for computation.

- **Hardware**: Actual equipment used to perform the computations.

- **Software**: Programs enabled us to communicate with a computer by providing it with the list of instructions it needs to operate.
A typical computer system
» All Computers, from the very smallest microsystem to the largest mainframe, consist of three basic components.
  » Memory
  » Central Processing Unit (CPU)
  » Input/Output devices
What is the computer?

Central Processing Unit (CPU)

Control Unit

Primary Storage Unit

Arithmetic and Logic Unit

Input Data

Output Information

Secondary Storage Unit
• Every computer comes with a certain amount of storage, both *internal* storage (*memory*), and *external* (or *secondary*) *storage*.

• The two forms of storage differ in *characteristics* and in *purpose*.

• Program currently in execution, along with some of the data required for execution, must be reside in memory.
Types of memory

- Main Memory
  - Read Only Memory
  - Random-Access Memory
- Secondary Memory
  - Hard Disk
  - Floppy Disk
  - CD-ROM
MAIN MEMORY

➢ Read Only Memory (ROM):
  – Stores information permanently (*not* volatile).
  – Stores the boot instructions needed to start-up the computer when it is switch on.
  – Is written by the manufacturer.

➢ Random Access Memory (RAM):
  – Is usually volatile memory.
  – Temporarily stores programs while they are being executed and data.

➢ Cache Memory
  Checked by the processor prior to looking for a needed program instruction or data in regular RAM.
 MAIN MEMORY

➢ Read Only Memory (ROM):
  – Stores information permanently (not volatile).
  – Stores the boot instructions needed to start-up the computer when it is switch on.
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➢ Random Access Memory (RAM):
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Central Processor Unit (CPU)

- Coordinating all computer operations
- Performing arithmetic and logical operations on data
- Contains two subcomponents
  - Arithmetic/Logic Unit (ALU)
    - Carries on all types of calculation (Arithmetic and logical operations)
  - Control Unit (CU)
    - Controls the actions of the other components.
    - Examples, Operating under the control of instructions from the programmer (these instructions reside in memory), the control unit causes data to be read from the input devices, passed the appropriate values from storage to arithmetic/logic unit for the required calculations, stores and retrieved data and intermediate results from main memory, and passes results to the output device for display
INPUT DEVICES

- Keyboard Devices
- Pointing Devices:
  - Mouse, Trackball, Touch Screen, Light Pen, Remote Control Unit
- Optical Reading Devices:
  - OCR (Optical Character Recognition):
    - optical mark reader, optical character reader, handprint reader
- Magnetic Reading Devices
  - EFT (Electronic Funds Transfer):
    - automatic deposit, automatic transfer, Automated Teller Machine (ATM)
- Speech Recognition Devices
OUTPUT DEVICES

- **Displayed Output Devices:**
  
  - Display Screen, Monitor, Cathode Ray Tube (CRT), Video Display Terminal (VDT)

- **Printers:**
  
  - Line Printers, Character Printers, Page Printers

- **Speech Output Devices**

- **Plotters**

- **Microfilm**
Hardware Development

- First Generation (1946-1959)
- Second Generation (1960-1965)
- Third Generation (1966-1975)
- Fourth Generation (1975 - Now)
- Accessories
Software Development

- System Software
  - Operating Systems
  - Utility Programs
  - Language Translators
Operating System

Without operating system, a software application or a program language software can’t communicate with the computer. Operating System is just like a brain on human body which organize all process inside a human body
There are six basic functions that an operating system can perform:

1. Schedule Jobs.
2. Manage Hardware and Software Resources
3. Maintain Systems Security
4. Enable Multiple User Resource Sharing
5. Handle Interrupts
6. Maintain Usage Records
Utility Programs

Utilities enable users to copy files, erase files, sort the content of files, merge two or more files together, and prepare removeable storage media for use. Other utilities allow the computer operations manager to recover lost or bad files, monitor performance of the system, and event control the flow data between users and computers.
Language Programming: There are three different kinds of Language programming:

- **Machine Language**
- **Low level Language**
  - Assembler
- **High Level Language**
  - Fortran, Lisp, Algol, Cobol, RPG, Basic, Pascal, Prolog, C, Matlab, etc.
• **Machine Language**
  - A computer's native language, containing instructions that are binary numbers.
  - It is difficult for human to learn and use.
  - Instructions to the control unit must be expressed in terms of the machine language of the particular computer.
  - A machine language instruction conveys the *operation* to performed and the *operands*, or memory cells, that are to take part.

Example, compute the cost of an item

\[
\text{cost} = \text{price} + \text{tax}
\]
<table>
<thead>
<tr>
<th>Operation Code</th>
<th>Operation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>Load</td>
<td>Copy the value of the memory cell addressed into the accumulator</td>
</tr>
<tr>
<td>010</td>
<td>Store</td>
<td>Copy the value of the accumulator into the word addressed</td>
</tr>
<tr>
<td>011</td>
<td>Add</td>
<td>Replace the present value of the accumulator with the sum of its present value and the value of the memory cell addressed.</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>111</td>
<td>Halt</td>
<td>Terminate execution</td>
</tr>
</tbody>
</table>

*Sample Instruction Set*
• **Assembly Language**
  - Is programming language in English-like abbreviations
  - Later be converted into machine code by program's translator called assemblers
  - Example, adds to number and store in another variable
    
    ```
    LOAD A
    ADD B
    STORE C
    ```
• **High-Level Language**
  - A programming language whose instructions resemble every day language
  - Has a **language standard** that describe the grammatical form (syntax) of the language
  - Every high-level language instruction must conform to the syntax rules specified in the language standard.
  - Example, BASIC, C, C++, COBOL, FORTRAN, LISP, PASCAL, Java
  - Example of C++ code,

\[
\text{cost} = \text{price} + \text{tax};
\]
Presentation Application:

Animation

Interesting Presentation

Goal

Power Point

WHY

Can be embedded from another software application such as word, excell, access, picture, video, audio etc.

Can be convert to html file

Interesting Presentation
Image Processing Application:

- Matlab
- Khoros
- Halcon
- Ad Oculos
- Vista
- Image Pro Plus
- Mega Wave
Image Processing Application: Matlab

WHY

- Easy to program
- Many library specially for Image Processing
- Can be compiled with C++ compiler
- Interactive Program
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Internet & Multimedia
Application:

- Browsing
- File Transfer
- Remote Control
- Video Conferencing
- Tools
- Audio player
- Video player
- Webcam
- Ads Banner
- Email
- Etc.
• **Internet**
  - worldwide collection of computers connected together by a network communication channel.

• **Benefit of Internet**
  - **Electronic mail** (E-mail)
    • one form of communication where an individual can use to send mail to another person or to a complete list of addresses.
  - **Sites**
    • another form of communication to access other people’s **files** or information
• **World Wide Web (WWW)**  
  – the collection of sites across the world that offer information
• **To visit the site, we must have**  
  – Web Address / Uniform Resource Locators (URL)
    • http://www.cnn.com
    • http://www.au.ac.th
    • http://www.infoseek.com
  – Computer, communicating devices (MODEM, LAN card) and **web browser**
• **Web browser**  
  – A program that allows us to type the address and send messages asking for information from that site.
  – Browser companies: Microsoft’s Internet Explorer (IE) and **Netscape**
Example of Web browser (IE)
FILE TRANSFER

- WS FTP
- Cute FTP
- FTP
- Telnet

REMOTE CONTROL
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EMAIL

WEB BASED

Yahoo
gmx
Hotmail
Themail
etc

NON WEB BASED

Netscape
Pegasus
Eudora
Microsoft Mail
etc
APPLICATION SOFTWARE

- Word Processing
- Database & File Management
- Models
- Management Investation
- Accounting
- Project Scheduling
- Spreadsheet
- Presentation
- Internet

- Graphic
- Printer Manipulation
- Tools
- Sorting
- Education
- Games
- Statistik
- Multimedia
- Image Processing
» General Business Packages
   Inventory, Tracking Customer, Account Receivable, etc.

➢ Industry-Specific Packages
   Agriculture, Real Estate, Trucking, Health Care, etc

➢ Organizational Productivity Packages
   Group decision support system.
   Electronic mail.
   Project management packages.
   Forecasting and statistical analysis packages.

➢ Personal Productivity Packages
   Office Automation: Word Processor, Spreadsheet, etc
   Desktop Publishing.
ACHIEVING USER FRIENDLINESS IN SOFTWARE
Software that is to be used in end-user computing should be easy to learn and use, or *user-friendly*, as possible. To achieve user friendliness, software designers make use of a variety of tools and technique in various hardware environments. In mainframe and minicomputer environments, *menu*, *context sensitive help* and *guided dialog* all contribute to easy of use by the user. In the microcomputer environment, *the graphic user interface*, with its mouse- or trackball-driven icons, windows, and pull-down menus, has emerged as the the unofficial standard.

KEEPING INPUT ERRORS TO A MINIMUM
Event with all the techniques that have been devised to assist the user with data entry, it is still possible to make errors. Typographical errors are just as easy to make with a computer as with a typewriter. In other cases, the user simply enter incorrect data. Software can be designed to reduce the opportuntunity for errors by providing for their *prevention, detection, and correction*. 
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Technology

Multimedia Object:
- Text
- Image
- Movie
- Sound
- etc

Connection to database, with:
- PC
- Notebook
- Palm Organizer
- etc.