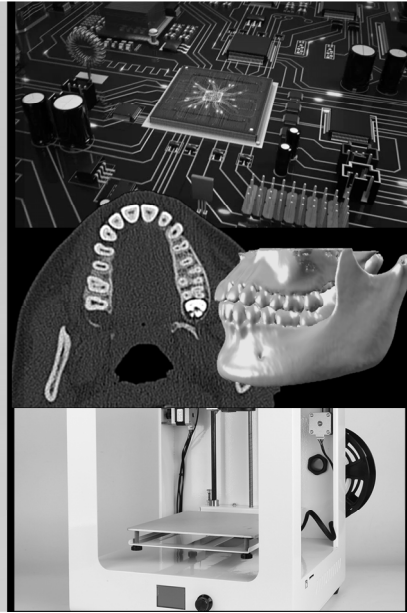# Slide 1

COMPUTER SCIENCES
KNOWING YOUR COMPUTER IV
(MANAGER OF COMPUTERS: OPERATING SYSTEM)

Chia-Feng Lu 盧家鋒

Department Of Biomedical Image And Radiological Sciences, NYCU
Ext. 67308
alvin4016@nycu.edu.tw

Slide 2

COMPUTER COMPONENTS

Desktop computer

Monitor

Operating System (OS)

CPU/fan
Memory modules
Graphics card
Motherboard
Power supply

Optical Drive
Hard Drive
Casing

Build your own Gaming PC

電腦選購 組裝與維護 自己來！

Slide 3

COMPUTER COMPONENTS IV

- Operating System (OS) 作業系統
  - Windows 11/10/7
  - MAC OS
  - LINUX

  ➤ Resource management, coordination and applications
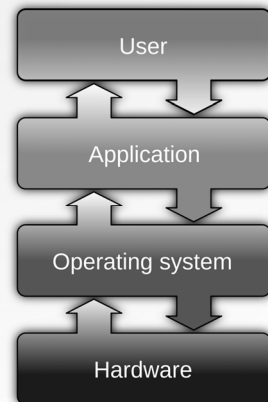
Please download handouts from (Week 6)
http://cflu.lab.nycu.edu.tw/CFLu_course_CompSci.html

User
Application
Operating system
Hardware

Slide 4

Functions of OS

- Integration and coordination of all activities
  - User interface
  - Power on/off
  - Device setup
  - Program management
  - Work coordination
  - Memory, disk and file management
  - Performance monitoring
  - Network connection
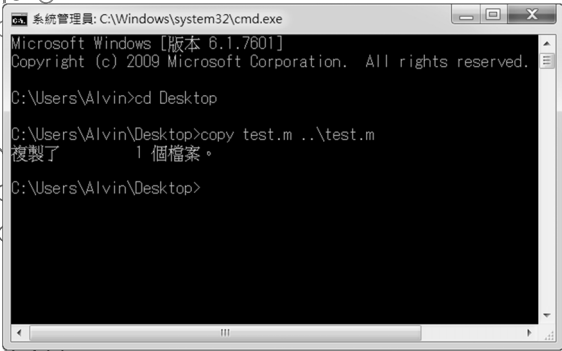 - Security and updates

User Interface – Communicate with Your Computer

Command line interface (CLI)

Graphic user interface (GUI)

Power On/Off – Usages

- Switch on
- Shutdown
- Sleep mode (睡眠)
    - Store the running files and programs in memory and switch the computer to low power mode.
- Hibernate mode (休眠)
    - Save the running files and programs to the hard disk and turn off the power.

Password protection when waking up your computer to ensure security!

Power On/Off – Usages

- Sleep mode
    - Memory, low power mode
- Hibernate mode
    - HD, power off

Device Setup – Driver(驅動程式)

- All connected hardware devices require a set of working commands to function (software ⇔ hardware).
    - Keyboard, Mouse
    - Screens
    - Printers
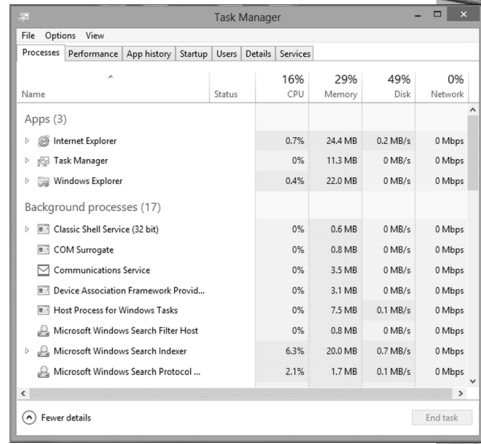   - Graphic cards
    - Webcam
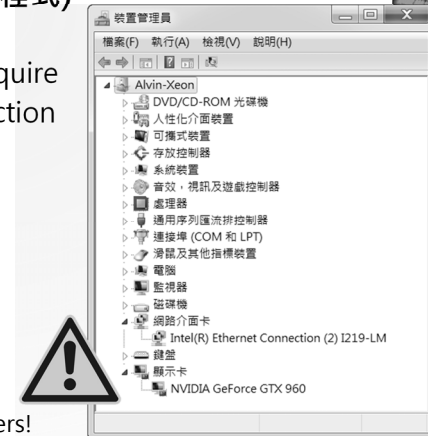
Install correct and up-to-date device drivers!

Program Management & Coordination

- Multi-tasking OS

- Foreground programs
  - Currently used
- Background programs
  - Partially or fully hidden
- Background processes

Task Manager

Program Management & Coordination

- Tasks are the computational actions managed by the processor.
  - Receiving data from the input device, processing commands, and sending data to the output device

- Multitasking buffering (spooling)
  - Temporarily store pending items in a buffer, a specific block of memory or storage.
  - Items are arranged in a queue and wait for sequential processing.
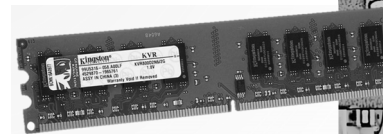

Memory Management

- Optimizing the use of memory module
  - Allocate data or commands to specific memory areas.
  - Monitor memory contents.
  - Release memory that is no longer in use.

OS	Chrome	PowerPoint	Word	MATLAB	LINE	Anti-virus
463MB	6122MB	321MB	70MB	2432MB	25MB	41MB

Total 9, 474 MB of memory is being used.

Disk And File Management

Control Panel

- Increase the performance of the operating system in managing and accessing files.

tracks
sectors
clusters
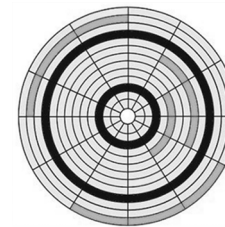
The same file data may be stored in discontinuous sectors.

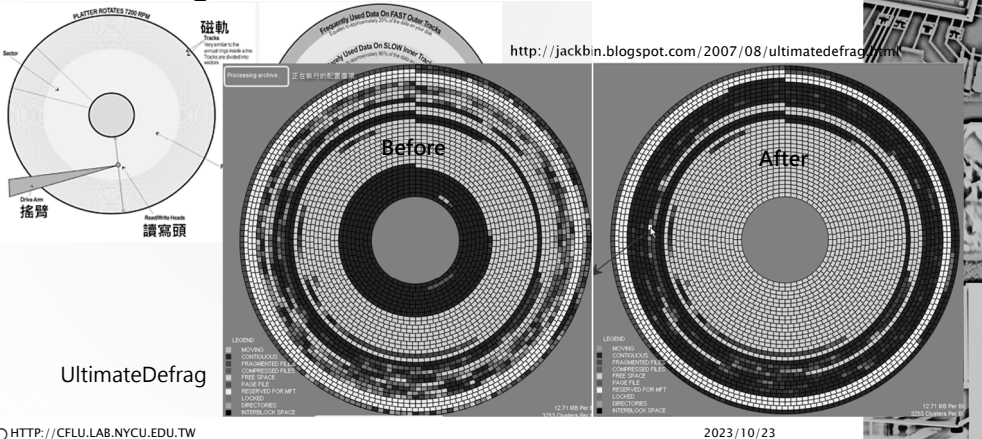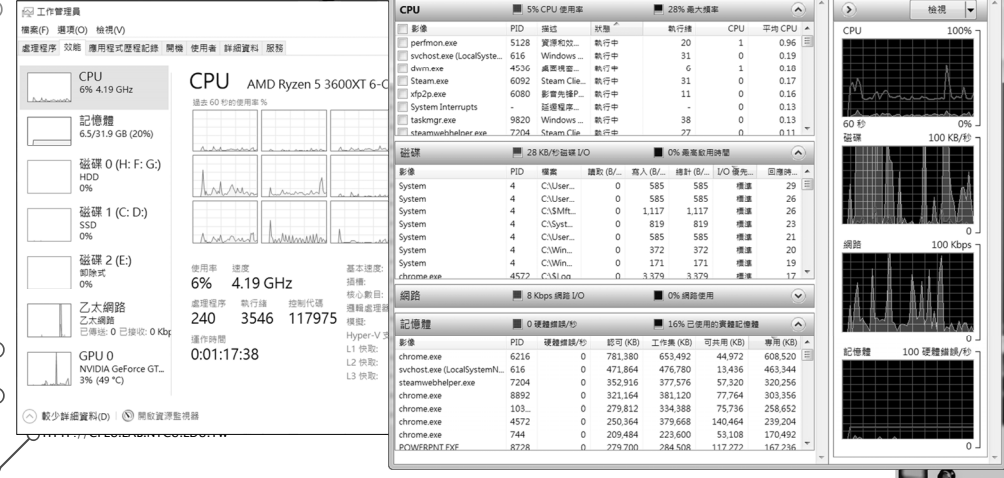| Tools	Functions
檔案管理員	Display file lists and folders; copy, name, move, delete, and sort files.
程式集 (解除安裝程式)	Remove a specific program and its associated items
磁碟分割	Create or delete partitions of disk for file storage
磁碟清理	Search and remove unwanted files
磁碟重組	Reorganize files and unused space to access data more quickly
備份和還原	Copy the contents of the storage media to other storage locations

Disk Defragmenter - Increase Data Access Performance

http://jackbin.blogspot.com/2007/08/ultimatedefrag.html
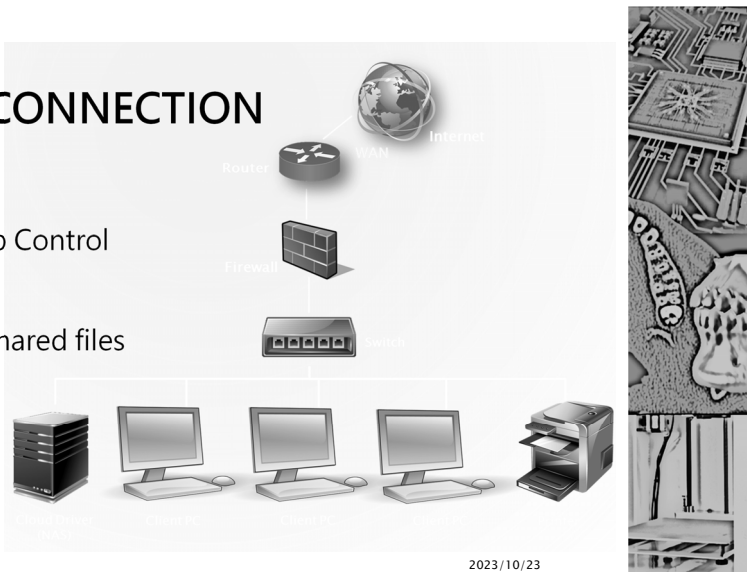
磁軌
讀寫頭
搖臂

Before
After

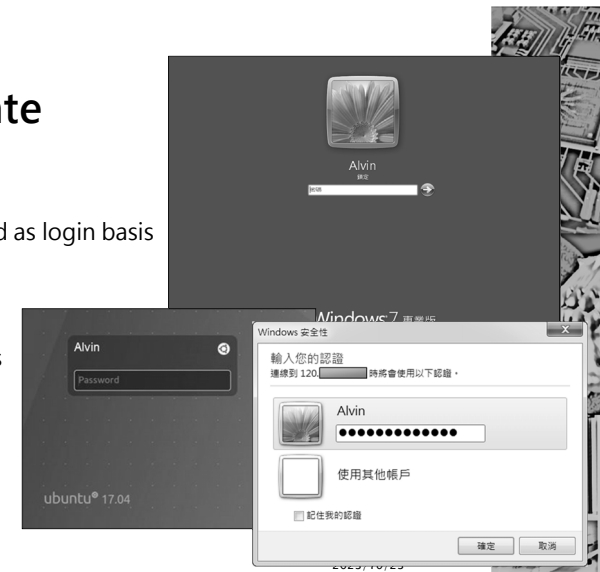UltimateDefrag

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Resource Manager

INTERNET CONNECTION

- Web browsing
- Remote Desktop Control

- Share folders, shared files
- File printing
- Shared Printers

Security And Update

- Create user account
  - Use user name and password as login basis
  - Monitor computer usage
- OS update
  - Fixing security vulnerabilities
  - System Stability

Types of OS

Microsoft 75~88%   Apple 10~20%   Open Source 2%   Google

mobile

Derived from Debian

Derived from Fedora

Market share   mobile

https://openingsource.org/129/zh-tw/

Similarity Between OSs   https://youtu.be/FDJiv3MHV9E

Types of OS   All with a graphical user interface (GUI)!

Command Line Interface (CLI)

MAC OS X

Linux Ubuntu

```
Last login: Fri Dec 18 12:07:32 on ttys000
You have new mail.
minwtdeMBP:~ minwt$ ls
Applications        Downloads        Music
Creative Cloud Files Dropbox         Pictures
Desktop             Library          Public
Documents           Movies           Typeface.html
minwtdeMBP:~ minwt$ cd Applications
```

```
ostechnix@ostechnix:~$ sudo apt-get update
Get:1 http://security.ubuntu.com/ubuntu xenial-security InRelease [102 kB]
Hit:2 http://in.archive.ubuntu.com/ubuntu xenial InRelease
Get:3 http://in.archive.ubuntu.com/ubuntu xenial-updates InRelease [102 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu xenial-backports InRelease [102 kB]
Fetched 306 kB in 3s (91.8 kB/s)
Reading package lists... Done
ostechnix@ostechnix:~$
```

WINDOWS OS (Without Server OS)

- 1985, the first version of Windows operating system Windows 1.0
- 1987, Windows 2.0
- 1990, Windows 3.0
- 1993, Windows NT
- 2001, Windows XP
- 2006, Windows Vista
- 2009, Windows 7
- 2012, Windows 8
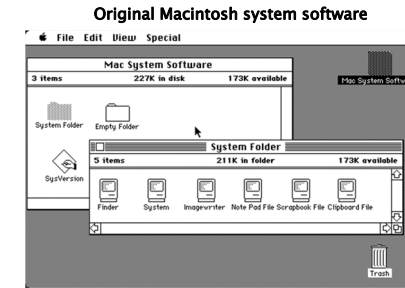- 2015, Windows 10
- 2021, Windows 11

Windows 1.0
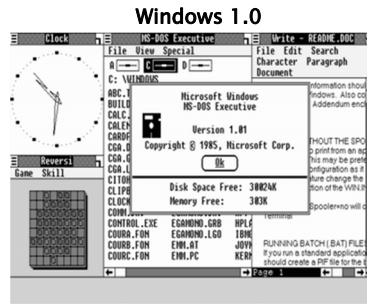
MAC OS (Without Server OS)
Macintosh

- 1984, Apple releases the Classic Mac OS
- 1985~1987, System software 2, 3, and 4
- 1987-1988, System software 5 and 6
- 1991, System software 7/Mac OS 7.6
- 1997, Mac OS 8
- 1999, Mac OS 9
- 2001-2018, Mac OS X 10.0-10.15
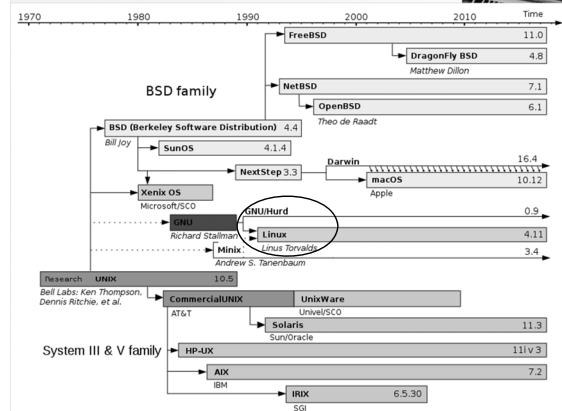- 2020, Mac OS 11
- 2021, Mac OS 12
- 2022, Mac OS 13

Original Macintosh system software

LINUX OS

- Linux, UNIX-like OS
- It was first released by Linus Torvalds in 1991. After adding user space applications, it became the Linux operating system.
- 1994, Linux 1.0
- 1996, Linux 2.0
- 2012, Linux 3.0

Free and open source software representation

LINUX.ORG

https://www.Linux.org/pages/download/

Ubuntu	CentOS	Debian	Fedora	Slackware
Mint	Xubuntu	Arch	OpenSUSE	Red Hat
Slackel	PureOS	Mageia	PCLinuxOS	Puppy
Zorin	BunsenLabs	Kubuntu	Manjaro	Bodhi
Netrunner	Neptune	Kali	Black Lab	Solus

Run Multiple OS on the Same Computer

Virtual Machine

Parallels Desktop

Windows 10 + Linux

Mac OS + Windows 10

Summary (1/2)

- Sleep and hibernation modes can be used to save power, prevent hard drive corruption and quickly resume the work.

- Understanding memory and disk management will enable you to effectively manage your computer's performance and status.

- Learn to use performance and resource monitors to understand current program resource usage.

Summary (2/2)

- Install the appropriate driver before using any hardware device.

- Keep user accounts and passwords carefully and update them in a timely manner to ensure data and privacy security.

- A virtual machine is an environment on a computer where operating systems and programs can be installed and executed.

THE END

ALVIN4016@NYCU.EDU.TW