OPERATING SYSTEMS, UTILITY PROGRAMS, AND FILE MANAGEMENT

EGCO342 INFORMATION TECHNOLOGY IN DAILY LIFE



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System Software Basics

- Two basic types of software:
 - Application software is used to do everyday tasks at home and work
 - System software is set of programs that helps run the computer
 - Operating system is group of programs that controls how computer system functions
 - Utility programs are small programs that perform many general housekeeping tasks

Operating System (OS)

- Software that helps manage and control a computer.
- If you don't have it you can't run any other program at all.



Operating System (OS)

- OS for Personal Computer
 - Windows (..., XP, Vista, 7, and 8)
 - Mac OS (..., Lion (10.7), Mountain Lion (10.8), ...)
 - Linux (Ubuntu, RedHat, Suse, CentOS, Fedora, and more.)
- OS for Mobile Devices
 - iOS
 - Android
- OS for Servers & Networks
 - Windows Server
 - Unix / Linux
- Other OS
 - Real Time OS (Car Engines, Medical Devices, Robot, and more.)

Web-Based Operating Systems

- Prototypes are being developed
- Still need a computer, operating system, and Web browser
- Enables users to access applications and content via the Web anywhere, on any machine and at any time
- Google is taking steps toward developing a complete Web-based operating system

Chrome OS and Chrome Book



Know Your Computer (1)



Finder Fi	le Edit View
About This Ma	C
Software Upda	.te
App Store	
System Prefere	nces
Dock	
Recent Items	•
Force Quit Find	der 飞合黑色
Sleep	
Restart	
Shut Down	
Log Out Ruj	企業Q

Know Your Computer (2)



Upgrading Your Operating System

- Questions to ask before you upgrade:
 - Is current OS still supported?
 - Are there significant features in new version?
 - Will your hardware work with the new OS?
 - Is your software compatible with new OS?
- Back up all data files before starting upgrade.

What the Operating System Does ?

- Coordinates and directs the flow of data and information
 - Provides a user interface
 - Manages the processor, or CPU
 - Manages memory and storage
 - Manages hardware and peripheral devices
 - Provides means for software applications to work with the CPU

The User Interface

- Enables user to interact with the computer
- Types of interfaces
 - Command-driven interface
 - Menu-driven interface
 - Graphical user interface (GUI)



Processor Management

- CPU usually is asked to perform several tasks at once
- OS arranges for execution of all activities
- Assigns a slice of time to each activity
- Switches among processes millions of times a second
- Appears that everything is happening seamlessly

Memory and Storage Management

- OS uses RAM as temporary storage area for instructions and data
- Processor accesses these instructions and data from RAM when it needs them
- OS is responsible for coordinating space allocation in RAM
- Clears item from RAM when processor no longer needs them

Virtual Memory

- RAM has limited capacity
- When RAM is full, Instructions and data are stored on the hard drive



Performance Options
Visual Effects Advanced Data Execution Prevention
Processor scheduling
Choose how to allocate processor resources.
Adjust for best performance of:
Programs Background services
Virtual memory
A paging file is an area on the hard disk that Windows uses as if it were RAM.
Total paging file size for all drives: 2885 MB
Change
OK Cancel Apply

Hardware and Peripheral Device Management

- Device Drivers
 - Facilitate communication between device and the operating system.
 - Translates device's commands into commands the operating system can understand.
- Plug and Play
 - Hardware and software standard.
 - Facilitates the installation of new hardware.

Software Application Coordination

- For programs to work, they must contain code the CPU recognizes
- Application programming interface (API)
 - Blocks of code for similar procedures
 - Prevent redundancies in software code
 - Make it easier for software developers

The Boot Process: Starting the Computer

- The boot process loads the operating system into RAM
- Four basic steps:
 - BIOS is activated
 - A POST checks attached devices
 - The operating system is loaded into RAM
 - Configuration and customization settings are checked

BIOS (1)

- Basic Input/Output System (BIOS) and also known as the System BIOS, ROM BIOS or PC BIOS)
- Piece of software located inside the mainboard.
- Help detect components and start up the computer.
 - POST (Power-On Self-Test)





BIOS (2)



1 Keystroke to start the BIOS setup program

BIOS (3)

BIOS SETUP UTILITY								
Main Advanced	H/W Monitor Boot Security	Exit						
System Overview		Use [ENTER], [TAB] or [SHIFT-TABL to						
System Time Sustem Date	[04:13:04] [Sun 01/29/2006]	select a field.						
BIOS Version : Processor Type : Processor Speed : Microcode Update: Cache Size :	775XFire-eSATA2 BIOS P1.00 Intel(R) Pentium(R) 4 CPU 3.00GHz (64bit supported 3014MHz F43/5 2048KB	Use [+] or [-] to configure system Time.						
Total Memory : DDRII1 : DDRII2 : DDRII3 : DDRII4 :	1024MB Dual-Channel Memory Mode None 512MB/200MHz (DDRII400) None 512MB/200MHz (DDRII400)	 ↔ Select Screen ↑↓ Select Item +- Change Field Tab Select Field F1 General Help F9 Load Defaults F10 Save and Exit ESC Exit 						

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When We Need BIOS

- Boot your PC from CD / USB
- Select a boot sequence
 - CD -> HD -> USB
 - HD -> USB -> CD

File Systems (1)

- If it's all 0/1 on the disk, how do we know where our file is!?
- File System is how OS tell where information are on the disk.
- Example: NTFS, EXT3, FAT16, FAT32

File Systems (2)

A file as stored on a hard disk



(c) www.teach-ict.com

What is the Differences ?

File system	Maximum filename	Allowable characters in	Total Files	Max file size	Max volume
	length	directory entries			size
FAT16	8.3 or 255	Any byte except for	65,460	4 GB	2 - 4 GB
FAT32	UTF-16	values 0-31, 127	268,173,		2 - 16 TB
	code units	(DEL) and: " * / : < >	300		
	with Long	? \ + , . ; = []			
	File Name	(lowcase a-z are			
		stored as A-Z). With			
		VFAT LFN any			
		Unicode except NUL			
NTFS	255		2 ³² -1	16 TB	256 TB
HFS+	Very long			Very big	Very big

Compatibility

- Fat 16, Fat 32 can be read/write by all
- NTFS read/write on Windows, Read only for Mac
- HFS+ read/write on Mac only.

Formatting

- Wipe all data from a hard disk/flash drive.
- Set file system.
- Try right click on a drive.
- Quick Format vs Normal Format
 - Quick = File directory system is destroyed.
 - Normal = Very Slow (Hours or Day) but check HD condition

Partitioning and File Systems (1)

- Partitioning: Enables you to logically divide the physical capacity of a single drive into separate areas, called partitions or logical drives
- Used to:
 - Install more than one operating system.
 - Create a recovery partition.
 - Create a new logical drive for data.
 - Increase efficiency (smaller drives can use smaller cluster sizes)
- File system: Determines the cluster size, maximum drive size, and maximum file size
- FAT, FAT32, and NTFS

Partitioning and File Systems (2)

- Usually remove partition destroys ALL DATA.
- Windows has a tool for repartition that can shrink and expand without destroying data.
- Possible to use special software for repartitioning without losing data at all such as *Partition Magic, GNU Parted, etc...*



Partitioning and File Systems (3)

🕞 🕞 🗸 👘 🕨 Control Panel 🕨 Syste	m and Security Administrative Tools			Search Administrative 👂		
Organize 🔹 🔳 Open				· · · · · · · · · · · · · · · · · · ·		
🚖 Favorites	Name	Date modified	Туре	Size		
📃 Desktop	🏇 Component Services	14/7/2552 11:57	Shortcut	2 КВ		
bownloads 🖉	瀞 Computer Management	14/7/2552 11:54	Shortcut	2 KB		
Recent Places	🔊 Data Sources (ODBC)	14/7/2552 11:53	Shortcut	2 KB		
_	🗿 Event Viewer	14/7/2552 11:54	Shortcut	2 KB		
🚔 Libraries	뤎 iSCSI Initiator	14/7/2552 11:54	Shortcut	2 KB		
Documents	揭 Local Security Policy	27/11/2557 15:24	Shortcut	2 KB		
📣 Music	hicrosoft .NET Framework 2.0 Configuration	11/12/2557 13:51	Shortcut	2 KB		
S Pictures	🔊 Performance Monitor	14/7/2552 11:53	Shortcut	2 KB		
Julieos	🚧 Print Management	1/12/2557 22:46	Shortcut	2 KB		
	🖗 Services	14/7/2552 11:54	Shortcut	2 KB		
🐝 Homegroup	😹 System Configuration	14/7/2552 11:53	Shortcut	2 KB		
	护 Task Scheduler	14/7/2552 11:54	Shortcut	2 KB		
💐 Computer	📝 Windows Firewall with Advanced Security	14/7/2552 11:54	Shortcut	2 KB		
😻 Windows 7 HD (C:)	📷 Windows Memory Diagnostic	14/7/2552 11:53	Shortcut	2 KB		
🛫 Desktop (\\vmware-host\Share	😽 Windows PowerShell Modules	14/7/2552 12:32	Shortcut	3 KB		
🛫 Shared Folders (\\vmware-host						
🔃 Network						
Computer Management Date modified: 14/7/2552 11:54 Date created: 14/7/2552 11:54 Shortcut Size: 1.26 KB						

Partitioning and File Systems (4)

E Computer Management										
File Action View Help										
🗢 🔿 🙋 🗔 🚺 🗔 🖄 🗙 🖆 😂 😣										
🎥 Computer Management (Local)	Volume	Layout	Type Fi	ile System	Statu	S	Capacity	Free Space	% Fi	Actions
🔺 🕻 System Tools	System Reserved	Simple I	Basic N	ITFS	Healt	hy (System, Active, Primary Partition)	100 MB	66 MB	56 9	Disk Managem 🔺
> 🕑 Task Scheduler	Windows 7 HD (C:	Simple I	Basic N	ITFS	Healt	hy (Boot, Page File, Crash Dump, Primary Partition)	39.90 GB	151 MB (0 %	More Actio
Event Viewer										Wore Actio V
Shared Folders										
> & Local Users and Groups										
> Performance										
Storage										
in services and Applications										
	•					J			-	
	Disk 0									
	Basic	System Re	eserved	I ////////////////////////////////////		Windows 7 HD (C:)				
	40.00 GB	100 MB N	TFS ////			39.90 GB NTFS				
	Online	Healthy (Sy	ystem, A	Active, Prim	hary	Healthy (Boot, Page File, Crash Dump, Primary Part	ition)			
	0				1				_	
	CD-ROM 0									
	DVD (D:)									
	No Media									
		arv partitio	on							

Why Partition ?

- Separate OS from data
 - OS on one partition and Data (Music, Word, etc) on another.
 - OS need certain free space for virtual memory.
- Have more than one OS on the same computer.

Files and Directories



Organizing Your Computer: File Management

- Additional function of the operating system is to enable file management
- Provides an organizational structure to the computer's contents.



Naming Files

- File name is the name you assign to the file when you save it
 - First part is similar to your first name
- In Windows, an extension, or file type, follows the file name and a period or dot (.)
 - Similar to a last name, extension identifies the application needed to read the file

Common File Name Extensions

Extension	Type of Document	Application
.doc	Word processing document	Microsoft Word 2003
.docx	Word processing document	Microsoft Word 2007 and 2010
.xlsx	Spreadsheet	Microsoft Excel 2007 and 2010
.accdb	Database	Microsoft Access 2007 and 2010
.pptx	PowerPoint presentation	Microsoft PowerPoint 2007 and 2010
.pdf	Portable Document Format	Adobe Acrobat or Adobe Reader
.rtf	Text (Rich Text Format)	Program that can read text documents
.txt	Text	Program that can read text documents
.htm /.html	Hyper Text Markup Language	Any program that can read HTML
.jpg	JPEG image	Programs capable of displaying images
.zip	Compressed file	WinZip

File Naming Conventions

- Each OS has own naming conventions
- Up to 255 characters
- Forbidden characters in Windows:

" $/ \setminus *$? < > | :

• Mac file names may not use a colon (:), are case sensitive and do not need file extensions

File Path

- Determine location of a file by its file path
- File path includes drive, folders, subfolders, the file name, and the extension
- Path separators include a backslash (\) for Windows, or colon (:)
 for Mac



Working with Files

- File-management actions
 - Open
 - Copy
 - Move
 - Rename
 - Delete
 - Recycle Bin (Windows)
 - Trash (Mac)

Utility Programs

- Small applications that perform special functions
- Some are incorporated into operating system
 - Firewall and file-compression utilities
- Stand-alone utility programs offer more features and require frequent updating
 - Antivirus and security programs

Display Utilities (1)

- Personalization has features to change the appearance of your desktop:
 - Background
 - Screen savers
 - Window colors
- Vast array of downloadable options are available on the Web.

Display Utilities (2)



The Programs and Features Utility

- Installing a new program usually runs a wizard automatically that walks you through installation
- Delete programs by:
 - Selecting the program's own uninstall option
 - Windows uninstaller utility

File Compression Utilities

- Makes a large file more compact
- Easier and faster to send over Internet
- Windows has built-in file compression
- Take out redundancies
- Look for repeated patterns

The rain in Spain falls mainly on the plain.

System Maintenance Utilities (1)

- Disk Cleanup removes unnecessary files
 - Recycle Bin
 - Temporary Internet files
 - Offline Web pages
- If not deleted, these files can hinder
 efficient performance

Disk Cleanup for Windows 7 HD (C:)	X
Disk Cleanup	
You can use Disk Cleanup to free up to 272 MB of dis on Windows 7 HD (C:).	k space
Files to delete:	
V Downloaded Program Files 0 by	tes 🔺
Temporary Internet Files 174 I	MB _
Offline webpages 7.70	КВ
🔲 🧊 Recycle Bin 0 by	tes
Setup Log Files 20.6	KB
Tomorany files 60.01	MR
Total amount of disk space you gain: 2	12 MB
Description	
Downloaded Program Files are ActiveX controls and Java app downloaded automatically from the Internet when you view ce pages. They are temporarily stored in the Downloaded Progra Files folder on your hard disk.	olets ertain m
View File:	s
ОК	Cancel

System Maintenance Utilities (2)

- Disk Defragmenter regroups related pieces of files on the hard disk
- Error-checking checks for lost files and fragments and physical errors on hard drive.
- Use Task Manager to check on program.
 - that has stopped working or to exit nonresponsive programs.

System Maintenance Utilities (3)

File A	File B	File C	Free S	pace
File A	File B	File C	File A	Free Space
File A		File B Fi	ile C	Free Space

Task Manager Utility

💐 Windows Task Manager	
File Options View Windows Help	
Applications Processes Services Performance Networking	g Users
Task	Status
E Computer Management	Running
🥵 System	Running
End Task Switch To	New Task
Processes: 60 CPU Usage: 12% Physical M	lemory: 47%
Processes: 60 CPU Usage: 12% Physical M	1emory: 47% 🛒



Sleep and Hibernate

- Control Panel -> Power Options
- Sleep / suspend
 - Pause computer
 - Power out = lose everything
- Hibernate
 - Pause to hard disk.
 - Need space = memory.
 - Slower to start.
 - Safe from power out.

Working Remotely

	Computer Name Hardware Advanced System Protection Remote
	Remote Assistance
	Allow Remote Assistance connections to this computer
B Remote Desktop Connection	What happens when I enable Remote Assistance?
Remote Desktop Connection	Advanced
	Remote Desktop
Computer: example.cs.wisc.edu	Click an option, and then specify who can connect, if needed.
User name: None specified	On Don't allow connections to this computer
You will be asked for credentials when you connect.	
	 Allow connections from computers running any version of Remote Desktop (less secure)
Options Connect Help	Allow connections only from computers running Remote Desktop with Network Level Authentication (more secure)
	Help me choose Select Users
	OK Cancel Apply

System Properties

X