Computers: Tools for an Information Age

System Software



Objectives

- System Software
- Operating system (OS)
- Popular Operating Systems

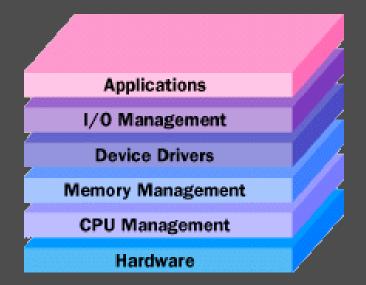
System Utilities



System Software



System Software



System software includes all of the programs needed to keep the computer and its peripheral devices running smoothly.

Two major categories of system software:

- Operating system (OS)
- System utilities



Operating system (OS)



The Operating System (OS)

- The operating system is a set of programs that perform certain basic functions.
- The functions of the operating system are:
 - Starting the computer
 - Managing programs
 - Distributing memory
 - Coordinating the processor and peripheral devices
 - Enabling user interaction with the computer



Starting the Computer

- The cold booting process begins when the power is turned on.
- There are several steps to a cold boot:
 - 1. ROM loads BIOS (basic input/output system) into the computer's memory.
 - 2. BIOS conducts a Power-on self-test (POST) to check the input/output system for operability.
 - 3. BIOS searches for the OS. Settings in the CMOS (complementary metal-oxide semiconductor) determine where to look for the OS.
 - 4. The kernel (the essential OS components) is loaded into memory from storage.
 - 5. OS takes control of the computer.



Configuring the System

- **1.** The system is configured from the OS's registry.
- 2. Drivers and utility programs are loaded into memory.
- 3. System utilities (volume control, antivirus software, etc.) are loaded into memory.
- 4. Authentication or user login occurs.
- 5. User interface begins, enabling user interaction with computer programs.

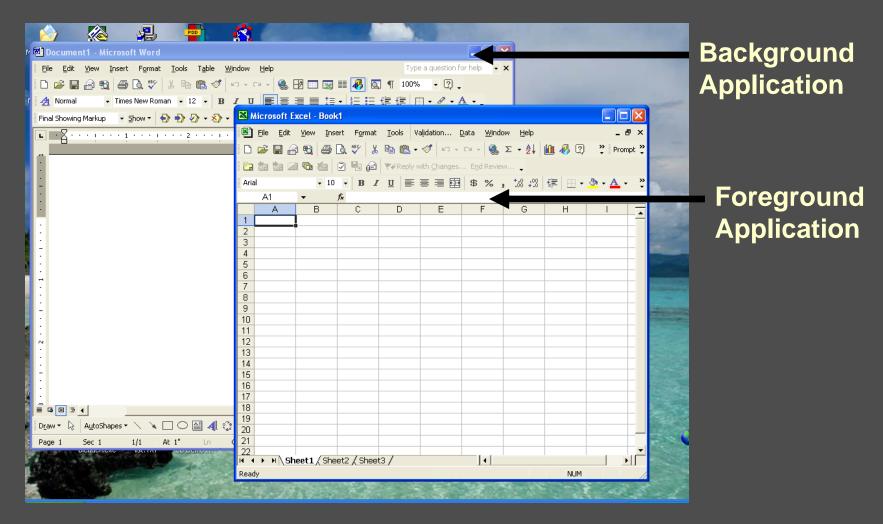
Managing Programs

Single-tasking systems run one application program at a time.

- Multitasking operating systems have the ability to run more than one application program at a time.
 - Multitasking is accomplished by:
 - Foreground application Active program or program in use
 - Background application– Inactive program or program not in use



Example of Multitasking

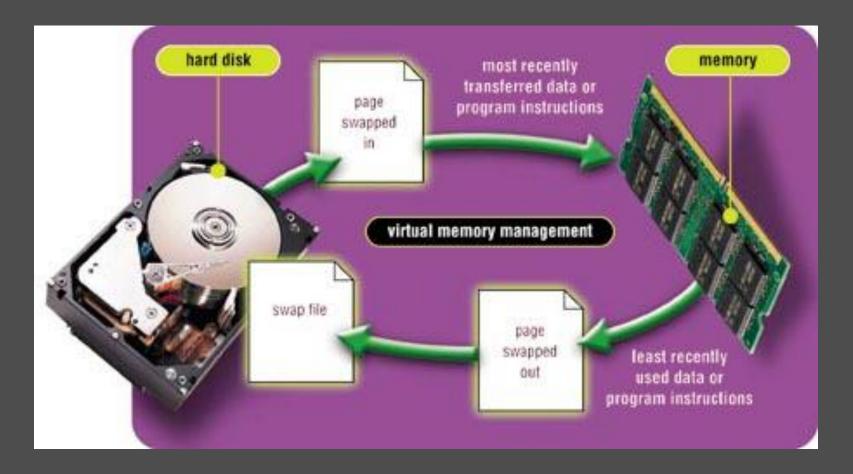


Managing Memory

- The operating system allocates memory area for each running program. It keeps programs from interfering with each other.
- The OS uses virtual memory as an extension of RAM. Pages of data and instructions are swapped between RAM and the hard drive if RAM is full.
- The OS works with the direct memory access (DMA) controller to permit peripherals access to RAM.



Managing Virtual Memory





Providing the User Interface

The user interface is that part of the operating system that enables the user to interact with it.

Two types of user interfaces:

Command-line – Requires the user to type keywords or commands to enter data or give instructions.

States of the second states



Command-Line Interface

Command Prompt

Microsoft Windows XP [Version 5.1.2600] (C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\default>dir/p Volume in drive C has no label. Volume Serial Number is 07D0-0A0D

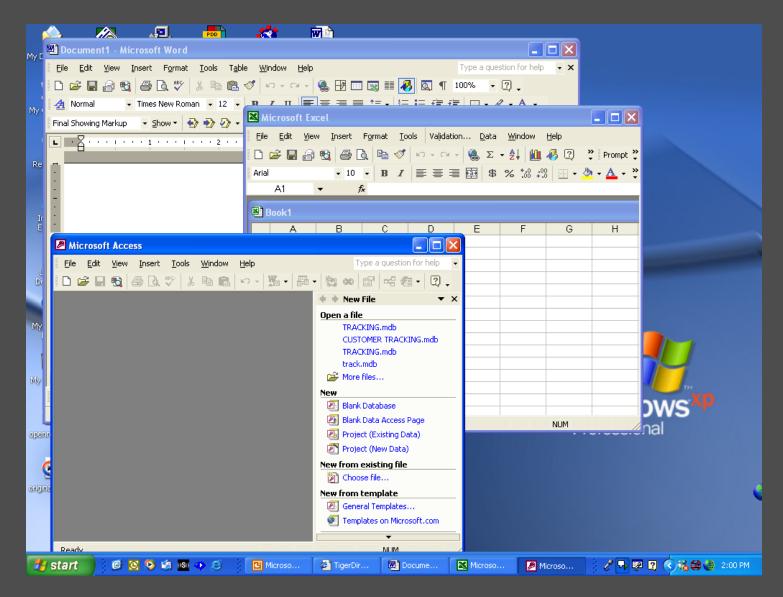
Directory of C:\Documents and Settings\default

02/12/2002	09:53 AM	<dir></dir>	-
02/12/2002	09:53 AM	<dir></dir>	
02/12/2002	10:21 AM	<dir></dir>	My Documents
02/12/2002			Favorites
02/12/2002			Desktop
02/12/2002			Start Menu
02/14/2002			WINDOWS
		(s)	0 bytes
	7 Dir(s	> 11,026,9	39,904 bytes free

C:\Documents and Settings\default>_



Graphical User Interface (GUI)





Popular Operating Systems



Popular Operating Systems

UNIX

MS-DOS



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LINUX



MAC OS

WINDOWS XP





UNIX

- **Developed by AT&T in 1970s**
- First preemptive multitasking system
- Developed concepts of file management and path names
- Client/server networking system
 - Widely used by corporations





MS-DOS

Developed for IBM PCs in 1981 Uses command-line interface Use is diminishing

🖾 Command Prompt	- 8 >
Microsoft Windows XP [Version 5.1.2600] (C) Copyright 1985-2001 Microsoft Corp.	-
C:\Documents and Settings\default>ver	
Microsoft Windows XP [Version 5.1.2600]	
C:\Documents and Settings\default>c:	
C:\Documents and Settings\default>c:\ /c:\` is not recognized as an internal or external command, operable program or batch file.	
C:\Documents and Settings\default\dir Uolume in drive C has no label. Volume Serial Number is 87000-8600	
Directory of C:\Documents and Settings\default	
02/12/2002 09:53 AM (DIR) 02/12/2002 09:53 AM (DIR) 02/12/2002 09:53 AM (DIR) 02/12/2002 10:21 AM (DIR) 02/12/2002 10:21 AM (DIR) 02/12/2002 09:35 AM (DIR) 02/14/2002 09:35 AM (DIR) 01 FIN Start Henu 02/14/2002 09:45 PM (DIR) 0 FIL 0 0 FIL 0	
👭 start 🔹 🙆 🚱 🧐 🚳 🙆 🖂 🖙 Command Prompt	



MAC OS

First to use graphical user interface in 1984

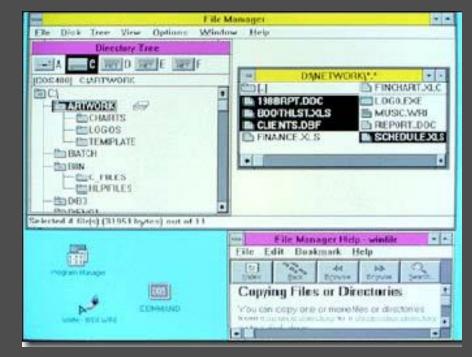
Easiest operating system for beginners





Windows 3.X

- Includes Windows 3.0, 3.1, 3.11, and Windows for Workgroups 3.1
- Not a true operating system
- Uses cooperative multitasking





Windows 95 and 98

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	2440	

Windows 95

- True operating system
- Uses preemptive multitasking
- Downward compatible with DOS
- Considered a transitional system



Windows 98

- Improved version of Windows 95
- More stable than Windows 95



Windows CE (consumable electronics)



System used in PDAs or palmtops
Runs simplified versions of Windows programs
Data can be transferred to PCs
Includes handwriting and speech recognition



Windows NT

- Designed for client/server systems
- Two components:
 - Windows NT Workstation
 - Windows NT Server
- Oriented to business needs Offers security, remote administration, directory services, and server

My Computer	👰 DFS	Server M	anager					_ [×
	<u>C</u> ell ⊻ia	w <u>H</u> elp							
Network	Selected DCE Iden		.dce.acme.com web.dce.acme.com/ce	ell_admin (creden)	ials (will expire 11:54:50 AM 8	/20/97)	Į.	2
Neighborhood	Neighborhood Server Status								
	🗊 ntdis		Normal						
	A ntdfs		Service up	client stopped at	12.2	20:43 PM 8/18/97			
Internet	🗥 solar	is14 🚺	Moving Fileset - DF	S Server Man	iger	ł		_ 🗆 🗙	
Explorer			<u>-</u>	I				=	_
Filesets on se Fileset announ	rver solaris ce.press		Moving fileset usr.broo on server ntdfs2	oks from aggregat	e ag	gr.47.1 on server solaris	4 to aggregate agg	.46.1 Write	Quota 292.9 MB
🔬 graphic	\$	aggrb	Read/Write	878.9 MB		private	aggr.46.1	Read/Write	488.2 MB
marketi		aggrb	Read/Write	488.2 MB		public	aggr.46.1	Read/Write	878.9 MB
root.dfs		aggr.root	Read/Write	97.6 MB		public.readonly	aggr. 46.1	Staging Replica	
root.dts	readonly	aggr.root aggr.47.1	Staging Replica Read/Write	97.6 MB		usr.bin	aggr.46.1	Read/Write	292.9 MB
usr.bror		aggr.47.1 aggr.47.1	Read/Write	97.6 MB					
usr.han		aggr.47.1	Bead/Write	97.6 MB					
usr.rege		aggr.47.1	Read/Write	4.8 MB					
usr.smy		aggr.47.1	Read/Write	292.9 MB					
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Windows 2000

Two versions:

- Microsoft Windows
 2000 Professional
- Microsoft Windows
 2000 Server
- Better stability and more features than Windows NT





Windows XP

- **Replaces all previous versions of Windows**
- Three versions:
 - Windows XP Home Edition
 - Windows XPProfessional
 - Windows XP Server





Linux

- Developed in 1991 by UNIX
- Competes with Windows and MAC
- Powerful and free
- Growing fast in acceptance
- Uses Apache web server





System Utilities





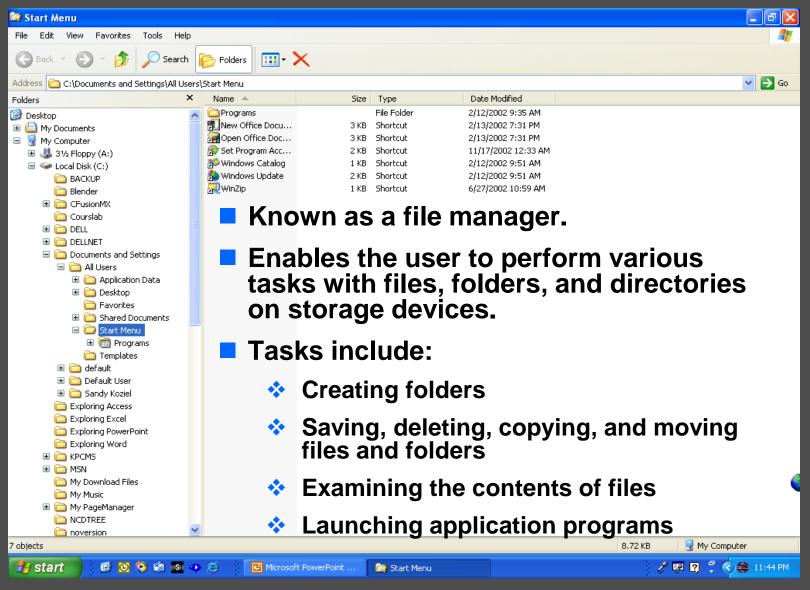
System utilities are programs that help the operating system manage the computer system's resources.

Types of utilities:

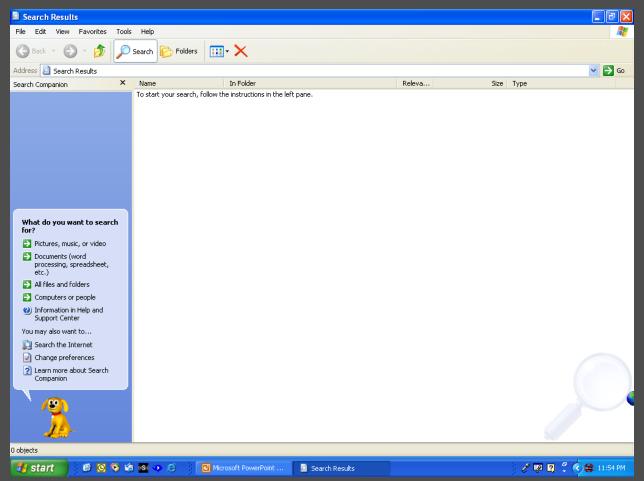
- File management
- File finders
- ✤ Backup utilities
- ✤ Antivirus software
- File compression
- Disk scanning
- File defragmentation



File Management Utilities



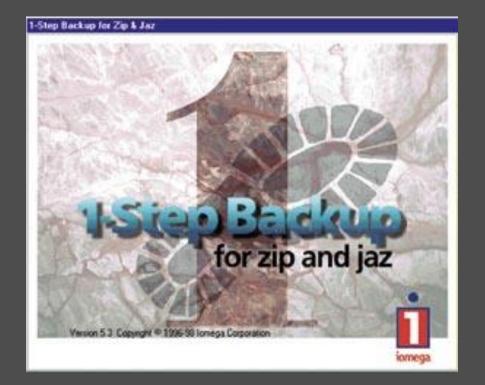
File Finders



File finders are programs that enable the user to find files on a storage device.



Backup Utilities



Backup utilities are programs that enable the user to copy data from the hard disk to another storage medium.



Antivirus Software

🛃 Norton AntiVirus					
Sector Description	IS		<u> @ H</u> elp →		
Norton AntiVirus	System Status: Urgent attention 🛞				
Stat <u>u</u> s ┥	Security Scanning Features	Item Details			
Scan <u>f</u> or Viruses	Auto-Protect	On	The items marked in		
R <u>e</u> ports	🧭 Email Scanning	On	red need your attention.		
	🧭 Script Blocking	On	Please select an item by clicking on the item at left in order to get more information and		
	🖲 Full System Scan	Not completed			
	Virus Definition Service	take the necessary action.			
	🧭 Virus Definitions	2/5/2003			
	🧭 Subscription Service	2/7/2004			
	🧭 Automatic LiveUpdate	On			
		Norton A	Virus ^{™2003}		
symantec.		ΑΠΤΙ	VIFUS ²⁰⁰³		

Antivirus software protects the computer from computer viruses.



File Compression Utility

WinZip		×					
THE ARCHIVE UTILITY FOR WINDOWS							
Thank you for trying WinZip!							
	This is not free software. This is a fully functional unregistered version for evaluation use only.						
	version does not displ						
You can order the registered version online, by phone, or by mail. Immediate online delivery is available from www.winzip.com.							
View Evaluation License Enter <u>R</u> egistration Code							
I understand that I may use WinZip only for evaluation purposes, subject to the terms of the Evaluation License, and that any other use requires payment of the registration fee.							
Quit	l Agr <u>e</u> e	<u>O</u> rdering Info					
Days Installed:	57 Total Arc	hives Opened: 24					
21-day ev	aluation period ha	s expired					

A file compression utility reduces the size of a file.



Disk Scanning Utility

🤣 ScanDisk - (C:)	
- 	
Select the drive(s) you want to check for errors:	
Type of test	
 Stangard (checks files and folders for errors) 	
© <u>I</u> horough (performs Standard test and scans disk surface for errors)	Options
Automatically fix errors	
<u>S</u> tart <u>C</u> lose	Advanced

A disk scanning utility is a program that detects and fixes physical and logical problems on storage devices.



File Defragmentation Utility

💕 Disk Defragment	er						
File Action View	Help						
← → 🖪 😫							
Volume	Session Status	File System	Capacity	Free Space	e 👘 🕺 🗞 Free Space		
🗐 (C:)		FAT32	18.64 GB	7.57 G	3 40 %		
Estimated disk usage before defragmentation:							
Estimated disk usage a	after defragmentation:						
Analyze [Defragment Pau:	se Stop	View Report				
	_						
📕 Fragmented files 📘 Contiguous files 📃 Unmovable files 🔲 Free space							

A file defragmentation utility is a program that moves data on a storage device to improve performance.

