

**Discovering Computers**  
Concepts for a Digital World **2003** Chapter 8 Objectives  
Web and XP Enhanced

Describe the two types of software

Identify various stand-alone operating systems

Understand the startup process for a personal computer

Identify various network operating systems

Describe the term user interface

Recognize devices that use embedded operating systems

Explain features common to most operating systems

Discuss the purpose of the following utilities: file viewer, file compression, diagnostic, uninstaller, disk scanner, disk defragmenter, backup, and screen saver

Know the difference between stand-alone operating systems and network operating systems

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8.2

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### What is an operating system (OS)?

- Set of programs that coordinates all activities among computer hardware resources

Operating System

Next  
8.3

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### What are the functions of an operating system?

start up the computer

monitor performance and provide housekeeping services

manage memory and manage programs

administer security

control a network

schedule jobs and configure devices

access the Web

provide user interface

p.83 Fig. 8-1  
Next  
8.3

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### Where is the operating system located?

operating system resides on ROM in handhelds

operating system resides on hard disk in most cases

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### What is a cross-platform application?

- One that runs identically on multiple operating systems

runs on Windows 95, 98, 2000, ME, and XP

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8.4 Fig. 8.2

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## Operating System Functions

### What is booting?

- Process of starting or restarting a computer

#### cold boot

Process of turning on a computer after it has been powered off completely

#### warm boot

Process of restarting a computer that is already powered on

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8.4

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## Operating System Functions

### What messages display on the screen when you boot the computer?

Labels on the left:

- BIOS version and copyright notice
- total amount of memory
- devices detected and tested
- Windows message
- sound card and CD-ROM drivers loaded

Messages on the right:

```
ROM BIOS Version 2.10 A05
Copyright BIOSTech Inc. 2003
All rights reserved

0065536 KB

Keyboard.....Detected
Mouse.....Detected
Hard Disk Installed WCV AC41600H
Floppy A: Installed

Starting Windows

SoundUTIL TSR Version 1.20
Copyright SoundCard Technology 2002-03

IDE CD-RW Device Driver Version V2.33 (4/20/03)
Copyright Gajjin Electric Co.
1 drive(s) selected
```

Next  
8.4 Fig. 8-3

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## Operating System Functions

### How does a personal computer boot up?

- 1: Power supply sends signal to components in system unit
- 2: The processor accesses BIOS to start computer

Step 2

processor

BIOS

Next  
8.5 Fig. 8-4

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## Operating System Functions

### Step 3: BIOS checks components such as mouse, keyboard connectors, and expansion cards

Step 3

processor

BIOS

CD-ROM drive

expansion cards

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8.5 Fig. 8-4

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## Operating System Functions

### Step 4: Results of POST are compared to data in the CMOS chip

Step 4

processor

BIOS

CD-ROM drive

CMOS

expansion cards

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8.5 Fig. 8-4

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## Operating System Functions

### Step 5: BIOS looks for system files in drive A (floppy disk drive) and then drive C (hard disk)

Step 5

processor

BIOS

floppy disk drive

CD-ROM drive

CMOS

hard disk

expansion cards

Drive that contains operating system is called boot drive

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8.5 Fig. 8-4

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**Step 6: Boot program loads kernel of operating system into RAM from boot drive**  
 Operating system in memory takes control of computer

Step 6

Next  
 8.5 Fig. 8-4

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**Step 7: Operating system loads configuration information and displays desktop on screen**  
 Operating system executes programs in StartUp folder

click Start to display list of applications you can run

Step 7

Next  
 8.5 Fig. 8-4

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**What is an emergency recovery disk?**

- Floppy disk that contains system files that will start computer when hard disk becomes damaged and computer cannot boot
- Also called repair disk, boot disk, or rescue disk

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 8.6 Fig. 8-5

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**What is a user interface?**

- Controls how you enter data and instructions and how information displays on screen

command-line (DOS) interface

graphical (Windows) interface

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 8.7 Fig. 8-6

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**What is multitasking?**

- Allows single user to work on two or more applications that reside in memory at same time

- ⊕ Foreground contains active application - the one you currently are using
- ⊕ Background contains inactive programs that are running but are not in use

foreground application

background applications listed on taskbar

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 8.9 Fig. 8-8

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**What are other program management features of operating systems?**

- multiuser**  
 Operating system enables two or more users to run a program simultaneously
- multiprocessing**  
 Operating system can support two or more processors running programs at same time
- fault-tolerant computer**  
 Continues to operate even if one of its components fails  
 Computer has duplicate components such as processors, memory, and disk drives

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 8.9

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### What is memory management?

- Optimizes the use of random access memory (RAM)

allocates, or assigns, data and instructions to area of memory while they are being processed

monitors contents of memory

clears items from memory when processor no longer requires them

Next  
8.8.10

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### What is virtual memory (VM) management?

- Operating system allocates portion of hard disk to function like RAM
- Paging
- Thrashing

page swapped out

disk (virtual memory)

RAM (physical memory)

page swapped in

Next  
8.8.10 Fig. 8-9

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### How does an operating system schedule jobs?

- Adjusts schedule based on job's priority

receiving data from an input device

job

An operation the processor manages

transferring items from storage to memory and from memory to storage

processing instructions

sending information to an output device

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### What is spooling?

- Print jobs sent to buffer instead of directly to printer, where print jobs wait their turn

print spooler application

print job

print queue

server

jobs to be printed

disk

jobs being printed

laser printer

Next  
8.8.11 Fig. 8-10

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### What is a device driver?

- Small program that tells operating system how to communicate with a device
- Each device requires its own specific driver

device driver

Next  
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### How do you install a device driver?

- Use the Printers and Other Hardware link in Control Panel

Control Panel

Printers and Other Hardware link

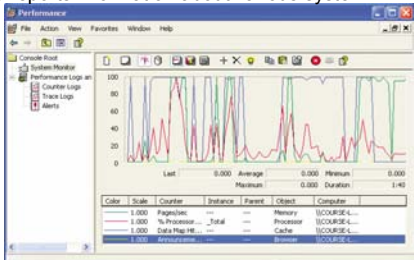
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8.8.12 Fig. 8-11

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### Operating System Functions

How does an operating system monitor performance?

- Provides a program, called **performance monitor**, that assesses and reports information about various system resources and devices



Color	Scale	Counter	Instance	Parent	Object	Computer
Blue	0-100	Pages/sec			Memory	SCORPION
Green	0-100	% Processor Time	_Total		Processor	SCORPION
Red	0-100	Cache Reads/sec			Cache	SCORPION
Yellow	0-100	Bytes/sec			Branch	SCORPION

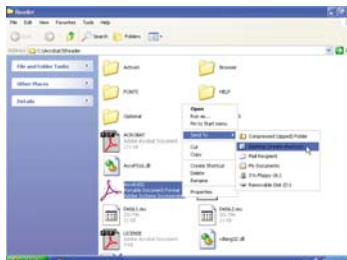
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8.14 Fig. 8-14

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### Operating System Functions

How does an operating system manage files?

- Includes a program called **file manager**, such as **Windows Explorer**
  - Commands include Copy, Rename, Delete, Move, Format, and New Folder



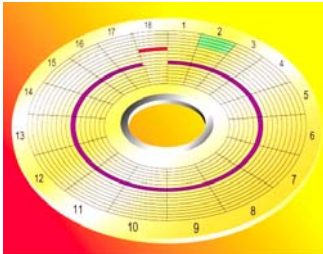
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8.14 Fig. 8-15

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### Operating System Functions

What is a file allocation table (FAT)?

- A table of information that operating system uses to locate files on a disk
- Reformatting disk usually erases only file allocation table and leaves actual files on disk




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### Operating System Functions

What are features of a network operating system?

- Server** is computer that controls access to network and provides centralized storage area
- Other computers on network are called **clients**



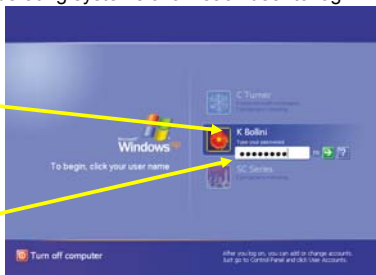
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8.15 Fig. 8-16

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### Operating System Functions

How do operating systems administer security?

- Most multiuser operating systems allow each user to log on

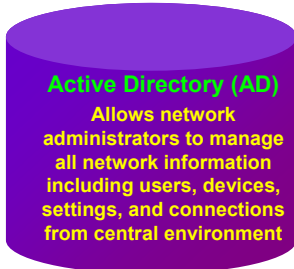


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8.16 Fig. 8-17

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### Operating System Functions

What is Active Directory (AD)?



**Active Directory (AD)**  
Allows network administrators to manage all network information including users, devices, settings, and connections from central environment

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## Types of Operating Systems

What are some characteristics of operating systems?

- device-dependent**: One that runs only on specific type of computer
- device-independent**: Runs on many manufacturers' computers
- proprietary software**: Privately owned and limited to specific vendor or computer model
- downward-compatible**: Recognizes and works with application software written for earlier version of operating system
- upward-compatible**: Written for earlier version of operating system, but also runs with new version

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## Types of Operating Systems

What are three categories of operating systems?

<b>Stand-alone</b>	<ul style="list-style-type: none"> <li>DOS</li> <li>Windows 3.x</li> <li>Windows 95</li> <li>Windows NT Workstation</li> <li>Windows 98</li> <li>Windows 2000 Professional</li> <li>Windows Millennium Edition</li> <li>Windows XP Home Edition</li> <li>Windows XP Professional Edition</li> <li>Mac OS X</li> <li>OS/2 Warp Client</li> <li>UNIX</li> <li>Linux</li> </ul>
<b>Network</b>	<ul style="list-style-type: none"> <li>NetWare</li> <li>Windows NT Server</li> <li>Windows 2000 Server</li> <li>Windows .NET Server</li> <li>OS/2 Warp Server for E-business</li> <li>UNIX</li> <li>Linux</li> <li>Solaris</li> </ul>
<b>Embedded</b>	<ul style="list-style-type: none"> <li>Windows CE</li> <li>Pocket PC 2002</li> <li>Palm OS</li> </ul>

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8.17 Fig. 8-18

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## Stand-Alone Operating Systems

What is DOS (Disk Operating System)?

- Refers to several single user operating systems developed in the early 1980s for personal computers

```

C:\My Documents>DIR *.XLS
Volume in drive C: has no label
Volume Serial Number is 2331-1205
Directory of C:\My Documents

CUSTOMER.XLS      5,632  05-23-02  9,36a Customer.xls
STOCKS.XLS        15,360  11-15-02  1,46a Stocks.xls
BILLPH11.XLS     14,848  03-01-02  2,84a bill physics graph.xls
WILNCS1.XLS       95,744  09-09-02  3,44a Haines Volunteers.xls
4 file(s)
0 dir(s)
9,255,594 MB free

C:\My Documents>COPY *.XLS STOCKS2.XLS
1 file(s) copied

C:\My Documents>RENOME STOCKS2.XLS STOCKSDX.XLS
C:\My Documents>CD
C:\>
  
```

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## Stand-Alone Operating Systems

What are features of most Windows operating systems?

- Active Desktop™
- Registry Checker
- FAT32
- Taskbar/toolbars
- Windows Explorer has a Web browser look and feel
- Increased speed
- Update Wizard
- Tune-Up Wizard
- Universal Serial Bus
- Multiple display support
- Accessibility Settings Wizard
- Hardware support

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## Stand-Alone Operating Systems

What is Mac OS?

- Multitasking operating system available only for computers manufactured by Apple
- Apple's Macintosh operating system was first commercially successful GUI

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## Network Operating Systems

What is UNIX?

- Command-line multitasking operating system

```

Terminal
File Edit Session Options Help

root login
root login file

if ( ! $? ) then
  exec -q "rsh login:rv100" $TERM
endif

stty sane ctabase
set _pathlist=100
set ignoreeof

setenv EXCITE 'set al sh root'
setenv HOSTALIAS 'HOME/localalias'

/usr/games/fortune
file
head letter index.html mail mbox www
file mail
file
saved-messages root-mail
file *
...
saved-messages root-mail

Connection established
  
```



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8.23 Fig. 8-24

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## Network Operating Systems

### What is Linux?

- Popular, free, open-source multitasking UNIX-type operating system
- Open-source software means code is available to the public




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8.24 Fig. 8-25

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## Network Operating Systems

### What is Solaris?

- UNIX-type operating system designed specifically for e-commerce applications
- Can manage high-traffic accounts
- Incorporates security necessary for Web transactions
- Developed by Sun Microsystems



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8.25

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## Embedded Operating Systems

### What is an embedded operating system?

- Operating system found on most handheld computers and small devices
- Resides on a ROM chip



Pocket PC 2002  
Palm OS®  
Windows CE

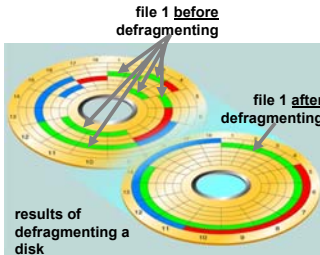
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## Utility Programs

### What is a utility program?

- System software that performs a specific task
- Examples include:
  - File viewer
  - File compression
  - Diagnostic utility
  - Uninstaller
  - Disk scanner
  - Disk defragmenter
  - Backup utility
  - Screen saver



file 1 before defragmenting  
file 1 after defragmenting  
results of defragmenting a disk

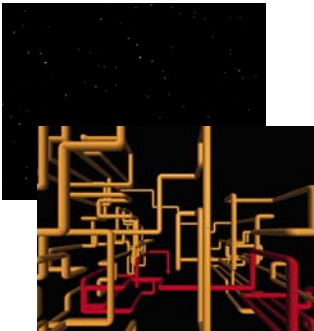
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## Utility Programs

### What is a screen saver?

- Causes monitor's screen to display a moving image or blank screen if there is no activity for a specified time period
- Prevents ghosting
- Popular for security, business, or entertainment purposes



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8.31 Fig. 8-35

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## Summary of Operating Systems and Utility Programs

- System software
- Operating systems
- Operating system functions
- Types of operating systems
- Stand-alone operating systems
- Network operating systems
- Embedded operating systems
- Utility programs

**Chapter 8 Complete**

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