

*Operating Systems
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CHAPTER 7 6th ed
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MS-DOS Commands

When you finish reading this chapter you should be able to:

- ▶ Describe the structure of an MS-DOS command.
- ▶ Set the default drive and format a diskette.
- ▶ Define a valid MS-DOS file name, including an extension.
- ▶ Describe the MS-DOS hierarchical directory structure and define a path name.
- ▶ Use a directory command to view the contents of a directory.
- ▶ Create a directory.
- ▶ Distinguish between the root directory and the current working directory, and use a change directory command to change the working directory.
- ▶ Use copy commands to create a file from the console and to copy an existing file.
- ▶ Use wild card characters to copy several files with a single operation.
- ▶ Explain redirection, filters, and pipes.

■ MS-DOS

Given the availability of Windows and other more intuitive interfaces, **MS-DOS** is rarely used today, so why bother to learn about MS-DOS? Basically, there are two reasons:

1. Windows and other, more sophisticated operating systems sometimes do a bit too much for the user, effectively hiding what is really happening inside the computer. MS-DOS is much more basic and direct. Consequently, if you can understand what is happening in MS-DOS, you may find it easier to understand what is happening in Windows.
2. Should your computer fail or become infected with a virus, many utility and virus protection programs include a special recovery diskette. Often, the recovery diskette uses MS-DOS commands to support the recovery process.

MS-DOS Commands

Typically, a user accesses a computer through an application program's interface and the program communicates with the operating system through an application programming interface (Figure 7.1). At times, however, the user must communicate directly with the operating system to perform such functions as launching a program. This chapter focuses on the MS-DOS user interface.

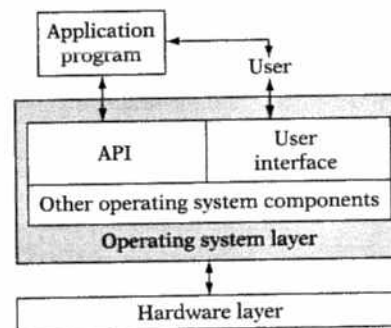


FIGURE 7.1

A user communicates with the operating system through a user interface.

MS-DOS and Microsoft

When IBM entered the personal computer marketplace in the fall of 1981, responsibility for creating an operating system was subcontracted to a company named Microsoft recently formed by two young men named Bill Gates and Paul Allen. The result, originally called PC-DOS, was a command-driven operating system that allowed users to issue cryptic, single-line commands through a command interface. Rechristened MS-DOS, Gates and Allen's operating system quickly became an industry standard and established a stable platform that served as a launching pad for the personal computer industry. MS-DOS also laid the financial base on which the founders built today's Microsoft.

Under MS-DOS, a user communicates with the operating system by issuing **commands**. The general form of an MS-DOS command is shown in Figure 7.2. The **default drive** and the system **prompt** are displayed by the operating system. The user responds to an active prompt by typing a command name followed by any necessary **parameters**. A **delimiter**, usually a space, separates the command from the parameters and (if there are several) the parameters from each other.

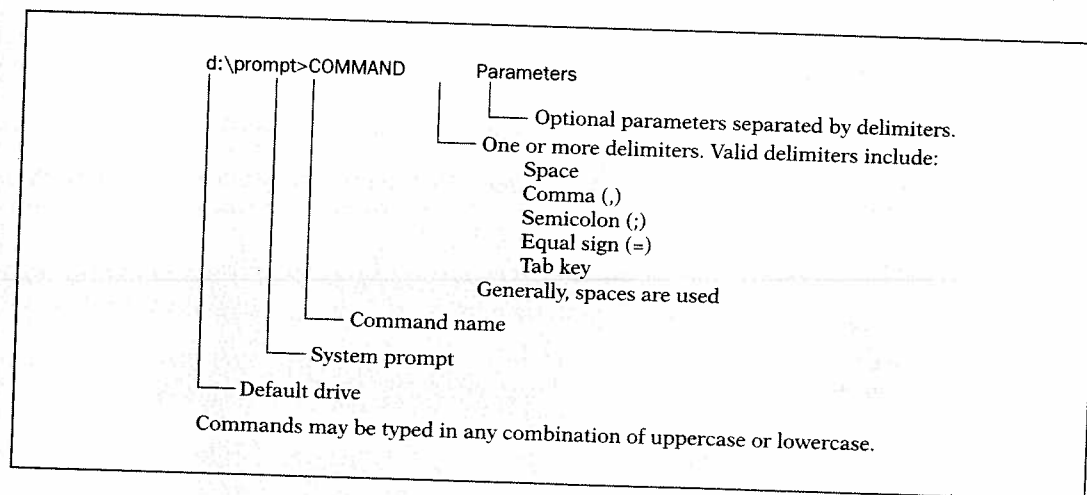


FIGURE 7.2

The general form of an MS-DOS command.

The Chapter Tutorial

This introduction to MS-DOS is presented as a tutorial. Do not simply read it. Instead, find a personal computer that runs Microsoft Windows, open your book, and follow along. As you read about a command, enter it and see for yourself how the computer responds. You will need a blank diskette. Later, you may find Appendix B a useful reference.

MS-DOS error messages tend to be rather cryptic and (often) not very useful. Common mistakes include misspelling a command or file name, failing to type a space between a command and its parameters (or between parameters), and adding extra, unnecessary parameters. If you type a command, press enter, and see an error message, simply retype the command after the next MS-DOS prompt.

■ Getting Started

The easiest (and safest) way to access MS-DOS through Microsoft Windows is to select the *MS-DOS Prompt* from the *All Programs* or *Programs* menu. Click on the *Start* button. If you are using Windows XP, move the mouse pointer to *All Programs*, then *Accessories*. On the *Accessories* menu, you should find an entry labeled *Command Prompt* (Figure 7.3). On some earlier versions of Windows, the *Accessories* menu entry might read *MS-DOS Prompt*, and you might find the *MS-DOS Prompt* or *Command Prompt* entry on the *All Programs* menu rather than on the *Accessories* sub-menu.

In any event, click on *Command Prompt* or *MS-DOS Prompt* and the initial MS-DOS screen (or window) will appear (Figure 7.4). If you are using Windows XP, the system prompt should read *C:\Documents and Settings\default>*. On earlier versions of Windows, the prompt is likely to read *C:\>* or *C:\Windows>*. The precise wording of the prompt is not significant to the rest of this tutorial.

For future reference, there are at least two other ways to access MS-DOS. One is to boot the system from an MS-DOS system diskette. Alternatively, when you shut down a pre-XP version of Windows, one option on the shut down menu is *Restart*, or *Restart the computer in MS-DOS mode*. Stay with the *Command Prompt* or *MS-DOS Prompt* for now, however.

Selecting the Default Drive

The last line on the screen (Figure 7.4) holds the MS-DOS prompt

```
C:\Documents and Settings\default>
```

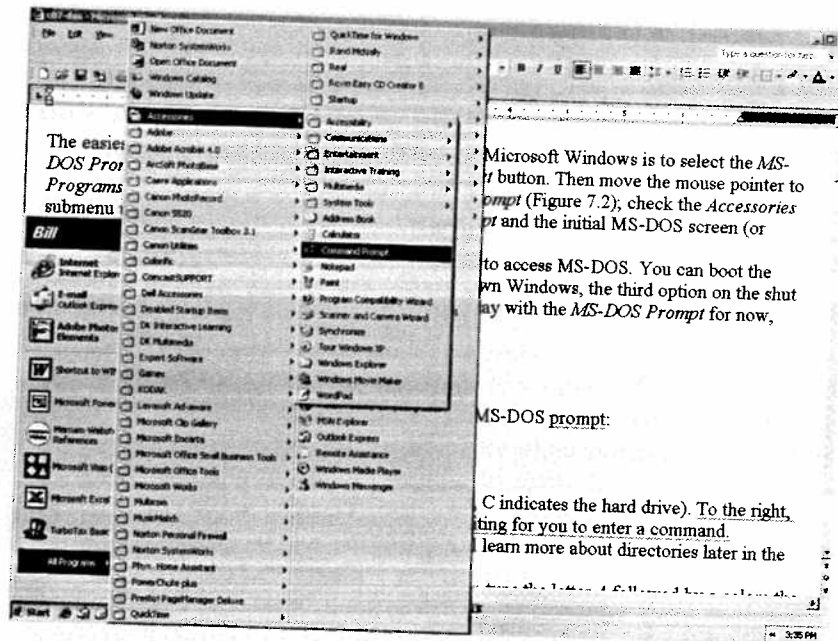


FIGURE 7.3

Accessing the command prompt through the Windows Start menu.

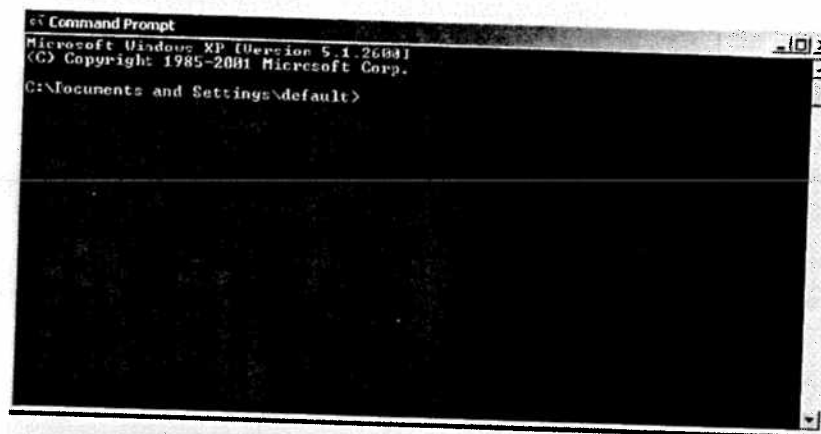


FIGURE 7.4

The initial MS-DOS prompt.

The C: indicates that C is the current default drive. (On most systems, C indicates the hard drive.) *Documents and Settings\default>* (or *\Windows>*) is the name of the current directory; you will learn more about directories later in this chapter. The greater than (>) symbol indicates that MS-DOS is waiting for you to enter a command.

Insert a blank diskette into the diskette drive. Then type the letter A followed by a colon (:); the prompt line should read

```
C:\Documents and Settings\default>A:
```

In this tutorial, sample commands will be typed uppercase, but you can type commands in uppercase, lowercase, or mixed case because MS-DOS is not case sensitive. After you press enter, a new prompt will appear (Figure 7.5)

```
A:\>
```

Drive A (the diskette drive) is now the default.

Experiment a bit. Type the letter C followed by a colon and the initial C prompt will reappear. Type A: and you'll return to the A:\> prompt.

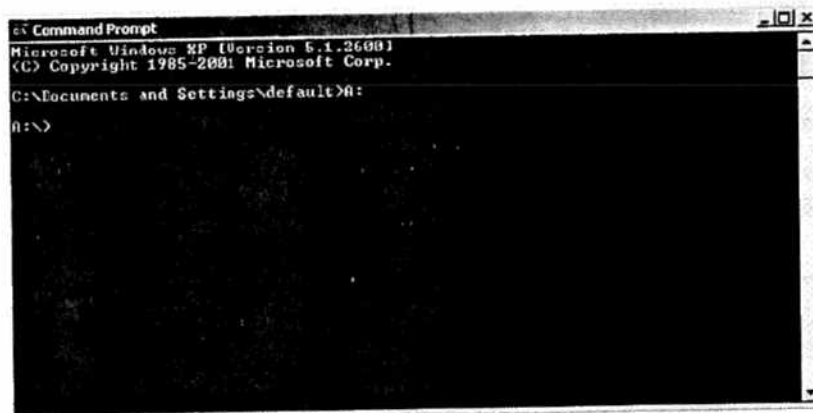


FIGURE 7.5

Changing the default drive to A.

Generally, type any drive letter followed by a colon and that drive becomes your default drive.

Make sure the prompt reads A:\> before you move on to the next step.

Formatting a Diskette

Later in the chapter you will need a work diskette. Before a diskette can be used, it must be formatted. The formatting process writes a pattern of sectors on the disk surface, records a copy of the boot routine on the first sector, and initializes control information.

The **FORMAT** command (Figure 7.6) is used to format a disk¹. The simplest form of the command consists of a single word: **FORMAT**. If you issue such a command, MS-DOS will format the disk in the default drive to that drive's default density (for a diskette, usually 1.44 MB or high density). Several optional parameters are summarized in Figure 7.6. If you type more than one parameter, insert spaces to separate them.

A note of caution: *be careful*. **FORMAT** is a destructive command. When you format a disk, you erase whatever data might be stored on it. *If your default drive is a hard drive (for example, drive C), do not under any circumstances format that disk.* You could destroy your system.

Before you move on to the next step in this tutorial, make sure your default drive is your diskette drive (usually, drive A). If not, type A: and press the enter key.

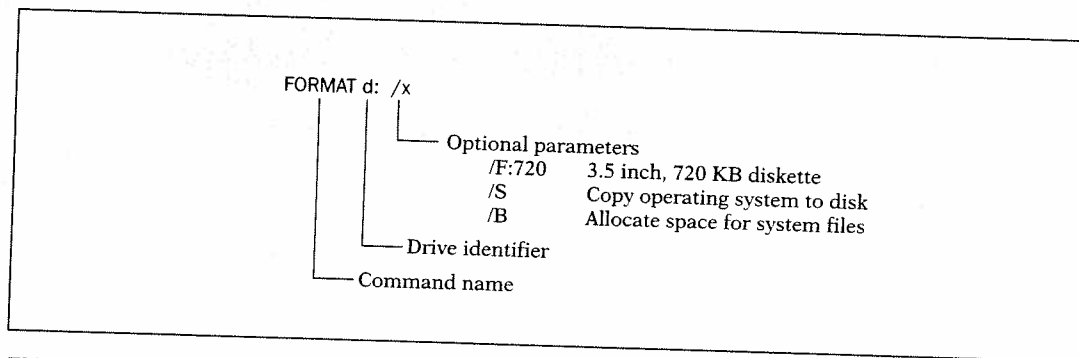


FIGURE 7.6

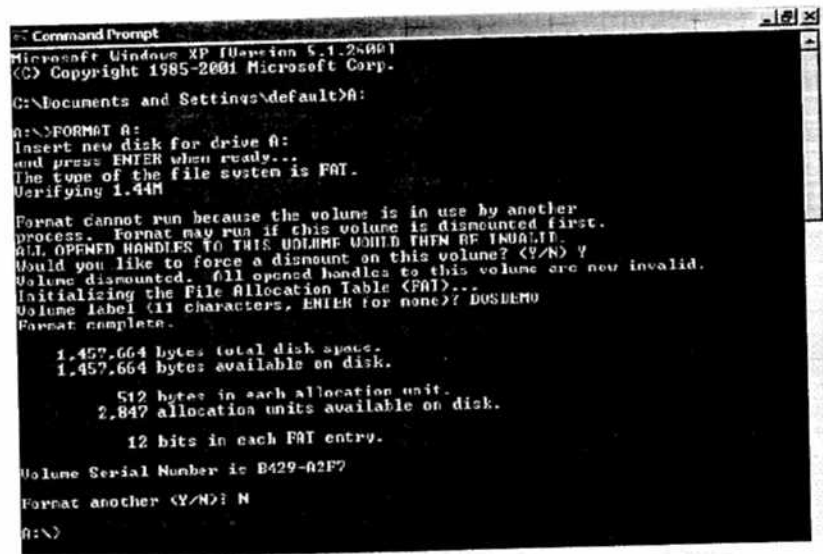
The **FORMAT** command.

¹Most diskettes are purchased pre-formatted, so it may be unnecessary to format a new diskette. Using a **FORMAT** command to re-format a previously used diskette is common, however.

Even with the default drive set correctly, it is a good idea to specify the target drive as part of your command. For example, type the command

FORMAT A:

(Figure 7.7). The A: parameter identifies drive A as the target drive. A message will tell you to insert the diskette to be formatted into drive A and press the enter key². After you press enter, a series of messages will track the format routine's progress as it formats the diskette. In response to the *Volume label* prompt you can optionally specify an identifying label that will be



```
Microsoft Windows XP [Version 5.1.2600.5512]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\default>A:

A:\>FORMAT A:
Insert new disk for drive A:
and press ENTER when ready...
The type of the file system is FAT.
Verifying 1.44M

Format cannot run because the volume is in use by another
process. Format may run if this volume is dismounted first.
ALL OPENED HANDLES TO THIS VOLUME SHOULD THEN BE INVALID.
Would you like to force a dismount on this volume? (Y/N) Y
Volume dismounted. All opened handles to this volume are now invalid.
Initializing the File Allocation Table (FAT)...
Volume label (11 characters, ENTER for none)? DOSBEMO
Format complete.

1,457,664 bytes total disk space.
1,457,664 bytes available on disk.

512 bytes in each allocation unit.
2,847 allocation units available on disk.

12 bits in each FAT entry.

Volume Serial Number is B429-A2F7
Format another (Y/N)? N
A:\>
```

FIGURE 7.7

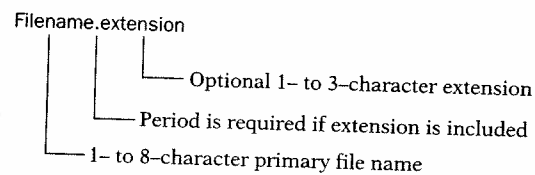
The FORMAT command guides the user through the process of formatting a diskette.

²Windows XP users might get a *Format cannot run ...* message, as shown in Figure 7.7. If the message appears, type Y and press enter in response to the *... force a dismount ...* query. Users of other versions of Windows should not get this message.

stored electronically on the disk. Type DOSDEMO. The format routine then summarizes the space available on the diskette, assigns a volume serial number, and asks if you would like to format another diskette. Type N (for no) and press the enter key.

■ The File System

The MS-DOS **file system** allows a user to identify, save, and retrieve files by name. Note that a program is a type of file.



- Legal characters

A-Z a-z 0-9 \$ & # % ' ()
 @ ^ { } ~ \ ! _

- Illegal characters

? , ; : = * []
 / \ + " < > | space

- Lowercase letters are converted to uppercase
- Primary file name padded with spaces to 8 characters
- Extension padded with spaces to 3 characters
- Reserved device names

CON PRN LPT1 LPT2 LPT3 AUX
 COM1 COM2 COM3 COM4 NUL CLOCK

- Some conventional extensions

ASM	Assembler source	EXE	Executable file
BAK	Backup file	FOR	FORTRAN source
BAS	BASIC source	LIB	Library source
BAT	Batch file	LST	ASCII list file
BIN	Binary file	MAP	ASCII load module
COB	COBOL source	OBJ	Object module
COM	Command file	OVR	Overlay file
DAT	ASCII data file	REF	Cross reference
DIF	Difference file	TMP	Temporary link
DOC	ASCII document	\$\$\$	Temporary work
DVD	Device driver		

FIGURE 7.8

The rules for defining a file name.

File Names

A **file name** (Figure 7.8) is composed of the name itself and an optional **extension**. The name consists of from 1 to 8 characters. A few file names are reserved by the system, and delimiter characters may not be used in a file name. Otherwise, just about any combination of characters you can type is legal. Incidentally, most Windows users can issue line commands that reference long file names (Chapter 8), but the traditional MS-DOS 8-character limit featured throughout this chapter is valid no matter what version you might be using.

The file name is separated from its optional, 1- to 3-character extension by a period. Some extensions have special meaning to the operating system; they are summarized near the end of Figure 7.8. The extension is sometimes used to identify a version of a program or data file; for example, VITA.1, VITA.2, and so on.

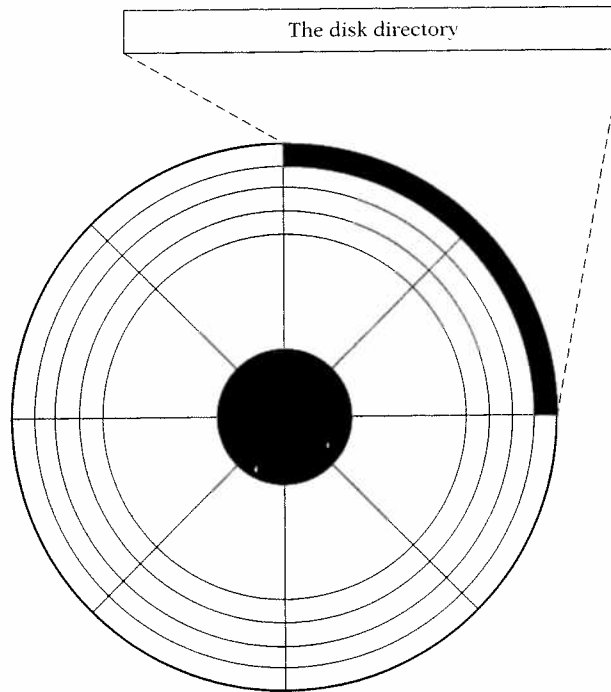


FIGURE 7.9

A file's name and starting address are recorded in the disk directory.

Directories

Directory management is a key MS-DOS file system function. The first time a file is written to disk, its name, disk address, creation date, and other information are recorded in the disk's **directory** (Figure 7.9). Later, when the file is retrieved, the operating system reads the directory and searches it for the file name. When a file is modified, the file system updates its directory entry. When the file is deleted, its directory entry is marked as deleted.

Subdirectories

When a disk is first formatted, a single **root directory** is created by the format routine. Using a single directory is fine for a few files, but as the number of files increases, distinguishing them becomes increasingly difficult.

For example, imagine a work disk that holds several different types of files. To simplify keeping track of the files, MS-DOS allows the user to create special files called **subdirectories**. For example, Figure 7.10 shows the root directory and three subdirectories. LETTERS holds letters and other correspondence. A book's chapters are stored under subdirectory BOOK. Finally spreadsheets are grouped in subdirectory WS. Think of a subdirectory as a file folder that allows you to group related files and thus organize the disk.

Path Names

When subdirectories are used, you need more than a simple file name to find a file. For example, it is possible to have files named PAY stored in two different subdirectories. A reference to PAY would thus be ambiguous—which PAY do you mean?

To fully identify a file you need a complete **path name** (Figure 7.11). For example,

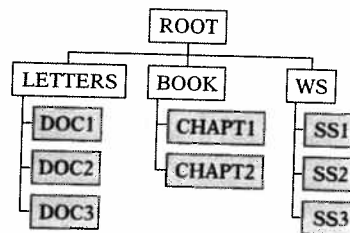


FIGURE 7.10

Subdirectories help to organize the data stored on a disk.

\LETTERS\PAY

and

\WS\PAY

are two different files. The first one is stored in subdirectory LETTERS. The second one is stored in subdirectory WS.

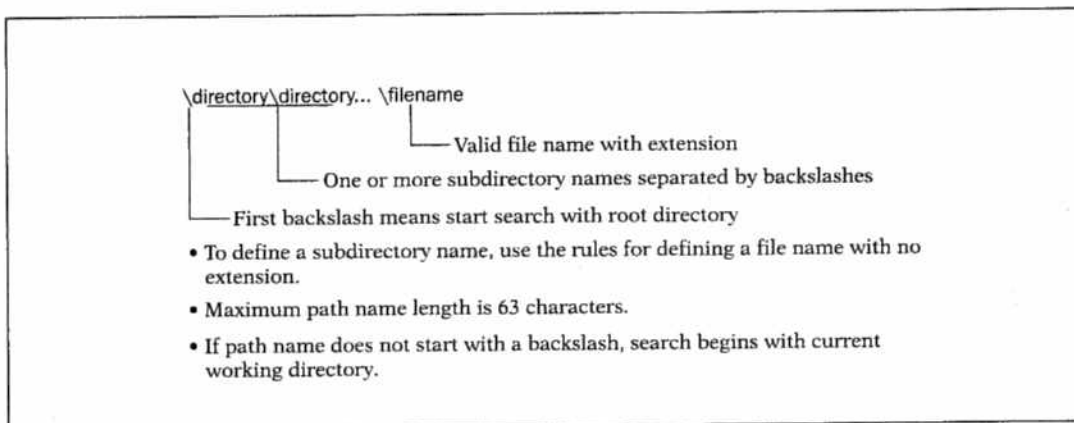


FIGURE 7.11

The rules for defining a path name.

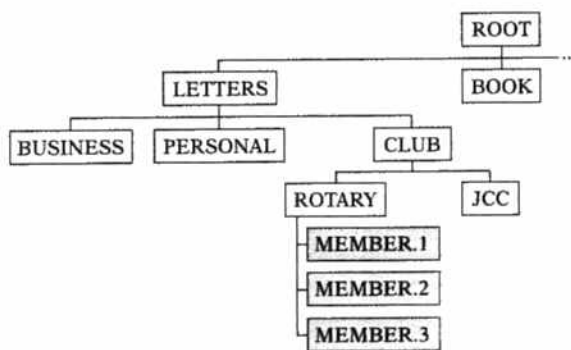


FIGURE 7.12

Directories can be subdivided into lower-level subdirectories.

Study the first path names listed above. The first backslash references the root directory. The second backslash separates the subdirectory name from the file name. The first path name shown above tells MS-DOS to start with the root directory, find a subdirectory named LETTERS, and search the subdirectory for a file named PAY. The second path name tells MS-DOS to start with the root directory, find a subdirectory named WS, and search the subdirectory for a file named PAY.

It is possible to divide a subdirectory into lower-level subdirectories. For example, Figure 7.12 shows LETTERS broken into three subdirectories. One, CLUB, is further subdivided into ROTARY and JCC. To retrieve a document named MEMBER.3 from the ROTARY subdirectory, the path name would be

`\LETTERS\CLUB\ROTARY\MEMBER.3`

Note how the path name leads from directory to directory until you reach the desired file.

At first glance, subdirectories may seem to complicate rather than simplify the task of accessing files. In practice, however, people rarely use such lengthy path names. Instead, they select a working directory and allow the operating system to keep track of the subdirectories needed to complete a path name. Later in the chapter you will learn how to select a working directory.

The Backslash

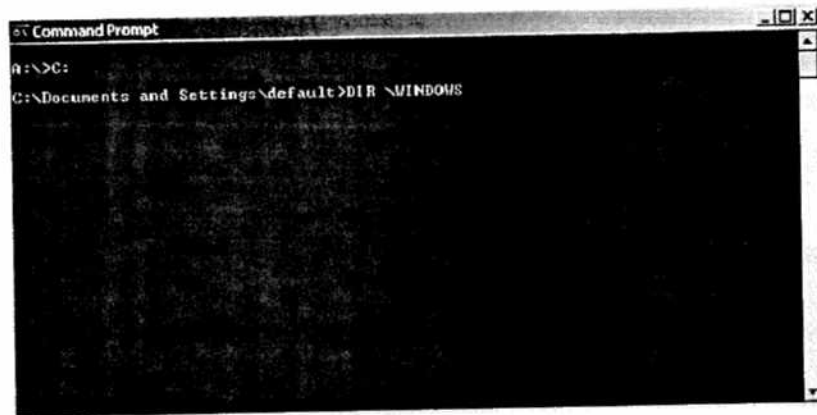
Why did Microsoft decide to use a backslash (\) as a separator in an MS-DOS path name? A good way to answer that question is with another question: When is the last time you typed a backslash other than in a path name? Simply put, the backslash character is almost never used, so adopting it as a path name field separator was unlikely to create confusion.

Viewing a Directory

Before you begin creating and manipulating directories, it might be wise to look through an existing one. Following the A-prompt, type

C:

and press the enter key. The new prompt (Figure 7.13) should read

**FIGURE 7.13**

Make the C drive your default drive.

C:\Documents and Settings\default>

or

C:\Windows>

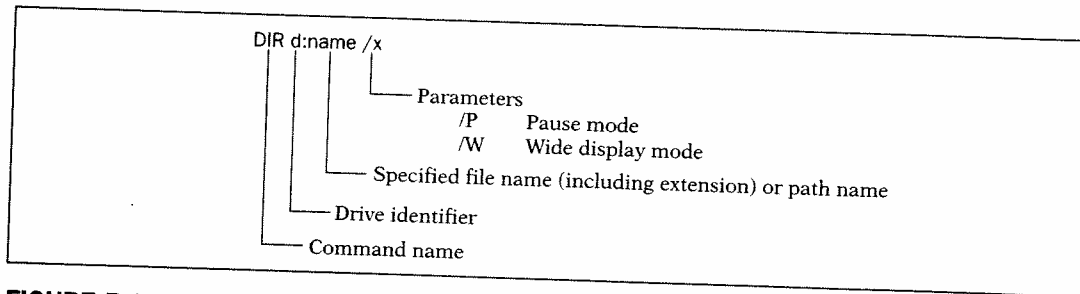
It tells you that drive C is your default drive and it identifies the **current directory**.

No matter what the default directory, all versions of Windows contain a directory named *Windows* that holds numerous system files. To list the contents of the *Windows* directory, type a **directory (DIR) command** (Figure 7.14).

DIR \WINDOWS

Figure 7.13 shows the command as typed. DIR is the command name and \WINDOWS (note the initial backslash) is the path name of the *Windows* directory. Press the enter key, and a list of file names and other information will scroll rapidly across your screen³. Figure 7.15 shows the last screen followed by a new prompt.

³If necessary, ask your instructor to help you find the WINDOWS directory on your system.

**FIGURE 7.14**

The directory (DIR) command displays a directory's contents.

As entered, the directory command was not very useful because the list of files in directory Windows is much too big to fit on a single screen. Try adding a pause parameter. Type the command

DIR \WINDOWS /P

```

03-23-2001 12:00 PM  94,794 tuain.dll
03-23-2001 12:00 PM  46,592 tuain-32.dll
03-23-2001 12:00 PM  49,688 tunk-16.exe
03-23-2001 12:00 PM  256,192 winhelp.exe
03-23-2001 12:00 PM  260,752 winhelp32.exe
03-23-2001 12:00 PM  82,944 clock.avi
03-23-2001 12:00 PM  18,944 unnnag32.dll
03-23-2001 12:00 PM  684,624 setuploc.txt
03-23-2001 12:00 PM  1,080,912 GETJ.tsp
03-23-2001 12:00 PM  13,608 SET7.tmp
03-23-2001 12:00 PM  66,048 NOTEPAD.EXE
03-23-2001 12:00 PM  15,360 TASKMAN.EXE
03-23-2001 12:00 PM  1,512 rcgopt.log
03-23-2001 12:00 PM  4,748 UPDINST1.INI
03-23-2001 12:00 PM  22,112 argon.log
03-23-2001 12:00 PM  20,776 ilc6.log
03-23-2001 12:00 PM  64,640 cenzotup.log
03-23-2001 12:00 PM  37,568 ntdeceup.log
03-23-2001 12:00 PM  64,744 rsnr.log
03-23-2001 12:00 PM  6,112 msnsscm.log
03-23-2001 12:00 PM  6,482 ocnrn.log
03-23-2001 12:00 PM  157 vdiadbug.log
03-23-2001 12:00 PM  1,272 Blue Larc 16.bnp
03-23-2001 12:00 PM  65,978 Soap Dubbley.bnp
03-23-2001 12:00 PM  17,052 Coffee Bean.bnp
03-23-2001 12:00 PM  16,716 Featherfeet.bnp
03-23-2001 12:00 PM  17,116 Gnome Fishing.bnp
03-23-2001 12:00 PM  26,582 Greenstone.bnp
03-23-2001 12:00 PM  55,954 Prairie Wind.bnp
03-23-2001 12:00 PM  17,162 Rhododendron.bnp
03-23-2001 12:00 PM  26,688 River Smiles.bnp
03-23-2001 12:00 PM  65,832 Santa Fe Slacks.bnp
03-23-2001 12:00 PM  9,522 Zapotec.bnp
03-23-2001 12:00 PM  1,080 cenzotup.log
03-23-2001 12:00 PM  128 DtlInstall.log
03-23-2001 12:00 PM  36 ch.ini
03-23-2001 12:00 PM  74 chaddin.ini
03-23-2001 12:00 PM  267 desktop.ini
03-23-2001 12:00 PM  197,488 Window Update.log
03-23-2001 12:00 PM  4 control.ini
311 File(s)  33,864,766 bytes
52 Dir(s)  29,765,920,912 bytes free
C:\Documents and Settings\default>

```

FIGURE 7.15

The last page of a directory list.

```

03/23/2001 06:00 AM      26,562 Groomstone.bmp
03/23/2001 06:00 AM      65,954 Prairie Wind.bmp
03/23/2001 06:00 AM      17,362 Rhododendron.bmp
03/23/2001 06:00 AM      26,680 River Sunida.bmp
03/23/2001 06:00 AM      65,832 Santa Fe Stucco.bmp
03/23/2001 06:00 AM       9,522 Zapotec.bmp
07/03/2002 03:55 PM       1,659 osamwr.setup.log
07/03/2002 03:55 PM       126 DoolInstall.log
07/03/2002 03:56 PM      <DIR>      Registration
07/03/2002 03:56 PM        36 vb.ini
07/03/2002 04:01 PM       74 vbaddin.ini
07/03/2002 04:01 PM       264 desktop.ini
07/03/2002 03:57 PM      <DIR>      erubasst
02/07/2003 04:22 PM      194,358 Windows Update.log
07/03/2002 04:06 PM        8 control.ini
308 File(s)      33,638,622 bytes
52 Dir(s)      29,986,258,944 bytes free

C:\Documents and Settings\default>DIR \WINDOWS /P
Volume in drive C has no label.
Volume Serial Number is 0710-0C0B

Directory of C:\WINDOWS

12/11/2000 09:54 PM      <DIR>      .
12/11/2000 09:54 PM      <DIR>      ..
12/11/2000 09:54 PM      <DIR>      COMMAND
12/11/2000 09:54 PM      <DIR>      OPTIONS
12/11/2000 09:54 PM      <DIR>      POLCALTH
12/11/2000 09:54 PM      <DIR>      SYSTEM
12/11/2000 10:03 PM      <DIR>      54 MAURIX.INI
12/11/2000 10:06 PM      <DIR>      URGINTC
12/11/2000 10:06 PM      <DIR>      HELP
12/11/2000 10:06 PM      <DIR>      LANS
12/11/2000 10:07 PM      <DIR>      SYTIME22
12/11/2000 10:09 PM      <DIR>      MSACENT
12/11/2000 10:09 PM      <DIR>      CURSORS
12/11/2000 10:09 PM      <DIR>      JAVA
12/11/2000 10:09 PM      <DIR>      UPCLLS
07/03/2002 04:54 PM      <DIR>      URM
12/11/2000 10:09 PM      <DIR>      DRATISCH
12/11/2000 10:09 PM      <DIR>      MEDIA
06/08/2000 06:08 PM      6,048 DMLTEFI.INI

Press any key to continue . . .

```

FIGURE 7.16

A directory command with a pause option.

A space separates the command from the parameter, and the slash is a regular slash, not a backslash. Press the enter key, and a single page of information will appear on your screen (Figure 7.16). Reading from left to right, each Windows XP line displays a file's creation date and time, either <DIR> (for a directory) or the file length, and the file name. On non-XP versions of Windows, the file name comes first.

The last line on Figure 7.16 reads *Press any key to continue*. Press the space bar, and a new screen of file names will appear. Continue pressing the space bar to step through the directory one screen at a time.

The wide mode display is another useful option. When the next prompt appears, type the command

```
DIR \WINDOWS /W
```

```

C:\Documents and Settings\default\
twain.dll                twain_32.dll
twaink_16.exe            winhlp32.exe
winhlp32.exe             clock.avi
setuplog.txt             SET7.tsp
TASKMAN.EXE              ODBCINST.INI
iis6.log                 ntdtccsetup.log
msgscn.log               wiadebug.log
Soap Bubbles.bmp         FeatherTexture.bmp
Greenstone.bmp           Rhododendron.bmp
Santa Fe Stucco.bmp      sessmgr.setup.log
(Registration)           vbaddin.ini
(srchasst)               control.ini
desktop.ini              Windows Update.log
308 File(s)              33,638,622 bytes
52 Dir(s)                29,980,098,560 bytes free
C:\Documents and Settings\default\

```

FIGURE 7.17

A wide mode directory list.

and press enter. The resulting screen (Figure 7.17) lists only file names, two across on Windows XP and between two and five across on earlier versions of Windows. The *Windows* directory contains so many files that not even a wide mode list will fit on a single screen.

Creating Directories

Before you move on to the next task, make sure the diskette you formatted is in the drive. Then change your default drive back to the diskette drive by typing

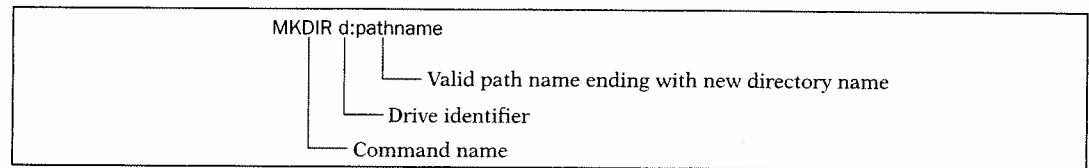
A:

and pressing enter. You are about to create three new directories and several files on your diskette.

Use the **make directory (MKDIR, or MD) command** (Figure 7.18) to create a directory. For example, type the command

MKDIR \LETTERS

(Figure 7.19) and press enter. The backslash indicates that LETTERS is a subdirectory of the root directory. Use similar MKDIR commands to create

**FIGURE 7.18**

The make directory (MKDIR) command creates a new directory.

two more directories: BOOK and WS. When you finish creating the directories, type a DIR command with no parameters. A DIR command with no parameters will list the contents of the current directory, which is your diskette's root directory. As Figure 7.19 shows, three subdirectories have been added to the diskette's root directory.

A MKDIR command is used to create a subdirectory. To remove or delete a directory, issue a remove directory (RMDIR, or RD) command.

Creating Files

Most files are created by application programs such as a word processor, a spreadsheet, a database manager, and so on, but you can also copy an existing file. When MS-DOS carries out a **COPY command** (Figure 7.20), it reads the file specified in the first parameter (the source file) and copies it to the file specified in the second parameter (the destination file).

A simple way to create a short file is to copy it from the console (your system's keyboard and display). For example, type the command

```

C:\Documents and Settings\default>A:
A:\>MKDIR LETTERS
A:\>MKDIR BOOK
A:\>MKDIR WS
A:\>DIR
Volume in drive A is DOSDEMO
Volume Serial Number is 7C50-C9BD

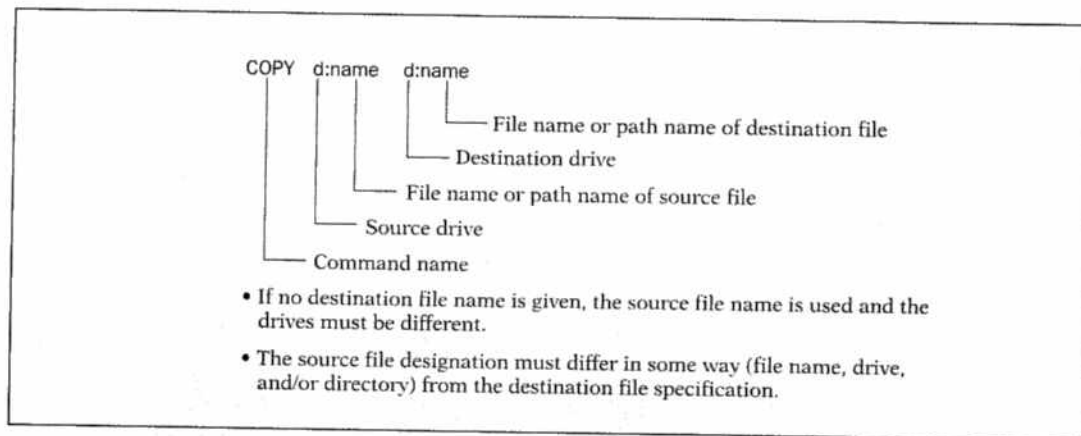
Directory of A:\

02/07/2003  04:37 PM    <DIR>          LETTERS
02/07/2003  04:37 PM    <DIR>          BOOK
02/07/2003  04:37 PM    <DIR>          WS
               0 File(s)              0 bytes
               3 Dir(s)              1,456,128 bytes free

A:\>_
  
```

FIGURE 7.19

The commands to create and list three subdirectories.

**FIGURE 7.20**

The COPY command copies one or more files from a source to a destination.

COPY CON A:\LETTERS\JIM

(Figure 7.21). The first (source) file name, CON, stands for the console. The second (destination) file name specifies a path name. (Read the command from left to right.) The destination file will be stored on drive A, subdirectory LETTERS and assigned the file name JIM.

If you haven't already done so, press enter to issue the COPY command. The cursor will appear directly under the command line (you will see no prompt). At this point you can type whatever you want. (If you'd like your file's

```

C:\> Command Prompt
A:\> COPY CON A:\LETTERS\JIM
Looking forward to spring break!
Will I see you in Florida?
^Z
1 file(s) copied.

A:\> COPY CON A:\LETTERS\SALLY
Sorry, Jim.
I'm going skiing in Utah!
^Z
1 file(s) copied.

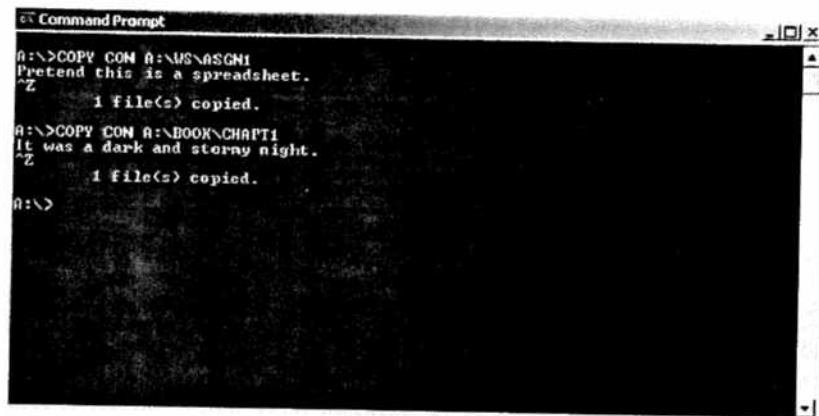
A:\> COPY CON A:\LETTERS\JOM
Note:
Math assignment.
Chapter 8, problems 10-14.
^Z
1 file(s) copied.

A:\>

```

FIGURE 7.21

Copy these three files from the console to directory LETTERS.



```
Command Prompt
A:\>COPY CON A:\US\ASGN1
Pretend this is a spreadsheet.
^Z
1 file(s) copied.
A:\>COPY CON A:\BOOK\CHAPT1
It was a dark and stormy night.
^Z
1 file(s) copied.
A:\>
```

FIGURE 7.22

Copy this pretend spreadsheet to WS and this opening sentence to BOOK.

contents to match subsequent examples, refer to Figure 7.21 and type what you see.) When you reach the end of a line, press the enter key. When you have typed all your lines, press function key F6 or simultaneously press *ctrl-Z* (either generates the COPY command's sentinel value) and then press enter.

Copy the three files you see in Figure 7.21 (or substitute your own content) to directory LETTERS. Then refer to Figure 7.22, copy a line that represents a pretend spreadsheet to directory WS, and copy the first line of Chapter 1 to directory BOOK.

Changing Directories

Now that your diskette holds some directories and files, investigate it. Start by typing the command

DIR A:

and pressing enter. Only the three directories (the contents of the root directory) are listed (Figure 7.23). To view the contents of the LETTERS directory, type

DIR A:\LETTERS


```

C:\>Command Prompt
A:\>DIR A:
Volume in drive A is DOSDEMO
Volume Serial Number is 7C50-C9ED

Directory of A:\

02/07/2003  04:37 PM    <DIR>          LETTERS
02/07/2003  04:37 PM    <DIR>          BOOK
02/07/2003  04:37 PM    <DIR>          US
               0 File(s)              0 bytes
               3 Dir(s)          1,453,568 bytes free

A:\>_

```

FIGURE 7.23

Your diskette's root directory.

and press enter. Note that the three files you just created are listed (Figure 7.24).

Look carefully at Figure 7.24. Directory LETTERS contains two unusual files: (.) and (..). The single dot refers to the directory itself. The double dot is a reference to its parent, in this case, the root directory.

The root directory is the current **working directory**. To shift to a different working directory, type a **change directory (CHDIR, or CD) command** (Figure 7.25)

```

C:\>Command Prompt
A:\>DIR A:\LETTERS
Volume in drive A is DOSDEMO
Volume Serial Number is 7C50-C9ED

Directory of A:\LETTERS

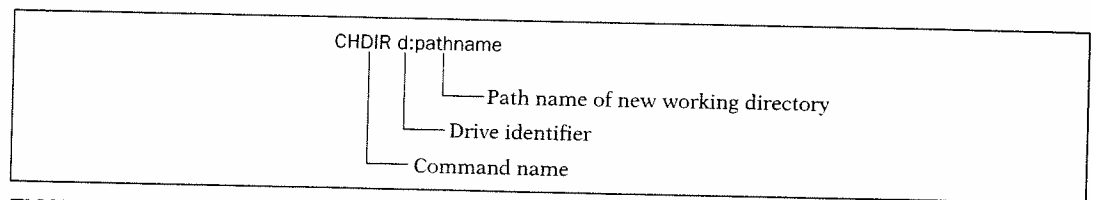
02/07/2003  04:37 PM    <DIR>          .
02/07/2003  04:37 PM    <DIR>          ..
02/07/2003  04:41 PM             62 JIM
02/07/2003  04:43 PM             48 SALLY
02/07/2003  04:44 PM             54 TOM
               3 File(s)             156 bytes
               2 Dir(s)          1,453,568 bytes free

A:\>

```

FIGURE 7.24

The contents of subdirectory LETTERS.

**FIGURE 7.25**

Use a change directory command to change the working directory.

```
CHDIR A:\LETTERS
```

and press enter. Then type the command

```
DIR A:
```

with no parameters and press enter again. The output should match Figure 7.24. If no directory is specified, MS-DOS assumes the current working directory. The change directory command allows you to specify a new working directory.

Manipulating Files

Earlier, you copied some text from the console to create a file on diskette. More generally, any existing file can be copied. The `COPY` command's first parameter specifies a source file and its second parameter specifies a destination file. If drive designators are prefixed to a parameter, a file on one disk can be copied to another. If a file name is specified for the destination file, the new file name is used. If no file name is specified for the destination file, the source file name is used.

For example, make sure your diskette is in the drive and type the command

```
COPY A:\LETTERS\TOM A:\LETTERS\TAMMY
```

(Figure 7.26). Note that a space separates the two parameters. Press the enter key. MS-DOS will read the file named `TOM` from the `LETTERS` directory on drive `A`, make a copy, and store the new copy on the `LETTERS` directory.

```

C:\>Command Prompt

A:\>COPY A:\LETTERS\TOM A:\LETTERS\TAMMY
1 file(s) copied.

A:\>COPY A:\LETTERS\JIM A:\LETTERS\GINA
1 file(s) copied.

A:\>DIR A:\LETTERS
Volume in drive A is DOSDEMO
Volume Serial Number is 7C58-C9BD

Directory of A:\LETTERS

02/07/2003  04:37 PM  <DIR>
02/07/2003  04:37 PM  <DIR>
02/07/2003  04:41 PM               62 JIM
02/07/2003  04:43 PM               40 SALLY
02/07/2003  04:44 PM               54 TOM
02/07/2003  04:44 PM               54 TAMMY
02/07/2003  04:41 PM               62 GINA
               5 File(s)              272 bytes
               2 Dir(s)              1,452,544 bytes free

A:\>_

```

FIGURE 7.26

Some copy commands.

Wild Card Characters

Consider a few generic examples before you resume the tutorial. Special **wild card** characters allow a user to generalize the parameters. A question mark (?) represents any single character; for example, the file name

TERM.?

identifies TERM.1, TERM.2, TERM.C, and any other file named TERM with a 1-character extension. An asterisk (*) represents multiple characters; for example,

TERM.*

stands for every file named TERM with a 1-, 2-, or 3-character extension, including TERM.1, TERM.V6, and TERM.ABC.

Imagine you have been working on a BASIC program named MYPGM. By convention, your source module uses the extension BAS and your object module uses the extension OBJ. You want to copy both. You can, of course, issue two COPY commands, but you can copy both with a single command if you reference MYPGM.* or MYPGM.??? as your source file. Seeing the

wild card characters, MS-DOS will look for all files that fit, so the single COPY command

```
COPY MYPGM.* A:\PROGRAMS
```

(which you should not issue) will copy both MYPGM.BAS and MYPGM.OBJ to a subdirectory named PROGRAMS on the A drive using the source file names.

Consider one more example before you resume the tutorial. Wild card characters are particularly useful for making backup copies of selected files or an entire disk. For example, the command

```
COPY C:\PAYROLL\*.* A:
```

(which you should not issue) copies all the files from a directory named PAYROLL on the C drive to the diskette in the A drive. Similarly, the command

```
COPY C:\PROGRAMS\*.BAS A:
```

(which you should not issue) copies all the files with the extension BAS from a directory named PROGRAMS on the C drive to the diskette in the A drive.

Now, back to the tutorial. Type the command

```
COPY A:\LETTERS\JIM A:\LETTERS\GINA
```

(Figure 7.26) and press enter. MS-DOS will retrieve a copy of the file named JIM from subdirectory LETTERS, rename it GINA, and store the copy on subdirectory LETTERS. To verify the copy operation, type the directory command

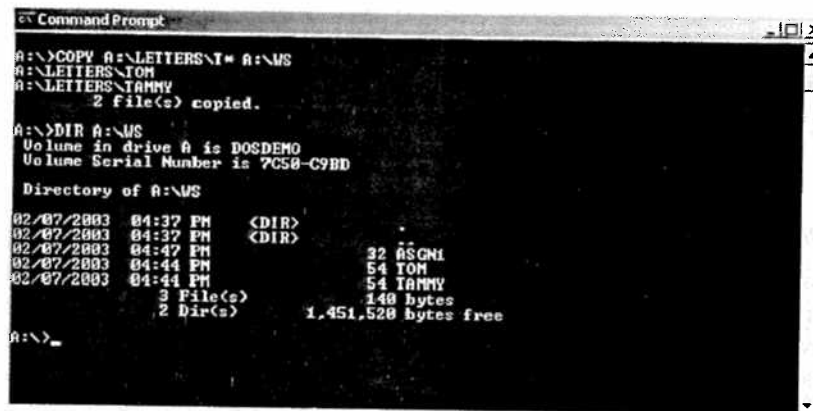
```
DIR A:\LETTERS
```

and press enter. Note the file named GINA on Figure 7.26. (You created the file named TAMMY earlier.)

Next, type the command

```
COPY A:\LETTERS\T* A:\WS
```

and press enter. It copies every file on subdirectory LETTERS that begins with the letter T to the directory named WS. To verify the copy operation, type the directory command



```

C:\Command Prompt
A:\>COPY A:\LETTERS\I* A:\WS
A:\LETTERS\TOM
A:\LETTERS\TAMMY
        2 File(s) copied.

A:\>DIR A:\WS
Volume in drive A is DOSDEMO
Volume Serial Number is 7C50-C9BD

Directory of A:\WS

02/07/2003  04:37 PM    <DIR>          .
02/07/2003  04:37 PM    <DIR>          ..
02/07/2003  04:42 PM                32 ASCII
02/07/2003  04:44 PM                54 TOM
02/07/2003  04:44 PM                54 TAMMY
               3 File(s)      140 bytes
               2 Dir(s)      1,451,520 bytes free

A:\>_

```

FIGURE 7.27

This copy command uses wild card characters.

DIR A:\WS

and press enter. As you can see in Figure 7.27, files named TOM and TAMMY have been stored on subdirectory WS.

Incidentally, many people who learned MS-DOS in the pre-Windows era still switch to the command prompt to take advantage of wild card characters for certain file manipulation tasks. Wild cards are very useful.

Batch Files

A **batch file** is a file of precoded MS-DOS commands. You can assign any file name to a batch file, but the extension must be .BAT. If you type the batch file's name and press enter, MS-DOS will execute the commands in sequence. For example, if it exists, a file named AUTOEXEC.BAT is automatically executed each time the system is booted.

Program Files

A program is a special type of file. By convention, executable programs are assigned the extension COM or EXE. To load and execute a program, simply type its file name (with or without its extension) as though it was a command. If no extension is given, MS-DOS will look for a command with the

specified file name and a .COM extension, then search for a .EXE file, and finally for a .BAT file.

■ Pipes, Filters, and Redirection

Many MS-DOS commands assume a standard input or output device; for example, by default the directory command sends its output to the screen. By using **redirection** parameters (Figure 7.28) the user can change those defaults. For example, the command

DIR > PRN

sends the output directory listing to the printer instead of to the display screen.

Parameter	Meaning	Example
<	Change source to a specified device or file	<MYFILE.DAT
>	Change destination to a specified device or file	>PRN
>>	Change destination (usually) to an existing file and append output to it.	>>HOLD.DAT
	Pipe standard output to another command or to a filter	DIR MORE

FIGURE 7.28

Many MS-DOS commands and filters utilize the standard input and output devices. Redirection parameters allow a user to change to a specified file or device.

A **filter** is a special type of command. It accepts input from the standard input device, modifies (or filters) the data in some way, and sends the results to the standard output device. For example, the SORT filter, (Figure 7.29) accepts data from the keyboard, sorts the data into alphabetical or numerical sequence, and outputs the sorted data to the screen. You can add

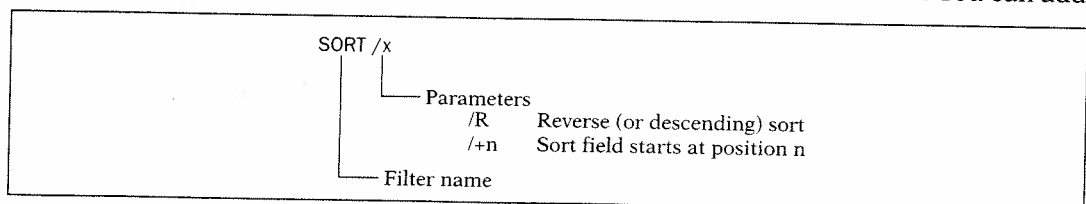


FIGURE 7.29

The SORT filter.

redirection parameters to override or change the standard input device, output device, or both.

For example, consider the command

```
SORT <A:\LETTERS\JIM
```

Because of the redirection parameter (<), this SORT filter accepts its input from the file named JIM. The output, the lines of text that you typed when you created JIM sorted into alphabetical order, should appear on your screen*. For future reference, to sort and store the output on a different file, code something like

```
SORT <MYFILE >RESULT
```

Note that both source and destination redirection parameters are included.

MORE is another useful filter (Figure 7.30). It sends output to the terminal one screen at a time. MORE is often used with pipes. A **pipe** causes one command's standard output to be used as the standard input to another command. Pipes are designated by a vertical line (|); you will find this character on the right of most alphanumeric keyboards, often just below the *Backspace* key.

For example, type

```
C:
```

and press enter to make drive C your default drive. Then type

```
DIR /WINDOWS
```

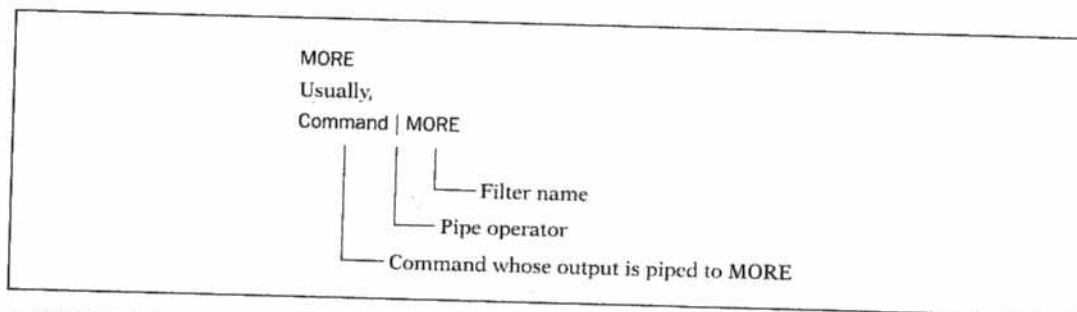


FIGURE 7.30
The MORE filter.

*The SORT filter may not be supported by all versions of Windows

```

C:\WINDOWS>DIR
Volume in drive C has no label.
Volume Serial Number is 02D0-8C00

Directory of C:\WINDOWS

12/11/2000 09:54 PM <DIR>      .
12/11/2000 09:54 PM <DIR>      ..
12/11/2000 09:54 PM <DIR>      COMMAND
12/11/2000 09:54 PM <DIR>      OPTIONS
12/11/2000 09:55 PM <DIR>      PCHEALTH
12/11/2000 10:03 PM <DIR>      SYSTEM
12/11/2000 10:21 PM <DIR>      54 000EMX.INI
12/11/2000 10:06 PM <DIR>      UPCHMPS
12/11/2000 10:06 PM <DIR>      HELP
12/11/2000 10:06 PM <DIR>      LAMP
12/11/2000 10:09 PM <DIR>      SYSTEM32
12/11/2000 10:09 PM <DIR>      MSAGENT
12/11/2000 10:09 PM <DIR>      CURSORS
12/11/2000 10:09 PM <DIR>      JAVA
12/11/2000 10:09 PM <DIR>      UPGDLLS
07/03/2002 03:58 PM <DIR>      WEB
12/11/2000 10:09 PM <DIR>      DRVATSON
12/11/2000 10:09 PM <DIR>      MEDIA
06/08/2000 05:00 PM <DIR>      5.068 DELETED1.INI
-- More --

```

FIGURE 7.31

The MORE filter displays data one screen at a time.

Press enter and watch the file names scroll by too quickly to read. Now type the command

```
DIR /WINDOWS | MORE
```

The directory command's standard output will be routed to the MORE filter rather than directly to the screen. The filter will display one screen and then wait until you press the enter key before it displays the next screen (Figure 7.31).

■ Returning to Windows

That completes the chapter tutorial. To return to Windows, type the command

```
EXIT
```

and press the enter key.

MS-DOS is a powerful operating system and you have barely scratched the surface of its command language. However, given a clear understanding of the commands in this brief tutorial, you should be able to read a reference manual and determine how to use additional commands on your own.

■ Summary

MS-DOS is a command-driven operating system that allows users to issue cryptic, single-line commands through a command interface. The default drive and the system prompt are displayed by the operating system. The user types a command name followed by necessary parameters.

You can access MS-DOS or the command prompt through Microsoft Windows. The **FORMAT** command is used to format a disk. The MS-DOS file system allows a user to identify, save, and retrieve files by name. Directory management is a key function of the MS-DOS file system. When a disk is first formatted, a single root directory is created by the format routine. When sub-directories are used, you need a complete path name to fully identify a file.

The system prompt identifies the default drive and the current working directory. To list the contents of a directory, type a directory (**DIR**) command. Use the make directory (**MKDIR**, **MD**) command to create a directory. To shift to a different working directory, type a change directory (**CHDIR**, **CD**) command.

Use a **COPY** command to copy an existing file. When you issue a **COPY** command, special wild card characters allow a user to generalize the parameters and copy several files with a single operation. A batch file is a file of pre-coded MS-DOS commands. A program is a special type of file.

Many MS-DOS commands assume a standard input or output device. By using redirection parameters the user can change those defaults. A filter accepts input from the standard input device, modifies (or filters) the data in some way, and sends the results to the standard output device. A pipe causes one command's standard output to be used as the standard input to another command. To return to Windows from the MS-DOS prompt, type the command **EXIT**.

■ Key Words

batch file	FORMAT command
change directory (CHDIR , CD)	make directory (MKDIR , MD) command
command	MS-DOS
command	parameters
COPY command	path name
current directory	pipe
default drive	prompt
delimiter	redirection
directory	root directory
directory (DIR) command	subdirectory
extension	wild card
file name	working directory
file system	
filter	