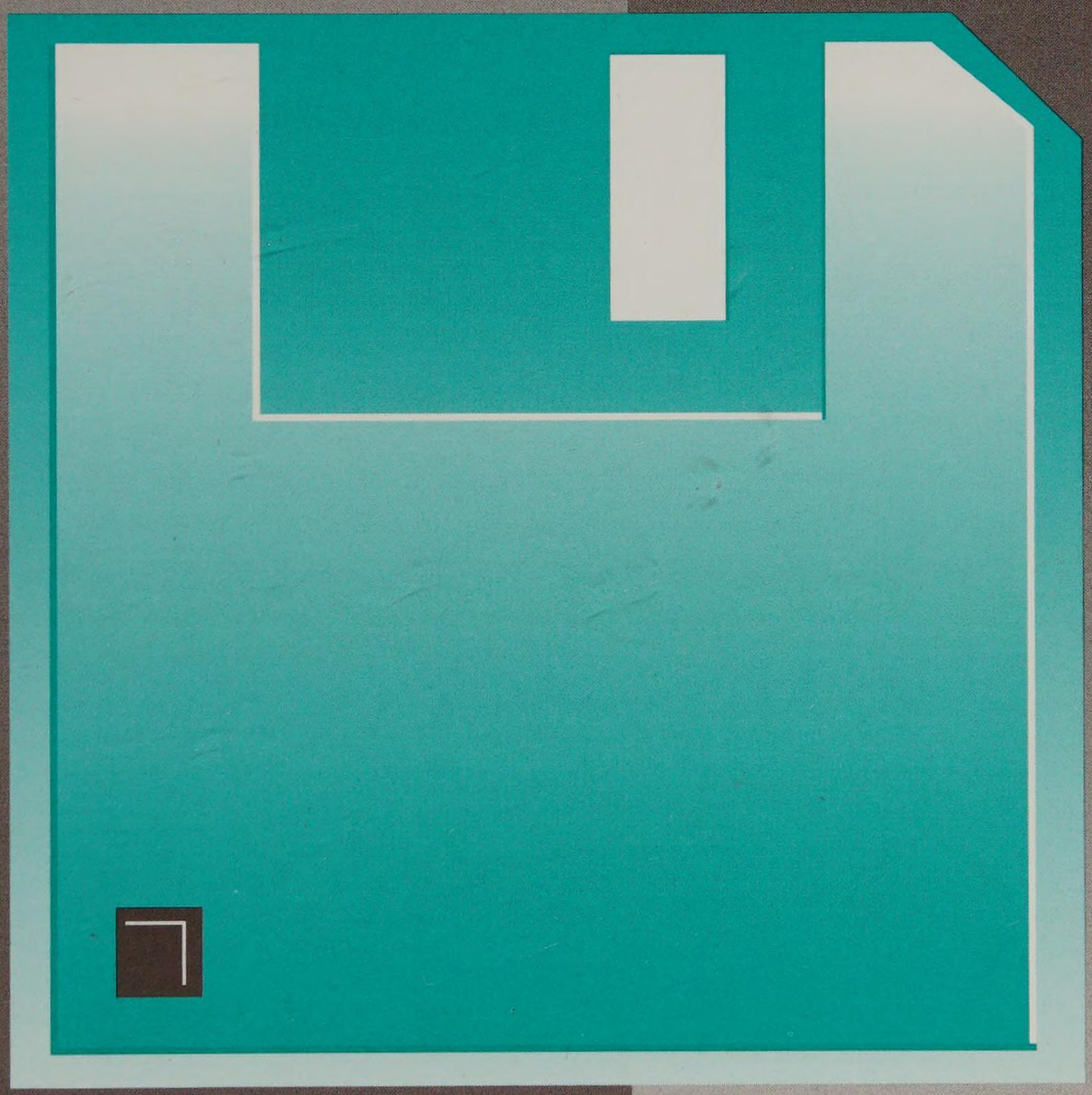
ESSENTIAL

DOS 3.3



TIM DUFFY

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ESSENTIAL

DOS 3.3

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ESSENTIAL DOS 3.3

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To Wendy and Michael

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PREFACE

PURPOSE

This *Software Essentials* book and its associated software-training materials teach software competency. These materials are designed for both majors and non-majors in a quarter or semester course that uses the microcomputer as the primary vehicle for introducing students to problem solving. As typically expected in this type of course, there are no prerequisites.

APPROACH

Students acquire software competency by completing a set of software-training chapters that focus on current releases of various major software packages. To achieve that competency, each software package is presented in a separate booklet emphasizing hands-on problem solving. Carefully prepared, hands-on tutorials are provided within each chapter. Closely related end-of-chapter exercises reinforce the tutorial learning and expand the student's mastery over a broader range of applications.

Software packages covered in this series include

- DOS 3.3 and 5.0.
- WordPerfect 5.0/5.1.
- Lotus 1-2-3 2.2 and 2.3.
- Quattro Pro 3.0.
- dBASE III Plus.
- dBASE IV 1.1.
- Paradox 3.5.
- Windows 3.1.

IMPROVEMENTS IN SOFTWARE INSTRUCTION

I have always made the greatest possible effort to make hands-on instruction direct and meaningful. For this series in *Software Essentials,* the hands-on passages have been extensively reviewed and revised to make the booklets in the series more effective for the teacher and learning easier for the beginning student. Important changes include the following:

- **Self-Contained Modules** Each software module is self-contained. Each has its own front matter, chapter numbering, glossary, and command summary.
- **Expanded Hands-On Learning** The number of hands-on exercises has been increased dramatically. Particularly, the number of shorter exercises has been increased.
- **Use of Second Color** All hands-on exercise commands in the text appear in second color. This allows the student to quickly identify what keystrokes to enter and to distinguish them from additional explanation about a software feature or command.

- **Hints/Hazards Boxes** Many Hints/Hazards boxes inform students about the tricks they can use and potential traps they may encounter when using a particular software tool.
- **Keyboard Icons.** Keyboard icons appear frequently in headings and tables. These icons help the student to identify and remember specific keystrokes.

WORKING IN A HANDS-ON ENVIRONMENT

Software Essentials and its allied materials work best in a hands-on environment. The step-by-step exercises make most sense when an individual is sitting at computer and can immediately see the results of his or her actions. A symbol such as the one shown in the margin indicates hands-on material.

Each software package covered in this series is treated in enough detail to satisfy the requirements of a computer novice. However, each software booklet assumes that the software has already been configured for the student's use. If a package has not been configured for a specific machine, refer to the documentation for that package.

HARDWARE REQUIREMENTS FOR HANDS-ON SOFTWARE

An IBM PC or compatible computer with two disk drives and 320K of memory is required for most tools in this series. Note that you need 512K and a hard disk to run dBASE IV. You will also need a color monitor/graphics adapter board to properly display Lotus 1-2-3 graphics on the screen. A printer (with graphics capabilities if you wish to print Lotus graphs) is also required for printing documents, reports, graphs, and worksheets.

The hard disk (fixed disk) has resulted in many changes in the way computer concepts and use are taught in the classroom. During the past few years, the prices of hard disk technology have plummeted. Because this technology is now affordable for most colleges and universities, this text includes instructions for running software from a fixed disk.

LEARNING AIDS AND SAMPLE FILES

Exercises are provided at the end of each chapter to give students quick feedback on their progress. Besides the written exercises, hands-on computer exercises are included at the end of the software chapters to provide feedback through challenging applications of material covered in the chapter. A number of sample diskette files—including sample worksheets, text files, and database files—have been provided for use with text lessons and exercises.

ESSENTIAL

DOS 3.3

1

INTRODUCTION TO DOS

CHAPTER OBJECTIVES

After completing this chapter, you should be able to

- **Distinguish between internal and external DOS commands**
- **Start (boot) the computer system**
- **Change the default drive**
- **Write appropriate filenames**
- **Describe how DOS uses various keys and how it uses wild cards**
- **Understand the format of DOS commands**
- **Use the Directory (DIR) command**
- **Prepare a diskette for use with the FORMAT command**
- **Use the DATE and TIME commands**

In Chapter 3 of "Introductory Microcomputer Concepts," we explained the function of operating systems in general and gave some information on the IBM PC **disk operating system (DOS).** In this chapter, we chapter, we discuss more about DOS and introduce several DOS commands required for daily use of the IBM PC. For more information about DOS or about differences in the commands contained in other versions, refer to the **Microsoft MS DOS** reference manual that comes with your version of DOS.

DOS commands are either internal or external. **Internal commands** are built into the command processor file **COMMAND.COM. External commands** reside in separate, external files (also called utilities). For example, the FORMAT command is contained in a file called FORMAT.COM. External commands must be read from the appropriate file before they can be executed. This means that a disk containing that file must be available in one of the drives for DOS to execute it.

Besides COMMAND.COM and various external files, DOS also includes two files called **IO.SYS,** which handles input and output, and **DOS.SYS,** which acts as a file manager. IO.SYS and DOS.SYS are hidden program files that reside on the same disk as COMMAND.COM but are not listed when you issue the Directory command to call up a list of files contained on the disk.

When DOS is placed on a disk, it consumes considerable storage space. In fact, recent versions of DOS require over 100K of storage space, leaving about 260K of storage available on a typical 5.25-inch double-density disk for programs and data. Once DOS has been loaded, the hidden files take up to 50K of your computer's RAM. DOS does not have to be placed on **data disks** but should be copied, if possible, onto any disk that will be used to hold application programs.

THE BOOT PROCESS

Starting a computer has long been known as the **boot process,** a term derived from the old expression "pulling oneself up by the bootstraps." Two basic ways initiate the boot process: the **cold start** (starting the computer when the power is off) and the **system reset,** or **warm start.**

When a computer is started cold or warm, the CPU executes the bootstrap loader, a small program contained in ROM. The bootstrap loader checks the disk directory to ensure that the disk has, in consecutive storage locations, the IO.SYS and DOS.SYS programs, which are then loaded in order into RAM.

The IO.SYS program executes next, checking to see what peripherals are attached to the computer and preparing them for use. For example, the IO.SYS initializes a printer, signaling it to stand by to receive information. After IO.SYS has finished, the DOS.SYS program performs **initialization** work that allows data to be passed to a disk and stored. Next, the COMMAND.COM file is automatically brought in from the disk and placed in RAM, completing the boot process.

After the boot process is completed, DOS checks for an AUTOEXEC.BAT file on the boot disk. **AUTOEXEC.BAT** files are command files that you can create, for instance, to tell the computer to automatically start up a certain application program. If there is such a file, DOS executes its commands.

If it does not find an AUTOEXEC.BAT file, it will next display date and time prompts. If your computer has its own internal clock/calendar hardware, it will most likely show the correct date and time. If it doesn't, it will probably display the date 01-01-80. If you want to accept the date and time the computer gives

you, press Enter. If you want to change the date, respond to the prompt requesting you to enter a new date. DOS asks you to type the date in a month/day/year format (MM/DD/YY).

In between the numbers for month, day, and year, you must enter some form of delimiter. A **delimiter** is any sort of punctuation that shows where one part of a command ends and the next part begins. Enter the date using either dashes or slashes as delimiters (mm-dd-yy or mm/dd/yy). Complete the command by pressing Enter. The date entered will be recorded in the directory for any files that are created or changed during this session.

Next, the computer asks for the time in the hh:mm format, which you must enter using colons as delimiters (for example, 10:42 for 10:42 A.M. or 22.42 for 10:42 P.M.). The time entered will serve as the starting time for the time recorded in the directory for any files that are created or changed during this session. After the date and time have been entered, the computer displays something like the following three lines at the top of the screen:

```
The IBM Personal Computer DOS
Version 3.30 (C)Copyright International Business Machines Corp 1981, 1987
             (C)Copyright Microsoft Corp. 1981, 1986
C>
```

Depending on your system, you may see C>, A> or B>. Each of these is the **DOS prompt.** It means that DOS is waiting for you to enter a command.

Starting DOS if the Computer Power Is Off (Cold Start)

1. To load DOS into memory, insert the DOS disk or the program disk with DOS (label side up and thumb on label) in disk drive A (the left-hand disk drive).
2. Close the drive door. (If you have a fixed disk, leave the drive door open and turn on the machine.)
3. If peripherals are attached, turn their power switches to the ON position.
4. Turn the system unit power switch (located on the right-hand side, toward the rear of the machine) to the ON position.

Restarting DOS if the Computer Is Already On (System Reset, or Warm Start)

1. To load DOS into memory, insert the DOS disk or the program disk with DOS (label side up and thumb on label) in disk drive A.
2. Close the drive door. (If you have a fixed disk, leave the drive door open and turn on the machine.)
3. Press and hold down both Ctrl and Alt; then press Del. Release the three keys.

When first turned on in a cold start, a computer performs a memory check to ensure that all RAM locations are capable of storing and retrieving data correctly. This memory check is not performed during a system reset. The memory check consumes most of the computer's start-up time, and the more memory a machine has, the longer the check takes. Microcomputers may take anywhere from 3 to about 45 seconds to start and load DOS.

USING DOS: AN INTRODUCTION

HARDWARE CONFIGURATIONS

One of the problems in writing a text like this is that a computer can take many different types of configurations. One user's computer may have two 5.25-inch disk drives; another's might have a 3.5-inch disk drive and a hard disk drive; another's a 5.25-inch disk drive, a 3.5-inch disk drive, and a hard disk drive; yet another's two 3.5-inch disk drives and a hard disk drive; and so forth.

When you are referring to a specific drive or other storage device on your computer, you must call it by the name that DOS uses, which will be some letter of the alphabet, *A* through *N*. If you have fixed disk, it is typically referred to as device C (though part of that disk may also be called D and another part E). Your diskette drives are referred to as A and B. If the drives sit next to one another, the left-hand drive is usually A. If the drives are stacked on top of one another, the top drive is usually A (Figure 1.1).

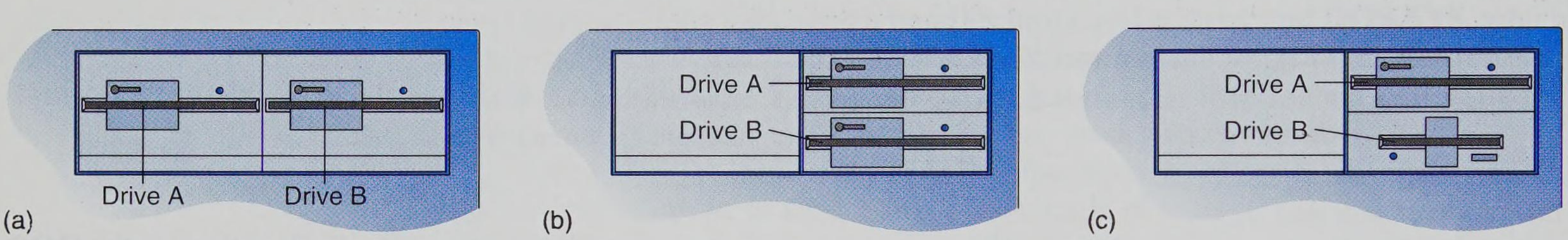


Figure 1.1

How DOS names the computer's disk drives in (a) a side-by-side configuration, (b) a stacked configuration, and (c) a stacked configuration with one 5.25" disk drive and one 3.5" disk drive.

CHANGING DEFAULT DRIVES

The C in C> (the DOS prompt) designates the **default disk drive** to DOS, telling it which disk the computer will automatically use to retrieve a file or execute a command. Unless you specify another drive, DOS searches only the default-drive disk for filenames. The default drive can be thought of as the drive currently in use.

The boot program tries to start a computer by trying to find DOS on whatever disk is in drive A. If it finds a disk in A that does not contain DOS, it responds with an error message and asks you to put in the correct disk. If it does not find a disk in A, it checks to see if there is a hard disk with DOS. If DOS is on the disk in drive A, the default drive remains A. If DOS is on the hard disk, the default drive becomes C. Additional drives attached to the computer are specified by consecutive letters: B for the second, C for the third, and so on.

You can change the default drive by typing the designation letter of the desired drive in either uppercase or lowercase letters, followed by a colon, and pressing Enter. (DOS always translates lowercase letters into uppercase.) For example, to change from disk drive A to drive B, change the prompt as follows:

Screen shows A>	Original drive
Type `B:`	Specifies new drive designation
Press Enter	Makes the change
Screen shows B>	New drive, new prompt

B is now the default (current) drive. DOS will now search only the disk located in disk drive B to execute commands or find filenames, unless you specify another drive. Try this on your computer.

HINTS/HAZARDS

If you have a computer with a fixed disk and only one diskette drive, you may be a bit confused by the fact that DOS will refer to the diskette drive—or let you refer to it—sometimes as drive A and sometimes as drive B. Don't worry about this. Referring to the same drive by different names is sometimes necessary—for instance, when you are using the same drive to copy material from one diskette to another by alternately inserting one diskette and then the other into the same drive.

Changing Default Drives

Type `B:`	Changes the default drive and the prompt to B>.
Enter	Executes the command.
Type `A:`	Changes the default drive and the prompt to A>.
Enter	Executes the command.

DIRECTORIES

Every disk that is used with DOS contains a **directory** of the files on that disk. This directory is also called the root directory, and its framework is created during the disk-preparation (format) process. The directory of a disk can be listed by using the Directory (DIR) command, as will be shown in more detail later in the chapter. Figure 1.2 shows a typical disk directory. The first column shows the filename of each file in the directory. The second column contains an additional part of the filename, the file extension. (Not all filenames have extensions.) The third column shows the file size in bytes. The fourth and fifth columns show the data and time when the file was created or last changed.

Next to the root directory on the disk (but not displayed on the screen) is a system area known as the **file allocation table (FAT).** Its job is to keep track of which sectors store particular files and to inventory available space on the disk so that new files can be created and stored in unused areas. Each disk has one directory and two copies of the FAT. If the system has a problem reading the first copy of the FAT, it reads the second.

Examining a Directory

1. Place the student data disk (or some other disk containing files) in drive A of your computer and issue the Directory command:

Type `DIR`	Issues the command.
Enter	Executes the command.

2. Identify the following items of information displayed to the screen:
   Filename
   File extension
   File size
   Date and time of creation
3. How much space is left on the disk?

```
A>dir
 Volume in drive A has no label
 Directory of A:\

   CH8EX7   WK2      896   3-01-92   8:05p
   CH10EX1A AHV     4608   2-28-92   7:53p
   CH8EX8            512   3-01-92   8:21p
   CH8EX9            896   3-01-92   8:28p
   EDTARTCL        10880   3-03-92   8:34a
   CH10EX5A         1024   2-28-92   8:00p
   CUSTOMER DBF     1598   1-01-80   2:06a
   BLUEWS4        106240   3-02-92   4:50p
   FOOTNOTE         2048   2-27-92   7:30p
   BLUEWS7         52864   3-01-92   8:56p
   EXER1            1024   3-03-92   8:35a
   CH9EX8   DBF     1110   3-02-92  10:31a
   BOOKEXER         9216   3-27-92   8:42a
   CH9EX9   WK1     1810   3-02-92  10:40a
   BLUEWS9         53888   3-02-92   5:24p
   SMLBUSNS         3328   3-01-92   2:59p
   NEWLETTR        11136   2-27-92   5:08p
   PROTDATA         8448   3-02-92  11:54a
   BLUEWS5         57984   3-01-92   8:24p
   BLUEWS8         48768   3-02-92   5:04p
   BLUEWS6         69632   3-01-92   8:46p
   CH7EX6           3712   3-01-92   5:05p
       22 File(s)      176128 bytes free
```

Figure 1.2
A typical disk directory.

FILENAMES

A file is a collection of related information that can be either data (data file) or instructions for manipulating data (program file). Users keep track of the files on a disk by name.

HINTS/HAZARDS

Within any given list of files displayed in a directory, each filename must be unique. If a disk has a file named MICRO.1 on it and you store a second file named MICRO.1 on that disk, the computer will destroy the original MICRO.1 and replace it with the second.

Within space and special-character limitations, you can name files almost anything you wish. Disk **filenames** can be one to eight characters in length and can be followed by a one- to three-character **filename extension,** separated by a period. A student data file for grades, for example, might be called STUDGRAD.TXT. The components of this name are labeled in Figure 1.3.

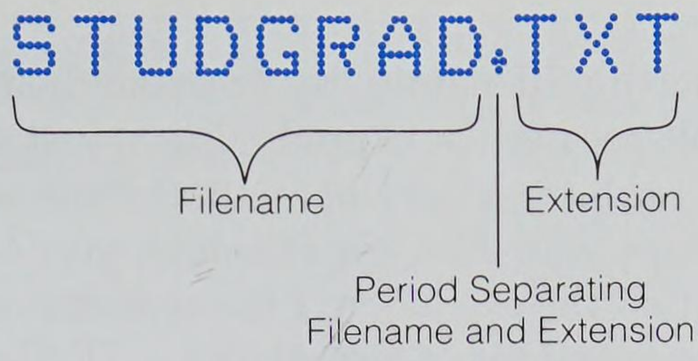


Figure 1.3
Components of a filename.

In creating a new file, you can give a filename extension or omit it. However, to access an existing file that has an extension, you must type the complete name, separating the filename from the extension using a period and leaving no blank spaces between them. (You may notice that the directory in Figure 1.2 shows one or more spaces between the filename and the extension and does not show the period—this was arbitrarily done by Microsoft.) DOS can generally locate a file with an extension only if you enter both the filename and the extension. The only exceptions to this concern the DOS file extensions .BAT, .EXE, and .COM.

The following characters can be used for filenames and extensions:

A–Z	!	}	&	)	~
0–9	'	-	#	-	'
$	(	^	@	{	

All other characters are invalid. An invalid character is assumed to be a delimiter, which truncates the filename. Embedded spaces (blanks within the filename or filename extension) are not allowed.

Generally, special characters should not be used in filenames because some software packages do not accept them. In addition, Microsoft may use special characters as DOS commands in future versions of the operating system program. For example, the %, <, >, and \ characters were allowable in DOS 1.0 and DOS 1.1 but are invalid in all versions of the software from DOS 2.0 on.

The following filenames and extensions would be acceptable filenames in DOS Version 3.30:

HOMERUNS
HOMERUNS.ABC
123HOMER
H
#.@

The following would not be acceptable:

REGGIEJACKSON	(more than eight characters)
75%.GRD	(disallowed character)
.WED	(no filename)
HOMER?.NOW	(disallowed character)

Filenames should reflect the data held in the files. For example, a student drafting an English term paper on a computer could title the file ENGTP—an abbreviation for English term paper.

HINTS/HAZARDS

When selecting filenames, try to make them self-documenting. This may be difficult because DOS limits you to just eight characters. You can alleviate this problem somewhat with the use of a file extension that descriptively names your file. For example, you can give any file containing a letter an .LTR file extension, a file containing a memo an .MEM file extension, a file containing a term paper a .TP file extension, and a file containing an annotated bibliography a .BIB file extension.

The root directory of a 360K disk can store as many as 112 files or a single document of 360K if it is the only file on the disk. A hard disk, however, does not have this limitation, and DOS allows a file to be up to 32 billion bytes in size.

SPECIAL DOS KEYS

Control Keys

Control keys perform a variety of functions in connection with entering commands or lines of input. Table 1.1 lists the control keys.*

DOS Editing Keys

DOS editing keys let you make changes to the last DOS command entered, which can save many keystrokes (Table 1.2). The instruction

Table 1.1 Control Keys

Control Keys	*Function*
Enter ↵	Makes a line or command available to the computer.
Ctrl + Break	Stops a program that is executing.
Ctrl + S	Temporarily stops output to the screen so that it can be examined (restart the output by again pressing Ctrl + S).
Shift + PrtSc (or Ctrl + P)	Toggles (turns) the printer echo either ON or OFF. Prints the exact contents of the screen.
Esc	Cancels the current line (many programs also use this key to stop processing or to get out of some difficulty).
BackSpace ←	Moves the cursor back one position.
Function keys F1, F2, . . .	Cuts down on the number of keystrokes required to enter a command.
NumLock	Activates either the numeric keypad or the Arrow keys and other special function keys.

Throughout this text, the following system is used to show how keystrokes are combined. When two or three keystrokes are separated by plus signs (for example, Ctrl + Del), hold down the first key while pressing the remaining key(s). When two keystrokes are separated by a comma (for example, F2, Del), simply press each key in the order given.

Table 1.2 DOS Editing Keys

Editing Keys	*Function*
Del	Skips one character in the current line.
Esc	Cancels the current line without changing the data in the instruction buffer.
F1	Copies and displays one character from the instruction buffer to the cursor position in the current line.
F2	Copies all characters from the instruction buffer up to a specified character and places them in the current line.
F3	Copies all remaining characters from the instruction buffer up to the current line.
F4	Skips all characters in the instruction buffer up to a specified character.
F5	Places the current line in the instruction buffer for more editing.
Ins	Inserts characters at the current cursor location using this toggle.

buffer, referenced with some of the keys in Table 1.2, is a temporary holding area that retains your last command so that it can be quickly executed again.

The F3 key is probably the most important of the **function keys.** Pressing it reissues the prior command, which has been held in the instruction buffer.

DOS COMMAND SYNTAX

Syntax refers to the rules that apply when you enter commands into a computer. According to the syntax of DOS, issuing a DOS command begins by typing the name of the command. This is usually followed by one or more **parameters**—information of any kind that is entered in addition to the command name. For example, the name of the file to be copied and the destination drive for the copy are parameters for the COPY command.

As noted previously, a delimiter is a character that shows where one part of a command ends and another part begins. The most commonly used delimiter is a space (usually represented in instruction manuals as the character ␣). Other common delimiters are the comma, semicolon, equal sign, and Tab key. A period is *not* a delimiter. Commands and parameters must always be separated by delimiters, but there must never be a space or other delimiter between a colon that appears between a drive name and a following filename. The following examples are correct:

```
ERASE FILE01.DOC
RENAME OLDFILE NEWFILE
DIR B:REPORT.DOC
COPY A:FILE03 B:
DIR B:FILE04.DOC
```

The following are incorrect:

B:REPORT DOC	(period missing between filename and extension)
A: REPORT.DOC	(unallowed space between drive and filename)
DIR A:FILE04. DOC	(unallowed space between filename and extension)

HINTS/HAZARDS

You can never go wrong placing a space after a DOS command, if you wish to follow that command with any parameters.

You can end commands while they are running by pressing Ctrl + Break (or Ctrl + C). It may take a while for the command to affect the computer.

Drives can act in either of two ways: A **source drive** is one from which data are transferred, and a **target drive** is one to which data are transferred. Depending on the particular operation involved, any drive may function as either the source drive or the target drive.

HINTS/HAZARDS

If you are using a networked device, you cannot use the following commands:

CHKDSK
DISKCOPY
FORMAT
LABEL
RECOVER
SYS

If you do try to use such a command, DOS generally responds with the following message:

```
Cannot <command> to a network device
```

The <command> entry is the name of the command that you entered at the keyboard.

HOW THIS BOOK PRESENTS DOS COMMAND INFORMATION

In the following pages, information about each DOS command is presented in the following order: (1) the name of the command; (2) the purpose (function) of

the command; (3) the syntactic format (word order, spacing, and punctuation) of the command, with any optional parameters; (4) the nature of the command, identifying whether it is part of the COMMAND.COM file (internal) or is a utility (external); and (5) any remarks or explanations about the command.

The following tells how to read the syntactic format for each command, for example, the DOS command CHKDSK [d:][filename][/F][/V]:

1. Any words shown in capital letters must be entered exactly as shown. They can, however, be entered as any combination of uppercase and lowercase letters because DOS automatically changes all letters to upper case.
2. Items shown in lowercase letters ask you to supply some variable information, such as the name of a specific file or disk drive.
3. Items in brackets ([ ]) are optional.
4. Ellipses (. . .) indicate that the item they accompany can be repeated as many times as desired.
5. All punctuation (except brackets)—commas, equal signs, question marks, colons, slashes, and so on—must be included where shown.

GLOBAL FILENAME CHARACTERS

Global filename characters, also known as **wild cards,** let you execute a command against several files whose names have one or more characters in common. The two wild cards used in DOS are the question mark **(?)** and the asterisk **(*).** A ? in a filename or extension indicates that any character can occupy that position or the position can be vacant. The use of wild cards is illustrated in the following discussion of the **Directory (DIR) command.**

THE DIRECTORY (DIR), FORMAT, DATE, AND TIME COMMANDS

DIRECTORY (DIR) COMMAND

Function This command lists all file-related information for specified files or families of files. The entity being listed can be a disk or a subdirectory (see Chapter 2). The list includes the filename, extension (if any), file size, and date and time of creation (or updating).

Format `DIR [d:][filename][.ext]][/P][/W].`

Type Internal.

Remarks and Examples Here are some examples of the DIR command:

A>DIR This lists all file entries from the root directory on the default drive. A typical directory listing might look like this:

```
Volume in drive A has no label
Directory of A:\
CH8EX7   WK2      896  3-01-92   8:05p
CH10EX1A AHV     4608  2-28-92   7:53p
CH8EX8            512  3-01-92   8:21p
CH8EX9            896  3-01-92   8:28p
EDTARTCL        10880  3-03-92   8:34a
CH10EX5A         1024  2-28-92   8:00p
CUSTOMER DBF     1598  1-01-80   2:06a
BLUEWS4        106240  3-02-92   4:50p
FOOTNOTE         2048  2-27-92   7:30p
BLUEWS7         52864  3-01-92   8:56p
EXER1            1024  3-03-92   8:35a
CH9EX8   DBF     1110  3-02-92  10:31a
BOOKEXER         9216  2-27-92   8:42a
CH9EX9   WK1     1810  3-02-92  10:40a
BLUEWS9         53888  3-02-92   5:24p
SMLBUSNS         3328  3-01-92   2:59p
NEWLETTR        11136  2-27-92   5:08p
PROTDATA         8448  3-02-92  11:54a
BLUEWS5         57984  3-01-92   8:24p
BLUEWS8         48768  3-02-92   5:04p
BLUEWS6         69632  3-01-92   8:46p
CH7EX6           3712  3-01-92   5:05p
      22 File(s)    176128 bytes free
```

The filename, extension, size of the file, creation date, and time of creation are given for each file on the disk. At the end of the listing, the amount of available storage on the disk is given.

A>DIR B: This lists all entries on the disk in drive B.

You can also use the wild-card characters ? and * with the filename and extension parameters. For example:

A>DIR REPORT?.? This lists all directory entries on the default drive with filenames of seven characters beginning with REPORT. The listed entries may have any character in the seventh position. Files that would be listed by the above DIR command include

REPORT
REPORTS.PDQ
REPORT3
REPORTB.2

An * in a filename or extension indicates that any character can occupy that position and any remaining positions in the filename or extension:

DIR W*.* This lists all directory entries on the default drive that have filenames beginning with W and having any or no extension. The filenames in this example may be from one to eight characters in length, and the extensions may be from one to three characters in length. (The second * in the above command tells DOS to list any files that start with a

W with or without a file extension.) Files that would be listed by the above DIR command include

WS	COM
WSOVLY1	OVR
WINSTALL	COM
WORK01	

B>DIR C*.* This lists all files in drive B that start with a C. The listing might look like this:

```
Volume in drive B has no label
Directory of B:\
CH8EX7           896  3-01-92   8:05p
CH10EX1A        4608  2-28-92   7:53p
CH8EX8           512  3-01-92   8:21p
CH8EX9           896  3-01-92   8:28p
CH9EX8   DBF    1110  3-02-92  10:31a
CH9EX9   WK1    1810  3-02-92  10:40a
CH10EX5A        1024  2-28-92   8:00p
CUSTOMER DBF    1598  1-01-92   2:06a
CH7EX6          3712  3-01-92   5:05p
       9 File(s)    176128 bytes free
```

Only files that begin with a C are included in this listing.

C>DIR *.COM This lists all entries on the disk (or directory) in the default drive that have an extension of .COM. The listing might look like this:

```
Volume in drive C has no label
Directory of C:\WS5\
README   COM    29212  8-17-92   5:00p
SWITCH   COM      571  8-17-92   5:00p
WSLIST   COM    64000  8-04-92   5:00p
GOODCLK  COM       50  8-04-92   5:00p
KEYSET   COM     1256  8-04-92   5:00p
       5 File(s)    526336 bytes free
```

A>DIR/P Adding the /P parameter causes the display to pause after 23 lines have been shown. The screen then displays the message `Strike a key when ready...`. This command is useful when the disk or subdirectory contains more files than the screen can show at one time. Under such conditions, the DIR command alone causes filenames to scroll off the top of the screen as it displays names that are farther down the list.

B>DIR/W This command displays only the filenames and extensions of the disk files. The /W parameter produces a five-column-wide display of the files, and the amount of available storage is also given:

```
Volume in drive B has no label
Directory of B:\
CH8EX7          CH10EX1A        CH8EX8          CH8EX9          EDTARTCL
CH10EX5A        CUSTOMER DBF    BLUEWS4         FOOTNOTE        BLUEWS7
EXER1           CH9EX8   DBF    BOOKEXER        CH9EX9   WK1    BLUEWS9
SMLBUSNS        NEWLETTR        CH3             PROTDATA        BLUEWS5
BLUEWS8         BLUEWS6         CH7EX6
      23 File(s)    175104 bytes free
```

Chapter 2 discusses other commands related to directories and subdirectories.

Issue the following DIR commands against your student data disk (press Enter after each command). This exercise assumes that the disk is in drive A:

`DIR *.C*`	Gets a listing of all files that have a C as the first character of the file extension.
`DIR B*.*`	Gets a listing of any file that begins with a B.
`DIR *.C13`	Gets a listing of any file that has a C13 as the file extension.

FORMAT COMMAND

The following presents the **FORMAT command** in its simplest version, which is all you need at the moment. Chapter 2 gives more variations.

Function Data are stored on a disk's narrow, concentric recording rings called tracks, which are further divided into sectors. Before a disk can store data, it must be organized by the formatting (initializing) process, which magnetically marks the boundaries of the tracks and sectors. These magnetic tracks lay out information boundaries on the disk, somewhat like traffic lanes dictating the routes and directions of cars.

For DOS to recognize a disk and to track files on it, the disk must be formatted with the FORMAT command:

Format `FORMAT [d:][/S]`

Type External.

Remarks and Examples A disk needs to be formatted only the first time it is used. FORMAT verifies the storage integrity of every sector of a disk. It finds and write-protects tracks that have bad (nonrecordable) sectors, sets up the directory, establishes the FAT, and puts the boot record program at the beginning of the disk. It can also create a copy of DOS on a new disk.

The command FORMAT A:/S both formats the disk in drive A and places DOS on the disk. Use this command if you want to store application software to the disk and boot the system with the disk.

The command FORMAT A: formats the disk in drive A but does not place DOS on it. This should be used for disks that will store only data.

HINTS/HAZARDS Do not perform the following exercise in relation to a hard drive (C:). Formatting a hard disk will erase all program and data files from the disk.

The following exercise involves formatting a **diskette.** For this exercise, you will need a new 3.5-inch or 5.25-inch diskette or a diskette that does not contain any files that need to be saved because formatting will erase all existing files. First, confirm that the diskette doesn't contain files to be saved: Insert the diskette in

a drive and issue the DIR command to see the directory of files. Then enter the following commands.

`FORMAT A:`	Formats the disk as a data disk.
`DIR`	Issues the Directory command.

You should receive a `No files` message.

How DOS Uses the 5.25-Inch Double-Density Disk Most disk drives record 48 tracks per inch (tpi) on diskette, but only a $\frac{5}{6}$-inch-wide strip of disk actually holds tracks. With 48-tpi drives, then, only 40 usable tracks are actually created. These tracks are labeled 0 through 39.

Each track is usually divided into 8 or 9 sectors. A PC, unless told to do otherwise, will automatically divide a track into 9 sectors, creating 720 total sectors on a disk (40 tracks × 9 sectors × 2 sides). Of these 720 sectors, 12 are reserved by the system to be used as follows:

To hold the FAT (two copies, with two sectors per copy): 4 sectors

To hold the directory: 7 sectors

To hold the boot program in the boot record: 1 sector

Therefore, 708 sectors (with a total user storage of 362,496 bytes) remain available on a disk formatted without the operating system.

Other types of disks, such as the 3.5-inch disk, use more sectors to hold directory and FAT information.

Space within a track is allocated in increments called **clusters.** A cluster on a single-sided disk is one sector; a cluster on a double-sided disk consists of two adjacent sectors. The operating system will allocate just one cluster to a file, then wait until that cluster is filled before assigning another.

Another important disk concept is the **cylinder.** A floppy disk contains 40 tracks on each side of the disk, with each track on the top side lying directly above the corresponding track on the bottom side. All like-numbered tracks on all recording surfaces constitute a cylinder. On floppy disks, 2 tracks make up each cylinder; on a hard disk, up to 10 tracks to a cylinder (Figure 1.4).

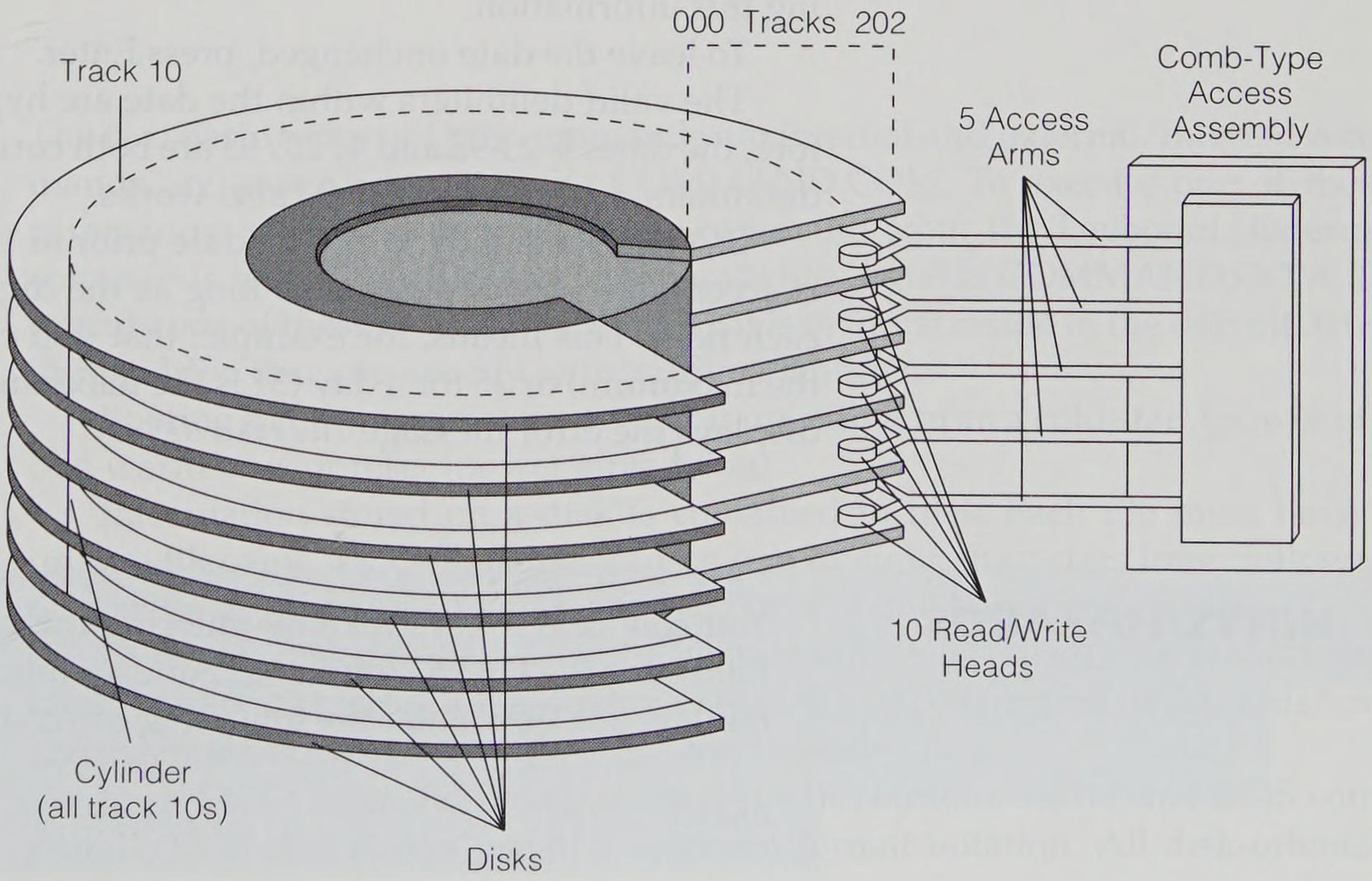


Figure 1.4
The like-numbered tracks from all disks in a hard drive create a cylinder.

DOS refers to the bottom of the disk as side 0 and to the top as side 1. On a double-sided disk, DOS starts storing data on the outermost track (referred to as track 0) of side 0, filling sectors 0 through 8. It then goes to side 1 to use track 0, sectors 0 through 8; then back to side 0 to use track 1, sectors 0 through 8; and so on. This process continues until the entire disk is full. (If the disk is single-sided, of course, DOS does not switch sides.)

The cylinder concept lets the disk drive access information much faster than would otherwise be possible. The read/write heads need only be activated electronically from one side to another until the cylinder of storage is filled, at which point the read/write head can position itself mechanically to the next cylinder. Mechanical delay is always more time-consuming than electronic delay.

DATE COMMAND

Function Some computers come with built-in clock/calendar circuitry. With such a computer, you do not have to reset the date and time every time you start the computer. If you have a computer without such circuitry or you want to change the internally held date, you must use the **DATE command.** This command changes the date that has been stored by DOS (today's date). Ultimately, the date is placed in the directory entry for any files that are created or altered and resaved during this session.

Format `DATE mm-dd-yy.`

Type Internal.

Remarks and Examples For example, to change the system date to January 15, 1993, enter the command DATE 1-15-93. If you have entered a valid date, it will be the new date accepted by DOS. If you press Enter after DATE, the DATE command produces the following prompt:

```
Current date is day mm-dd-yy
Enter new date: __
```

The system displays the day of the week in the day location. Don't worry that you have never told it the day of the week; DOS has a formula for calculating this information.

To leave the date unchanged, press Enter.

The valid delimiters within the date are hyphens (-) and slashes (/); therefore, the dates 4-23-93 and 4/23/93 are both correct. DOS also lets you mix these delimiters, so the date 4/23-93 also works.

DOS does not let you enter a date prior to 1-1-80. Apart from that, any date is acceptable as today's date as long as the digits are in the correct ranges for each field. This means, for example, that you can't enter 16 for a month (12 is the maximum) or 35 for a day (31 is the maximum). If you make a mistake, DOS displays the error message `Invalid date`.

HINTS/HAZARDS

You can save a keystroke by entering the new date to be used by DOS following the DATE command. For example, to change the system date to January 15, 1993, enter the following command at the keyboard:

```
DATE 1-15-93
```

TIME COMMAND

Function The **TIME command** lets you enter a new time for the system. This time then becomes a part of any directory entry of a new file.

Format `TIME [hh:mm:ss.xx].`

Type Internal.

Remarks and Examples Upon receiving a valid time entry, DOS stores that information and updates it until a new time is entered. In the latter case, the system displays the following prompt:

```
Current time is hh:mm:ss.xx
Enter new time: __
```

In this prompt, hh stands for hours, mm for minutes, ss for seconds, and xx for hundredths of a second.

To leave the time as currently set, press Enter.

A 24-hour clock pattern is used. This means that 1:00 P.M. is entered as 13:00. Most people are concerned only with hours and minutes; entering the seconds and hundredths of a second is not required.

If you enter partial time information (for example, just hours), the remaining fields are shown as zeros.

The valid delimiters for time fields are colons (:)—separating hours, minutes, and seconds—and the period (.)—separating seconds and hundredths of a second.

If you enter an invalid time or invalid delimiter, the message `Invalid time` appears.

In the following example, when Enter is pressed, the time recorded by the system will be changed to 18:25:00.00:

```
A>TIME
Current time is 00:25:16.65
Enter new time:18:25 __
```

CHAPTER REVIEW

The two basic types of DOS commands are internal and external. Internal commands are part of the DOS file COMMAND.COM. To execute one of these commands, you need only enter the command from the keyboard. External commands reside on disk(ette) as separate files outside COMMAND.COM. To execute one of these commands, the disk it is on must reside in the default drive or in a drive that you specify with a drive identifier.

Booting a computer means starting it up, either from a cold start (power off) or a warm start or reset (power already on).

Information stored on a disk is contained in files. Each file must have a unique filename. DOS filenames can be one to eight characters long, followed optionally by a period and an extension name of one to three characters.

DOS uses disk drives in executing commands. It also uses information contained on special areas of the disk or in files. Global characters (wild cards) can access some of this information if it is file-related.

Each DOS command has characteristics in common with other DOS commands; DOS also makes use of a common format notation. All disk-oriented

commands have unique features that can be expressed adequately only when discussed in detail.

The Directory command (DIR) lets you see a list of the files on your hard disk or diskette. The DOS FORMAT command prepares a disk for use with DOS. The DATE and TIME commands let you set the date and time that your system uses.

KEY TERMS AND CONCEPTS

AUTOEXEC.BAT
boot process
cluster
cold start
COMMAND.COM
control key
cylinder
data disk
DATE command
default disk drive
delimiter
directory
Directory (DIR) command
diskette
disk operating system (DOS)
DOS editing keys
DOS prompt
DOS.SYS
external command
file allocation table (FAT)
filename
filename extension
FORMAT command
function key
global filename characters
initialization
internal command
IO.SYS
Microsoft
MS DOS
parameter
source drive
syntax
system reset
target drive
TIME command
warm start
wild card
?
*

CHAPTER QUIZ

Multiple Choice

1. What information is entered in addition to a DOS command?
   a. Delimiter
   b. Extension
   c. Modifier
   d. Parameter

2. Which of the following are acceptable filenames for DOS Versions 2.0 and higher?
   a. INVENTORY.303
   b. DOC\23.bk!
   c. ///.AHV
   d. 2978
   e. -#.9$

3. Which of the following are acceptable delimiters in DOS?
   a. Comma
   b. Space
   c. Equal sign
   d. Period
   e. Semicolon

4. Which of the statements below is false?
   a. A DOS filename can have up to eight characters.
   b. A DOS filename must have an extension.
   c. A period must appear between a filename and its extension.
   d. The filename extension can have from one to three characters.
   e. All of the above are true.

5. DOS is *not* made up of which of the following parts?
   a. Boot record
   b. IO.SYS
   c. DOS.SYS
   d. COMMAND.COM
   e. It is composed of all the above parts.

True/False

6. You do not have to format a disk before you use it for the first time.

7. The difference between a cold start (cold boot) and a warm start (system reset) is that the RAM memory is not checked during the system reset.

8. Only the disk on the default drive is checked during a search for files, unless the computer is otherwise instructed.

9. DOS keeps track of where files are stored by using the file allocation table (FAT).

10. Global characters (wild cards) are normally not much help in using DOS commands.

Answers

1. a 2. d, e 3. a, b, c, e 4. b 5. e 6. f 7. t 8. t 9. t 10. f

Exercises

1. Define or describe each of the following:
   a. DOS
   b. Cold start (cold boot)
   c. Warm start (system reset)
   d. Default drive

2. Describe the difference between an internal command and an external command.

3. List and describe the two parts of a filename. Place an asterisk to the left of the required part(s).

4. List the five pieces of information given by the DIR command for each file.

5. The _____ command prepares a disk for use.

6. A(n) _____ boot requires that the power to the machine be off beforehand.

7. The disk that is automatically searched is the _____ disk.

8. Of the 720 sectors created on the 5.25-inch disk, only 708 are available to the user. The remaining sectors are taken up by _____, _____, and _____.

9. The wild-card character _____ identifies a variable in only one position.

10. If a file was originally created with a file extension, that extension must be used any time that the file is referenced in the future. List three exceptions to this rule.

11. Up to _____ files can be stored on a single disk.

COMPUTER EXERCISES

1. Enter the characteristics of your computer system(s) at your (a) school and (b) home/elsewhere.
   a. What is the amount of RAM memory? _____ K
      How many diskette drives? _____
      What is the size of the diskette drive? _____
      How many bytes can be stored on a diskette? _____
      Do you have a fixed disk? _____
      What is the size of the fixed disk? _____
      What is the type of display? _____
      What is the type of printer? _____
      What is the speed of the printer? _____
      Which software packages are installed for your computer? _____
   b. What is the amount of RAM memory? _____ K
      How many diskette drives? _____
      What is the size of the diskette drive? _____
      How many bytes can be stored on a diskette? _____
      Do you have a fixed disk? _____
      What is the size of the fixed disk? _____
      What is the type of display? _____
      What is the type of printer? _____
      What is the speed of the printer? _____
      Which software packages are installed for your computer? _____

2. Place your student data disk in drive A. Enter the following DIR commands:
   a. Display the directory, one page at a time.
   b. Display the directory using the wide parameter option. Enter the following commands. Enter how many files are displayed for each of the commands:
   c. DIR E*.*
   d. DIR CH?EX*.*
   e. DIR CH*.*
   f. DIR *.WK1
   g. DIR *.*

3. What happens when you press F3?

4. List the three keys that are used for a system reset (warm start) and then perform one.

5. Format a disk using the /S parameter to place the system on a diskette. Once the format procedure is finished, issue a DIR command against that disk. You should see only the COMMAND.COM file on that disk.

6. Again format this disk, but format it as a data disk (this is necessary if you want to get rid of the hidden DOS files). Issue a DIR command against that disk. You should now receive a `File not found` message because reformatting has erased the COMMAND.COM file.

7. If your computer has only one diskette drive, issue the command A: to change the default drive to A. Issue a DIR command and note the files that are displayed. Issue a B: command to change the default drive to B. Issue another DIR command and note the files that are displayed. There should be no difference. The contents of the physical drive (the diskette drive) do not change as the drive name (logical drive) is changed.

8. Issue a system reset command (Ctrl + Alt + Del). What two pieces of information does DOS automatically prompt you for when the boot process is finished (provided there is no AUTOEXEC.BAT file present)?

9. When you performed the system reset, did the correct date and time appear? If a date other than 1-1-80 appeared, your computer contains built-in clock/calendar circuitry. Does your computer have this built-in circuitry?

10. Issue the two commands below against your student data disk. What is the difference between the files that are displayed?
    a. DIR CH?EX*.*
    b. DIR CH??EX*.*

11. What is the DOS prompt that automatically appears on the screen after the boot process is finished for a diskette-based system?

12. What is the DOS prompt that automatically appears on the screen after the boot process is finished for a hard disk–based system?

2

MORE DOS COMMANDS AND WINDOWS

CHAPTER OBJECTIVES

After completing this chapter, you should be able to

- **Create a subdirectory**
- **Use common directory-building commands**
- **Use the active directory**
- **Use various other DOS commands**
- **Use the Windows graphics user interface**

This chapter continues the previous chapter's coverage of DOS commands that are commonly used with microcomputers.

MORE NOTES ON DISK DIRECTORIES

In its **root directory,** any disk drives operating with DOS can hold a certain number of files, or subdirectories. A **subdirectory** is a smaller directory nested within a larger one. A 5.25-inch double-sided floppy disk can hold up to 112 files, or subdirectories. Table 2.1 shows the capacities of various types of disks.

Subdirectories can contain more files or even more subdirectories. Although DOS limits the number of entries in a root directory, it does not limit the number of entries within a subdirectory.

Learning to use subdirectories is very important for two reasons. First, they allow you to have many more files on a disk than it can otherwise contain. Second, they let you organize your disk more effectively. For instance, you can create a subdirectory that groups together all of the program or data files for a particular application. In Figure 2.1, all of the word processing program files are held in a word processing subdirectory. Within this subdirectory are nested three more subdirectories for filing data files (memos, letters, reports, and so on) pertaining to work, school, or home.

One problem with this type of directory structure is that program and data files are mixed in a single directory, making it difficult to find a specific data file. Each subdirectory depicted can be divided into other subdirectories. For example, besides holding the database program files, the database directory can hold two subdirectories that subdivide the data files according to whether they are for business or personal use.

DOS DIRECTORY COMMANDS

Although a subdirectory is like a root directory in some ways, it is actually a file. Because a subdirectory is a file, it must be named. However, the procedure for creating a subdirectory is different from that for creating an ordinary file. The following commands are used to create, display, and delete subdirectories:

- Make Directory (MKDIR) [MD] builds a file to contain the new directory entries.
- Change Directory (CHDIR) [CD] moves to another directory and makes that the active directory.
- Remove Directory (RMDIR) [RD] deletes the file containing the directory.
- TREE displays all directories on the disk.

The first three commands are internal. They can be executed either by their complete DOS name (in parentheses) or by their abbreviated name [in brackets].

Table 2.1 File Capacities of Various Types of Disks

Disk Type	*Maximum Number of Files or Subdirectories*
Single-sided	64
Double-sided	112
High-density (AT or 3.5-inch)	224
Hard disk	512

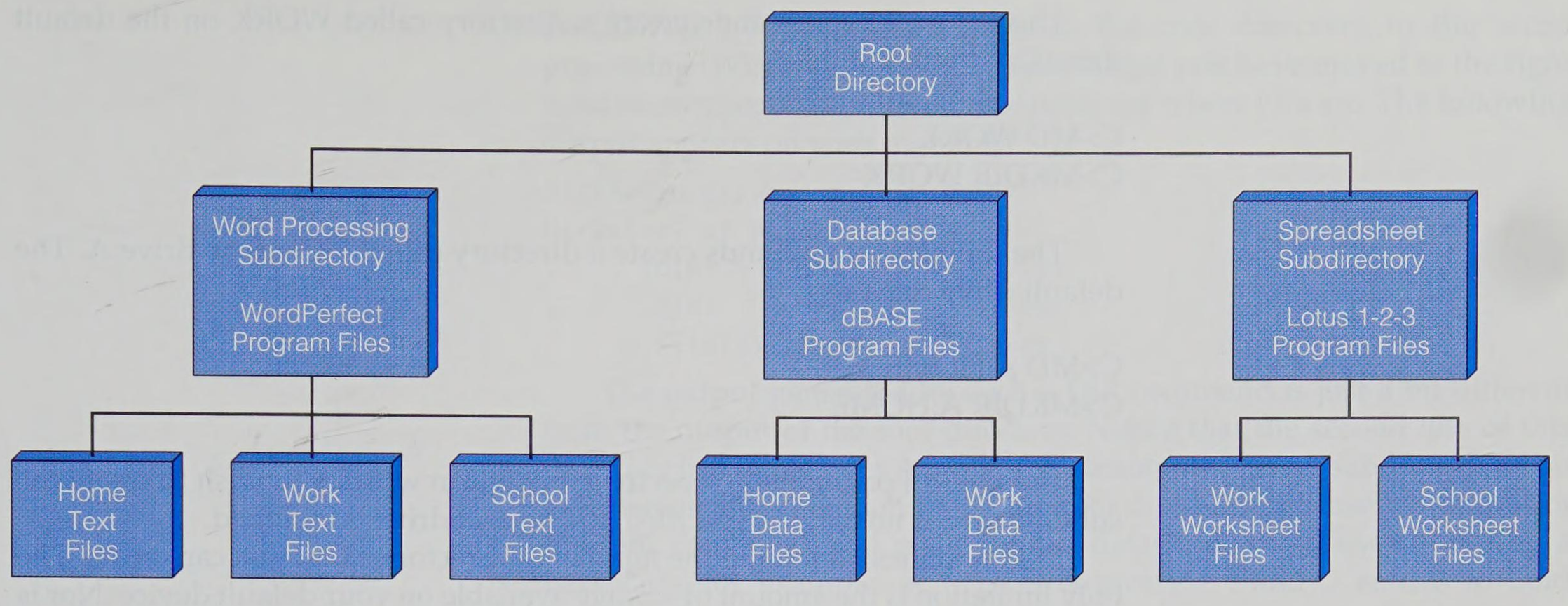


Figure 2.1
Project subdirectories within applications' subdirectories.

TREE is an external command and resides as a separate file on disk. These commands are explained more fully below.

Before you make a subdirectory, plan how you want to store data on your disk. You may decide to store programs and information by application type or you may plan to store programs and information by project. A third possibility is to combine these two techniques, storing information by project within an application (Figure 2.1).

You can use the Directory (DIR) command to list files in a subdirectory. If that subdirectory is currently the active directory, simply issue the DIR command by itself to list the files in that subdirectory. You can also use the DIR command to list the files in a lower-level subdirectory of the currently active subdirectory. For instance, suppose your DOS prompt shows WP51 as the name of the active subdirectory, C:\WP51>, and 123-22 is the name of a subdirectory within WP51. The following command lists the files in subdirectory 123-22: C:\WP51>DIR 123-22. The following command lists all files in 123-22 that bear the .WRK filename extension: C:\WP51>DIR 123-22*.WRK.

MAKE DIRECTORY (MKDIR OR MD) COMMAND

Function Once you have an idea of how you want to store your information, you can build the subdirectories that will hold the information. The **MKDIR (MD) command** creates a subdirectory on a specified drive named by the characters following the command. The complete name for a file, including the complete subdirectory name on which it is found, is referred to as the **path.** For example, the entry C:\1-2-3\WORK\SALES.WK1 refers to the SALES.WK1 file that resides in the WORK subdirectory of the 1-2-3 directory on drive C.

Format `MD [d][path]` or `[MKDIR [d:][path]`.

Type Internal.

Remarks and Examples You can use the abbreviated form MD for the MKDIR command. The path entry in the format refers to the exact location of a file or directory on disk.

The following commands create a directory called WORK on the default drive C:

```
C>MD WORK
C>MKDIR WORK
```

The following commands create a directory called HOME on drive A. The default drive remains C:

```
C>MD A:HOME
C>MKDIR A:HOME
```

Use the [d:] parameter to specify the drive on which you wish to create the subdirectory. If no drive is specified, the default drive is assumed.

DOS specifies no limit to the number of directories that you can create. The only limitation is the amount of storage available on your default device. Nor is there a limit to how many times a filename can appear on a disk as long as each occurrence is in a different subdirectory.

After each MD command is entered, the specified drive starts to record information about the new subdirectory. You can issue a DIR command, and your screen displays information about the created subdirectory. You might, for example, see something like the following if you created a subdirectory called WP:

```
Volume in drive A is TIM DUFFY
Directory of A:
WP              <DIR>        3-29-92     12:05a
                 x File(s)   290792 bytes free
```

Upon issuing a DIR command, you will notice that DOS is treating the subdirectory as a file. You can differentiate a subdirectory from a file by the <DIR> (abbreviation for directory) message, which is displayed in place of the file-size data. Notice that the date on which the subdirectory was created (the system date stored in the machine at start-up time) is also listed.

Also notice that the bytes-free entry that appears on your screen changes as any subdirectories are created. Each subdirectory takes a minimum of 1K, or 1024 characters, of storage.

CHANGE DIRECTORY (CHDIR OR CD) COMMAND

Function Once you have created subdirectories, you can reach a subdirectory via the **CHDIR command.** It changes the current DOS directory or displays the current directory of the default drive.

Format `CD [d:][path]` or `CHDIR [d:][path]`.

Type Internal.

Remarks and Examples You can use the abbreviated form CD for the CHDIR command. Use the [d:] parameter to specify the drive on which the subdirectory that you want to change resides or on which you want to display the current directory.

Assume that you have created the WP subdirectory and enter the following commands:

A>CD\WP This moves you from the root directory to the word processing (WP) subdirectory. To ensure that you have moved to the right subdirectory, issue the DIR command to see where you are. The following output appears on your monitor:

```
Volume in drive A is TIM DUFFY
Directory of A:\WP
.      <DIR>      3-29-92    12:08a
..     <DIR>      3-29-92    12:08a
     2 File(s) 292840 bytes free
```

The output generated by such a DIR command is just a bit different from the output of the root directory. Notice that the second line of this directory listing contains A:\WP. This denotes the active subdirectory. You can always tell when you are at the root directory because the output of the DIR command will give you the default drive followed only by a backslash, for example, A:\. DOS creates the . and .. entries to hold housekeeping information about the files that are stored in this directory.

The CD command provides you with a fair amount of flexibility in moving around a disk containing subdirectories:

CD This moves you from the current subdirectory to the root directory.

CD.. This moves you from the current subdirectory to the next higher directory.

CD This lets you find out where you are in a subdirectory tree. DOS will respond by naming the current active directory or subdirectory.

HINTS/HAZARDS

One problem that many people have using subdirectories is remembering exactly where they are in the directory structure. This problem is easily remedied by using the **PROMPT PG command.** Once that command is entered, the path of the active directory is given as the DOS prompt. Instead of seeing A appear, for example, you might see A:\DB> as the prompt. To turn this off, enter the command PROMPT at the DOS prompt.

The Active (Current) Directory The **active** (current) **directory** concept is especially important in a hard disk or high-density disk environment. After you have moved to a subdirectory in your hard disk, you can switch the default drive to one of your disk drives, and DOS will remember which is the active subdirectory. If you copy files from the disk to the hard disk drive that contains the active (current) subdirectory, they will be placed in that subdirectory.

HINTS/HAZARDS

When you want to issue a CD command that is to be used one level beneath the current (active) directory, the backslash is not a required character. For example, instead of entering the command CD \DB, you can enter the command CD DB.

REMOVE DIRECTORY (RMDIR OR RD) COMMAND

Function The **RMDIR (RD) command** removes the subdirectory of the name composed of the characters following the command.

Format `RD [d:][path]` or `RMDIR [d:][path]`.

Type Internal.

Remarks and Examples Assume that the DB subdirectory is no longer needed. Not wanting to waste the disk space taken up by this directory and its files, you decide to erase it with the RMDIR (RD) command. First, all files must be deleted from the directory with the DEL *.* command (this command will be discussed in detail later in the chapter). If you forget to remove any file from the subdirectory, DOS will display the following error message:

```
Invalid path, not a directory
or directory not empty
```

If you receive this error message, simply go to that directory and erase the rest of the files from it; then issue the RD command to remove the subdirectory.

You cannot remove root directories from a disk.

To work along with the following subdirectories exercise, place your student data disk in drive A.

`A>MD\WP` Creates the word processing subdirectory (see Figure 2.1).

`A>MD\DB` Creates the database subdirectory (see Figure 2.1).

`A>MD\SS` Creates the spreadsheet subdirectory (see Figure 2.1).

After each command is entered, drive A starts to record information from that subdirectory's files.

`DIR` Displays the following information on your screen:

```
Volume in drive A is TIM DUFFY
Directory of A:\
WP       <DIR>              3-29-92     12:05a
DB       <DIR>              3-29-92     12:05a
SS       <DIR>              3-29-92     12:05a
     12 File(s) 292840 bytes free
```

The number of bytes free will probably be different on your disk.

Notice that this listing shows that DOS is treating the subdirectories as files. The original listing had *x* files, but after you created the subdirectories, it has three more files. You can differentiate a subdirectory from a file by the <DIR> message, which is displayed in place of the file-size data. The date on which the subdirectory was created (the system date stored in the machine at start-up time) is also listed.

Also notice that the bytes-free entry has changed since the three subdirectories were created. Each subdirectory takes a minimum of 1K, or 1024 characters, of storage. Continue entering these commands:

`PROMPT $P$G`	Activates the path as part of the DOS prompt.
`CD\WP`	Makes the WP subdirectory the active subdirectory.
`DIR`	Issues a Directory command.

Note that there are now two files with a . and a .. filename. Remember, DOS uses these to track information about the files stored in a subdirectory.

`MD SCHOOL`	Creates the subdirectory SCHOOL.
`MD PERSONAL`	Creates the subdirectory PERSONAL.
`CD\SCHOOL`	Moves to the SCHOOL subdirectory.

Notice that the DOS prompt has `A:\WP\SCHOOL>`.

`CD..`	Returns to the WP subdirectory.
`CD\PERSONAL`	Positions to the PERSONAL subdirectory.

Notice that the DOS prompt has `A:\WP\PERSONAL`.

`C:`	Changes the default drive to C.
`DIR A:`	Issues a Directory command against drive A.

Notice that the second line indicates that you are getting a directory listing of `A:\WP\PERSONAL`. You receive this listing because the PERSONAL subdirectory is the active or current directory for drive A. This means that this was the last directory that you were in on drive A.

`A:`	Returns to drive A.
`CD\`	Returns to the root directory.

Notice that you could have entered two CD.. commands to accomplish the same task. The CD\ command saves keystrokes when you are several subdirectory levels below the root directory. Continue as follows:

`CD\WP`	Moves to the WP subdirectory.
`RD SCHOOL`	Deletes the SCHOOL subdirectory.
`RD PERSONAL`	Deletes the PERSONAL subdirectory.
`CD..`	Returns to the root directory.
`RD WP`	Deletes the WP subdirectory.
`RD DB`	Deletes the DB subdirectory.
`RD SS`	Deletes the SS subdirectory.

TREE COMMAND

Function You may someday use a microcomputer system that is not familiar, in which case you may not know what subdirectories are on a disk or which files are in which subdirectory. The DOS **TREE command** will then be extremely helpful. It displays all subdirectories on a disk and, using an optional parameter, lists the files of the root directory and each subdirectory.

Format `[d:][path] TREE [d:][/F].`

Type External.

Remarks and Examples Use the [d:] and [path] optional parameters that appear before the TREE command to tell DOS in what drive and in what subdirectory this external file resides. Use the optional [d:] following the TREE command to tell DOS in which drive to execute the command. Use the optional [/F] parameter to tell DOS to list each file contained in each subdirectory.

Suppose a root directory contains the subdirectories SS, WP, and DB. For that directory, the TREE command without any of its parameters creates the following output:

```
TREE(Command)
DIRECTORY PATH LISTING FOR VOLUME TIM DUFFY
Path: \SS
Sub-directories: None
Path: \WP
Sub-directories: None
Path: \DB
Sub-directories: None
```

If this information is not enough, the /F parameter will list any files found in a subdirectory besides the subdirectory name. The command TREE /F creates the following display:

```
DIRECTORY PATH LISTING FOR VOLUME TIM DUFFY
      Path: \SS
      Sub-directories: None
      Files:           None
      Path: \WP
      Sub-directories: None
      Files:           FORMAT.COM
      Path:  \DB
      Sub-directories: None
      Files:           FORMAT.COM
```

DISK COMMANDS

The remainder of this chapter covers other commonly used DOS commands, which have been grouped into two families. **Disk commands** are discussed in this section. The **file commands** COPY, ERASE, RENAME, and TYPE are discussed in the following section. Each section begins with a brief description of the commands, followed by details and examples.

The **CHKDSK command** examines the directory and file allocation table (FAT) of a disk and produces disk and memory status reports. CHKDSK can also repair errors in the directories or FAT. This is the only command that lets you verify the amount of RAM that has been installed for the computer (up to 640K of base RAM).

The **DISKCOPY command** copies the entire contents of the disk that is in the specified source drive onto the disk that is in the specified target drive—exactly as the information appears on the source disk.

The basic FORMAT command was introduced in Chapter 1. This section provides further details. The FORMAT command initializes the disk in the designated or default drive so that it conforms to a recording format that DOS can use. As it executes, FORMAT analyzes the entire disk for defective sectors, initializes the directory, sets up space for the FAT, and records the boot program in the boot record.

CHECK DISK (CHKDSK) COMMAND

Function This command lets you analyze the directory and the FAT of a disk and produces disk and memory status reports. CHKDSK can also repair errors in the directories or FAT.

Format `CHKDSK [d:][filename][/F][/V].`

Type External.

Remarks and Examples CHKDSK temporarily makes the drive specified in [d:] the default drive. If CHKDSK ends prematurely (because, for example, you replied N to a disk error message), the default drive changes to the drive that CHKDSK was checking.

The command CHKDSK by itself does not automatically correct errors found in the directory or FAT. This is good in that it allows you to first analyze errors and consider the consequences of making corrections. It is generally inadvisable to make corrections unless there is a major problem; if the error is in the directory or FAT itself, a large part of the data on the disk can be lost.

The [/F] parameter causes CHKDSK to automatically correct errors in the directory and FAT.

The [/V] parameter brings a series of messages to the screen, identifying the status of each file.

CHKDSK [FILENAME] tells if the file specified (in this case, [FILENAME]) has been stored in contiguous sectors on disk. When a disk has recently been formatted, the 512 individual byte sectors used to store files will store input files contiguously. After some files have been erased and other files added, however, DOS will still attempt to store any new files or additions to existing files in the first vacant sector. Occasionally, a large file will end up being stored in a number of nonadjacent sectors as a result. Such a file, referred to as a **fragmented file,** will slow DOS's reading speed because the read/write heads will have to be moved physically to a number of different locations on disk.

For most applications, a fragmented file has no effect on the speed at which that file gets retrieved. Fragmentation is almost an automatic by-product of how files are stored on disk. If you are constantly adding information to a file, that file will be fragmented.

If a file is large and the number of noncontiguous locations reported by CHKDSK is large, the COPY command can eliminate this fragmentation because the COPY command copies a file onto contiguous sectors. This may improve performance.

CHKDSK does not prompt you to insert a disk in the specified drive; it automatically assumes that the disks are in the appropriate drives and begins to execute shortly after Enter has been pressed.

The status report displayed by CHKDSK contains the following pieces of information:

Disk Report

Total disk space
Number of bytes used for hidden or system files
Number of bytes used for user files
Bytes used by tracks containing bad sectors
Bytes available for use

RAM Report

Bytes of total memory (RAM)
Bytes of available (unused) memory

After the disk has been checked, error messages (if any) and a status report are displayed. The report shows disk information such as the following:

362496 bytes total disk space
48128 bytes in 2 hidden files
135168 bytes in 12 user files
(4608 bytes in bad sectors)
179200 bytes available on disk

It also shows information about RAM:

654336 bytes total memory (total RAM memory)
584192 bytes free (unused RAM memory)

Notice that two hidden files are reported in the above. These are the DOS system files IO.SYS and DOS.SYS, which are hidden from normal directory searches.

You should run CHKDSK occasionally for each disk to ensure the integrity of the file structures. Here are some examples of the uses of CHKDSK:

C>CHKDSK B: This runs the CHKDSK program that resides on drive C against the disk in drive B.

A>CHKDSK B:/F This tells CHKDSK to correct any errors in the above example. Respond yes (Y) to the prompt about fixing errors when CHKDSK is through.

A>CHKDSK REPORT This tells DOS to find out if the file REPORT is fragmented.

C>CHKDSK A:*.* This tells DOS to find out whether any file on the disk in drive A is fragmented.

B>C:CHKDSK With B as the default drive, this executes the CHKDSK utility located on the disk in drive C against the files on the disk in drive B.

C>CHKDSK With C as the default drive, this executes the CHKDSK utility and examines the hard disk.

DISK COPY (DISKCOPY) COMMAND

Function This command copies the contents of the disk in the specified source drive onto the disk in the specified target drive—exactly as the information appears on the source disk. When this command is executed, you end up with two identical disks.

Format `DISKCOPY [d:][d:][/1].`

Type External.

Remarks and Examples The first parameter specified is the source drive, and the second is the target drive. The [/1] parameter causes DISKCOPY to copy only side 0 (the first side) of the disk, regardless of whether the disk is single- or double-sided (for most applications, this parameter is not used).

The same drives (or different ones) can be specified as source and target. If the drives are the same, a single-drive copy operation is performed. This requires you to insert, alternately, the source and target disks. DISKCOPY prompts you throughout the process. Here are examples of the command:

A>DISKCOPY A: B: This causes DOS to load in the DISKCOPY file from the default disk drive. The contents of a disk to be placed in drive A are to be copied to a disk to be placed in drive B. The following message is displayed:

```
Insert source disk in drive A:
Insert target disk in drive B:
Strike any key when ready:
```

The DISKCOPY program then checks to see if the disk in drive B is formatted. If it isn't, DISKCOPY formats it. It then performs the copy process and after copying displays the following prompt:

```
Copy another (Y/N)? ___
```

If you press Y, the next copy is done on the originally specified drives, and DISKCOPY again prompts you to insert the source and target disks. If you press N, the command ends.

A>DISKCOPY B: A: In this case, the source disk is in drive B, and the target disk is in drive A.

HINTS/HAZARDS

DISKCOPY destroys all pre-existing files on the target disk as soon as the copying process begins. Be sure you understand how the command works before you use it.

A>DISKCOPY A: A: In this case, because both parameters specify the same drive, a single-drive copy operation is performed. The DISKCOPY program prompts you to insert first the source disk, which is then read. After the source disk is read, DISKCOPY prompts you to insert the target disk.

Disks subjected to much file creation and deletion activity become fragmented because disk space is allocated to files on the basis of the first available opening. Because a disk with fragmented files can degrade performance by requiring excessive head movement and rotational delays in finding, reading, or writing a file, use the CHKDSK *.* command on busy disks from time to time to identify the extent of fragmentation. If a lot of fragmentation exists, use the COPY command instead of DISKCOPY to eliminate it.

Use the following command, for example, to copy all files (in unfragmented order) from the disk in drive A to the disk in drive B: COPY A:*.* B:.

HINTS/HAZARDS It is safest to use preformatted disks when using DISKCOPY. Make certain that no bad sectors exist on the target disk. Because the copy generated is a mirror image, good data can end up being placed in a bad sector during a DISKCOPY operation.

HINTS/HAZARDS When you use the DISKCOPY command, be consistent in specifying the source and target drives. Otherwise, you may insert your original disk in the target drive and a blank, formatted disk in the source drive. In this situation, you end up with two blank, formatted disks along with a severe case of heartburn.

FORMAT COMMAND

Function Chapter 1 presented this command in its simplest versions. Besides initializing in the DOS recording format, FORMAT analyzes the entire disk for defective sectors, initializes the directory, sets up space for the FAT, and records the boot program in the boot record.

Format `FORMAT [d:][/S][/1][/8][/V][/B][/4][/t:yy][/n:xx].`

Type External.

Remarks and Examples All new disks must be formatted. An unformatted disk is unrecognizable to DOS. The following examples demonstrate the basic command as well as the numerous parameters:

A>FORMAT B: This is the basic command to format a disk in drive B with nine-sector tracks. This disk (identified as a data disk) can be used only to store data. The system cannot be booted from such a disk; if booting is attempted, DOS will display the following message:

```
Non-System disk or disk error
Replace and strike any key when ready
```

When you issue the FORMAT command, the system begins by issuing the following message:

```
Insert new disk for drive B:
and strike any key when ready
```

After you insert the appropriate disk and strike any key, the system issues the following message while disk formatting is taking place:

```
Formatting...
```

Once the formatting is complete, the system issues a message like this:

```
...Format complete

362496 bytes total disk space
362496 bytes available on disk

Format another (Y/N)? ___
```

Enter Y to format another disk; enter N to end the FORMAT program.

During the formatting process, discovery of any defective sectors in a track results in the entire track's being marked RESERVED. This prevents any sectors in the **reserved track** from being allocated to a data file. DOS reports the total amount of defective space with an additional message such as `4608 bytes in bad sectors` and subtracts this from the total bytes available on the disk.

HINTS/HAZARDS

DOS is so careful when it is formatting a disk that it is sometimes too conservative when marking bad sectors. Therefore, if you again perform a FORMAT on a disk containing bad sectors, those sectors may disappear after this preparation process has been performed.

HINTS/HAZARDS

Formatting destroys any previously existing data on the disk. Do *not* format a disk that contains data you will need later, or it will be lost forever.

C>FORMAT B:/S This does all that the basic FORMAT command does. In addition, it copies the IO.SYS, DOS.SYS, and COMMAND.COM files from the default drive onto the newly formatted, nine-sectored disk in drive B. The new disk is now a **system disk,** with all the operating system files necessary to boot the system. You can then copy an application program onto this same disk, thus creating a disk that will both boot the system and load a program. If you wish to have any external DOS utility programs also on this disk, they must be copied from a DOS master disk.

Once the formatting is complete, the system issues a message like this:

```
Formatting...Format complete
System transferred

362496 bytes total disk space
40960 bytes used by system
(4608 bytes in bad sectors)
316928 bytes available on disk
```

C>FORMAT A:/1 This formats a disk for single-sided use.

C>FORMAT A:/8 This tells FORMAT to prepare the disk with eight sectors per track, instead of the default number of nine per track. You should let DOS use the default number so that you gain the additional 40K of disk space.

C>FORMAT A:/V This causes DOS to prompt you for a volume label name. It cannot be used with the /8 parameter. The name you give can include up to 11 characters. Thereafter, the volume name will appear when the DIR or CHKDSK command is executed, identifying the disk for you.

C>FORMAT B:/B This creates a disk with eight sectors per track and leaves room for IBMBIO.COM and IBMDOS.COM to be placed on the disk at a later time with the SYS command. Because it does not record these files onto the disk, any version of the IBM operating system can be placed there.

C>FORMAT A:/4 Depending on the version of DOS and the type of disk drives that you have, you can specify the type of disk to be formatted. The /4 parameter formats a 5.25-inch 360K disk using a high-density disk drive; otherwise, DOS formats the disk as a 1.2M disk. Do not use this parameter if you have regular 360K disk drives.

C>FORMAT B:/t:yy This parameter is supported beginning with DOS 3.3. It lets you tell DOS the number of tracks on a 3.5-inch disk and formats a 3.5-inch disk to the number of tracks specified. For 720K disks and 1.44M disks, this value is 80 (/t:80).

C>FORMAT B:/n:xx This parameter is also supported beginning with DOS 3.3. It lets you specify the number of sectors per track, if it is different from the default setting. For example, you can format a 3.5-inch 720K disk in a 3.5-inch 1.44M drive. The command would be FORMAT B:/N:9 (to specify 9 sectors per track instead of the drive's default of 18 sectors).

HINTS/HAZARDS

Never format a 5.25-inch double-density disk as a high-density disk. The surface quality of a double-density disk is not good enough to retain the packed magnetic charges created by a high-density disk drive. If you try to format a double-density disk in this way, the result may be that you lose important files.

FILE COMMANDS

The **COPY command** copies one file or a number of files with similar names to another disk or subdirectory. It also copies the contents of one file into a new file with a different name on the same disk.

The **ERASE (DEL) command** deletes a specific file or group of files from the disk or subdirectory in the designated drive. (If no drive is specified, the default is used.)

The **RENAME (REN) command** changes the name of an existing file to a new name.

The **TYPE command** displays the contents of a file to the screen. It lets you view a file without first starting another program that might normally be used in processing that file.

COPY COMMAND

Function This command copies one file (the source) or, in some cases, a number of files with similar names to another disk or subdirectory (the target). It

also copies one or more files and creates a new file with a different name on the same disk or subdirectory. In the latter case, a different name must be given to the new copy.

Format

```
COPY [/A][/B][filespec][/A][/B] [d:][filename[.ext]][/A][/B]
```

or

```
COPY [/A][/B][filespec][/A][/B] [d:][filename[.ext]][/A][/B][/V]
```

Type Internal.

Remarks and Examples The parameter [filespec] is the source file. The parameter [d:][filename[.ext]] is the target file.

When you are copying files, the source file can be on just about any device (A, B, C, D, and so on). The target (where the file is going) can also be on any device. Unless told otherwise via a drive identifier, DOS assumes that the file being copied resides on the default drive/directory. You can indicate the drive to receive the copy (target) by specifying a drive identifier. You can also include the subdirectory name if you want to copy the file to a directory other than the root directory.

Only the commonly used aspects of the COPY command are discussed here. For additional coverage, refer to the DOS manual. Here are some examples of the uses of COPY:

A>COPY REPORT B: This copies the file REPORT from drive A onto the disk contained in drive B. Because no new filename is specified, it has the same name as the original file. For this reason, the source drive and the target drive must be different; otherwise, an error message is displayed.

A>COPY B:FILE01 This copies the file FILE01 from the disk in disk drive B onto the disk in the default drive A, with no change in the filename.

A>COPY *.* B: This copies all files from the disk in the default drive A onto the disk in drive B. The filenames remain unchanged, and each is displayed as its file is copied. This method is very useful if the files on the default-drive disk are fragmented.

C>COPY FILE01 FILE01.BAK This copies the file FILE01 and names the copy FILE01.BAK. Because no other drive has been specified, both files are on the disk in the default drive (C).

C>COPY FILE01 B:FILE01.BAK This does the same thing as the previous command, except that the new copy, FILE01.BAK, is placed on the disk in drive B.

A>COPY FILE01.ABC b:*.XXX This copies the file FILE01.ABC from the disk in drive A onto the disk in drive B. It names the copy in drive B FILE01.XXX.

A>COPY FILE01 C:\123-22\HOME This copies the file FILE01 from the disk in drive A to the HOME directory underneath the 123-22 directory found on drive C. The name stays the same.

HINTS/HAZARDS

You can use the COPY command even though you only have one disk drive on your computer. If, for example, you enter the command A>COPY FILE1 B:, DOS first reads the file and then displays a prompt telling you to insert a new disk in drive B and press a key when you are ready. Once you do this, the file is written to the new disk.

Copying Between Subdirectories The COPY command also copies files between subdirectories of disks. For example, suppose that your current active subdirectory (WP) is on drive A. Also suppose that you have changed your default drive from A to C but want to copy the file MEMO.TXT back to your active subdirectory on drive A. All that is required is to enter the following command.

```
C>COPY MEMO.TXT A:
```

Because DOS remembers which is the active subdirectory, it automatically copies the file to that subdirectory (WP).

When you are copying information from one directory to another, remember that both the directory and the filename must be used. For example, if you want to copy the MEMO.TXT from the root directory to the DB directory, enter the following DOS command:

```
A>COPY MEMO.TXT \DB
```

This command translates as follows: Take the file MEMO.TXT and copy it to the DB subdirectory; use the existing name. Now, if you want to refer to the MEMO.TXT file as it exists in the DB subdirectory while you are in the root directory, enter \DB\MEMO.TXT. When you refer to files in directories other than the active directory, you must use their full names. The subdirectory is part of that name. While remaining at the root directory, copy the MEMO.TXT file from the DB subdirectory to the WP subdirectory by using the following command:

```
A>COPY \DB\MEMO.TXT \WP
```

Again, you must specify all sending information (the path), which in this case is the name of the subdirectory and the name of the file, and all receiving information, which (unless you are going to change the name of the file) is only the receiving directory.

ERASE (OR DEL) COMMAND

Function This command deletes a specific file or group of files from a disk or subdirectory. (If no drive is specified, the default drive is used.)

Format `ERASE filespec` or `DEL filespec`.

Type Internal.

Remarks and Examples You can use the shortened form **DEL** in place of ERASE. The global characters ? and * can be used in the filename and in the extension. Use global characters with caution, however, because several files can easily be erased with a single command. If proper care is not taken in using this command, you may inadvertently delete all files on a disk or directory.

Here are examples of the ERASE, or DEL, command:

A>ERASE FILE01.PRG This erases the file FILE01.PRG from the disk in drive A.

A>ERASE B:FILE02.PRG This erases the file FILE02.PRG from the disk in drive B.

C>ERASE d:*.* This tells DOS to erase all files on the disk (or directory) in the specified drive. DOS responds with the message `Are you sure (Y/N)?` Then press Y and Enter to erase or press N and Enter to cancel the command.

The system files IO.SYS and DOS.SYS, however, cannot be erased because they are hidden files and are not accessible to you.

C:\WP51>ERASE \123-22\HOM*.WK? The DOS prompt for this command shows that the active subdirectory is WP51 from drive C. Any file from the 123-22 subdirectory starting with the letters HOM is deleted as long as the first two characters of the extension are WK.

HINTS/HAZARDS

The regular version of PC DOS cannot restore a file once it has been erased from disk. DOS utilities such as the Norton Utilities, Mace Utilities, and PC Tools have a program that performs this task. Also, a number of such utilities are available as public domain software. If you accidentally erase a file, do not save any data to the disk; make a copy of the disk using DISKCOPY before you try to recover the deleted file. If you make a mistake recovering the file, the deleted file will still be on your backup disk. You may have a special version of DOS that has an "unerase" utility. For example, the 3.3 Plus version of MS DOS, provided with Zenith computers, contains the command GDU to recover accidentally deleted files. GDU is an external command with the format GDU d:filename.

RENAME (OR REN) COMMAND

Function This command changes the name of an existing file specified in the first parameter to the new name and extension specified in the second parameter.

Format `REN[AME] filespec filename[.ext.].`

Type Internal.

Remarks and Examples You can use the abbreviated form REN for the RENAME command. The global characters ? and * can also be used with this command. Here are examples:

C>RENAME B:FILE03 NEWFILE This renames the file FILE03 on drive B as NEWFILE.

C>REN B:FILE03 *.XY This renames the file FILE03 on drive B as FILE03.XY.

TYPE COMMAND

Function This command causes the contents of the requested file to be displayed on the screen.

Format `TYPE filespec.`

Type Internal.

Remarks and Examples Press Ctrl + PrtSc if you want the contents of a file to be printed as they are being displayed. Press Ctrl + S to cause the output to pause and then press any key to continue scrolling.

Text files appear in a legible format; other files, however, such as object program files, may contain unreadable nonalphabetic or nonnumeric characters.

In the following example, file FILE03.PRG on the disk in drive A will be displayed on the screen: `C>TYPE A:FILE03.PRG`.

WINDOWS

Windows is a **graphics user interface (GUI)** created by Microsoft for the MS DOS family of computers. It is the most popular GUI for these computers. Depending on the type of microprocessor chip used by a computer, Windows lets you have several application programs active or running at the same time.

ENTERING COMMANDS

Instead of requiring you to type commands at the keyboard, Windows provides graphic screens containing menus and **icons** (graphic figures on the screen that represent a particular object or command). Using a mouse or pointing device, or entering commands from the keyboard, you activate and make selections from menus and activate programs represented by icons.

The Windows **desktop** is the screen area on which all Windows operations take place. It includes the entire screen. Any windows that appear on the screen, as well as any icons, are part of the desktop.

When you move the pointer over the surface of a window or use it to answer prompts in a dialog box, the shape of the pointer may change. For example, the pointer is an arrow when you are selecting a menu option but changes to a hand when you are using the Help feature.

Three commands can be issued using the left-hand button of a mouse: clicking, double-clicking, and dragging. Clicking is a single press and release of the button. Double-clicking is pressing the button twice in quick succession. Dragging involves holding down the button while you move the mouse.

STARTING WINDOWS

If the WIN command appears in an AUTOEXEC.BAT file, your computer will automatically start Windows when the computer is booted. To start Windows from DOS, enter the command WIN. You can tell Windows to start and then immediately run another program by placing the program name following the WIN command. For example, the command WIN PM4 tells the computer to start Windows and activate PageMaker 4.0.

Windows uses extensive secondary windows and dialog boxes. For example, executing a command may cause a new window to appear, overlapping a previous window, or make a dialog box appear. A dialog box contains a number of options that are available to you in using Windows or some application program.

PROGRAM MANAGER

When Windows starts to run, the Program Manager screen appears (Figure 2.2). Most windows generated by Windows have the same parts or characteristics. You can always verify where you are in Windows by examining the **title bar,** which contains the name of the window/application being run. In the left-hand portion of the title bar is the **control menu** button. This menu lets you arrange keyboard access to manipulations that otherwise require a mouse.

Each window displayed by Windows contains two buttons in the right-hand portion of the title bar. Clicking on the **minimize button** (down arrow) causes the window to disappear and an icon representing the window to appear at the bottom of the desktop. Clicking on the **maximize button** (up arrow) enlarges the window to take up the entire screen. Once a window has been maximized, the minimize button is replaced by a **restore button** (up and down arrows), which restores the window to its previous size.

The **menu bar** contains the menu options for the window. Windows is fairly consistent in how menu items are arranged and what types of commands are used in the submenus. This consistency and standardization makes different Windows applications easier to learn.

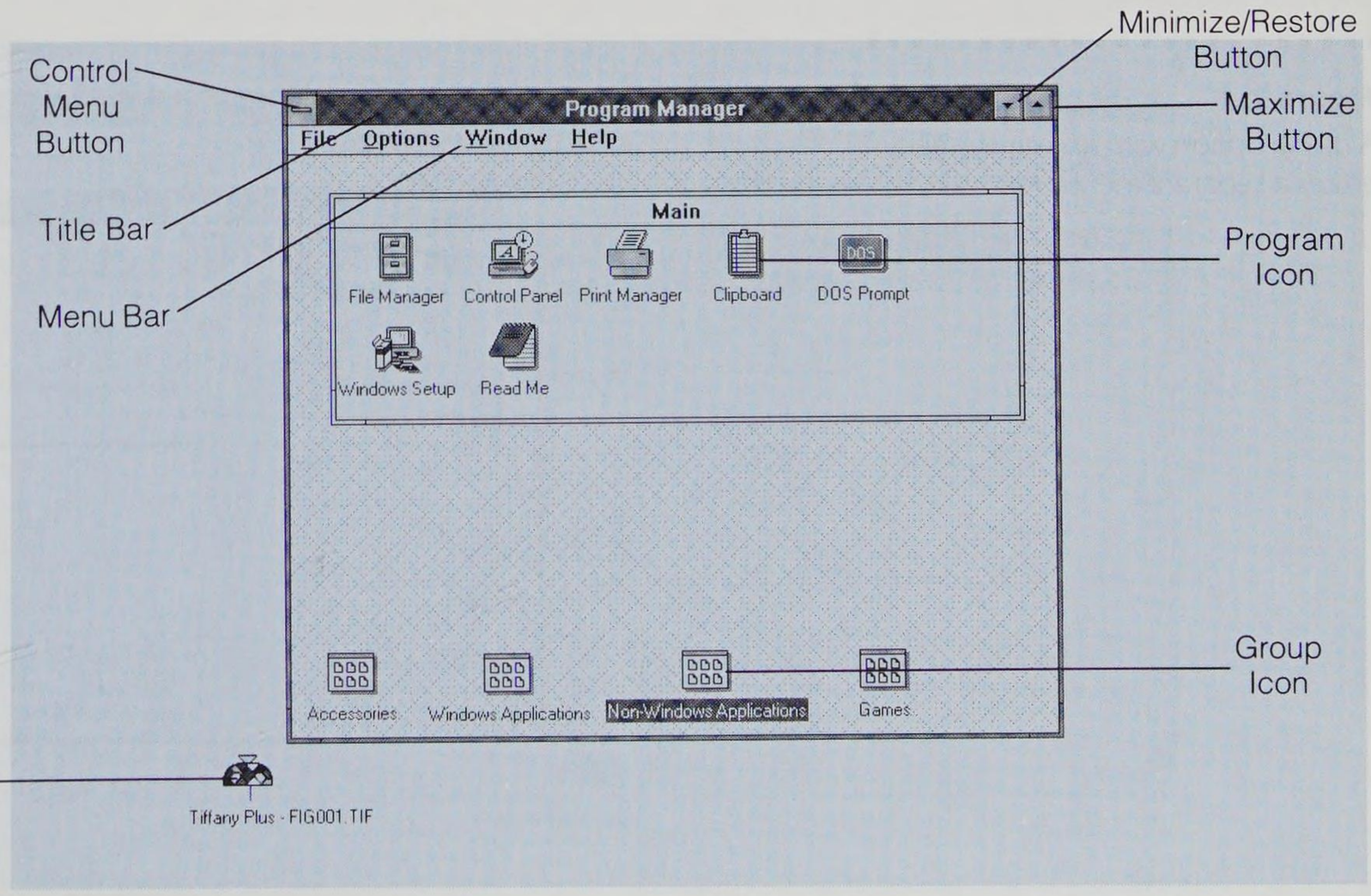


Figure 2.2
The first Windows screen, the Program Manager.

You can choose an option from the menu bar by clicking on it or by the Alt key together with the underlined character of the option. (For instance, Alt + F activates the File submenu of the menu bar.) A pull-down submenu then appears on the screen (Figure 2.3). Highlight an option from the submenu by clicking on it. If the option contains an ellipsis, a dialog box will appear (Figure 2.4). Menu commands are executed by double-clicking.

A window screen may also have a vertical **scroll bar** on the right-hand border (see Figure 2.3). Clicking the up and down arrow buttons moves the information up or down a line. The **scroll box** shows the relative location of the cursor in the displayed text or document. This button can be dragged up or down to move the cursor quickly to any part of the document.

The Main Menu of the Program Manager screen shows **program icons,** which can be double-clicked to activate various Windows programs. Each icon has a graphic portion and a label.

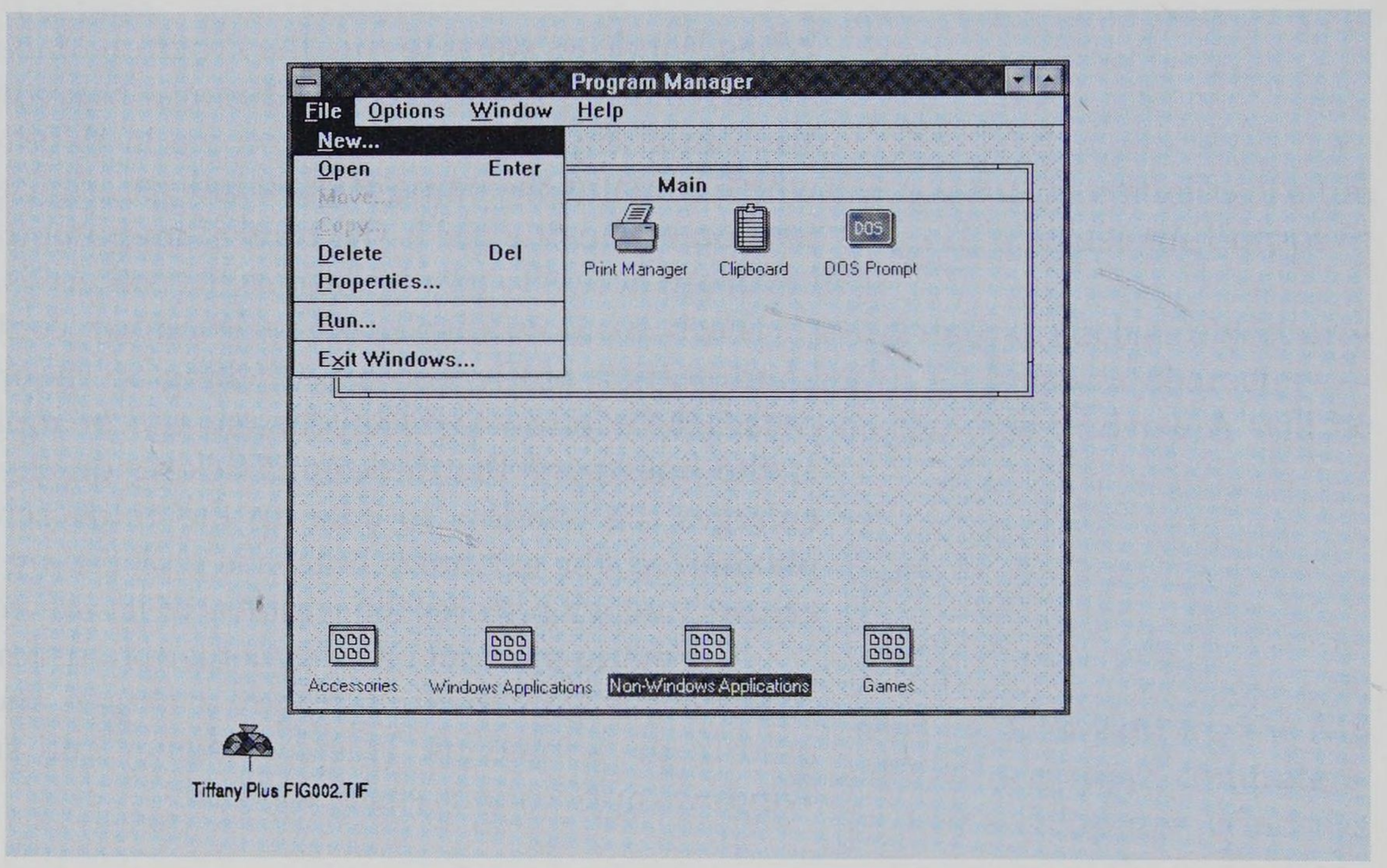


Figure 2.3
The pull-down menu for the File command of the menu bar.

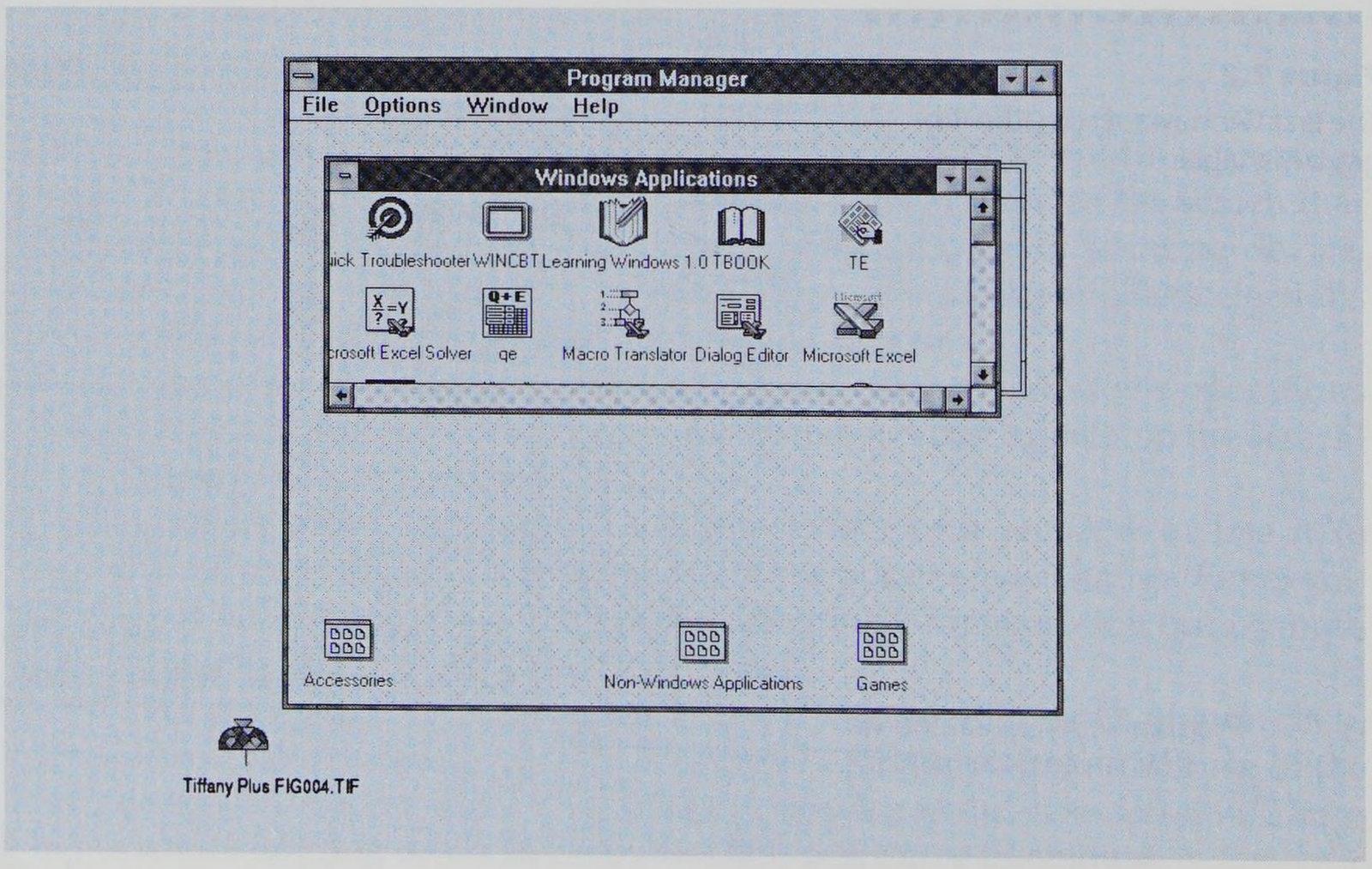


Figure 2.4
A menu option with an ellipses generates a separate menu box.

RUNNING WINDOWS APPLICATIONS

The icons at the bottom of the desktop are called **group icons.** Each activates an application window (Figure 2.5) from which specific programs can be selected. (If you do not have a Windows Applications group icon on your screen, click the Window command of the menu bar and then double-click the Windows Application command in the pull-down menu.)

To execute the Excel program from Figure 2.5, double-click on that icon. Windows now displays the full-screen window for Excel (Figure 2.6). Notice that Excel's menu bar is like the ones contained in Windows.

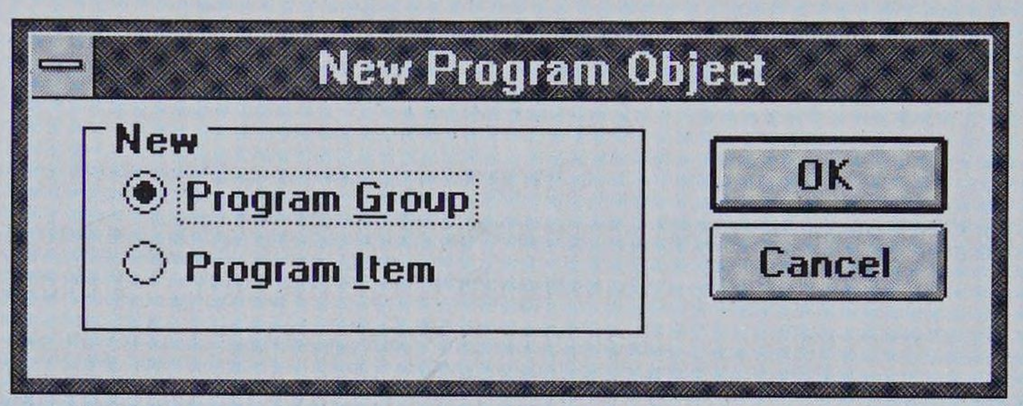


Figure 2.5
When the group icon Windows Applications is double-clicked, this window appears.

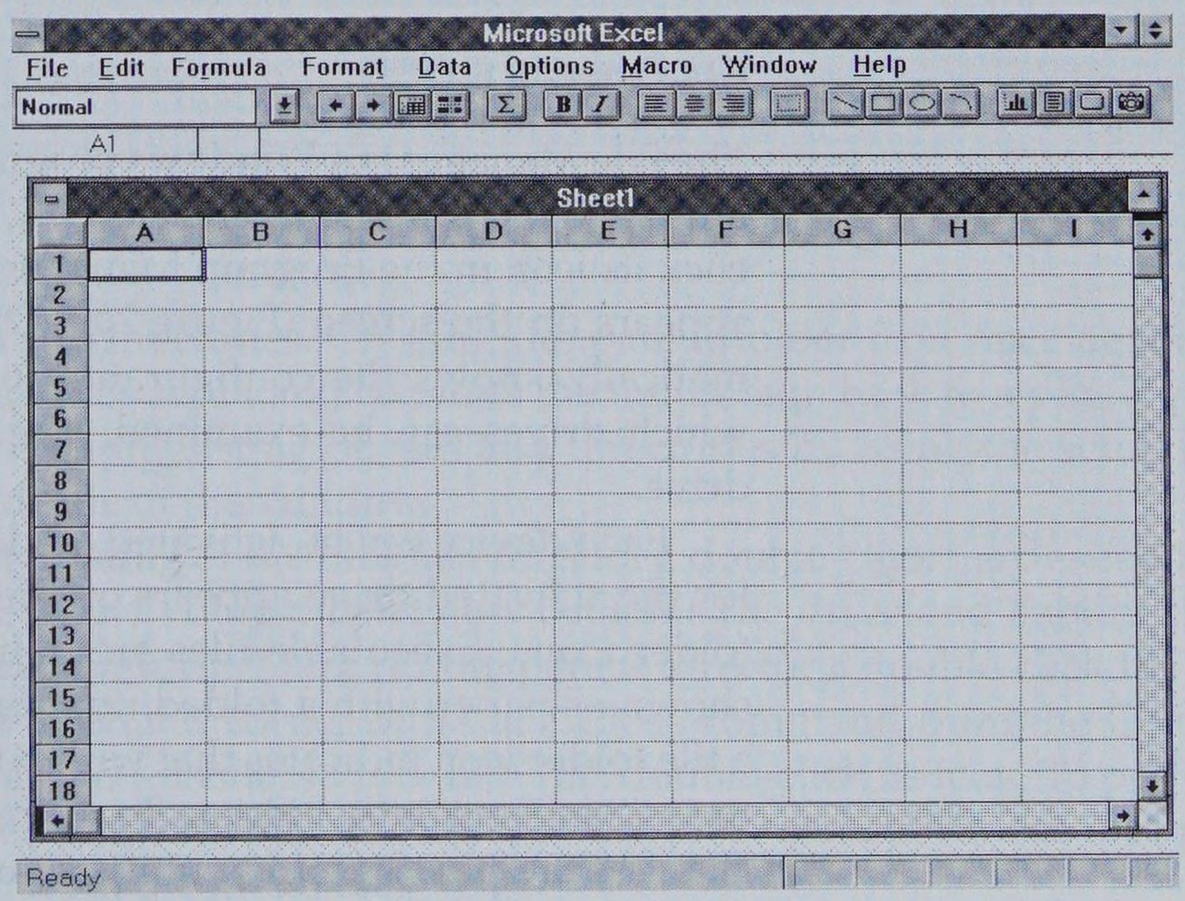


Figure 2.6
The window for some applications, like Excel, takes up the entire screen.

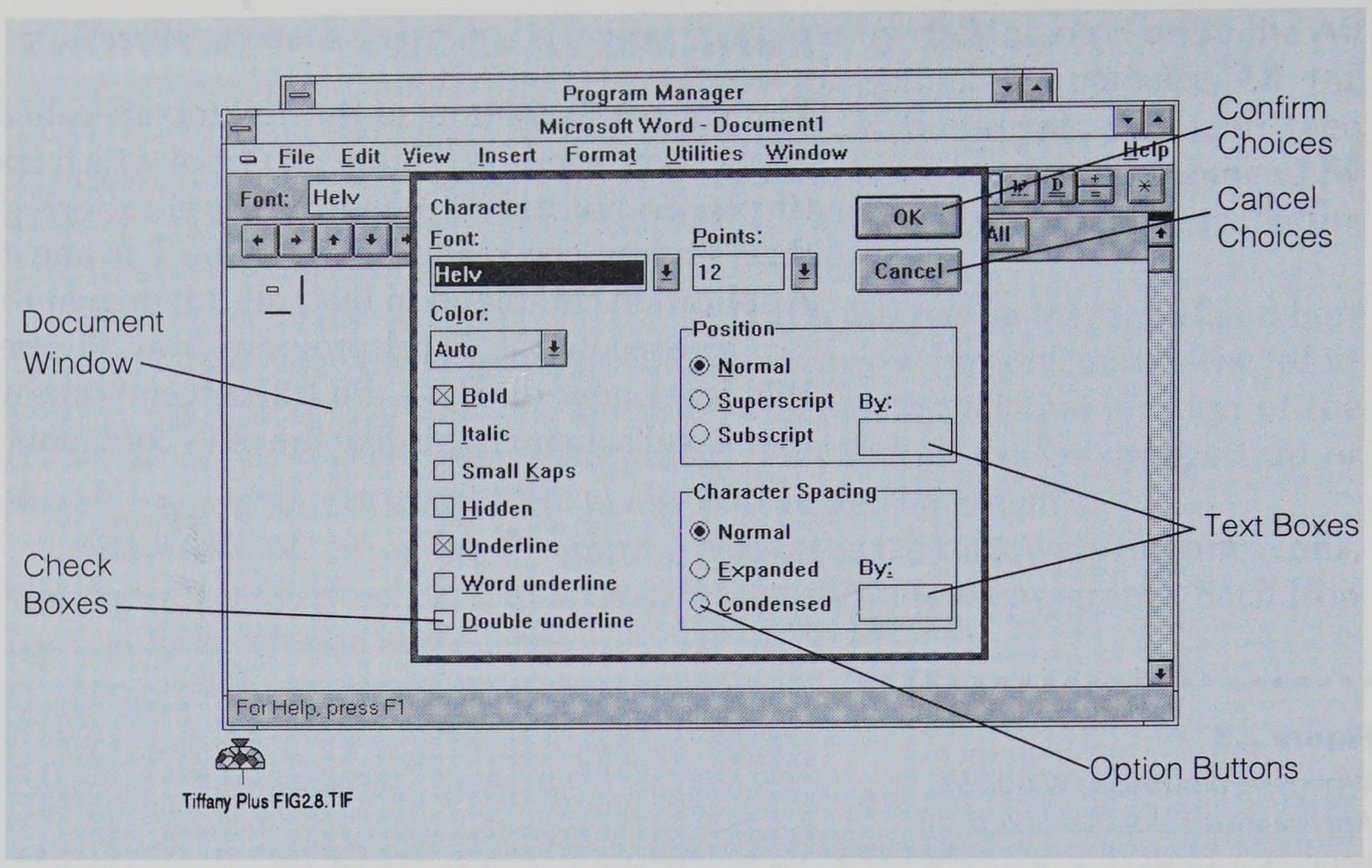


Figure 2.7
A Font dialog box generated by Microsoft Word.

Once you are in a Windows-supported application program, you can issue a command that displays a dialog box like Figure 2.7, which was generated by clicking on the Font entry of the Microsoft Word screen. Entries in boxes can be changed by pointing to the box, clicking, entering the appropriate text, and pressing Enter. Sets of option buttons let you select only one option. Check boxes let you check more than one option. The OK and Cancel buttons in the upper right-hand box let you accept or cancel changes to the box.

To exit from an application, use the File Menu of the menu bar. The Exit option closes any open application files along with the data files. The Close command will remove the application from the desktop, but it won't clear the application from your PC's memory or, in some cases, save the file.

If you just want to move a window out of the way to make more room on the desktop, minimize the window into an icon. This way, the application still resides in memory and can be restored by double-clicking the icon.

FILE MANAGER

The File Manager is a Windows program that performs functions similar to various DOS file commands such as DIR, COPY, and ERASE. To activate it, double-click its icon in the Program Manager window. The File Manager window now appears on the screen (Figure 2.8). Once Windows has been installed, it automatically knows the configuration of your system. The **drive icons** indicate which drives can be examined. The volume entry shows the active/default drive.

Each device can be activated by double-clicking on its icon. A directory tree for the activated drive appears on the screen. The tree shows directories as file folder icons. Executable files are depicted as rectangular icons. Data files are shown as paper with a folded upper right-hand corner. A plus sign (+) inside a file folder icon indicates that within the folder additional folders ("child directories") are currently hidden. To make the folders appear, click on the icon. This changes the plus sign to a minus sign (−) and causes the hidden folders to be

Figure 2.8
The directory tree of the File Manager displays the files and directories on the default drive.

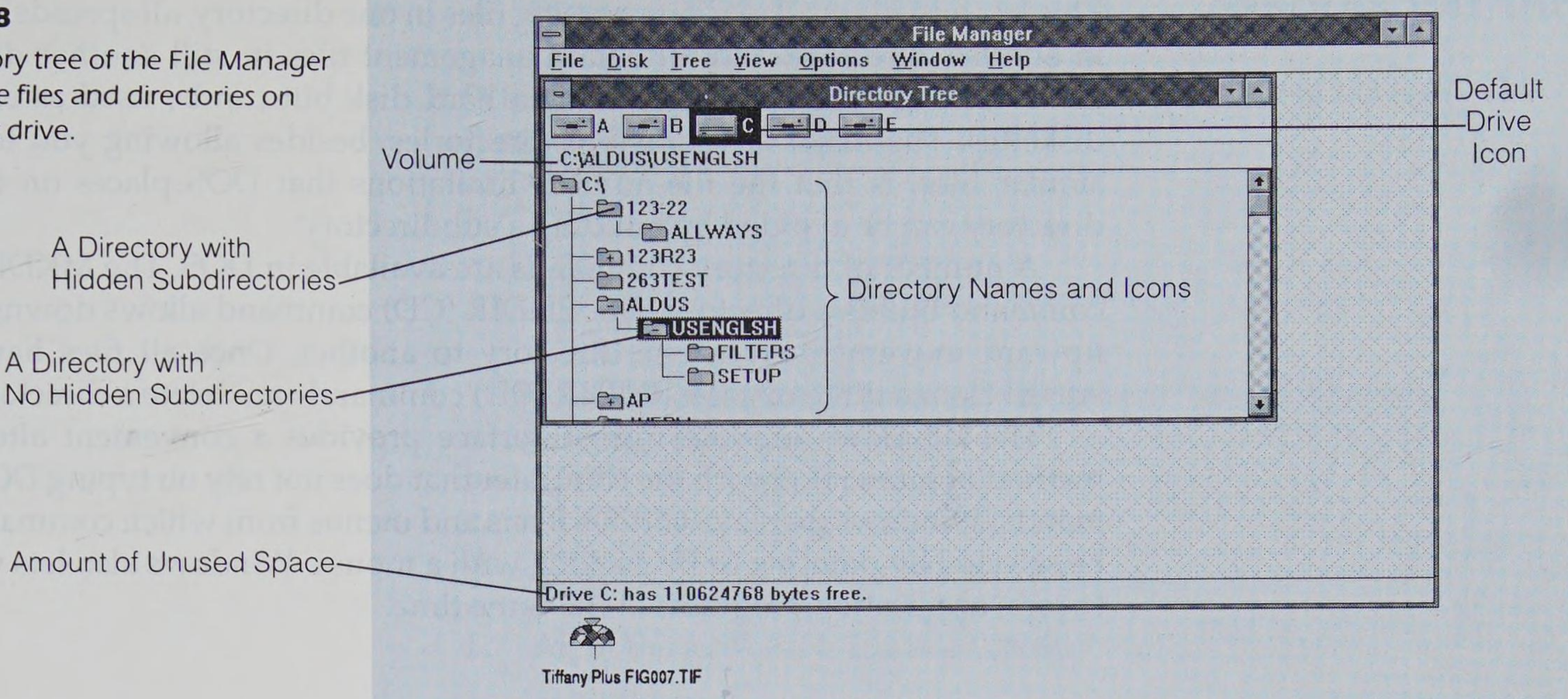
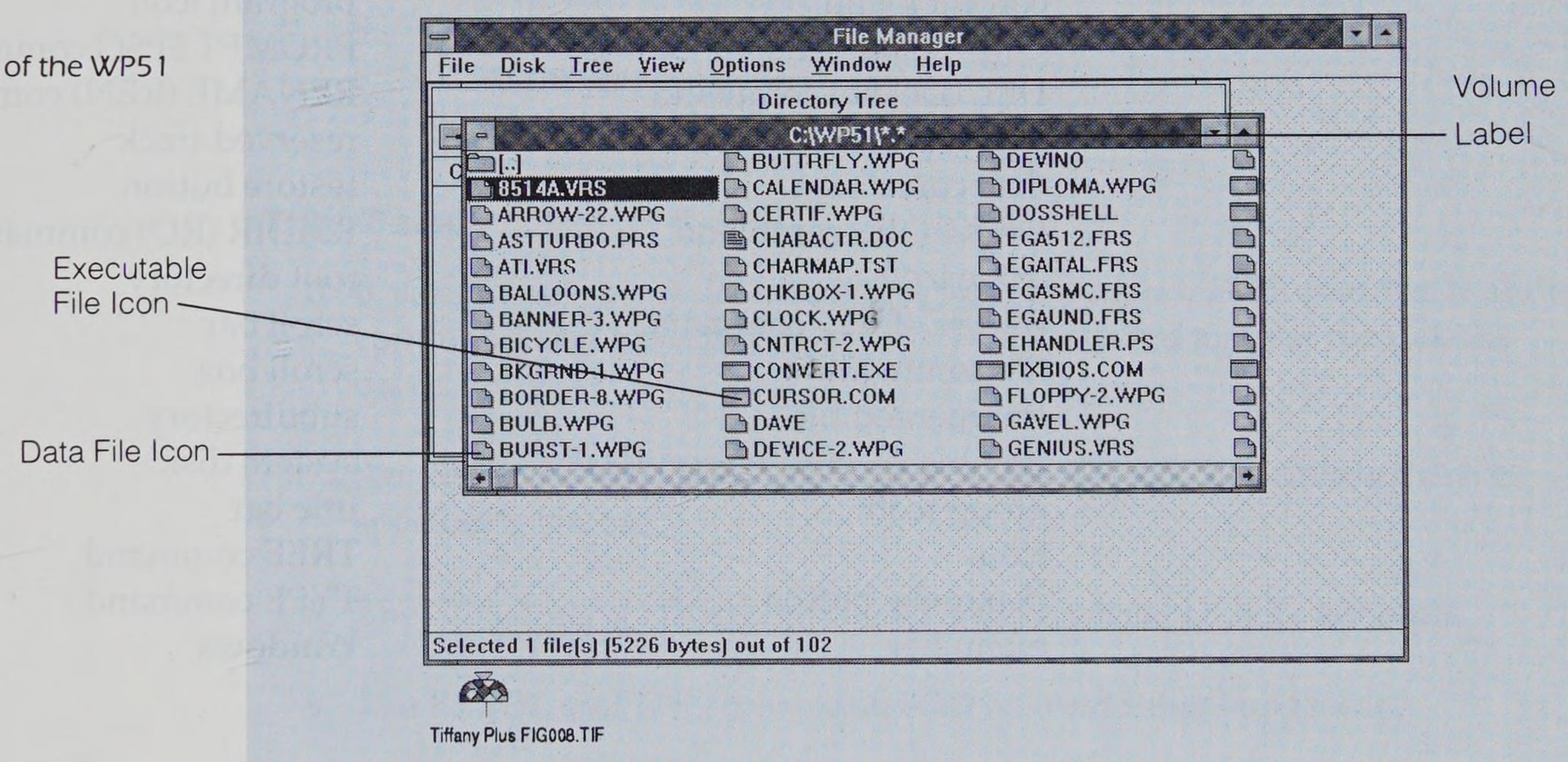


Figure 2.9
The detailed file listing of the WP51 directory.



shown as subdirectories. Clicking the parent folder icon once again hides the child directories again and converts the minus sign back to a plus sign. You can scroll through the listing of files and directories by using the scroll bar on the right-hand side of the window.

To get a listing of the files in a directory, double-click the desired folder icon (Figure 2.9). The volume label now contains the drive and subdirectory being examined. To return control to the parent directory, double-click the .. entry in the upper left-hand corner or issue a Close command from the Control Menu box. To start an executable program file, double-click its icon. To perform a task such as deleting or copying a file, click the filename and choose the appropriate command from the menu bar.

CHAPTER REVIEW

Directories and subdirectories divide disk storage space into functional units. This lets you place all word processing files in one directory, all spreadsheet files in another directory, and all data management files in still another directory. Directories are most appropriate on a hard disk but can be used as easily on diskettes. The major advantage of directories, besides allowing you to group similar files, is that the file-number limitations that DOS places on the root directory can be avoided by building a subdirectory.

A number of directory commands are available in DOS. The MKDIR (MD) command builds a directory. The CHDIR (CD) command allows downward or upward movement from one directory to another. Once all files have been erased from a directory, the RMDIR (RD) command can delete a directory.

The Windows graphics user interface provides a convenient alternative method of interaction with the computer that does not rely on typing DOS commands. Windows displays various icons and menus from which commands can be selected by pointing or by clicking with a mouse. Windows also lets you run several application programs at the same time.

KEY TERMS AND CONCEPTS

active directory
CHDIR (CD) command
CHKDSK command
control menu
COPY command
DEL (Delete) command
desktop
disk command
DISKCOPY command
drive icon
ERASE (DEL) command
file command
fragmented file
graphics user interface (GUI)
group icon
icon
maximize button
menu bar
minimize button
MKDIR (MD) command
path
program icon
PROMPT PG command
RENAME (REN) command
reserved track
restore button
RMDIR (RD) command
root directory
scroll bar
scroll box
subdirectory
system disk
title bar
TREE command
TYPE command
Windows

CHAPTER QUIZ

Multiple Choice

1. Which of the statements below is false with respect to copying files using IBM PC DOS?
   a. DISKCOPY is the command that re-forms fragmented files.
   b. COPY can create a copy of a file on the same disk, but a different name must then be used.
   c. COPY can create a backup file on another disk.
   d. DISKCOPY creates an exact copy of a disk's contents. It does this sector-by-sector and track-by-track.

2. The FORMAT command does all but which of the following tasks?
   a. Divides each track into eight or nine sectors.
   b. Marks any track having a bad sector(s) as reserved.
   c. Builds the directory.

d. Builds the file allocation table (FAT).
e. Performs all the above tasks.

3. Which of the following commands takes you directly to the root directory?
   a. CD
   b. CD ..
   c. CD\
   d. CD root

4. Which of the commands below *cannot* use the * or ? wild cards?
   a. ERASE
   b. COPY
   c. CHKDSK
   d. DISKCOPY
   e. DIR
   f. All of the above can use wild cards.

5. Which of these commands will cause the contents of FILE1 on a disk in drive A to be copied to a disk in drive B?
   a. A>COPY FILE1 A:
   b. B>COPY A:FILE1
   c. A>COPY FILE1 A:FILE1.BAK
   d. Both a and b
   e. All of the above

True/False

6. If you do not give a drive specifier in a command, DOS assumes that the command you have just entered is to be executed against the default drive.

7. An external command must reside on the default disk unless a drive specifier is given.

8. The COMMAND.COM file contains the external DOS commands.

9. The ERASE and DEL commands can be used interchangeably.

10. The computer can be booted from a data disk.

Answers

1. a 2. e 3. c 4. d. 5. b 6. t 7. t 8. f 9. t 10. f

Exercises

1. Define or describe each of the following:
   a. COPY versus DISKCOPY
   b. System disk versus data disk
   c. Path

2. List three internal DOS commands.

3. List three external DOS commands.

4. Without changing the default drive, give the following COPY commands:
   a. Copy FILE1 from the default disk A and create FILE1.BAK on drive A.
   b. Copy FILE1 from the default disk A onto the disk in drive B.
   c. Copy FILE1 from disk B and copy it onto the disk in default drive A, using the same name.
   d. Copy FILE1 from disk B and copy it onto the disk in default drive A, using the name FILE1.BAK.

5. The default drive is A. Enter the command that would erase FILE1 from the disk in drive B, without changing the default drive.

6. The DOS command that re-forms fragmented files is the _____ command.

7. The DOS command that examines the directory and prints a listing of files is the _____ command.

8. List two commands that can delete unwanted files.

9. The command that creates a "carbon" copy of the disk in drive A onto the disk in drive B is _____.

10. List two commands that can tell you the amount of available space on a disk.

11. The COPY command that will also copy all the files of one disk onto another disk is the COPY _____.

12. What happens when you enter the command ERASE*.*? What prompt do you receive? What happens if you continue?

13. The directory created automatically on any disk device during the format process is called the _____ directory.

14. A double-sided 5.25-inch disk can store a maximum of _____ files without using directories.

15. Directories are created by using the DOS _____ command.

16. Directories are erased by using DOS _____ command.

17. Before a directory can be removed, all files must be removed using the DOS _____ command.

18. The directory command that is part of PC DOS but not MS DOS is the _____ command.

19. A directory is actually viewed by DOS as a(n) _____ of data.

20. The _____ command finds out where you are in a series of directories and subdirectories.

21. The _____ command tells DOS to display the path of the current directory as part of the DOS prompt.

22. The _____ command tells DOS to use the default drive at the DOS prompt.

23. Windows is known as a(n) _____ interface.

24. When using Windows, many commands can be entered using the hand-held _____ instead of the keyboard.

25. The _____ is the screen area on which all Windows operations take place.

26. _____ is a single press of a mouse key.

27. _____ involves holding down a mouse button and, at the same time, moving the mouse.

28. The Windows _____ button changes the window to an icon at the bottom of the screen.

29. When using the Windows File Manager, if an entry is a subdirectory with files contained in it, the file folder will have a(n) _____ sign.

30. The _____ bar of a Windows screen contains the name of the window/application being run.

COMPUTER EXERCISES

1. Run CHKDSK on your disk. Fill in the following blanks:
   _____ bytes total disk space
   _____ bytes in _____ hidden files
   _____ bytes in _____ user files
   _____ bytes in bad sectors
   _____ bytes available on disk
   _____ bytes total memory
   _____ bytes free

2. If you have one, run CHKDSK on your fixed disk. Fill in the following blanks:
   _____ bytes total disk space
   _____ bytes in _____ hidden files
   _____ bytes in _____ user files
   _____ bytes in bad sectors
   _____ bytes available on disk
   _____ bytes total memory
   _____ bytes free

3. The date of creation for the SEMPCINT.DOC file is _____. The command that you used to obtain this information was the _____ command.

4. Make a backup of the SEMPCINT.DOC file on your disk, using the COPY command. Enter the command that you used: _____.

5. Run CHKDSK again on your disk. Fill in any of the following blanks that changed from Exercise 2.
   _____ bytes total disk space
   _____ bytes in _____ hidden files
   _____ bytes in _____ user files
   _____ bytes in bad sectors
   _____ bytes available on disk
   _____ bytes total memory
   _____ bytes free

6. Use the COPY command to do the following:
   a. Copy the SEMPCINT.DOC file to the SEMPCINT.BKP file on the same disk. Enter the command you used: _____.
   b. Copy the SEMPCINT.DOC file to another disk using the same name. Enter the command you used: _____.
   c. Copy the SEMPCINT.DOC file to another disk using the name SEMPCINT.BKP. Enter the command you used: _____.

7. Erase all copies of the SEMPCINT.BKP file. Enter the commands you used: _____ and _____.

8. Change the name of the SEMPCINT.DOC file to PCOUTLIN. Enter the command you used: _____.

9. What other command covered in this chapter would also let you change the filename? _____.

10. Use the TYPE command to list the file PCOUTLIN to the screen. Enter the command you used: _____. This is an example of a DOS text file. Notice that you can read all characters. Issue the TYPE command again and be ready with a Ctrl + S to make the display pause. Enter other Ctrl + S commands to display other pages of the file.

11. Use the TYPE command to list one of the DOS command files (CHKDSK.COM, for instance). Enter the command you used: _____. This is an example of a machine-executable file. Notice that many characters from the IBM character set that are not normally seen are displayed on your screen. These are examples of the 256 different characters that your computer can readily use.

12. Use the FORMAT command to prepare any disks that you will be using this term. Be sure to format them as data disks. You do not want the system program on any of these disks.

13. This exercise is intended to reinforce the directory concepts introduced in this chapter. It requires that you have the data disk that is used with this text in drive A. A number of directories (Figure 2.10) will be constructed on this disk, and some files will be placed in those directories. Two files from this disk will be copied to another disk (either to drive B on a two-disk computer or to drive C on a computer with a fixed disk). Once this exercise is completed, all directories and the two disk files will be erased.

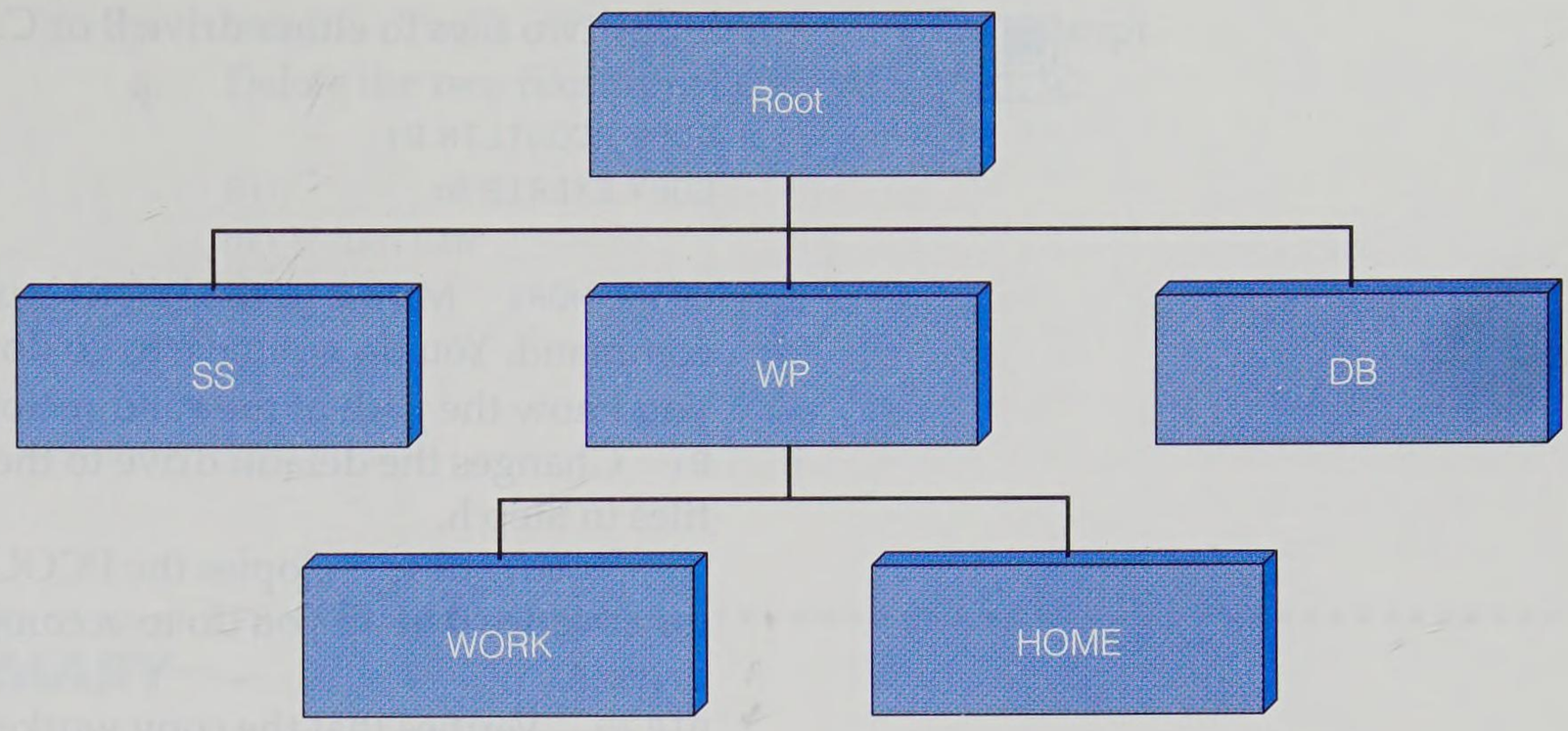


Figure 2.10
Directories to be created for Exercise 13.

The directories and any subdirectories, which they might have and that you are to create, appear below:

a. Create the directories. Make certain that you have the A> DOS prompt.

`MD SS`	Makes the SS subdirectory.
`MD WP`	Makes the WP subdirectory.
`ME DB`	Makes the DB subdirectory.
`CD WP`	Changes to the WP subdirectory.
`MD HOME`	Makes the HOME subdirectory.
`MD WORK`	Makes the WORK subdirectory.

b. `PROMPT $P$G` Activates the path as part of the DOS prompt.

c. Use some Change Directory (CD) commands:

`CD HOME`	Changes to the HOME subdirectory.
`CD..`	Changes to the WP subdirectory.
`CD..`	Changes to the root directory.
`CD WP`	Changes to the WP subdirectory.
`CD WORK`	Changes to the WORK subdirectory.

d. Use the command that goes directly to the root instead of using CD.. commands:

`CD\` Moves directly to the root directory.

e. `COPY E*.WK1 SS` Copies the two worksheet files that begin with the letter E to the SS directory. Notice that you do not have to place the drive identifier on the receiving path specification as long as the directory resides on the default drive.

f. `COPY R*.* WP\WORK` Copies the file that begins with an R to the WORK subdirectory.

g. From the root, issue two directory commands for subdirectories:

```
DIR WP\WORK
DIR SS
```

h. Copy two files to either drive B or C:

```
COPY PCOUTLIN B:
COPY EXER1B B:
```

i. `CD WP\WORK` Moves to the WORK subdirectory, using only one CD command. You do not have to go down one directory at a time, if you know the path of the subdirectory.

j. `B:` Changes the default drive to the disk to which you copied the files in Step h.
`COPY PCOUTLIN A:` Copies the PCOUTLIN file to the active directory. Notice that all you do to accomplish this is refer to drive A.
`DIR A:` Verifies that the copy worked correctly.

k. `COPY EXER1B A:WP` Copies the EXER1B file to the WP subdirectory.
`DIR A:WP` Verifies that the copy worked. Notice that, because the directory is on a disk other than the default, you must use the drive identifier.

l. `COPY PCOUTLIN A:WP\HOME` Copies the file PCOUTLIN to the HOME subdirectory.
`DIR A:WP\HOME` Verifies that the copy worked.

m. Return to the root directory of drive A.

`A:`	Returns to drive A.
`CD\`	Issues the return to the root directory.

n. `RD WP` Tries to remove the WP subdirectory. You should receive an error message indicating that the directory is not empty.

o. Erase the files from each of the subdirectories and then remove the subdirectories. Be certain that you issue each of the following directory commands exactly as entered and check the DOS prompt to ensure that you are at the correct location. Otherwise, you might erase all files contained in the root directory. Respond Y to each prompt warning you about erasing all files from the directory:

```
CD DB
DEL *.*
CD
CD WP\HOME
DEL *.*
CD ..
CD WORK
DEL *.*
CD ..
RD HOME
RD WORK
CD\
CD SS
DEL *.*
CD\
RD SS
RD DB
RD WP
```

p. `PROMPT` Turns off the path for the DOS prompt.
q. Delete the two files from either drive B or C:

```
B:
DEL PCOUTLIN
DEL EXER1B
```

DOS COMMAND SUMMARY

CD	Changes to a directory
CHKDSK	Checks the status of a disk and prepares the status report.
COPY	Copies one or more files.
DATE	Changes the system date.
DEL (or ERASE)	Deletes one or more files.
DIR	Lists the files in the directory.
DISKCOPY	Copies a complete disk.
ERASE (or DEL)	Deletes one or more files.
FORMAT	Prepares a disk for use.
MD	Creates a subdirectory.
PROMPT	Changes the system prompt.
RD	Removes a subdirectory.
RENAME	Renames disk files.
TIME	Changes the system time.
TREE	Lists subdirectories and files.
TYPE	Displays file contents on the monitor screen.

DOS COMMANDS BY FUNCTION AND TYPE

Time	**DATE, TIME**
File	**COPY, DEL, DIR, ERASE, RENAME, TYPE**
Disk	**CHKDSK, DISKCOPY, FORMAT, CD, RD, MD, TREE**
System	**PROMPT**

Internal Commands	*External Commands (Utilities)*
CD	**CHKDSK**
COPY	**DISKCOPY**
DATE	**FORMAT**
DEL	**TREE**
DIR	
ERASE	
MD	
PROMPT	
RD	
RENAME	
TIME	
TYPE	

GLOSSARY

?: The wildcard symbol that represents one character at this position.

***:** The wildcard symbol that represents any number of characters at this position and to the right.

active directory: The active directory on a disk device is the last directory that you were in via a CD command. Any files copied to the disk name (with no path specified) get copied to this directory.

Arrow keys: Keys (Down, Up, Right, and Left) found on the numeric keyboard and typically used to move a pointer or cursor.

AUTOEXEC.BAT: File that is executed by the computer as soon as the boot process is completed. This type of file is used in building a turnkey application that requires very little input from a user before starting.

Backspace key: Key used to erase the last character typed. It is labeled with an arrow that points toward the left.

boot process: Process of starting the computer. During the boot process, a memory check is performed, the various parts of DOS are loaded, and the date and time are requested.

break: Function for halting the program in progress. Usually the program returns to some higher-level program such as DOS, BASIC, or the main application program, but not all programs have this function. It is invoked by holding down the Ctrl key while pressing Scroll Lock.

CHDIR (CD): DOS command that lets you move to another directory and make that the active directory.

CHKDSK: DOS command that checks the status of a disk and prepares the status report.

cluster: Entity composed of two adjacent sectors. Storage is allocated to a file one cluster at a time.

cold start: Booting process used to begin operating a computer that has just been turned on.

COMMAND.COM: Command processor of DOS, containing built-in functions or subroutines that let you copy a file or get a directory listing of a disk.

Control key: General-purpose key whose uses include invoking breaks, pauses, system resets, clear screens, print echos, and various edit commands. In instructions, the Control key is often represented as a caret (^).

control menu: In the left-hand portion of the title bar is the Control Menu button, which provides access to a menu that provides keyboard access to many window manipulations that otherwise require a mouse.

COPY: DOS command that copies one or more files onto the current disk or onto another disk. In spreadsheets, it lets you copy the contents of a cell into one or more other cells.

cylinder: Entity composed of all like-numbered tracks from all recording surfaces of a disk.

data disk: A formatted disk that does not contain DOS. Data disks are used only to store user files.

DATE: DOS command that changes the system date.

default disk drive: Disk drive that is accessed automatically by the microcomputer when a file-oriented command is executed.

DEL: DOS command that deletes one or more files from disk.

delimiter: Character that indicates to the computer where one part of a command ends and another part begins. Typical delimiters are the space, the period, and the comma.

desktop: The screen area on which all Windows operations take place.

DIR: DOS Directory command that lists the files in the directory.

directory: Part of a diskette that holds the names of files stored on it. The directory also contains information about file size, file extensions, their location on diskette, and the dates and times files were created or changed.

disk commands: The subset of DOS commands that affect the disk, including CHKDSK, DISKCOPY, and FORMAT.

DISKCOPY: DOS command that copies a complete disk.

diskette: Square recordlike objects that store information from the computer.

disk operating system: *See* **DOS.**

DOS: Acronym for disk operating system, the program responsible for enabling you to interact with the many parts of a computer system. DOS (pronounced "doss") is the interface between you and the hardware. To perform system functions, DOS commands are typed on the keyboard, but DOS is actually a collection of programs designed to make it easy to create and manage files, run programs, and use system devices attached to the computer.

DOS editing keys: Keys that let the user make changes to the last DOS command entered, which can save many keystrokes.

DOS prompt: The characters that indicate which drive is the default drive and that DOS is waiting for a command to be entered (for example, A>, B>, C>).

drive icons: The drive icons indicate which drives can be examined on your system (Windows automatically knows the configuration of your system after it has been installed).

ERASE (DEL): DOS command that deletes one or more files from disk.

external DOS commands: Utility commands that are not part of the COMMAND.COM command processor. They reside on disk as separate files.

FAT: *See* **file allocation table.**

file allocation table (FAT): Entity that keeps track of which sectors belong to which files and of how much available space remains on the diskette (so that new files can be created and stored in unused areas of the diskette).

file commands: The subset of DOS commands that affect the files, including COPY, ERASE, RENAME, and TYPE.

filename: Unique identifier of a file, composed of one to eight characters. If an optional one- to three-character extension is used, there must be a period between the filename and the filename extension.

filename extension: One- to three-character portion of a filename. Extensions are typically used to indicate families of files, such as backups (.BK!), regular database files (.DBF), and indexes (.NDX).

FORMAT: DOS command that prepares a disk so that it can be used by the computer. It defines every sector of a diskette, finds and write-protects any tracks with bad sectors, sets up the directory, sets up the file allocation table, and puts the boot record program at the beginning of the diskette. *Format* also refers to how data are stored in a worksheet cell, for example, as character or numeric data.

fragmented file: A file whose sectors are not in adjacent locations. A fragmented file can be stored on a disk in a number of different physical locations.

function key: One of 10 keys (F1–F10) that allow special functions to be entered with a single user keystroke. Computer programs (DOS, BASIC, and so on) use these keys for different purposes.

global filename characters: DOS characters (? and *) that specify a number of files via a single command.

graphic user interface (GUI): A graphic means of allowing a user to enter commands using a mouse as a pointing device rather than typing the commands from the keyboard.

group icons: As the name implies, these represent groups of applications that can be activated via a separate window.

GUI: *See* **graphic user interface.**

IO.SYS: Hidden file in DOS that manages each character that is typed, displayed, printed, received, or sent through any communications adapter.

DOS.SYS: Hidden DOS file that handles any information to be passed to disk.

icon: A graphic image that represents a command or program. The command or program is invoked or executed by using a mouse to position the pointer on the icon and signaling with a click.

initialization: Process during the boot routine when the computer activates the various peripherals hooked to the computer.

internal DOS command: Command that is part of the COMMAND.COM command processor.

menu bar: The menu bar contains the menu options that can be selected for this window. One of the benefits of Windows is that it provides a fair amount of consistency in how menu items are arranged and what types of commands can be expected in the submenus. This consistency and standardization make different Windows applications easier to learn.

Microsoft: Company that originally developed PC DOS for IBM (an operating system known, with some minor differences, as MS DOS).

minimize/maximize buttons: Each window displayed by the Windows GUI contains two buttons in the right-hand portion of the title bar: the minimize and maximize buttons. When you click on the minimize (down arrow) button, Windows substitutes an icon for the window and moves the icon to the bottom of the desktop. When you click on the maximize (up arrow) button, Windows enlarges the window to take up the entire screen.

MKDIR (MD): The DOS command that creates a subdirectory.

MS DOS: Operating system developed by Microsoft. It is the same as PC DOS except that there is no ROM BASIC provision. This operating system is used by most IBM-compatible computers.

parameter: Modifying piece of information that constitutes part of a DOS or dBASE command. It might, for example, indicate which files or fields are to be included in an operation.

path: The complete name for a file, including the complete subdirectory name.

Print Screen key: Key that, when pressed with the Shift key, results in the screen contents being printed.

program icons: A graphic representation of a program.

PROMPT PG: DOS command that lets a user designate a path as part of the DOS prompt.

PrtSc: Key label for the Print Screen key.

RENAME (REN): DOS command that renames a disk file.

reserved tracks: Tracks of disk storage that contain a bad sector and have been set aside so that data cannot be recorded on them.

restore button: Once the maximize command is issued, Windows substitutes the minimize button with a restore (up and down arrows) button, which, when clicked, restores the window to its previous size.

RMDIR (RD): DOS command that deletes a subdirectory.

root directory: The main directory of a disk. Subdirectories are created below the root directory on a disk medium.

scroll bar: A window screen may also have a vertical scroll bar on the right-hand border. The up and down arrow buttons, when clicked, move the information up or down a line.

scroll box (slider): This shows the relative location of the cursor in the displayed text or document. This button can be dragged to move the cursor quickly from one part of the screen to another. You can also move the display up or down a screen at a time by clicking above or below the slider.

source drive: Drive that contains any files to be copied.

subdirectory: Like a root directory except that it is itself a file and contains DOS housekeeping entries in a regular directory; it does not have the size limitation of the root directory.

syntax: Structure of instructions in a language. If you make a mistake in entering an instruction and garble the syntax, the computer sometimes responds with the message Syntax error.

system: The command that lets you exit a software package to DOS, issue DOS commands, and then return to the software package previously exited.

system disk: Disk that has been formatted and contains DOS. This type of disk can be used to boot the system.

system reset: System function that restarts your computer just like a power on/off. This is accomplished by pressing the Del key while holding down the Ctrl and Alt keys. Three keys are required to ensure that you know what you are doing and to avoid an accidental system reset.

target drive: Disk to which files will be copied.

TIME: DOS command that changes the time for the system.

title bar: This contains the name of the window/application being run.

TREE: DOS command that lists all directories and subdirectories along with any files that might also be resident.

TYPE: DOS command that displays file contents on the screen.

warm start: Booting process used to restart a computer after you have lost control of its language or operating system.

wild cards: Characters that let you include a number of files or fields in an operation by using only one command.

Windows: The graphic user interface that makes using the computer and running programs easier. This interface allows use of the mouse as a pointing tool.

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DOS

Internal Commands			External Commands		Redirection
CLS	DIR	TYPE	CHKDSK	PRINT	< Specify input other than the keyboard
COPY	ERASE	VER	DISKCOPY	SORT	> Specify output other than the printer
DATE	RENAME	VOL	FORMAT	SYS	>> Specify output other than the printer and add this to the end of an existing line
DEL	TIME		MORE		

DOS

Copy:

A>COPY fn B:	Copy a file from the default drive to drive B:
A>COPY fna fnb	Copy a file to the same disk under another name
A>COPY B:fn	Copy a file from drive B: to the default
A>COPY B:fn fna	Copy a file from drive B: and place it on the default under a different name

A>Copy *.* B:	Copy all files from a: to b:
A>Copy file? B:	Copy any file beginning with FILE and any character in position 5.

DOS

CHKDSK

A>CHKDSK b:	Check the status of the disk in drive B:
A>CHKDSK fn	Check the file, fn, for fragmentation
A>CHKDSK B:*.*	Check all the files on drive B: for fragmentation
A>CHKDSK B:*.*/F	Check drive B: for fragmentation and fix any problems

Format

FORMAT B:	Format the disk in drive B: w/o DOS
FORMAT B:/S	Format the disk in drive B: with DOS
FORMAT B:/V	Format the disk w/o DOS and record a label
FORMAT B:S/V	Format the disk with DOS and record a label

DOS

DIR|SORT	Sort the directory by file name
DIR|SORT/+10	Sort the directory by file extension
DIR|SORT/+14	Sort the directory by file size
DIR|SORT/+25	Sort the directory by date
DIR|SORT>DIR1	Sort the directory and place output in file DIR1

Directory Piping Commands

MORE<filename	Display the contents of filename to the monitor a screen at a time
DIR|SORT|MORE	Display the directory in sorted order to the monitor a screen at a time

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