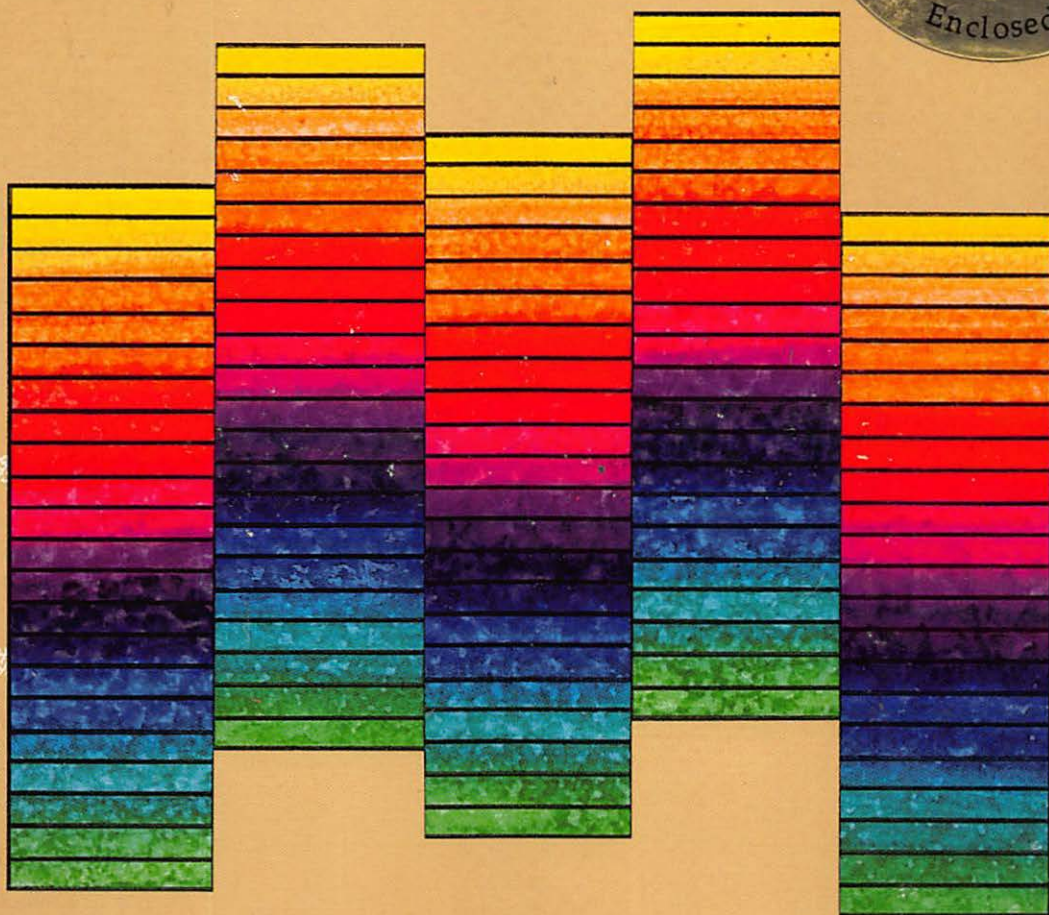


MICROSOFT® WORKS ON THE MACINTOSH® a tool for productivity

HERBERT L. NICKLES



MICROSOFT® WORKS ON THE MACINTOSH®

A Tool for Productivity

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Herbert L. Nickles
Loyola University



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This, my seventh book, is dedicated to my good friends and mentors, Dr. George Culp at the University of Texas at Austin, Fr. George Lundy at Loyola University in New Orleans, and Dr. Jane Mercer at the University of California, Riverside. Although their demand for excellence, enthusiasm toward their profession, and dedication to education caused me much lost sleep over the years, they provided a catalyst to make great things happen.

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Herbert L. Nickles

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INTRODUCTION

This book is not just about computers. It's about a dream. Some fifteen years ago, a young woman shared the dream with only a few hundred, maybe a thousand people. She was a typical American college student, except that her experience in computer programming had taught her the advantages and limitations of mainframe computer systems. She appreciated the power of the computer, but wanted it to be more personal. She envisioned writing books, keeping records, sorting and analyzing data, creating art, teaching her children, and playing games in her own living room.

She investigated homemade computers and the clubs that had sprung up to support this new hobby. But she didn't feel comfortable with the technobabble of the hobbyists—nor with a soldering iron. She thought computers should be small, unintimidating, friendly; “You shouldn't have to build one—it should come right out of a box, ready to use. Just plug it in and compute!”

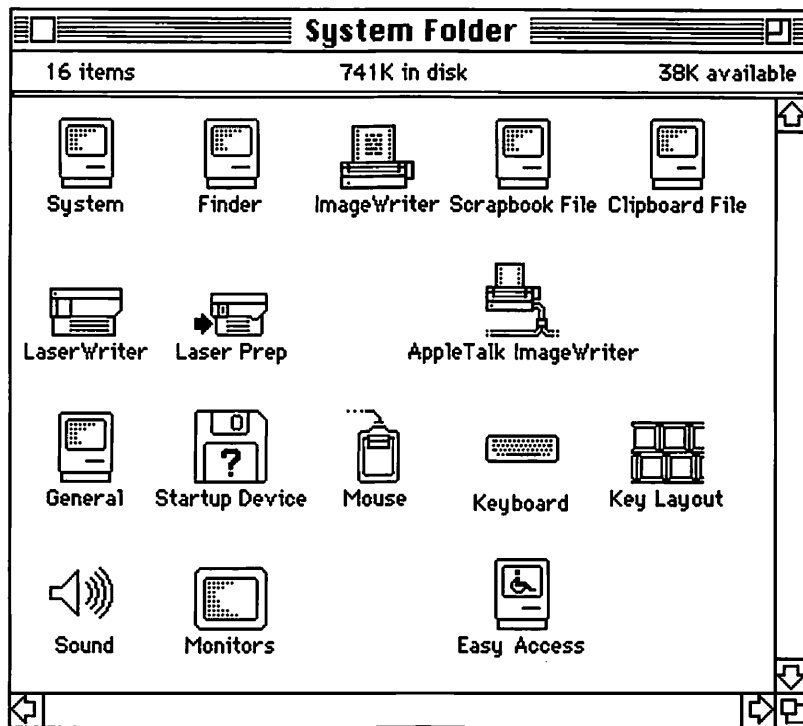
In 1977, Apple Computer introduced the Apple II[®] computer. The dream was headed for reality: here was a personal computer with easy-to-use software that improved productivity and enhanced creativity. The Apple II microcomputer started a revolution; soon other manufacturers joined the market: Radio Shack, Commodore, Atari, and IBM. But the promises of the computer manufacturers still fell a bit short of the full-blown dream. Yes, the systems fit easily on a desktop, used normal household current, and didn't require the special environmental conditions of large-scale mainframe computers. Yes, consumer-oriented software programs such as AppleWriter[™], Visicalc[®], Lotus 1-2-3[®], WordPerfect[®], and dBase[®] gave personal computer owners the ability to store, edit, and print text, keep track of their finances, and accumulate just about any kind of data. But the software wasn't always so friendly, and technical knowledge was often necessary. Users had to learn many special commands to use the microcomputer's operating system, and programming skills were essential to make it really do what its owners wanted.

In 1984, the world of computers was changed again. Not by Big Brother computers watching over us, as Orwell had predicted, but by a new computer called the Macintosh. “A computer for the rest of us,” the ads promised. The Apple® Macintosh® was designed to bring hardware and software together into a standard user interface. All software programs that ran on the Macintosh operated in the same manner. If you knew how to use one, the second, third, and fourth were easy to learn because 90 percent of the skills and techniques were shared by all programs.

In contrast to other personal computers of the period, the Macintosh used a “mouse” to select functions from “menus” rather than making the user type complex commands. Information and programs were represented graphically, with icons rather than eight-letter names (see Figure 1). Running a program was as simple as pointing to an icon and clicking the mouse button twice. But the most wonderful feature of all was that information—words, numbers, drawings, graphs—could be transferred easily between programs, printed together on the same page, and shared with other Macintosh computer owners regardless of their software packages. Market surveys by Peat Marwick and the Gartner Group showed that companies using the Macintosh (in comparison to IBM compatibles with non-Macintoshlike operating systems) reduced employee training time, increased the use of computing by employees, and increased overall employee productivity.

The innovations that made personal computers more “user friendly” are now standard on systems from Apple, Atari, IBM, Next, and others. Microsoft Corporation, one of the largest software manufacturers in the United States, developed Windows™, a software package that provided IBM owners with an operating environment similar to the Macintosh’s.

Over the past 12 years, personal computer software has evolved from stand-alone programs that were often more time-consuming than time-saving into productivity tools that increase the quality and quantity of the user’s work. Several manufacturers expanded their software products to include more functions. For example, Lotus Symphony® added word-processing and database capabilities to the popular Lotus spreadsheet software for the IBM® PC. Microsoft introduced Works for the Macintosh and the IBM PC. This fully integrated software package included word-processing, spreadsheet, database, business graphics, and communications applications into one package. The Macintosh version also included drawing capabilities and desktop publishing features. The advantage of having several tools in one package and the ability to move information between the tools quickly caught the attention of the



```
C:\>dir
```

```
Volume in drive C is INSIGNIA
Directory of C:\
```

```
COMMAND  COM      25276    2-03-88    2:31p
DOS       <DIR>         2-08-88    7:45p
INSIGNIA  <DIR>         2-08-88    7:51p
AUTOEXEC BAT       137    3-17-88    3:53p
CONFIG   BAK        55    3-17-88    3:53p
CONFIG   FSA        55    3-17-88    3:53p
CONFIG   SYS        55    3-17-88    3:53p
       7 File(s)    114688 bytes free
```

```
C:\>_
```

Figure 1. Comparison of a File Directory: Macintosh (Top) Versus IBM (Bottom)

nation. A survey of Macintosh retailers by InfoCorp rated Microsoft Works as the best-selling business software package in the nation in 1988 and 1989.

Apple's advertising promoted the vision of "one person, one computer." Today's computers with user-friendly interfaces—such as the Macintosh coupled with integrated software packages like Works—bring this vision closer to reality. As a tool, they free the businessperson from tedious calculations; assist the artist in shaping a creation; bolster the writer in crafting and delivering memorable phrases; and engage the scientist in a community of peers. The goal of this book is to give you, as well, the knowledge and skills necessary to use the Macintosh and Works as tools in developing solutions and improving your own productivity.

This book is written for explorers, for active participants in educational adventures. To receive the greatest benefit from this book, you will need access to a Macintosh computer and Microsoft Works throughout the learning process. The emphasis in each chapter is on clearly defining your goals and helping you achieve them via brief, descriptive discussions of the topics and hands-on exercises. Posers, problems, and projects are provided at the end of each chapter to allow you to practice your newly acquired skills. Because each chapter builds on knowledge acquired in previous ones, the chapters should be completed in order. However, Chapter 2, on word-processing, and Chapter 3, on drawing objects, can be completed in reverse order if you're unfamiliar with typing or are more receptive to visual learning. If you're already comfortable with the basic operation of the Macintosh (starting up the computer, pointing and clicking with the mouse, using windows, and so on), Chapter 1 may be skipped in order to go right to Works!

Another use of this book is as a reference guide for your future projects. The Appendix provides a resource to research questions that may arise when you're using Works. Summaries of the Works menu commands for word processing, drawing, spreadsheet, database, business graphics, and communications are included. The Appendix also includes a glossary and information on using macros, fonts, and desk accessories.

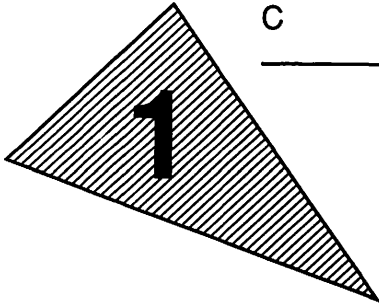
A supplemental diskette is bound in with each copy of the book. It includes word-processing, spreadsheet, and database files that are referred to in the book. Answers to selected problems are also included on the diskette, along with an interactive version of the Appendices in a HyperCard® stack. Because you may not have access to a host computer to complete the exercises in Chapter 8 on data communications, a HyperCard simulation of an on-line catalog search also appears on the diskette.

"Are you ready?"

"For what?" you ask.

"For the power to be your best!" the Apple metaphor exclaims.

Turn the page and discover for yourself . . .



THE MACINTOSH COMPUTER AND HOW TO USE IT

"Nothing in life is to be feared. It is only to be understood."

—*Marie Curie*

"In certain trying circumstances, urgent circumstances, desperate circumstances, profanity furnishes a relief denied even to prayer."

—*Mark Twain*

"So look this is a book.
But no page turns.
Only beneath the metal burns
Such stuffs as all newtimes are made of.
So, cowards, what are you afraid of?"

—*Ray Bradbury*

OBJECTIVES

When you've completed this chapter, you'll be able to do the following.

1. Briefly describe the inventions that led to the development of the microcomputer (Section 1.1)
2. Define the components of a typical computer system (Section 1.2)
3. Identify the components of a Macintosh and define their function (Section 1.3)
4. List the steps necessary to start up the Macintosh (Section 1.4.1)
5. List the items on the desktop and describe their purpose (Section 1.4.2)
6. Describe how to use the mouse to select and move items on the desktop (Section 1.4.3)
7. Describe how to use the Macintosh menus to execute commands (Section 1.4.4)
8. Describe the features of Macintosh windows and how to use them (Section 1.4.5)
9. List the steps necessary for formatting a blank diskette (Section 1.4.6)

1.1 A BRIEF HISTORY OF COMPUTING

Throughout history, men and women have continually tried to find better and easier ways of doing their work, including calculation. The idea of computing and record keeping, in fact, has evolved from prehistoric times. Our ancestors recorded quantities using scratches, marks, and drawings on cave walls. Knotted cords, clay tablets, and papyrus scrolls were also used to document data.

Probably the earliest calculating device was the Chinese abacus (see Figure 1.1). It is thought to have been developed around 3000 B.C. It consists of beads strung on wires fixed inside a frame and is based on a system of fives, like the five fingers of our hands. The abacus was used all over the world for centuries.

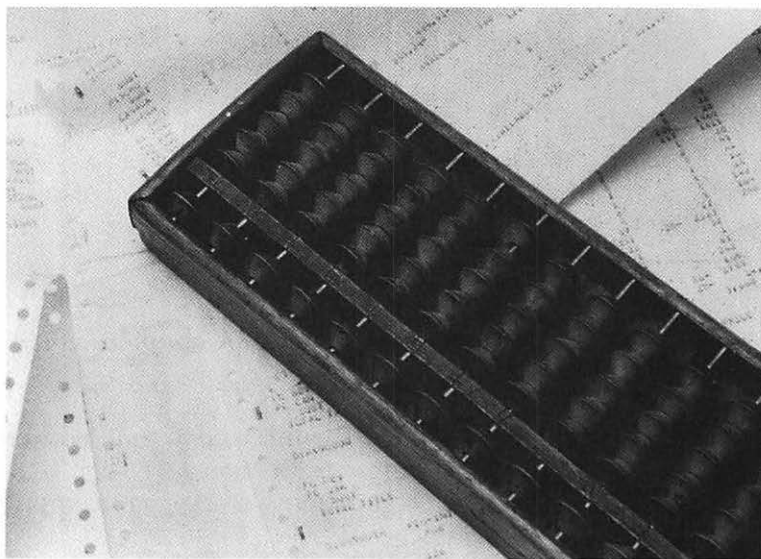


Figure 1.1. The Abacus (*Bonnie Hawthorne*)

As trading progressed between cultures monetary systems developed, and the need for more complex calculations became apparent. During the 17th century, several tools were developed to aid in those calculations. One such tool, the Pascaline, was invented by a 19-year-old Frenchman, Blaise Pascal, in 1642. He developed his calculator to help his father, a tax collector. Pascal's device used wheels and gears to add and subtract French currency.

During the 18th and 19th centuries, many others followed Pascal's lead and built calculating machines. In 1801, Joseph Jacquard invented the automatic loom. In his loom, rods passed

through holes in cardboard cards and guided the action of the weaving. This was the first machine to be controlled by a program stored on punched cards (see Figure 1.2).

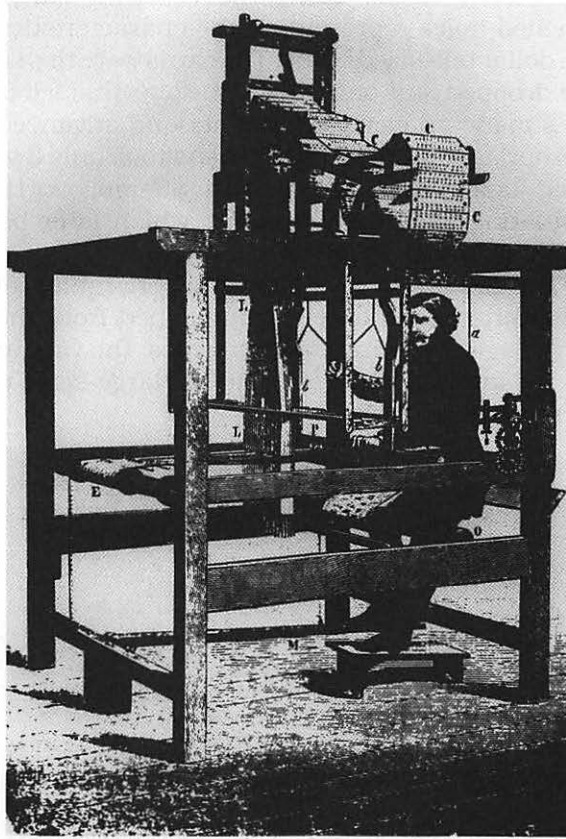


Figure 1.2. The Jacquard Loom (*Courtesy of IBM Archives*)

In 1840 Charles Babbage, an English mathematician, drew up plans for a machine called the Analytical Engine. This engine would do addition, subtraction, multiplication, and division automatically as directed by punched cards similar to those used in Jacquard's loom. The engine was to be powered by steam. Unfortunately, the technology of the period was not advanced enough to build the device, and Babbage died before it was ever constructed. Ada Lovelace, Lord Byron's daughter, lent financial support to Babbage's research and is credited with writing programming instructions for the engine. She was the world's first computer programmer.

In 1887 Herman Hollerith, an American working for the Census Bureau, designed a machine that did not perform calculations but rather counted and sorted information (see Figure 1.3). It had been estimated that the 1890 census would take more than 20 years to tabulate by hand. Using the Hollerith Machine, census takers punched holes representing the characteristics of each household into dollar bill–sized cards. The cards were then fed into a card reader that dropped pins onto them. The pins that fell through the punched holes made an electrical contact and advanced the pointer on the appropriate dial. The 1890 census took only 3 years to tabulate and saved taxpayers an estimated \$5 million. Hollerith formed the Tabulating Machine Company, which later became International Business Machines (IBM).

The 1940s saw the first of four generations of electronic computers. Each generation is distinguished from the previous one by a technological advance in electronics: the vacuum tube, the transistor, the integrated circuit, and the large-scale integrated circuit, or microprocessor chip.

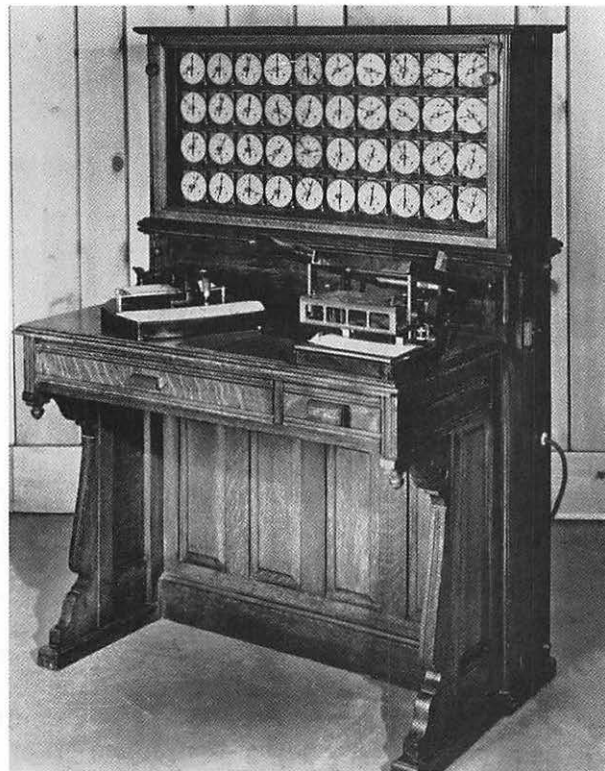


Figure 1.3. The Hollerith Machine (Courtesy of International Business Machines Corporation)

The First Generation. The first working computer, the Harvard-IBM Mark I, was designed and built by Howard Aiken using parts from 78 accounting machines. The Mark I used mechanical relays and could perform only three additions per second. Scientists realized that to increase the computational speed of computers mechanical relays must be replaced by vacuum tubes (see Figure 1.4). Vacuum tubes had already been used in radios for years. They could be switched on and off electronically, much faster than a mechanical relay could, and they contained no moving parts.

The first electronic computer was built in 1945 at the University of Pennsylvania. The ENIAC (Electronic Numerical Integrator and Calculator) had 18,000 vacuum tubes, drew 130,000 watts of electricity, and weighed 35 tons. Instructions to ENIAC had to be wired onto boards that were plugged into the computer. Although ENIAC could compute faster than the Mark I, it took a long time to change programs, and vacuum tubes burned out frequently.

The Second Generation. In 1947 the transistor was invented by a team of researchers headed by William Shockley at Bell Laboratories. The transistor performed the same function as the vacuum tube but required less space—it was 1/200th the size—and less electricity—it took 1/100 the power—gave off less heat, and was more reliable (see Figure 1.4). This invention began a new generation of computers classified as **mainframe** computers, large-scale systems requiring

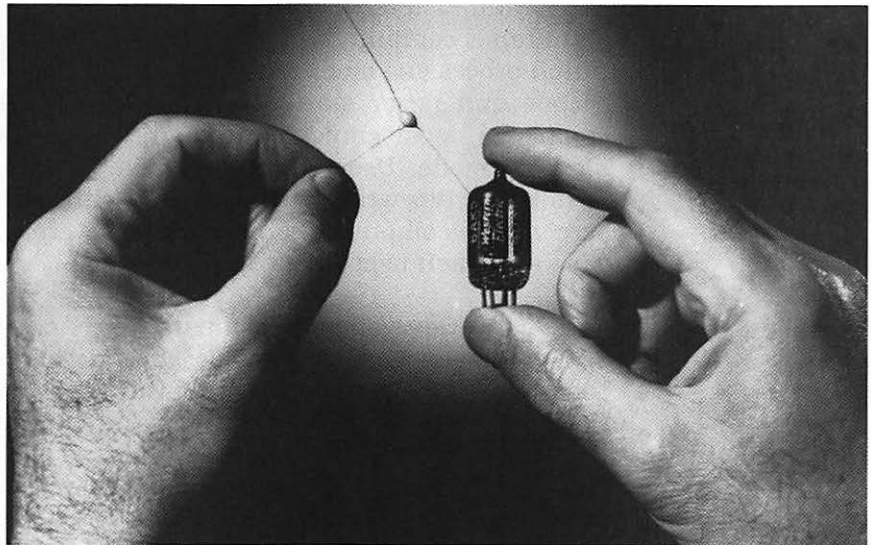


Figure 1.4. The Vacuum Tube and the Transistor (Courtesy of AT&T Archives)

special computer rooms, power generators, and air conditioning. In 1952, Remington Rand installed the first commercially available computer. By 1964, the mainframe computer had developed into the “state-of-the-art” IBM System/360®.

During this same period, computer programming languages were invented. A programming language is composed of Englishlike commands that instruct the computer to perform specific tasks when they are combined in the proper sequence (a computer program). Programming languages replaced the need to hard-wire instructions into the computer. Grace Hopper developed the first **compiler**, a program that compiles Englishlike commands into the corresponding low-level instructions (machine language) that the computer understands. This concept greatly expanded the functionality of computers because it made it easier to change programs and gave more people an opportunity to use them.

The Third Generation. Transistors had a flaw. They often broke off of the circuit boards. Texas Instruments and Fairchild Semiconductor simultaneously discovered the remedy: the **integrated circuit**, also known as the **IC** or **chip**.

The first integrated circuits contained the equivalent of 10 to 500 transistors. The chip lacks soldered wires, reducing its possible points of failure and thus making it ultrareliable. Because the integrated circuit is so tiny (one-half of a centimeter square), electric signals need travel only a short distance, saving time.

In the 1960s smaller computer systems called **minicomputers** were introduced. These systems were based on the integrated circuit and required less space, less power, and less air conditioning. Mainframe computers of the period primarily functioned in the **batch**-processing mode. This meant that they worked on one job at a time and never started another task until the first one was completed. Most minicomputers, in contrast, operated in a **time-sharing** mode. **Users** communicated with the computer using a terminal, a typewriter keyboard with either a printer or a TV-like screen. Minicomputers could work on several jobs at once, sharing time with each user—hence the term.

The Fourth Generation. Scientists were not satisfied with a mere 500 transistors on a chip, so they developed the Large Scale Integrated (LSI) circuit and later the Very Large Scale Integrated (VLSI) circuit. The LSI chip contains the equivalent of 500 to 20,000 transistors and can store several thousand characters of data. VLSI chips contain over 20,000 transistors. However, these new chips did not increase in physical size; the transistor circuits were miniatur-

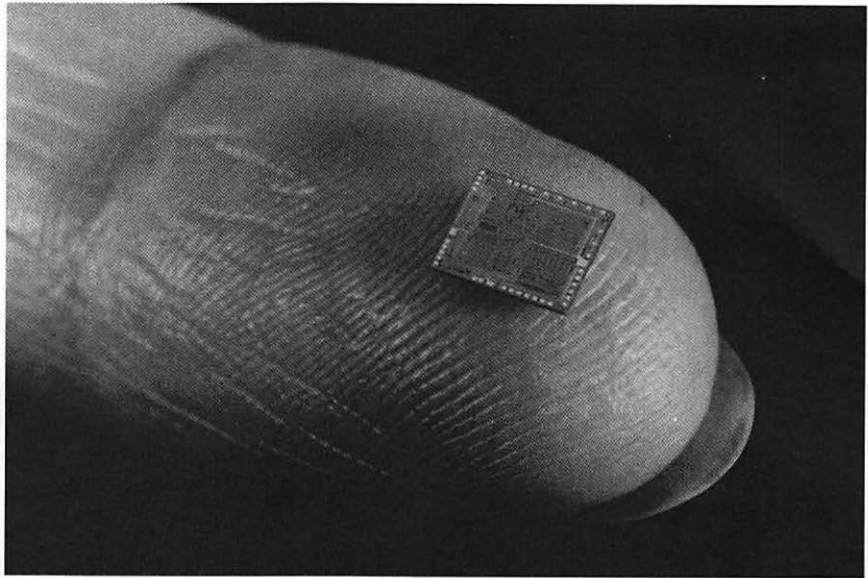


Figure 1.5. The Integrated Circuit (Brooks/Cole)

ized. Million-function chips are common today, and engineers expect to squeeze ten million functions onto a chip soon (see Figure 1.5).

The LSI chip provided the foundation for the development of the microprocessor chip found in today's **microcomputers**. In 1977, Apple Computer introduced the Apple II, a full-function computer the size of a portable typewriter, at a price ordinary people could afford. A few years later, International Business Machines introduced the IBM PC (or Personal Computer). These companies launched the microcomputer industry. The microcomputer was an instant success because its owners never had to share the computer, as a minicomputer is shared; they could even carry it around, making it available at all times in all places.

But the success of the microcomputer was not solely the result of its small size and modest cost. Software, or computer programs, designed for nontechnical users greatly expanded the demand for personal computers. Spreadsheet programs such as Visicalc for the Apple II and Lotus for the IBM PC "sold" computers because they gave nonspecialists the ability to use computers to solve business, financial, and mathematical problems. The potential of microcomputers in the future lies in the ability of hardware and software to become more integrated and to enable individuals to use computers more easily.

1.2 THE FUNDAMENTAL HARDWARE UNITS OF ANY COMPUTER

A computer is an extremely fast and accurate processor of data. In the simplest configuration, most computers comprise these four units, which are connected electronically.

1. An **input** unit (such as a computer keyboard or mouse), through which data are entered
2. A **central processing unit** and **primary storage**, which stores the data input and processes it electronically
3. An **output** unit (such as a computer screen or printer), which shows the results of processing the data input
4. A **secondary storage/retrieval** unit (such as a disk drive), which stores information on and retrieves information from some magnetic medium (such as a floppy disk)

Figure 1.6 shows these units in chart form.

It is very important, especially if you're new to microcomputers, that you become familiar with the processes needed to access, or use, the system. This means first gaining confidence in using the system. The remainder of this chapter is devoted to building that confidence. This book's examples and assignments assume that you have access to a Macintosh computer running the 6.03 (or later) version of the operating system and the 2.0 (or later) version of Microsoft Works.

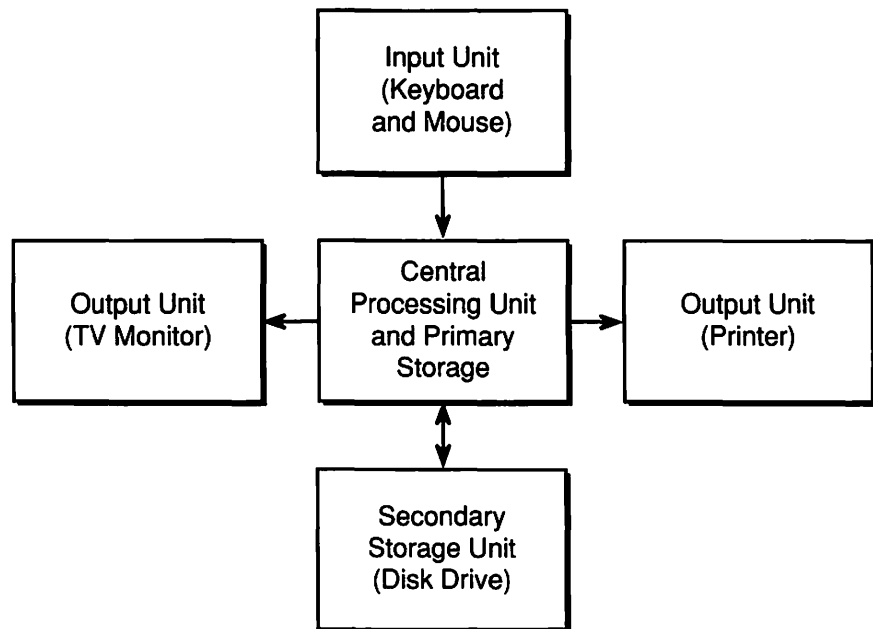


Figure 1.6. The Components of a Computer System

1.3 THE MACINTOSH FAMILY OF MICROCOMPUTERS

The Macintosh was first introduced in 1984; within 5 years it had become one of the most popular computers in America. Among the reasons for this popularity are its ease of use, high-quality text and graphics, communications compatibility with other computer systems both small and large, and high level of personal productivity.

Over the past 6 years, the Macintosh has seen many changes. The original model included only 128K (1K = 1024 **bytes**, or characters) of RAM (Random Access Memory), a 400K floppy disk drive, and a built-in 9-inch monitor. Subsequent models, such as the Mac Plus®, SE®, and Mac II® series, offered greatly increased RAM, additional disk drives, larger monitors, and even color monitors. The variety of Macintosh models and components makes it difficult to describe all the possible combinations. Therefore, this book will limit discussions to a "typical" system:

1. A Macintosh Plus or SE with 1 megabyte (1,024,000 bytes) of RAM
2. A standard 9-inch built-in monitor
3. An 800K built-in floppy disk drive
4. A second 800K floppy disk drive or an optional 20-megabyte hard disk drive
5. An Apple keyboard and mouse
6. An ImageWriter II® printer

1.3.1 Inside the Apple Macintosh

From the exterior, the Macintosh resembles a small TV set with a keyboard. Inside its case are the integrated circuits that make it operate. Figure 1.7 illustrates the "core" of the Macintosh. The functional work unit is the Motorola 68000 series microprocessor chip, which is centrally located on the Mac's main logic board. Surrounding the microprocessor are memory chips, expansion slots, and other electronics necessary for operation.

Two types of primary memory are found in most microcomputers. **ROM** (Read-Only Memory) has programs and instructions already stored in it by the manufacturer. These programs may be used (or read) but not changed in any way. They are permanent and are never lost, even when the power is turned off. In contrast, **RAM** (Random Access Memory) is read-and-write memory. It may be read or changed (or written to). When the power is turned off, anything stored in RAM is erased. Consequently, RAM is used for short-term memory needs.

The Macintosh ROM contains program routines to print text and graphics on the monitor's screen, to store and retrieve data from memory and disk, and to perform other basic system functions. The

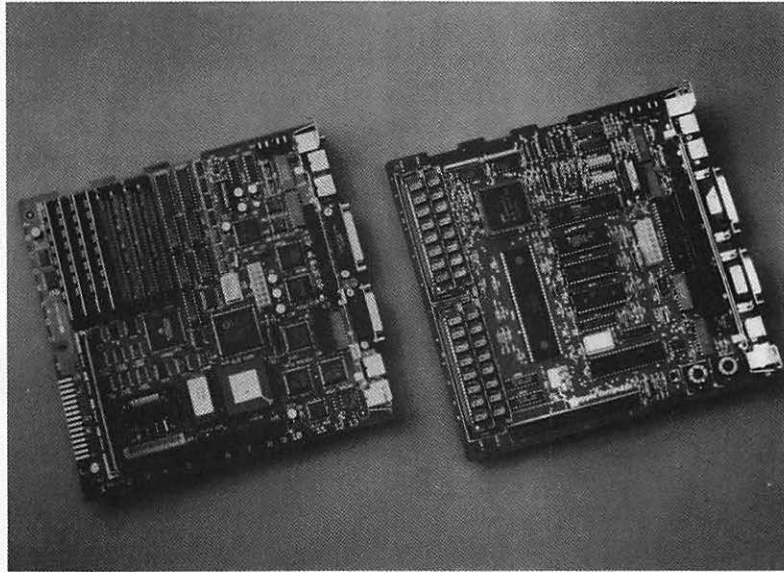


Figure 1.7. The "Core" of the Macintosh (Courtesy of Apple Computer, Inc.)

primary storage is used for storing applications such as Microsoft Works, program data files, and images of text and graphics on the screen. One byte of RAM can store a single alphabetic character or a three-digit number between 0 and 255. To store a single-spaced typewritten page with one-inch margins would require approximately 3,510 bytes. This chapter requires 41,000 bytes of storage, and this entire book, including the figures, requires more than 4 megabytes.

Several connectors are located at the rear of the Macintosh (see Figure 1.8). They connect the keyboard, mouse, external disk drives, printer, telephone modem, and speakers. An expansion slot on the main logic board allows you to add special monitors, expanded memory, and alternate processor boards.

1.3.2 The Built-in Monitor

Some microcomputers will output to any television or monitor. However, the resolution (the number of individual dots on the screen) of the Macintosh is so fine that it requires a special monitor. The built-in 9-inch monitor displays 175,104 **pixels**, or dots. The Macintosh II system requires a separate monitor of its own.

1.3.3 The Disk Drives

The disk drives are the "file cabinet," or secondary storage system, of the Macintosh. Documents are created in primary storage, RAM, and must be stored on hard or floppy disks if you wish to save them



Figure 1.8. The Connectors at the Back of the Macintosh (Courtesy of Apple Computer, Inc.)

permanently. The floppy disk drive on the Macintosh is capable of storing 400K, 800K, or 1.44Mb of information (as programs and/or data) per 3.5-inch diskette.

Helpful Hint: If a single-spaced typewritten page of text contains approximately 3,510 bytes of storage, a 3.5-inch 800K floppy diskette would contain approximately 228 pages of text.

The 3.5 inch diskettes can be inserted into and ejected from the disk drive by users, which enables them to transfer information from one Macintosh to another by carrying or mailing diskettes. The Mac SE, Mac II, and Mac Classic® are also capable of reading and writing IBM-formatted floppy diskettes.

The basic hard disk drive stores 20Mb of information. The hard disk drive is a sealed unit permanently mounted inside the Macintosh cabinet. It is constantly spinning at a high rate of speed and consequently transfers data much faster than the floppy disk drive can. Obviously, the advantages of the hard disk are speed and storage capacity. When a hard disk drive is used, floppy diskettes are only needed to transfer information or for back up purposes. Frequently used applications and files are best stored on the hard disk so they can be accessed almost instantaneously. Because information stored on both floppy and hard disks is retained even when the power is off, both are used for long-term storage.

1.3.4 The Keyboard and Mouse

All the Macintosh keyboards have standard typewriter keys plus a few special keys (see Appendix I for a summary of the functions of the

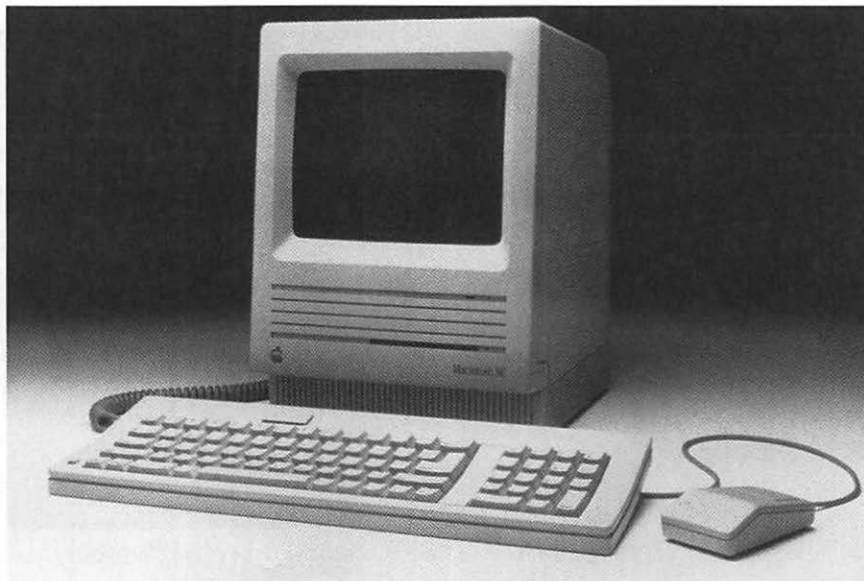


Figure 1.9. A Typical Macintosh System (Courtesy of Apple Computer, Inc.)

special keys). An extended keyboard contains 15 function keys and additional special keys that are helpful for advanced users and necessary for running some IBM PC software on the Macintosh (with appropriate hardware and software).

The mouse (see Figure 1.9) is an input device that eliminates much of the typing associated with early microcomputers. Using the mouse you can select items, execute commands, and control what is displayed on the screen.

1.3.5 The Printer

The most common and least expensive printer used with the Macintosh is the Apple ImageWriter II, a type of dot matrix printer. These printers use a series of small pins to print dots that make up the image on the paper. The Macintosh is a “what you see is what you get” (WYSIWYG) computer system. This means that the image you see on the computer’s screen will print exactly the same way on the printer—including pictures, graphics, and fancy type styles.

The Apple LaserWriter® printer costs much more, but provides higher-quality output. These printers have become commonplace in offices, print shops, art studios, and other businesses that require close to typeset-quality printing. The Macintosh and LaserWriter printer are the foundation of desktop publishing applications.

1.4 HOW TO USE THE MACINTOSH

The following sections of this chapter will explain how to start up the Macintosh, how to use the mouse, icons, menus, and windows, and how to format a blank diskette. The presentation is intended for the beginner, so it's not a thorough discussion of every option, command, or action available to the Macintosh user. For more detailed information, see the *Macintosh Owner's Guide* and *Macintosh System Software User's Guide*, which are included with each Macintosh. If you're already familiar with the operation of the Macintosh and its system you may wish to skip to the next chapter.

1.4.1 Getting Started

To begin you will need a floppy start-up diskette, unless your Macintosh has a hard disk drive. A start-up diskette is any diskette containing a **system folder**. The system folder contains the Macintosh operating system that must be loaded into RAM before using the computer. The examples and figures in this chapter use the *Macintosh System Tools* diskette included with each Macintosh. However, any diskette containing a system folder will work. To begin, follow these simple directions. (If you have a hard disk drive, you do not need to use a floppy diskette. Skip Steps 2 and 3.)

1. Turn on the Macintosh by pushing up on the switch located at the back of the computer on your left. The Macintosh will beep.
2. Insert a start-up diskette into the built-in floppy disk drive. The diskette's label should be facing up and its metal shutter should be pointing toward the back of the drive.
3. Push the diskette gently into the disk drive until it is entirely inside and snaps down into position. Do not force it. If it doesn't seem to fit, you may be inserting it upside down or backward. Remove the diskette and try again.
4. After a few seconds a welcoming message will appear, and then the Macintosh desktop will appear (see Figure 1.10).

Experienced users call the process of starting up the Macintosh **booting**. The booting process loads the Macintosh Operating System from the diskette into RAM memory. This is essential for controlling the screen image, disk drives, printer, keyboard, mouse, and other peripheral devices.

1.4.2 The Desktop, or Icon Hardly Wait

After successfully starting up the Macintosh you will be viewing the desktop, which is analogous to the top of an office desk. Just as a

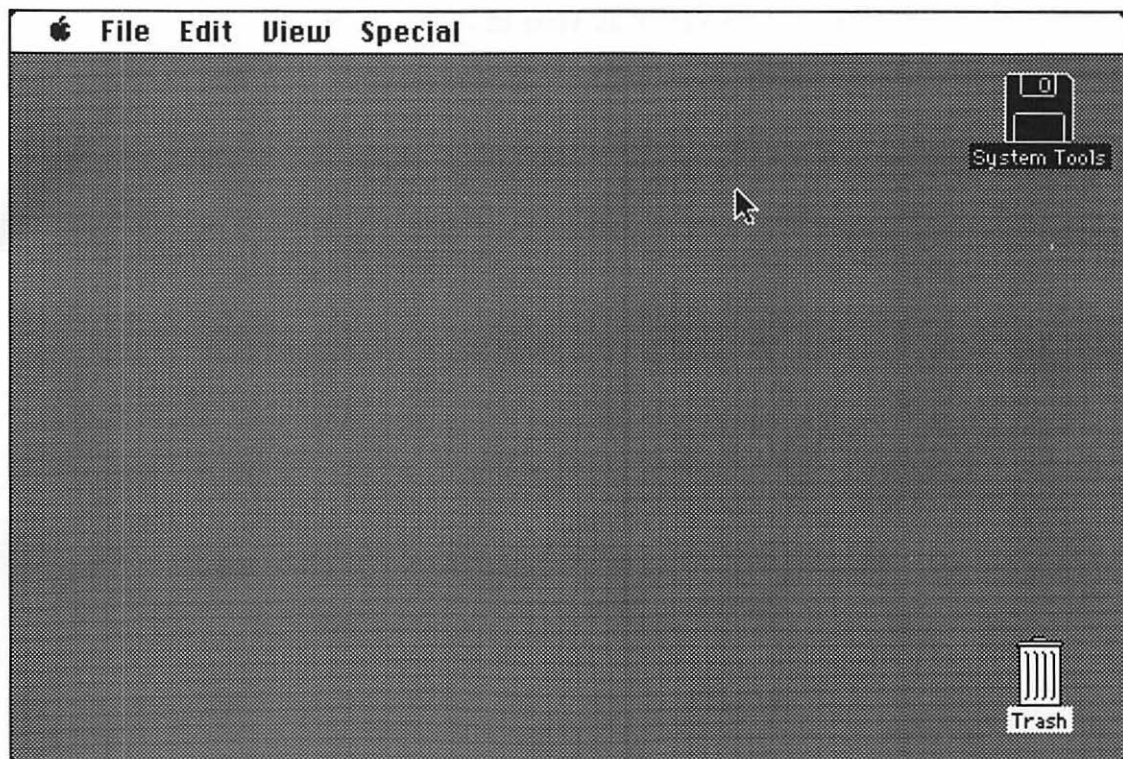


Figure 1.10. The Macintosh Desktop

secretary would lay out file folders, papers, and diagrams on top of a desk, so the Macintosh “displays” the necessary information that you need to use on the Macintosh desktop. Both systems allow items to be moved around on the desk, shuffling the item that is to be worked with onto the top.

Look closer at the desktop. At its upper right-hand side is an *icon* representing the start-up diskette. An icon is a graphic on the desktop that represents computer storage accessible to you. Numerous icons are used on the Macintosh, representing floppy and hard disks, file folders, application software such as Microsoft Works, and word-processing documents. Figure 1.11 shows a few of the many icons you will see and work with as you become more familiar with the Macintosh. The start-up diskette icon will either show a floppy diskette or a hard disk. The name of each diskette will appear below the icon. In the lower right-hand corner of the desktop is a trash can icon. The Trash is just what its name implies: a place to discard unwanted desktop items. Items placed in the Trash can be retrieved as long as the Trash has not been emptied. You will learn how to use the Trash later.

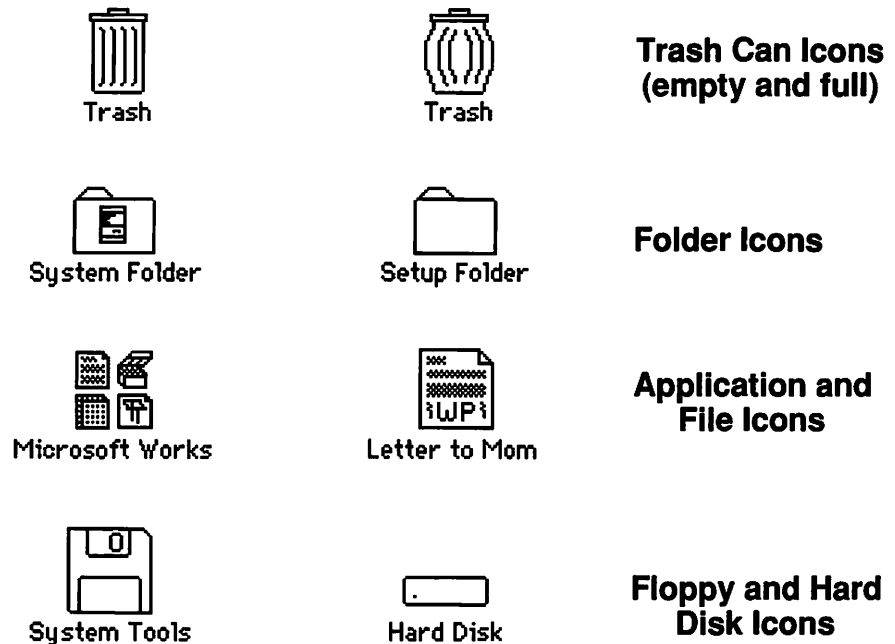


Figure 1.11. Examples of Macintosh icons

Across the top of the desktop is the **Menu Bar**, which contains the categories of commands available to you. Each category contains several commands that can be executed; for example, the File menu's commands will open, close, save, and print files. The categories on the Menu Bar change when you switch from one application to another, because the commands you need, for example, in word processing differ from those you need in drawing. Be patient! You will learn how to use the Menu Bar soon.

1.4.3 Mousing Around

The other image on the desktop is a small arrow. This arrow is the pointer controlled by your mouse. Place your hand on the mouse and roll it around on top of your desk. The pointer on the screen will follow its movement. If you go to the left, the pointer goes to the left, and so on. If you run out of space on your desk, you can pick the mouse up, move it over, and put it down again.

There is also a button on the top of the mouse. Hold the mouse so that your index finger gently rests on the button. Roll the mouse so that the pointer is pointing directly on the Trash. Press and release the mouse button. The Trash will become highlighted (it will change from black on white to white on black). This is called **selecting** an

icon. The selected icon will be the object of any action or command that is executed. To reverse the process, or deselect an icon, simply **point and click** on another icon or anywhere on the desktop.

You can **drag** a selected icon around on the desktop with the mouse. When you point to the Trash icon this time, continue to hold down the mouse button while you roll the mouse. An outline of the Trash will move on the Macintosh desktop as you roll the mouse. When you raise your finger from the mouse button, the Trash will have been moved to the new location.

Using the mouse, point to the start-up diskette icon. Click the mouse button twice rapidly. This action will **open** the start-up diskette, so you can see what is available in it. Figure 1.12 shows the result of **double clicking** the System Tools icon. The new object on the screen is called a **window**; it contains more icons, which represent folders and files stored on that diskette.

Before going on, practice mousing around—try dragging icons out of the window and onto the desktop. When you are done, be a good citizen and put the icons back where they came from.

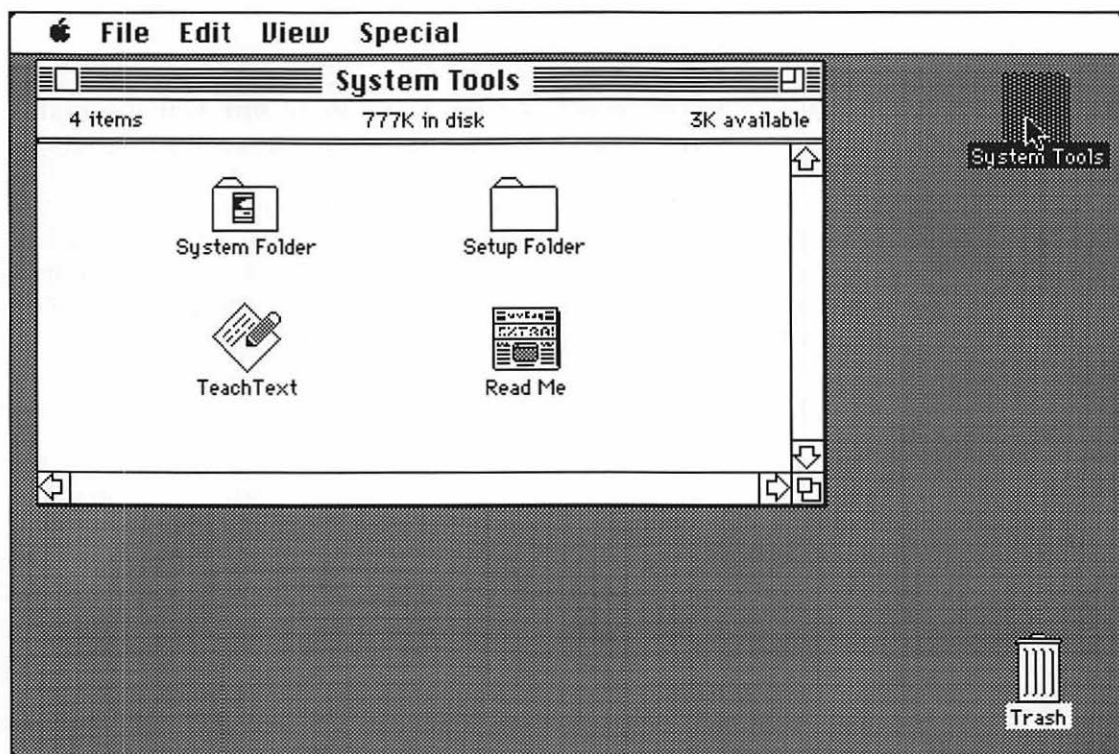


Figure 1.12. Opening the Start-up Diskette

1.4.4 Pull Down the Menu, Dear

Now that you have experience with pointing and clicking the mouse, you're ready to learn to use the Menu Bar. With the mouse, point to the Apple logo at the far left of the Menu Bar. Hold down the mouse button. Voilà! A list of commands and options will remain on the screen as long as you continue to hold down the mouse button. Still pressing the button, roll the mouse to your right along the Menu Bar. As you pass over each category, a different list of commands appears. Release the button and the menus will disappear.

A menu on the Macintosh is like a menu at a restaurant: a list of options from which you may choose. Look closely at the commands (see Figure 1.13). Some of them are in solid black letters. Others are shaded gray. The commands in solid letters are available for execution. The shaded commands are not available at this time because they would be inappropriate. For example, you cannot close a folder that has not been opened. The Macintosh Menu Bar will be very helpful. You seldom have to remember or look up commands; they

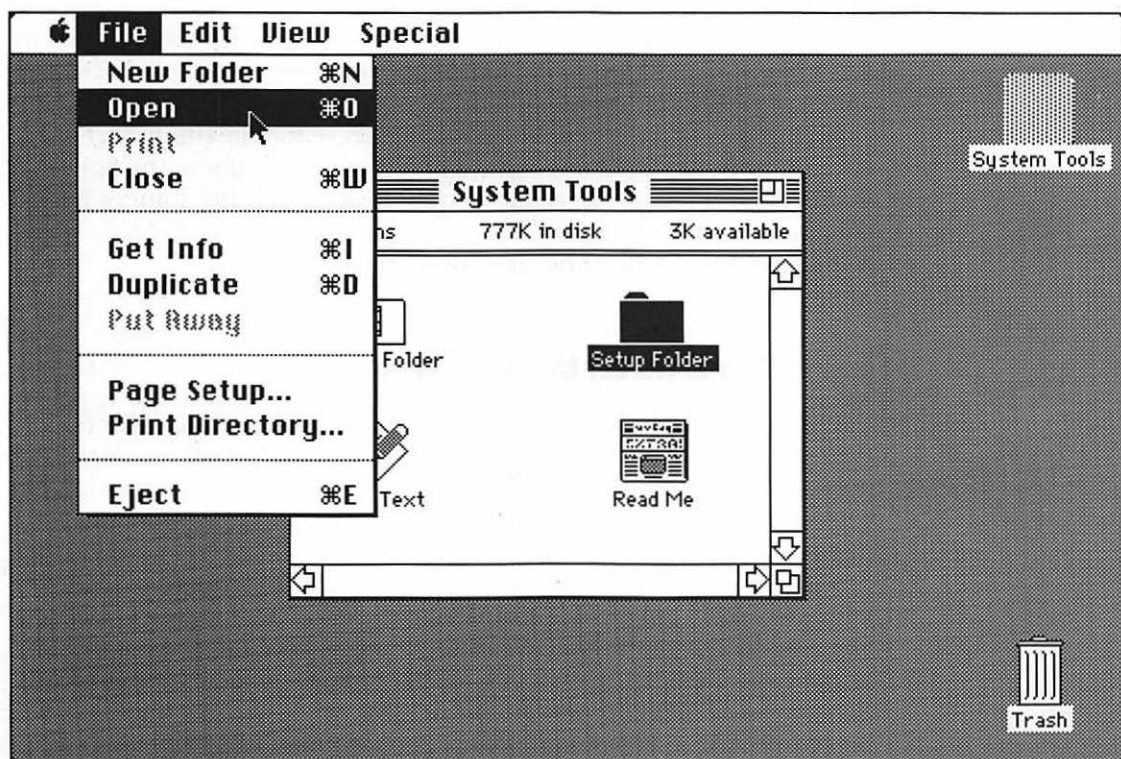


Figure 1.13. Using the Menu Bar to Open a Folder

are always handy on the desktop. The menu also reduces errors because it will not let you do something inappropriate.

Select an icon on the desktop by pointing to and clicking on it. It will be best if you select a folder or diskette icon. Then point to the File menu and hold down the mouse button. Drag the mouse toward you. As you do so, the commands in the menu will be selected (white on black). You can roll down the menu or up the menu. Stop on the Open command and release the mouse button. You have just executed the command to open the folder or diskette that was selected. Similarly, you can **close** a window by selecting the appropriate command from the File menu. Try it.

The icon you selected before should still be highlighted. Choose the Get Info command from the File menu. A little window will appear, describing the contents of the icon: the kind of document, the date it was created, how much storage space it requires, and more. The easy accessibility of this information is one of the nicest features of the Macintosh operating system. Close the window by choosing the Close command in the File menu.

Practice using the pull-down menus. If it is not already open, open the start-up diskette. (Clicking on the diskette icon and choosing Open from the File menu opens a diskette, just as double clicking on the diskette icon does.) Now try each of the commands in the View menu. These commands let you view the contents of the window in different ways.

With the start-up diskette still open, execute the New Folder command under the File menu. This will add a folder to the start-up diskette. You can store applications, files, and other folders inside this new folder. Drag an icon on top of the New Folder. What happened to it? Open the new folder and find out.

1.4.5 Windows on the Mac World

You have seen how a window displays the contents of a disk or folder. When you're using word-processing, spreadsheet, and database applications, windows will display your work in a document or file. Therefore it is most important to learn to manipulate windows on the desktop to work efficiently.

One of the advantages of windows is that you can have multiple windows open on the desktop. This allows you to switch back and forth easily between windows. For example, you may have a spreadsheet and want to transfer a calculation into a word-processing document. Other convenient features of windows are that they can be moved around on the desktop and changed in shape and size.

The best way to learn to use windows is by hands-on practice. From our example in the previous section you should have the start-up diskette's window open on your desktop. You may already have a folder window open too. If not, open a folder so that two windows are open on your desktop. (Do you remember how to open icons? If not, review Sections 1.4.3 and 1.4.4.)

Look closely at the two windows (see Figure 1.14). One of them, the "top" one, will have six horizontal lines on either side of its title. This indicates that it's the **active** window, the only one you may currently use. The other window may not be completely visible; a portion may be hidden by the active window. To bring the other window to the top, like shuffling a stack of papers, place the pointer inside it and click the mouse button. Practice switching between windows on the desktop.

To move the active window to a different location on the desktop, point to the **title bar**, the area at the top of the window with the title and the horizontal lines (see Figure 1.15), hold the mouse button

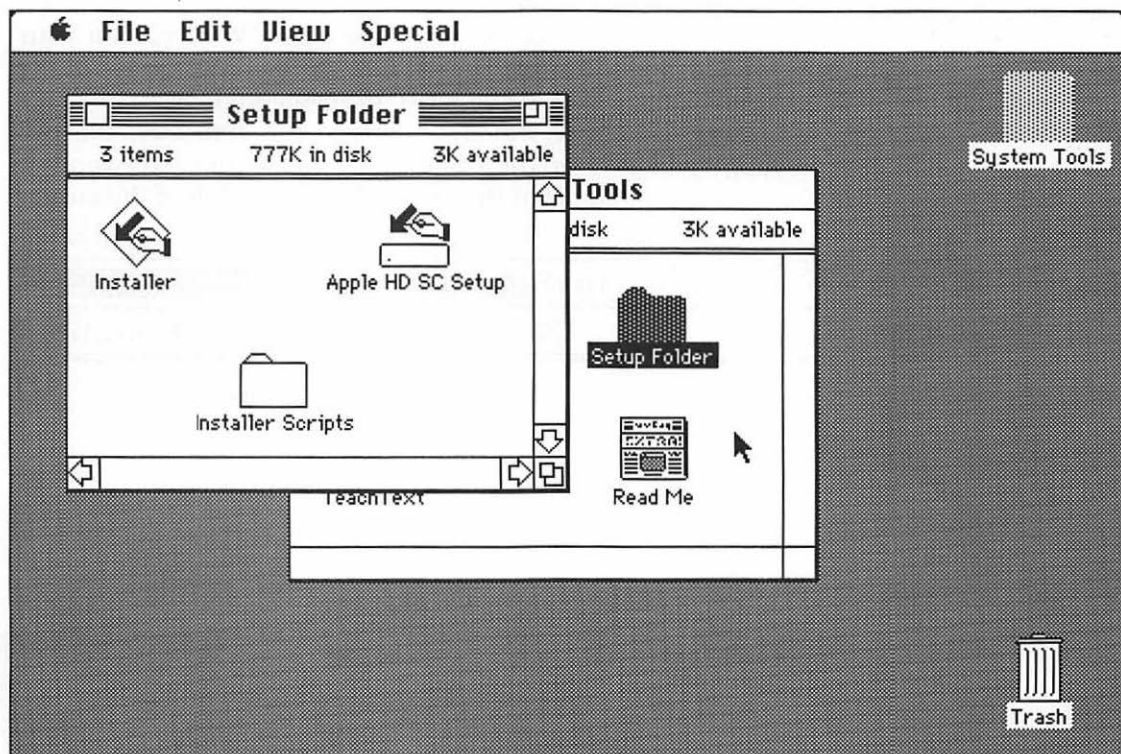


Figure 1.14. Switching Between Two Windows

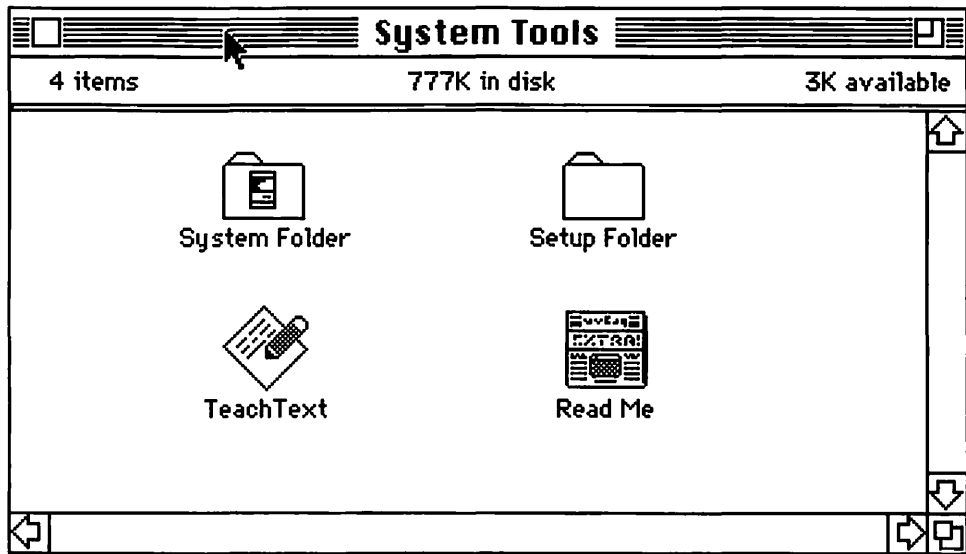


Figure 1.15. Using the Title Bar to Move the Window

down, and drag the window around the screen. When you lift your finger from the mouse button, the window will be repositioned at the new location. This action is similar to dragging an icon.

To enlarge the active window, point to the **size box**, the two interlocking small boxes in the lower right-hand corner of the window (see Figure 1.16). Hold down the mouse button and drag the corner

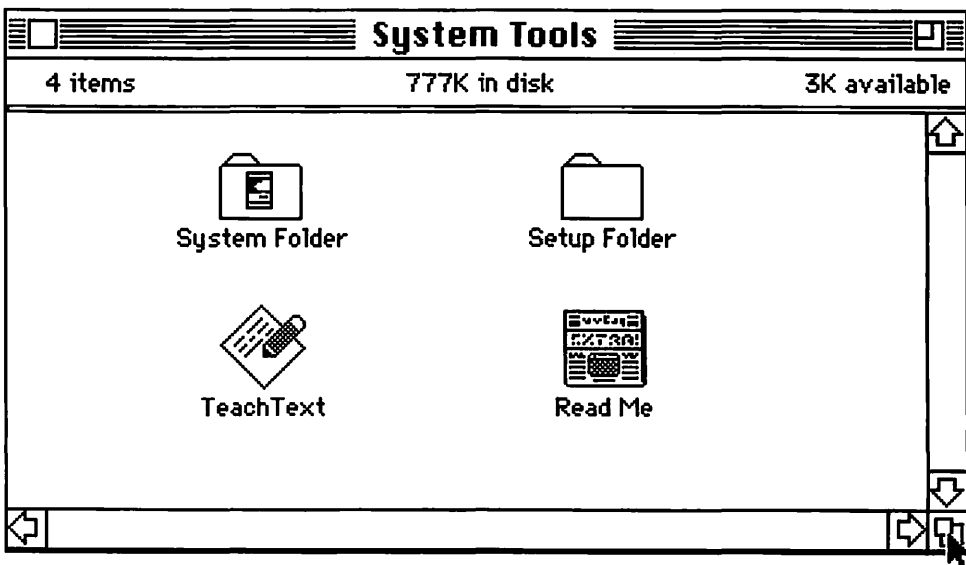


Figure 1.16. Using the Size Box to Resize the Window

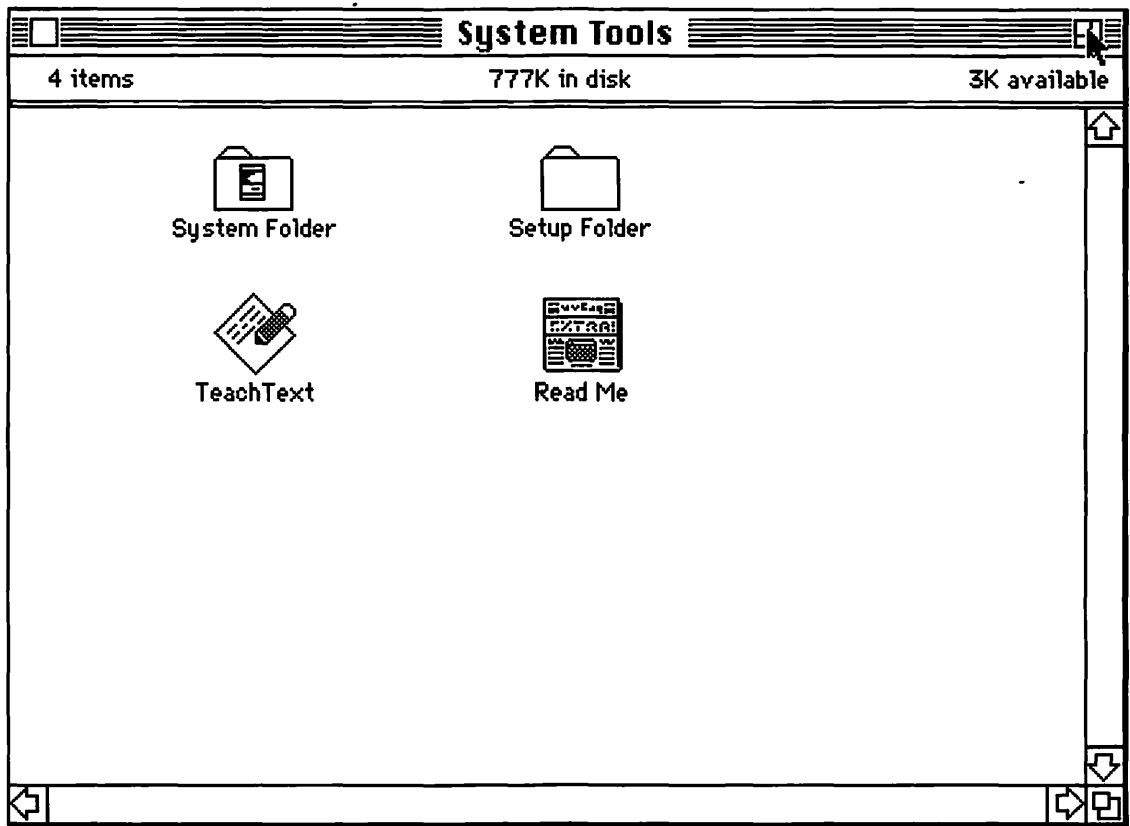


Figure 1.17. Using the Zoom Box to Size the Window to the Desktop

down and out. When you lift your finger from the button the window will enlarge, displaying other information that may be in it. This process can be reversed to make the window smaller, too. Try it.

Another way of enlarging the window is to use the **zoom box**. With the mouse, point to the two small boxes in the upper right-hand corner of the window (see Figure 1.17). Click the mouse button. The window will zoom up to fill the desktop. If you click the zoom box again, the window will return to its previous size. What a memory!

When a window is resized, there may be more information in it than can be displayed. When this happens, **scroll bars** appear on the right-hand side, on the bottom, or both. The scroll bars can be used to roll information, text, pictures, icons, and so on, up and down or left and right inside the window so you can get to everything in it. To scroll a window, point with the mouse to one of the arrows

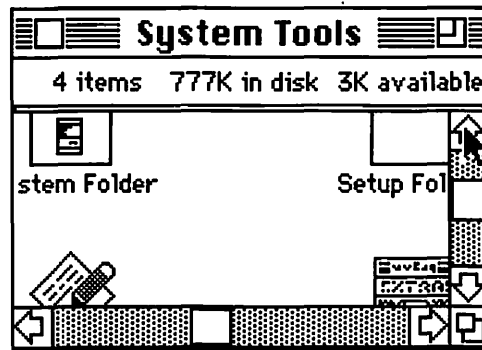


Figure 1.18. The Scroll Bars

and hold down the button. The top vertical arrow scrolls the window down (see Figure 1.18). The bottom vertical arrow scrolls the window up. The left horizontal arrow scrolls the window to the left and the right horizontal arrow scrolls the window to the right. Another way of scrolling the window is to point to the **scroll box**, hold down the mouse button, and drag (see Figure 1.19). Practice these features; you'll need them later.

There is one more window feature. In the upper left-hand corner of the window, find the **close box** (see Figure 1.20). Point and click in this box and the window will close. Clean up your desktop by using the close box to remove all the windows from sight.

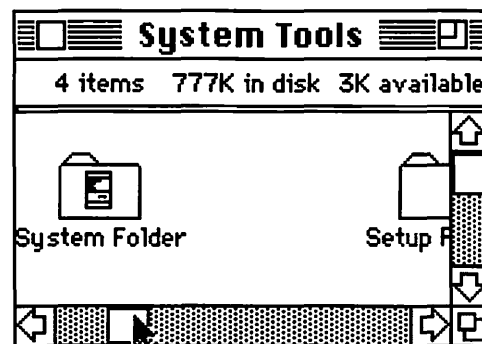


Figure 1.19. The Scroll Box

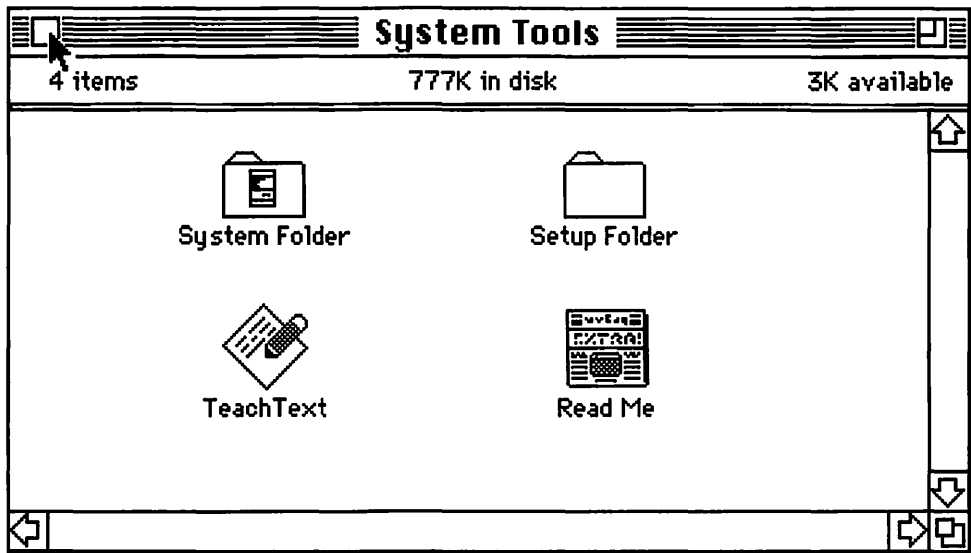


Figure 1.20. Using the Close Box to Close a Window

1.4.6 Formatting a Diskette

To effectively use this text you will need to work the examples and problems in the following chapters. It will be necessary for you to store your work on a diskette. A blank disk purchased from a computer store cannot be used with the Macintosh until it has been formatted, however. This process, also known as initializing, prepares the diskette so that data can be stored on its surface. On the Macintosh, this process can be initiated at any time by inserting a blank diskette in the disk drive.

Obtain a blank 3.5-inch floppy diskette and format it, using the following steps.

1. Start up the Macintosh using the procedure described in Section 1.4.1; wait for the desktop to appear.
2. Insert your blank diskette into any empty disk drive. If you have only one disk drive and the start-up disk is in it, use the Eject command from the File menu.
3. A dialog box will appear. Point to the button labeled "Two-sided" and click.
4. Another dialog box will appear. Point to the button labeled "Erase" and click.

5. After a few seconds, another dialog box will appear and ask you to name the diskette. Type in whatever you want to name this disk (for example, *Michelle's Data*).
6. After a few more seconds the computer screen will return to the desktop, having added an icon for your diskette.

It is very important that you have a blank diskette in the drive when you follow this procedure; otherwise, you will destroy any programs or data on the diskette. Once the diskette is formatted for the Macintosh it cannot be used on another brand of computer unless it is formatted for that system. If you need to make a start-up diskette, follow the procedure outlined and drag the System Folder icon from the start-up disk onto the icon for the newly formatted disk. (Note: Depending on your hardware configuration, you may be instructed via dialog boxes to alternately insert the start-up diskette and the new diskette.) More information about creating start-up diskettes can be found in the *Macintosh Owner's Guide* and *Macintosh System Software User's Guide*.

1.5 POSERS, PROBLEMS, AND PROJECTS

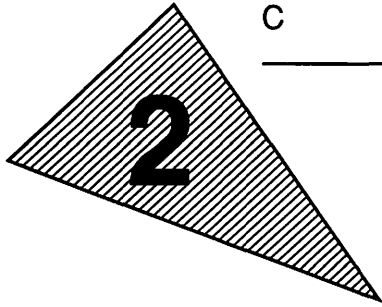
Most of the posers, problems, and projects in this book may be worked on the Macintosh. When possible, you should do so, because it will help you arrive at the solutions. As a last resort, or to check your work, refer to Appendix G for answers to selected problems. Problems preceded by an asterisk are somewhat more difficult; those preceded by a dollar sign are most appropriate for business applications.

1. Referring to Figure 1.6, identify the components of a computer system in relation to the Macintosh.
2. Describe how to initiate the following actions and describe the result.

<i>point</i>	<i>drag</i>	<i>scroll</i>
<i>click</i>	<i>double click</i>	<i>boot</i>
3. Define the following terms.

<i>RAM</i>	<i>chip</i>	<i>window</i>
<i>ROM</i>	<i>icon</i>	<i>menu</i>
4. When you boot the Macintosh, the desktop appears. Name three items that appear on the desktop after booting and explain what they represent.
5. Name the features that control a Macintosh window and describe how they work.

- *6. Describe the steps used to delete a file from the desktop.
- *7. Obtain a blank diskette and format it. Create a new folder on the diskette (hint: use the File menu). Be sure you create the folder on your diskette, not on the start-up diskette. Name the folder *Works Projects*. You will use this folder later to store your projects.



C H A P T E R

**I CAN'T TYPE ...
DON'T MAKE ME!**

"Many books require no thought from those who read them, and for a very simple reason; they made no such demand upon those who wrote them."

—Charles Caleb Colton

"There is no such thing as a moral or an immoral book. Books are well written, or badly written. That is all."

—Oscar Wilde

"One man's letter is another man's literature."

—Anonymous

OBJECTIVES

When you've completed this chapter, you'll be able to do the following.

1. Describe the three major advantages of word processing on a microcomputer (Section 2.2.1)
2. Start up the Macintosh computer and the Microsoft Works program (Section 2.2.3)
3. Enter and edit text in the Works word processor (Section 2.3.1)
4. Save a word-processing file on your own floppy diskette (Section 2.3.2)
5. Print the Works window and print a word-processing file (Section 2.3.3)
6. Find specific text anywhere in a document and replace it with new text (Section 2.4.2)
7. Cut, copy, and paste blocks of text within a word-processing document (Section 2.4.3)
8. Change the font, size, and style of type used in the Works word processor (Section 2.4.4)
9. Format a word-processing document, justifying the text and setting the line spacing, margins, paragraph indentation, and tab stops (Section 2.4.5)

10. Check the spelling of a Works word-processing document (Section 2.4.6)
11. Add page numbers, headers, footers, and title pages to your word-processing documents (Section 2.4.7)

2.1 AN INTRODUCTION TO MICROSOFT WORKS

One of the primary uses of computers is in managing information. Businessmen, educators, and students use computers in preparing written communications, keeping records, calculating formulas, monitoring resources, developing presentation materials, and accomplishing many other tasks.

Five major computer applications manage information: word processing, electronic spreadsheet, database, presentation graphics, and telecommunications. Word-processing software allows you to enter, edit, and print text. Spreadsheet software lets you manipulate numbers, do estimates, track budgets, and perform hypothetical what-if analyses. Database software acts like an electronic filing cabinet, organizing and retrieving information and printing reports. Graphics software gives you design tools to prepare overhead transparencies, posters, charts, graphs, and other visual representations of information. Telecommunications software connects your microcomputer with another microcomputer, minicomputer, or mainframe computer via telephone lines so you can share information or access remote databases.

Until recently, a microcomputer owner wanting to use all five of these applications had to purchase five separate programs on at least five diskettes, learn five different sets of commands and instructions from five manuals, and would still be unable to transfer data easily between programs. In recent years, however, **integrated programs** have been introduced to combine several applications in one software package. One of the first and still-popular integrated packages is the Lotus 1-2-3 for the IBM Personal Computer. It combines spreadsheet, database, and graphics applications.

Microsoft Works is another integrated package, but it combines all five of the major applications into one program for Macintosh computers. Like other integrated packages, it offers the advantage of sharing one set of commands and having one reference manual. It is less expensive to purchase than five separate programs, and data from all five applications can be stored on one diskette and shared by all. For example, a proposed budget can be electronically "cut" from the spreadsheet and "pasted" into an annual report in the word processor. Microsoft Works is the most widely used integrated package for the Macintosh.

2.2 GETTING STARTED WITH WORD PROCESSING

Word processing is one of the most practical and most popular computer applications. It can be used by businessmen for preparing memos, letters, and reports; by educators for producing lesson plans, tests, and handouts; and by students for improving their writing skills, completing homework assignments, and learning about computers.

The first word-processing systems were dedicated computers. In other words, they were microcomputers whose sole function was word processing. These machines were developed primarily by typewriter companies and sold for thousands to tens of thousands of dollars. Such systems are still available but are used primarily by businesses having large word-processing needs, such as the legal profession. Today word processing is available to anyone with access to a general-purpose microcomputer and appropriate word-processing software. A word-processing program can be purchased for almost any computer for as little as \$50 or as much as \$700.

2.2.1 Advantages of Word Processing

Basically, word-processing software does what a typewriter does: it puts text on a page. The main advantage of word-processing software is that the text on the page can be easily edited and formatted. Writing is not just a matter of collecting your ideas and putting them down on paper. Good writing means editing, correcting, and rewriting. If they had to retype the page, most people would not take time to rewrite a sentence or paragraph even if they knew it would read better. Word processing lets you put your ideas into words on the computer's screen. Then, making corrections, insertions, and deletions of a single letter, a word, a sentence, or a whole paragraph is as simple as moving the cursor to the desired location and entering and deleting the appropriate material. After rewriting and corrections are complete, a simple command transfers the written material to the computer's printer.

In addition to **entering**, **editing**, **formatting**, and **printing** text, here are some other major features of word processing.

Find and Replace. These features allow you to search an entire document quickly to **find** the next occurrence of a word or phrase. Once you find the text, you can **replace** it with new text. Let's suppose Michelle is Director of Public Relations for the Crescent City Paper Clip Company and has prepared her standard press releases using word-processing software. She takes a new position at the Acme Paper Clip Company. Using the find-and-replace feature of her

software, she can easily change every occurrence of Crescent City to Acme in her press releases with just one command.

Deleting, Moving, and Copying Text. Text can be *deleted* one letter at a time by using the Delete or Backspace key. But special functions will delete one word at a time, one line, or even an entire paragraph. Other special functions allow you to *move* a word, sentence, or paragraph from one location in a document to another. The *copy* feature allows you to duplicate text anywhere in the same document or to store the text and insert it into other documents at a later time. These electronic cut-and-paste features could be used to prepare customized letters to clients from a standard list of paragraphs appropriate to the particular business.

2.2.2 What You Need to Process Words

To effectively use word processing you need access to a suitable microcomputer and printer, appropriate word-processing software, and some blank floppy diskettes. This chapter will assume that you are using the Microsoft Works software on a Macintosh computer system. If you are planning to do a lot of word processing, obtaining a portrait monitor, which is capable of displaying an entire 8 1/2" × 11" page, is advisable. Another recommended addition to your system is a hard disk drive to eliminate the need to change diskettes frequently and reduce file-saving errors. If you do not have a hard disk drive, you'll need two floppy disks to use Works.

You will also need a printer and the appropriate cable to print your creative activities. A variety of printers can be used with the Macintosh. Section 2.3.3 will provide a general description of how to use a printer if you are not familiar with using one. This text assumes that you will be using an Apple ImageWriter II printer. Even though it is a dot matrix printer and hence lacks the resolution of the LaserWriter, the ImageWriter is the most popular printer among Macintosh users because it can print different sizes of characters, special foreign language characters, boldface text, underlined text, and proportionally spaced text.

To get the most out of this chapter, you'll need at least one formatted floppy diskette on which to store the examples from the text and your own projects.

2.2.3 Starting Microsoft Works

To get started processing words with Microsoft Works, follow these instructions.

Helpful Hint: If you have Microsoft Works stored on a hard disk drive, turn on the Macintosh and skip to Step 3 below.

1. Start up the Macintosh using the Works Startup and Program diskettes. (Remember how to start up the Mac? See Section 1.4.1 if you need help.)
2. If the Works window shown in Figure 2.1 is not visible on the screen, open the Works Program disk icon (see Section 1.4.3).
3. Start Microsoft Works by selecting the Works icon (point and click) and selecting Open from the File menu.

Short Cut: Double click—that is, click twice—on the Works icon.

4. The Works desktop should appear. Select Word Processor by pointing to the icon and clicking. Create a new document by pointing to and clicking on the New button (see Figure 2.2).
5. A word-processing document will be opened and the screen should appear as in Figure 2.3.

Helpful Hint: In Step 4, you may inadvertently click the Open button that opens an existing file. Close this file by clicking on the close box or choosing

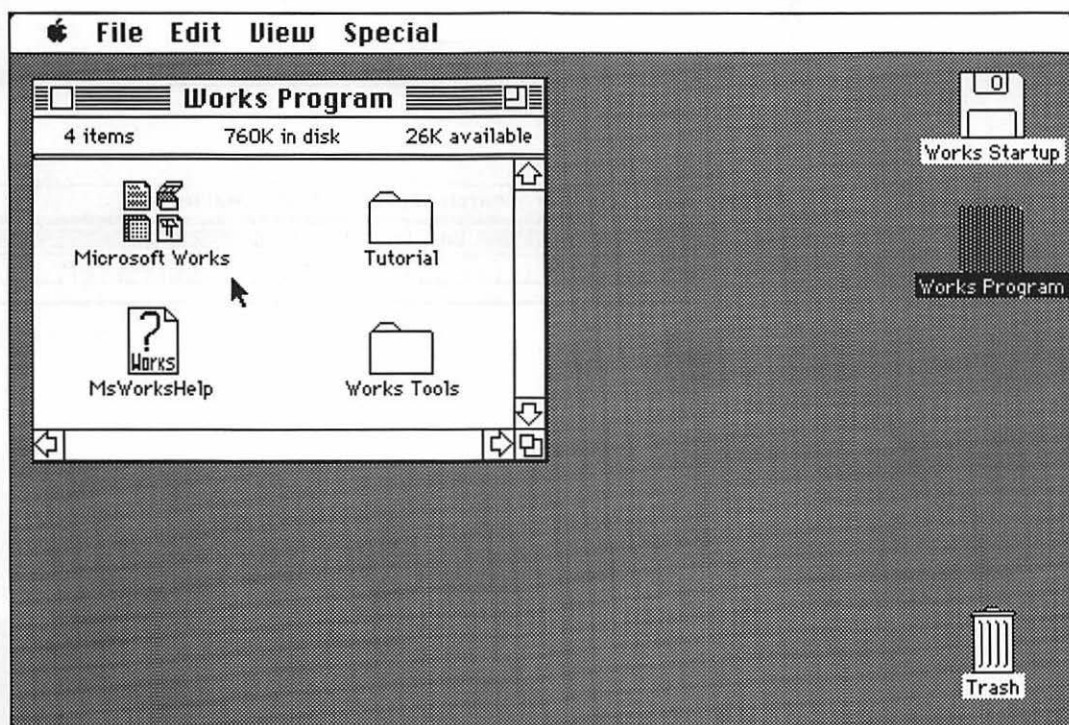


Figure 2.1. Starting Up Microsoft Works

Close from the File menu and repeat Steps 3 and 4. You have just created an Untitled word-processing document. In the following sections you will use this document to learn and practice the word-processing features of Works.

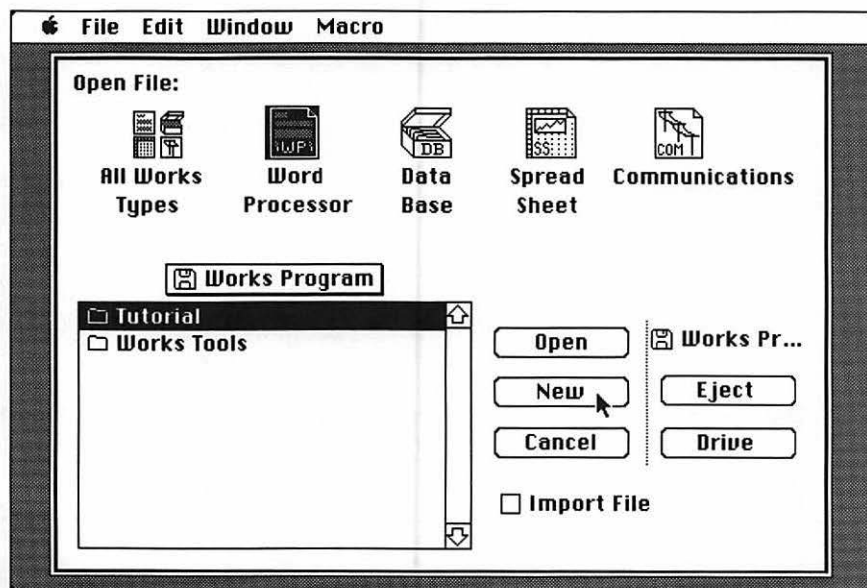


Figure 2.2. Creating a New Document

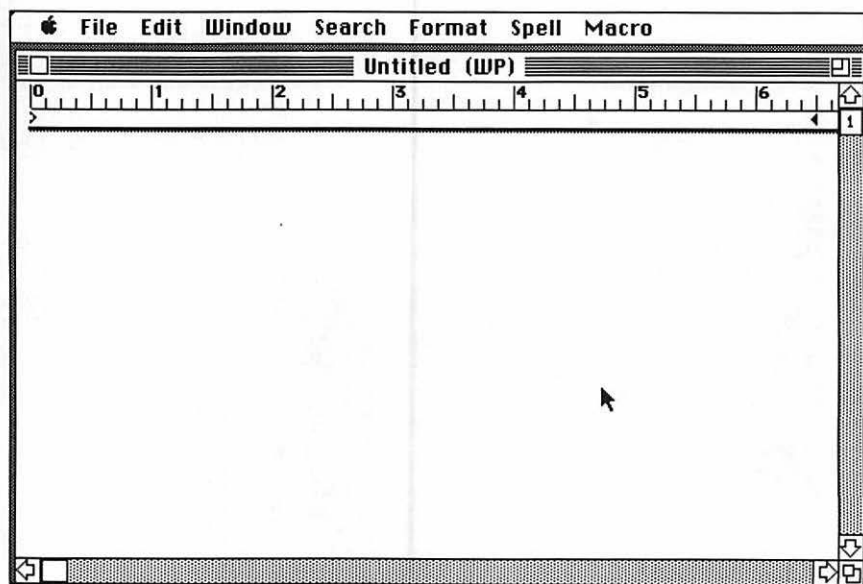


Figure 2.3. An Untitled Document

2.3 THE MICROSOFT WORKS WORD PROCESSOR

If you correctly followed the directions in the previous section for starting Microsoft Works, you now see displayed on the computer's screen a window representing a word-processing document (also known as a *file*). Because this is a new document, the window is empty (there is no text) and the document is labeled *Untitled*. After you have entered text, you will **save** your document. The save process will ask you to name your document and will store it on either a floppy diskette or a hard disk.

As you enter text, it is stored in the Random Access Memory of the computer. RAM is volatile memory that is erased when the computer's power is turned off. Consequently, if there should be a sudden power outage (such as when Rover trips over the power cord, unplugging your Mac), the text entered in your document will be lost. Saving the document copies text from RAM onto a floppy or hard disk for more permanent storage. *Always* save your work at regular intervals and before quitting to avoid reentering information.

2.3.1 Entering Text (Your First Document!)

Entering text in the Microsoft Works word processor is as simple as typing on a typewriter. Here are a few features of the word processor that simplify the task.

Ruler. At the top of the document's window is a ruler. This ruler is used to set the left and right margins, paragraph indentation, and tab stops. It can also be used to align text and graphics. Section 2.4.5 will teach you how to use the ruler to control the format of your document. When you open a new document, Microsoft Works assumes that you want a 1-inch margin on each side of the paper. This leaves 6 1/2 inches between the margins for text (see Figure 2.3).

Cursor. Directly beneath the ruler, in the upper left-hand corner of the document window, is a flashing vertical bar. This is the **cursor**. The cursor indicates where text will be printed on the screen. Type the word *Apple* on the keyboard. As you type, the cursor moves ahead to indicate where the next character will go.

Delete or Backspace Key. Depending on which model of Macintosh you are using, there will be either a Delete or a Backspace key on the keyboard. Either one deletes the character to the left of the cursor. Press the Delete or Backspace key five times slowly and watch how each letter of the word *Apple* disappears.

Caps Lock and Shift Keys. The Caps Lock key locks the alphabetic keys in uppercase mode. This eliminates the need for pressing the Shift key repeatedly when you desire all capitals. Caps Lock is active when the key is in the down position. When it is in the up position, the keyboard functions in lowercase mode. The numeric and punctuation keys are not affected by the Caps Lock key.

Return Key. The Return key is not used at the end of each line as it is on a typewriter. The Return key in the word processor is used to indicate the end of a block of text. This means that you continue typing text when you reach the end of a line. Works will automatically “wrap” the text onto the next line. This is known as **word wrap**. You do not press the Return key until the end of a paragraph. However, if you are entering text that must appear on a line by itself, such as a line in a poem or a title, press the Return key at the end of each complete line.

Using the hints provided above, enter the following quotation (your screen should resemble Figure 2.4 when you are finished).

“We’re still preparing our children for the same old repetitive jobs in the industrial age—the very jobs that are disappearing daily. Instead we should be preparing them for the jobs of the future, jobs that will require thinking skills, not rote memorization and repetition.

Computers, with their library of knowledge at student’s fingertips, will make it possible for children to enjoy learning by making them explorers, active participants in educational adventures.”

—John Sculley

Helpful Hint: Perhaps you need to make corrections? When the mouse is dragged inside the word-processing window, the pointer will change into an I-bar. Position the I-bar after the character that needs correcting. Click the mouse. The vertical cursor will move to the location of the I-bar. Press the Delete or Backspace key to erase the incorrect character and type the correct character.

2.3.2 Saving Your Quotation

At this point your document containing Mr. Sculley’s quotation (we hope it resembles Figure 2.4) exists only in RAM. You must save your file if you want to store it permanently on your diskette; otherwise, when you quit Microsoft Works and turn off the Macintosh, your file will be lost! To save your file, do the following.

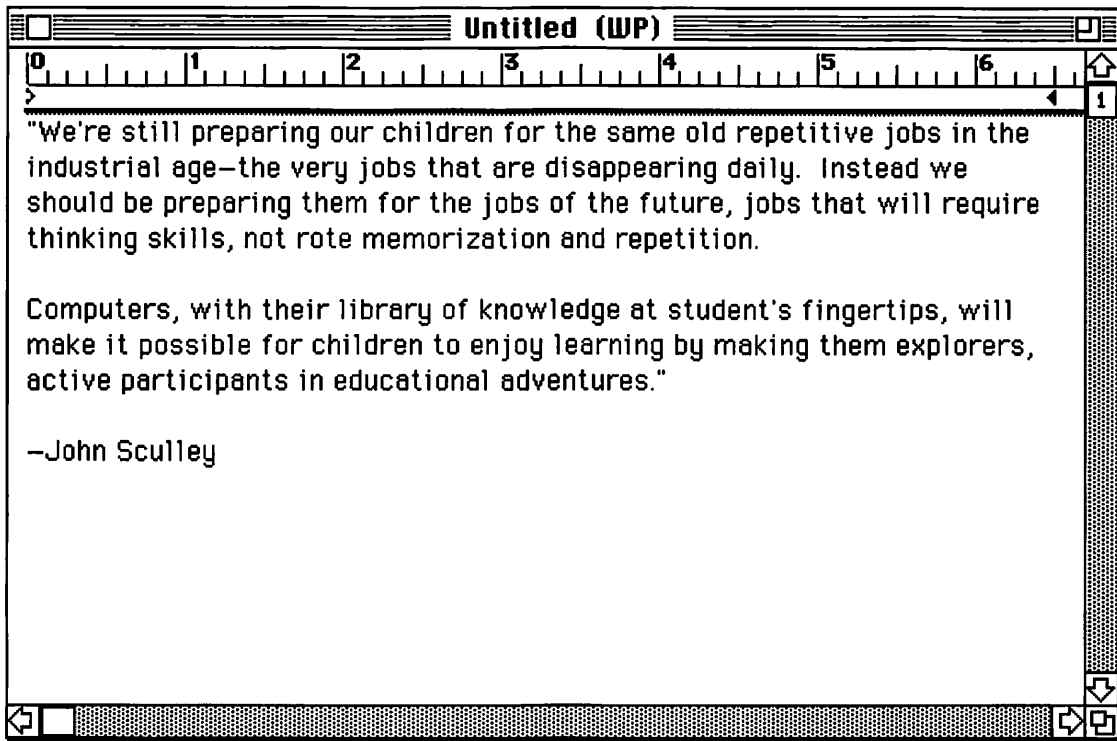


Figure 2.4. The Finished Quotation

1. Using the mouse, select the Save option from the File menu at the top of the screen.
2. A dialog box will appear (see Figure 2.5). Type *Sculley's Quotation* into the Save Document As box. This will be the name of your file. You must type in a name. Works will not let you name your file *Untitled*.
3. Insert the blank floppy diskette that you formatted in Chapter 1 into the vacant disk drive. (If there is no vacant disk drive, click the Eject button to eject the Works Program disk and insert your blank diskette.) The name of your diskette will now appear at the top of the dialog box.
4. With the mouse, point to the button labeled Save and click the mouse button. In a few seconds the dialog box will disappear and your document window will reappear. Your document has been saved and is now titled *Sculley Quotation*.

Short Cut: Now that you have named and saved your document, the next time you select Save from the File menu you will not have to type the file name. The Macintosh will automatically save your document under its name. This process will replace the old document with the latest

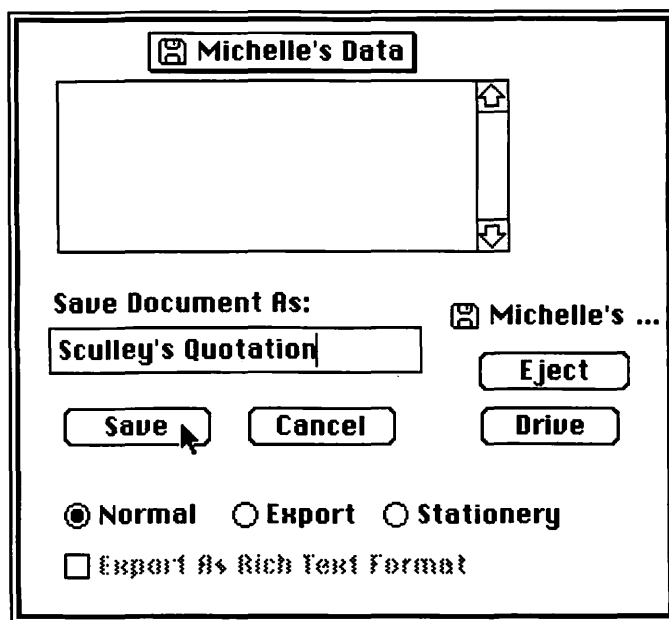


Figure 2.5. The Save Dialog Box

revisions. If you do not want to replace the original document, select the Save As command from the File menu and give the new document a different name.

2.3.3 Printing Your Document

There are two methods of printing in Works: you can print the contents of the window or you can print the entire document. Before you print, it is a good practice to save any changes that you have made to your document.

Printing a Document. Microsoft Works contains many special options that allow you to format your documents precisely the way you want. There are options to set the margins, to choose single or double spacing, to specify page numbering, to select different type styles and sizes, and many more. A major advantage of the Macintosh is that what you see on the screen is what will print on the printer (known as **WYSIWYG**, “what you see is what you get”; pronounced “wizzy-wig”). Before printing, check the screen to verify that what you see is what you want.

To print a document, follow these steps.

1. Align the paper on the ImageWriter so that the perforation is just above the black rollers. Turn on the ImageWriter by pressing the

- Power and Select buttons. Both the power light and the select light should be on.
2. Select Print from the File menu. The ImageWriter printing dialog box (see Figure 2.6) should appear on the screen.
 3. Select the Best, Faster, or Draft mode by pointing to the desired option and clicking. Draft mode is the fastest method of printing, but it is not WYSIWYG. It should be used for proofreading text material only. The Faster mode is WYSIWYG. The Best mode is also WYSIWYG and gives you the highest quality of print, but it's the slowest method of printing.
 4. As an option, you can enter the number of copies desired or a specific range of page numbers if you do not want to print the entire document. You can also hand-feed paper into the ImageWriter if you wish.
 5. Point to and click on the OK button and your document will be printed. If you wish to stop the printing, hold down the Command (⌘) key and simultaneously press the Period (.) key.

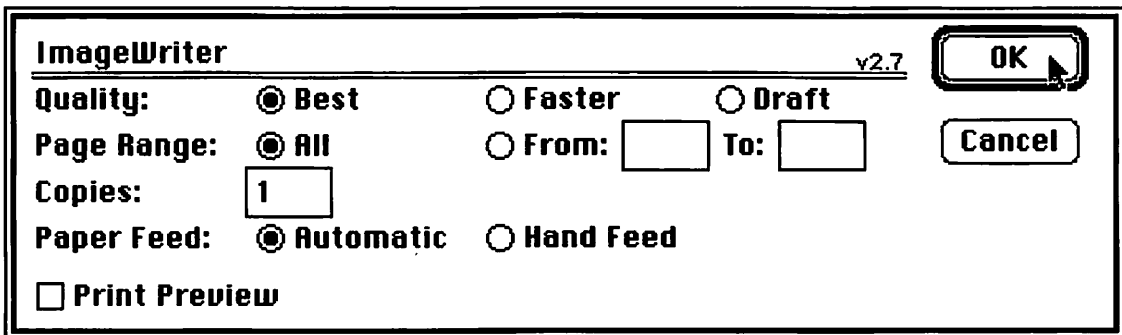


Figure 2.6. The ImageWriter Printing Dialog Box

Printing the Window. To print an exact copy of only what appears within the window on your screen, including the ruler, select the Print Window command in the File menu. Be sure that the power on your ImageWriter printer is turned on and that the select light is on.

2.3.4 Quitting Works

Now that you have been introduced to the word processor in Works, you need to know how to quit the program properly.

1. Select Quit from the File menu.
2. If you have made changes to your document since the last time it was saved, Works will ask you if you want to save the document. Click on the Yes button if you want to save the

changes, on the No button if you do not. If you click on the Cancel button, you will return to the word processor.

3. After a few seconds, you will return to the Macintosh desktop. Select Shut Down from the Special menu. Your disk will be ejected and the Macintosh's power will be shut off.

Helpful Hint: Although there are other ways to quit a Macintosh session, it is wise to always use Shut Down to ensure that your disk files are not damaged.

2.4 GETTING FANCY: THE ADVANTAGES OF WORKS ON THE MAC

This section will provide a more detailed look at how some of the special features work: finding specific text in your document, moving blocks of text, using different type styles and sizes, formatting the text, and spell-checking. To practice the commands necessary for accessing these features, first type in the example letter shown in Figure 2.7.

Helpful Hint: If you need help, review the following steps and refer to previous sections as necessary.

1. Start up the Macintosh (Section 1.4.1).
2. Start up Microsoft Works and open an untitled word-processing document (Section 2.2.3).
3. Enter the text in Figure 2.7 (Section 2.3.1). Remember to use the Return key only at the end of each paragraph or separate block of text such as the date, address, and salutation. Use the Tab key to skip across the screen when entering the table of tensile strengths.
4. Save the file on your data diskette (Section 2.3.2).

2.4.1 Editing Text

In Section 2.3.1, you learned how to enter text and make simple corrections by placing the cursor after a mistake, erasing the error with the Delete or Backspace key, and typing the correct characters. There are several short cuts to editing on the Macintosh.

Selecting Text. You can use the mouse to select or highlight text in the word processor and then edit the text, move it, or reformat it. Mastering this technique is the key to becoming proficient with Works and the Macintosh. Let's practice.

When you move the mouse so that the pointer is within the word-processing window, the pointer will change to an I-bar. In our

May 25, 1991

Mr. Sidney Celmour
Marketing Director
Acme Paper Clip Company
123 Main Street
Los Angeles, California 90001

Dear Mr. Celmour:

I wanted to take this opportunity to let you know how much your product has improved over the past year. Since our last meeting, I have had the opportunity to test your new kevlar Super Clip against the other national brands. I am happy to report that it is the strongest paper clip in the nation.

I wish to thank you for providing us with the necessary testing samples. Your research and design efforts have paid off as seen in the following table of tensile strengths:

Acme Super Clip	11,567 lbs.
United Plastics' Clip	404 lbs.
Mitsubishi Paper Clip	2,054 lbs.
A.O.S. Paper Clip	1944 lbs.

If your marketing efforts are as successful as your design efforts, I am sure that you will achieve the largest share of the market.

Yours truly,

Max Durst
American Testing Laboratories

Figure 2.7. Letter to Sidney Celmour

example letter (Figure 2.7), place the I-bar between the letter *C* and the letter *a* in the word *California* in the address. Instead of clicking the mouse button to place the blinking cursor, hold the mouse button down and drag the I-bar over the letters *alifornia*. The letters will become highlighted—white letters on a black background. Now press the Delete or Backspace key. The selected letters have been erased. Now type the letter *A*. You have successfully changed *California* to *CA*.

The I-bar can be used to select a single letter, several letters in a word, a whole word, several words in a line, a whole line, several lines in a paragraph, a whole paragraph, several paragraphs, or the whole document. To select several lines, place the I-bar at the beginning of a line and drag down the page instead of dragging across the line. This technique will select entire lines. Practice selecting words, phrases, and lines.

Helpful Hint: To select a whole word, place the I-bar anywhere on the word and double click with the mouse. The entire word, and the space after it, will be selected. To replace the word with another, simply type the new word. The selected word will be replaced by the new one. Try it in our example. Select the word *opportunity* by placing the I-bar on it and double clicking. Type the word *chance*.

Inserting Text. Suppose you wanted to add a sentence. How would you do it? Place the I-bar at the location you want to insert text, click the mouse, and type away! Using this method, you can insert a word between two words, a sentence between two sentences, or even a paragraph. The text following your insertion will automatically be “pushed down” and reformatted according to your margins.

Deleting Large Amounts of Text. If you wanted to erase an entire paragraph, it would be silly to use the Delete or Backspace key to erase each letter one at a time. Instead, select the entire paragraph with the mouse and press the Delete or Backspace key once.

Oops, I Goofed! There are trying times when we humans do make mistakes. The Macintosh therefore has a feature to **undo** mistakes. The Undo command is an option in the Edit menu in the Menu Bar at the top of the screen. When it is chosen, the last action that you performed will be undone and the screen will return to the way it was before your mistake. Remember, though, that you have only one chance to undo your mistake. In our example, select the entire second paragraph (“I wish to thank . . . tensile strengths:”). Press the Delete or Backspace key. The paragraph will be erased. Immediately select the Undo command from the Edit menu. The paragraph will reappear.

2.4.2 Searching for Information

You can find specific text anywhere in your document by using the Find option in the Search menu at the top of the screen. Find will locate every occurrence of the text that you specify. This is particularly

helpful when you have a large document. Here are the steps necessary for finding your way around your document.

1. Choose Find from the Search menu. A Find dialog box will appear at the bottom of your screen (see Figure 2.8).
2. Enter the text you wish to find in the box labeled "Find What." In our example letter, let's find the name of the company: enter *Acme*.
3. If you want to Match Whole Words Only, click on the appropriate box. Otherwise Works will find the letters that you have typed as a separate word or as part of another word. (If you specified *his* and did not check Match Whole Words Only, Works will find *this* and *history*.)
4. If you want Works to check for uppercase and lowercase exactly as you have specified in the Find What box, click on the Check Upper/Lowercase box. (If we clicked on the Check Upper/Lowercase box in our example, only *Acme* would be found; *acme* would not.)
5. Click on the Find Next button. The word *Acme* in the address will be selected.
6. Click on the Find Next button again. Works will find the next occurrence of the specified text. In your example, *Acme* will be selected in the table.
7. When there are no more occurrences of the specified text, the Macintosh will beep and a message to that effect will appear on the screen.

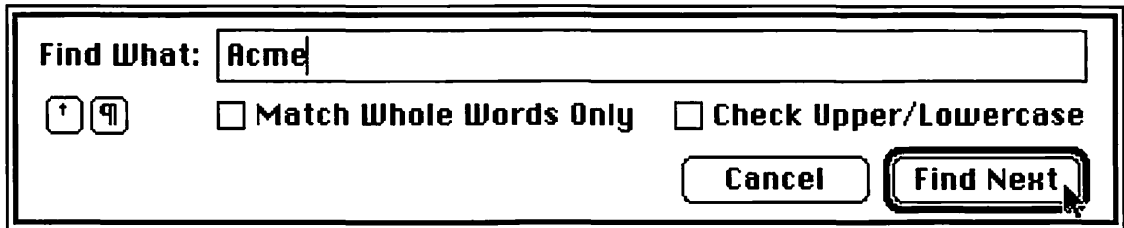


Figure 2.8. The Find Dialog Box

Once you have found the text you are looking for, you can click on the Cancel button. You will return to the word-processing window at the location of the found text.

Microsoft Works will also allow you to find text and replace it with new text by using the Replace option in the Search menu. For example, if you were writing a paper on Tchaikowsky you could type \$\$ instead of typing Tchaikowsky over and over. When you finished entering the paper, you'd use the Replace option to replace every occurrence of \$\$ with Tchaikowsky. Now that's a real time saver!

In your example letter, change the word *Celmour* to *Sellmore* by doing the following.

1. Choose Replace in the Search menu.
2. Enter *Celmour* in the box labeled Find What.
3. Enter *Sellmore* in the box labeled Replace With.
4. Click the Find Next button (see Figure 2.9). *Celmour* in the address section of your letter will be highlighted.
5. Click the Replace, Then Find button. Works will replace *Celmour* with *Sellmore* and then find the next occurrence of *Celmour*.
6. *Celmour* in the salutation line ("Dear Mr. . . .") will be highlighted. Click the Replace, Then Find button again. *Celmour* will be replaced. As there are no more occurrences of *Celmour*, the Mac will beep and a message will appear informing you of this fact.

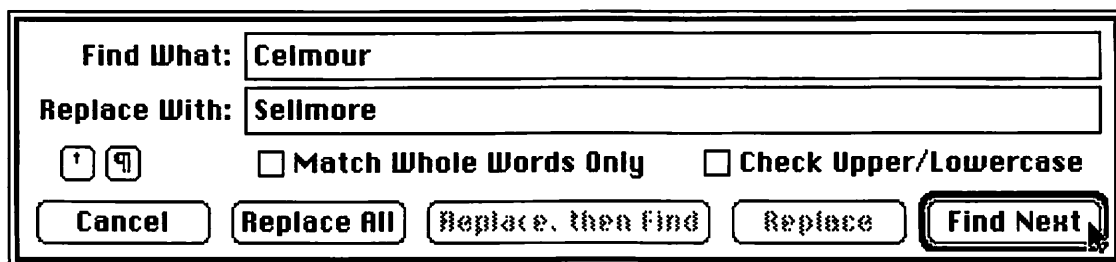


Figure 2.9. The Replace Dialog Box

Helpful Hint: Be very careful if you use the Replace All option. This option will automatically replace all occurrences of the text. It will not stop to ask if you really want to replace them, and you may not be able to Undo the replacements.

In the Find and Replace dialog boxes there are two buttons marked † and ¶ (see Figure 2.9). You are probably wondering what they are used for. The † button will find the place in the document where you have typed a tab stop and the ¶ button will find where you have pressed the Return key. These can be very helpful but are rarely used by beginners.

2.4.3 Cut and Paste: Moving Text

The Macintosh has some very powerful features that allow blocks of text and graphics to be deleted from a document; moved from one place to another within a document, to another document, or to another application; and copied (duplicated) within a document, to another document, or to another application. All three functions are performed in a similar fashion, in that they require the use of the **Clipboard**.

The Clipboard is a special storage area set aside in main memory. It can store only one block of text or graphics at a time. When you **cut** or **copy**, the selected information is automatically moved to the Clipboard. When you **paste**, the information will be moved from the Clipboard and inserted at the location of the cursor. Because the Clipboard contains only one item at a time, you must paste an item before you cut or copy again, unless you are willing to lose that item.

Cutting Blocks of Text:

1. Select the block of text—words, sentences, or paragraphs—using the cursor (see Section 2.4.1).
2. Choose Cut from the Edit menu in the Menu Bar.
3. The selected text will be cut from your document and placed on the Clipboard.

Helpful Hint: To check the contents of the Clipboard, choose the Show Clipboard option in the Window menu. To hide the Clipboard window, click in the close box or choose Hide Clipboard in the Window menu.

Copying Blocks of Text:

1. Select the block of text—words, sentences, or paragraphs—using the cursor (see Section 2.4.1).
2. Choose Copy from the Edit menu in the Menu Bar.
3. The selected text will remain in your document and a copy will be placed on the Clipboard.

Pasting Blocks of Text:

1. Place the I-bar at the location where you want the text pasted. Click the mouse button. Be sure that the blinking cursor is exactly where you want the text.
2. Choose Paste from the Edit menu in the Menu Bar.
3. The selected text will be copied from the Clipboard and pasted into your document.

Figure 2.10 diagrams cutting, copying, and pasting using the Clipboard. Let's practice moving text in our example letter. Suppose you want to move the last sentence below the signature line as a P.S.

1. Select the last sentence ("If your marketing . . . share of the market."), using the mouse.
2. Choose Cut from the Edit menu. The sentence will be moved to the Clipboard. (Do you remember how to check to see whether it's on the Clipboard?)
3. Using the mouse, place the cursor after the word *Laboratories* in the signature line. Press the Return key twice. Type *P.S.* and press the Space Bar twice.

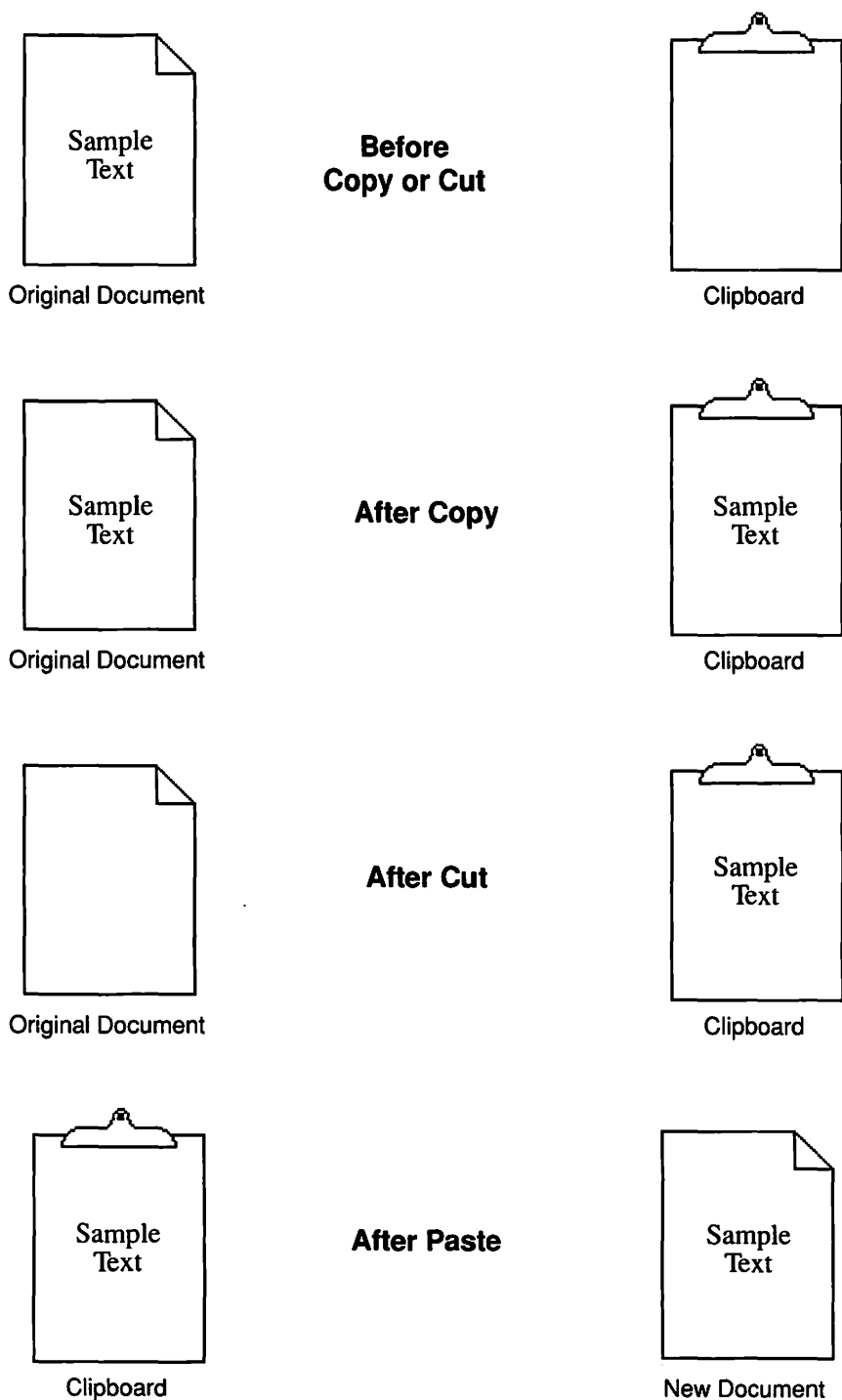


Figure 2.10. Using the Clipboard to Cut, Copy, and Paste

4. Choose Paste from the Edit menu. Your sentence has been successfully moved from one location to another within the document.

As you become more proficient in using different applications in Microsoft Works, you will learn how to cut and paste between the spreadsheet, the word processor, and other applications.

2.4.4 The Fontastic Mac: Fonts, Sizes, and Styles

As mentioned earlier, one of the major advantages of the Macintosh is that what you see is what you get. One of the best ways to make an impact in print is to use different styles of type, boldface type, italics, underlining, and different sizes of text. All of these features are available in Works on the Mac.

Fonts. The term *font* comes from the printing industry and means the style of type. If you compare professionally printed books, magazines, reports, and advertisements, you will notice that different fonts are used for emphasis or artistic expression. For example, this text is printed mostly in the Bookman font.

On the Macintosh, fonts are stored in the system files on the start-up disk. Consequently you can individualize your diskettes to contain the specific fonts that you want to use. Chicago, Geneva, New York, and Monaco are four common fonts. However, there are thousands more: fonts designed for the screen and the ImageWriter printer and special fonts designed for the LaserWriter printer. Chapter 9 will discuss the use of laser fonts in desktop publishing and how to load custom fonts onto your start-up disk.

To change the font of a block of text, do the following.

1. Select the block of text—letters, words, sentences, or paragraphs—using the mouse.
2. Choose Font from the Format menu in the Menu Bar. Instead of releasing the mouse button when Font is highlighted, continue to hold down the mouse button. The Font submenu will appear.
3. Roll the mouse to the right, highlight the desired font from the Font submenu, and release the mouse button. (The check mark indicates what font is currently being used for the block of text.)
4. The block of text will be converted to the font chosen.

Helpful Hint: If you want to change the font of an entire document, choose the Select All option in the Edit menu. The entire document will be highlighted. Select the font using the directions above. Try it on your sample letter. (You should exercise caution when using Select All, however. The entire text could be deleted if the Backspace or Delete key were accidentally pressed.)

Sizes. In addition to changing fonts, you can also display and print text in different sizes. On the Macintosh, the text size is specified in **points**, another term from the printing industry. Type that is 72 points is 1 inch high. The standard height of text on the Macintosh is 12 points, or one-sixth of an inch. The smaller the number of points, the smaller the type. Although some applications will produce text of up to 400 points, Works limits text to between 4 and 72 points.

To change the size of a block of text, do the following.

1. Select the block of text—letters, words, sentences, or paragraphs—using the mouse.
2. Choose Size from the Format menu in the Menu Bar. Instead of releasing the mouse button when Size is highlighted, continue to hold down the button and roll the mouse to the right. The Size submenu will appear.
3. Highlight the desired size from the Size submenu and release the mouse button. (The check mark indicates what size is currently being used for the block of text.)
4. The block of text will be converted to the size chosen.

Helpful Hint: You will notice that the text sizes in the Size submenu are displayed in two ways: in bold text (**20 Point**) and outlined text (12 Point). The outlined point sizes will print the best. The bold point sizes will be calculated from a smaller size and will sometimes print with ragged edges.

Style. On the Macintosh, text style does not mean the font, but the emphasis placed on the text. There are eight text styles: Normal, **Bold**, *Italic*, Underline, Outline, Shadow, Superscript, and Subscript. Superscript is printed above the normal text, as the 2 in X². Subscript is printed below the normal text, as the 2 in H₂O. And the styles are additive: you can select two or more styles for any block of text. For example, you could have a bold italic underlined text. (**You didn't believe me?**)

To change the style of a block of text, do the following.

1. Select the block of text—letters, words, sentences, or paragraphs—using the mouse.
2. Choose Style from the Format menu in the Menu Bar. Instead of releasing the mouse button when Style is highlighted, continue to hold down the mouse button and roll the mouse to the right. The Style submenu will appear.
3. Highlight the desired style from the Style submenu and release the mouse button. (The check marks indicate what styles are currently being used for the block of text.)
4. The block of text will be converted to the style chosen.

Practice changing fonts, sizes, and styles in your sample letter. If you have a color monitor, experiment with the Color option in the Format menu.

2.4.5 Formatting the Document

You've learned a lot about word processing. Now let's look at some of the finishing touches: justifying text, double spacing, changing margins, and setting tabs.

Justifying Text. If you type a letter on a typewriter, you normally line up each line with the left margin. On the right side of your letter, each line will be of a different length. To a printer, this is known as "flush left, ragged right." On the Macintosh, the terminology is **left justified**. Look at the morning newspaper. The text in the columns lines up on both the left and the right side. This is known as **justified** text. The spaces between words have been filled with extra space as needed, to make every line the same length.

In addition to left justified and justified, Works allows you to **right justify** text. Each line will line up on the right hand margin, but will be ragged on the left. This technique is useful in printing poems and photograph captions. You can also **center justify** text, which centers each line between the margins. Figure 2.11 gives examples of each type of justification.

To change the justification of a block of text, do the following.

1. Select the block of text—letters, words, sentences, or paragraphs—using the mouse.
2. Choose Justification from the Format menu in the Menu Bar. Instead of releasing the mouse button when Justification is highlighted, continue to hold down the mouse button and roll the mouse to the right. The Justification submenu will appear.
3. Highlight the desired justification type from the Justification submenu and release the mouse button. (The check mark indicates which justification is currently being used for the block of text.)
4. The block of text will be converted to the justification chosen.

In our sample letter, change the entire letter to justified. Use the Select All option in the Edit menu to select the entire letter. Then choose the Justified option in the Justification submenu.

Spacing. Most typewriters allow you to set the line spacing to either single or double space. Works allows both of these options plus 1 1/2-line spacing and 6 lines per inch. The latter is used when you're printing on pressure-sensitive labels and other special forms.

Peas
I eat my peas with honey,
I've done it all my life.
It makes the peas taste funny,
But it keeps them on my knife.
—Anonymous

Left Justified

Peas
I eat my peas with honey,
I've done it all my life.
It makes the peas taste funny,
But it keeps them on my knife.
—Anonymous

Right Justified

Peas
I eat my peas with honey,
I've done it all my life.
It makes the peas taste funny,
But it keeps them on my knife.
—Anonymous

Center Justified

Peas
I eat my peas with honey, I've
done it all my life. It makes the
peas taste funny, but it keeps
them on my knife.
—Anonymous

Justified

Figure 2.11. Examples of Justification

To change the spacing of a block of text, do the following.

1. Select the block of text—letters, words, sentences, or paragraphs—using the mouse.
2. Choose Spacing from the Format menu in the Menu Bar. Instead of releasing the mouse button when Spacing is highlighted, continue to hold down the mouse button and roll the mouse to the right. The Spacing submenu will appear.
3. Highlight the desired option from the Spacing submenu and release the mouse button. (The check mark indicates what spacing is currently being used for the block of text.)
4. The block of text will be converted to the spacing chosen.

The Ruler. The ruler at the top of the Works word-processing window controls the left and right margins, the paragraph indentation, and the tab stops. The margins and paragraph indentation are set in a similar fashion to changing the font or size of a block of text. Select the text with the mouse. To change the margins, point, click, and drag on either of the small triangles on the ruler. When you release the margin icon, the text will be adjusted to fit within the new margins. (Note: The spacing and justification will be preserved.) Let's investigate the icons for the various options in the ruler.

- ▶ This icon represents the left margin. When an untitled document is opened, it is positioned at 0 on the ruler.
- ◀ This icon represents the right margin. When an untitled document is opened, it is positioned at 6 1/2 inches on the ruler.
- This icon represents the paragraph indentation. Unlike on a typewriter, you do not need to press the Tab key at the beginning of a new paragraph in Works. Because you type a Return key at the end of each paragraph, Works "knows" to indent the next line automatically. When an untitled document is opened, the paragraph indentation icon is located at 0 on top of the left-margin icon.

Tab stops are easily set using the ruler. With the mouse, point just below the ruler and between the margin icons at the location where you desire a tab stop. Click the mouse button. A tab stop icon (┆) will appear. Try it. Click on the tab stop icon that you have just defined. It changes to a different icon (┆). Click a third time. It changes again (┆). Click a fourth time and it changes to still another icon (┆). Click a fifth time and it changes back to the first tab stop icon that you saw. Figure 2.12 gives examples of how each of these tab stops is used. Normally you set the tab stops before you enter text. As you are entering text, press the Tab key and the cursor will jump to the next tab stop. This process is similar to using tab stops on a typewriter.

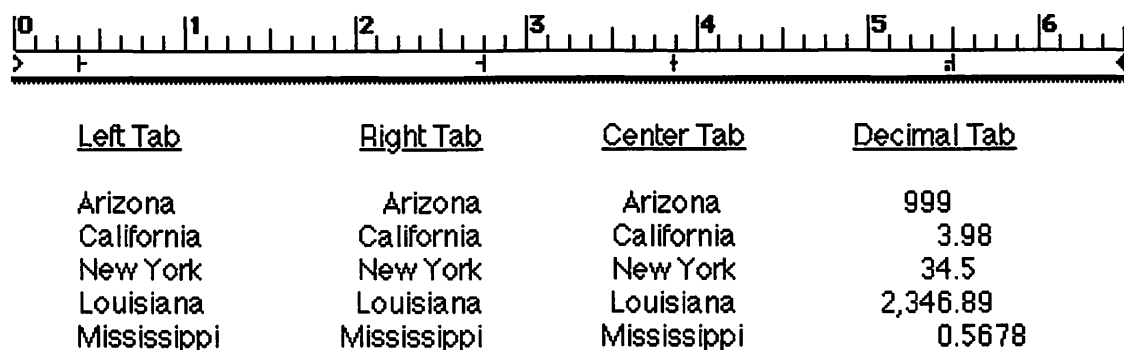


Figure 2.12. Examples of Tab Stops

In your sample letter, select the entire table of tensile strengths. Press the Delete or Backspace key to erase the table. Set two tab stops; one for the name of the paper clip manufacturer and one for the strength of its paper clip. Reenter the table in Figure 2.7 using the Tab key. Now try different tab stops for the tensile strength column. Select the entire table and click on the second tab stop. What happens?

Helpful Hint: If you know you want to use a specific font, size, style, justification, spacing, margin, or tab, you may want to select each of the appropriate options from the menus or the ruler *before* you enter text. Then, when you enter the text, everything will be to your specification. This will apply at the beginning of a document or at the beginning of a new paragraph. You can specify your preferences before you type text, or you can change the text after it is typed (the technique demonstrated in this chapter). Many professional writers who use word-processing software recommend that you first concentrate on the task of writing and then go back to change the formatting of the text.

2.4.6 Check That Spelling?

For many, the ability of word-processing software to check for misspelled words is a big advantage. However, there are some common misconceptions about the process. Spell-checking software does *not* correct spelling automatically. It simply identifies which words appear to be misspelled and gives you a choice of possible correct spellings. Ultimately, you must decide on the correct spelling. It does *not* check for grammar or punctuation and it does *not* check for the proper use of words in context. (For example, the words *there*,

their, and *they're* are all correctly spelled, but spell-checking software will not identify when they are inappropriately used.) It will identify as misspelled many technical terms, proper names, abbreviations, and slang words that are simply not in the software's dictionary.

Despite these limitations, spell checking saves proofreading time, improves your spelling skills, and helps produce more professional documents. To spell-check a document, follow these simple steps.

1. To check the spelling of a portion of a document, use the mouse to select the text to be checked. To check the entire document, make sure that no text is selected.
2. Choose Correct Spelling from the Spell menu in the Menu bar.
3. When (or if) a word of unknown spelling is found, the Correct Spelling dialog box will appear (see Figure 2.13). At the upper right, the Unknown word is printed. Just below it is the software's best guess at the correct spelling (in the Replace With box). If you click on the View Suggestions button, the window at the left lists the words in the dictionary that are closest in spelling to the unknown word.
4. If the Replace With box contains the correctly spelled word, click the Replace button and the unknown word will automatically be replaced with the correctly spelled word. The software will continue to check the remainder of the text.
5. If the Replace With box does not contain the correctly spelled word, you can either type the correctly spelled word into the Replace With box, or you can scroll the Dictionary window until you locate the correctly spelled word and click on it to place it in the Replace With box. When you have the correctly spelled word in the Replace With box, click on the Replace button to correct the text.
6. If the unknown word is *not* misspelled, you can either Skip it or Add it to the dictionary. Click on the Skip button to skip the word and continue checking the remainder of the document. Skipped words will be remembered and skipped again automatically later in the text. Click on the Add button to add the word to your dictionary. Once the word is added, it will no longer be unknown.

Helpful Hint: Be careful not to add a misspelled word to the dictionary. But if you add a word incorrectly, you can remove it from the dictionary. Scroll the dictionary window until you locate the incorrect word. Click on the word and then click on the Delete button. You will be asked to confirm that you want to delete this word from the dictionary.

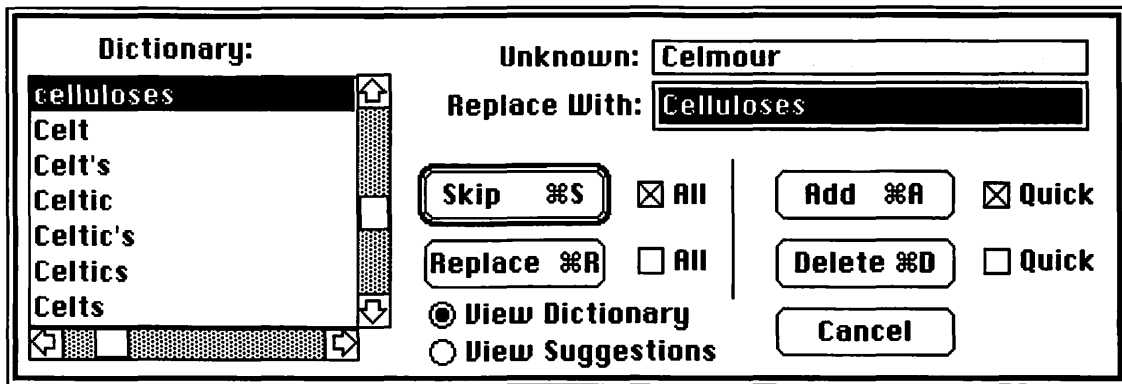


Figure 2.13. Correct Spelling Dialog Box

7. When the entire selection or document has been checked, you will return to the normal document window. If you want to quit the spell checker before checking the entire text, click the Cancel button.

Try checking the spelling of your sample letter. See what happens with proper names? Did you make any spelling errors?

2.4.7 More About Printing

In Section 2.3.3 you learned how to print a document in the word processor. But there are times when you may want to use a different size of paper, set up special margins, or print page numbers. These features are controlled by the Page Setup dialog box. Choose Page Setup from the File menu now.

At the top of the Page Setup dialog box (see Figure 2.14) you will find Paper options. The most commonly used options are US Letter and US Legal. When you click on these options the Paper Width and Paper Height will automatically be set for 8 1/2 × 11 inches or 8 1/2 × 14 inches, respectively. If you click Custom Size, you will have to enter your paper size in the Paper Width and Paper Height boxes. Computer Paper, A4 Letter, and International Fanfold are special sizes rarely used.

The Orientation option allows you to print vertically or horizontally (this is called landscape on some other computers) on the paper. Tall Adjusted is a Special Effect that should be selected if you are printing on an ImageWriter printer. This option adjusts the text so that 1 inch on your screen equals 1 inch on the printed paper. The 50% Reduction option prints your document at half its width and half its height (one-quarter of its normal size). The No Gaps Between

ImageWriter v2.7 **OK** **Cancel**

Paper: ☒ US Letter ☐ R4 Letter
☐ US Legal ☐ International Fanfold
☐ Computer Paper ☐ Custom Size

Orientation **Special Effects:** ☒ Tall Adjusted
☐ 50 % Reduction
☐ No Gaps Between Pages

☐ Print Row and Column Numbers **Paper Width:** 8.5
☐ Print Cell Notes **Paper Height:** 11

Header: &R&P
Footer:

Left Margin: 1 **Right Margin:** 1
Top Margin: 1 **Bottom Margin:** 1

Figure 2.14. Page Setup Dialog Box

Pages option will ignore top and bottom margins and print right over the perforations on your computer paper. This option can be used to save paper on draft copies.

The Header and Footer boxes are used to enter text that will be printed within the top (header) and bottom (footer) margin. These are normally used for entering the page number, document title, date, and so on. The text entered into the Header and Footer boxes will be printed on *every* page. Consequently, footers should not be used for footnotes.

To print page numbers, follow these steps.

1. Choose Page Setup from the File menu.
2. Decide whether you want the page numbers at the top (header) or bottom (footer) of the page.
3. Enter &P into the Header or Footer box. &P is a code that tells Works to print the page number at the left margin. If you want the page number right justified, enter &R&P (&R represents Right justified). If you want the page number in the center, enter &C&P. If you want the word *Page* to appear before the page number, enter &RPage&P.

4. Select the font and size of your header or footer by selecting the appropriate options from the Format menu while the Page Setup dialog box is still displayed.
5. Click on the OK button. You will return to the word-processing window.
6. If you do not want the page number to print on your first page, choose the Title Page option from the Format menu. It will be counted as a page, but no header or footer will be printed.
7. If you do not want to start numbering the first page as page number 1, choose the Set Page # option from the Format menu. Enter the page number from which you wish to start numbering and click the OK button.
8. Choose Print from the File menu. Click on the Print Preview box and then on the OK button to check your page numbers.

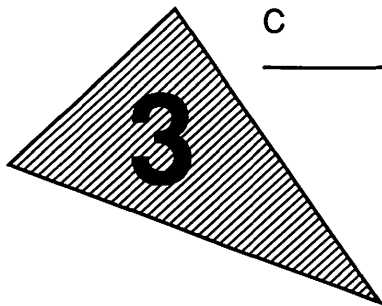
At the bottom of the Page Setup dialog box are options for setting the printing margins. You can enter the left, right, top, and bottom margin distances in inches. These are not to be confused with the margins that you set in the ruler: they are the printer paper margins. If your left Page Setup margin is at 1 inch and your ruler left margin is at 0 inches, your text will be printed 1 inch from the left side of the paper. If your right Page Setup margin is at 1 inch, your right ruler margin should be set at 6 1/2 inches (1-inch left margin + 6 1/2 inches of text + 1-inch right margin = 8 1/2-inch paper width). The top and bottom margins will determine how many lines of text will be printed on the page.

All these options are probably confusing right now, but as you become more proficient at word processing you will ask yourself how you can do something out of the ordinary. The word-processing options used in various combinations are very powerful and versatile tools for the experienced user. Take some time now to practice the basics. Then use the skills you have learned and the information in this text to develop solutions to your word-processing problems.

2.5 POSERS, PROBLEMS, AND PROJECTS

1. Using the Works word processor, write a letter to a friend or relative telling the person how much you like using the Macintosh. Include at least three fonts, two sizes of type, and two styles of type. Print your letter.
2. Copy any page of this text using the Works word processor. Try to match as closely as possible the type fonts, sizes, styles, margins, indents, tabs, and so on.

- \$3.** Sidney Celmour has asked you to respond to Mr. Max Durst of the American Testing Laboratories. Prepare a standard business letter thanking Mr. Durst for his assistance. (See Figure 2.7 for the original letter.) Be sure to justify your text.
- 4.** Create an advertising flyer using the word processor. You could advertise a garage sale, church picnic, club activity, or anything you choose. Use large type sizes, different fonts, and various styles for emphasis.



**ONE PICTURE IS WORTH
TEN THOUSAND WORDS**

“What is the use of a book,” thought Alice, “without pictures or conversations?”

—*Lewis Carroll*

“Every artist dips his brush in his own soul, and paints his own nature into his pictures.”

—*Rev. Henry Ward Beecher*

“Every artist was first an amateur.”

—*Ralph Waldo Emerson*

OBJECTIVES

When you’ve completed this chapter, you’ll be able to do the following.

1. Differentiate between object-oriented graphics and pixel-oriented graphics (Section 3.1)
2. Enter and exit the draw mode at will (Section 3.1.1)
3. Draw rectangles, squares, ovals, circles, polygons, arcs, and lines (Section 3.1.2 and Section 3.1.4)
4. Change the properties, size, location, fill pattern, line size, line pattern, and line type of objects (Section 3.1.3)
5. Align objects accurately on the screen (Section 3.1.5)
6. Create text objects in the draw mode (Section 3.2.1)
7. Insert, delete, and replace text in a text object (Section 3.2.2)
8. Change the font, size, and style of text in a text object (Section 3.2.3)

3.1 OBJECT-ORIENTED DRAWING

Throughout history progress has been the result of people's ability to understand complex concepts. Visual tools such as drawings, photographs, films, and videotapes provide a medium for making complex concepts understandable to everyone. After the computer had demonstrated its ability to analyze vast amounts of data rapidly, the idea of portraying visual information, or graphics, with it naturally evolved.

The computer screen is somewhat like a printed map. Both are two-dimensional surfaces with a vertical and a horizontal direction. Just as any point on a map may be identified by its horizontal and vertical coordinates (or latitude and longitude), any point on a computer's screen can be specified by measuring its vertical and horizontal distance from a corner (usually the upper left).

In early microcomputers, drawing graphics meant writing instructions to the computer specifying which points on the screen were to be illuminated. This process was time-consuming and generally inhibited the user's creativity. Later versions of microcomputers were designed to allow the user to concentrate on the product rather than on computer programming. Consequently, graphics will be easy to create and add to any of your projects on the Macintosh.

The dots on a computer's screen are called **pixels** for **picture elements**. There are 512 horizontal columns and 342 vertical rows, providing 175,104 pixels. Each of these pixels can be displayed as black or white on a monochrome screen or as red, green, or blue on a color screen. Through various combinations of these little points of light, up to 256 shades of gray or 256 colors can be displayed on the screen at once. Over 16 million color combinations are available on Macintosh color monitors.

Two types of graphics software are available for the Macintosh: paint software and draw software. Paint programs are pixel oriented. In other words, you "paint" designs, shapes, and so on with the pixels. If a change or correction needs to be made you must paint over the pixels, much as an artist paints over a portion of a canvas to be worked. Draw software is **object oriented**. The user draws objects such as boxes, circles, and lines on the screen. These objects are stored in the computer's memory and can be relocated, resized, erased, and edited at will. You will soon learn how you can create object-oriented graphics with Microsoft Works.

3.1.1 Starting Works Draw

Microsoft Works contains drawing tools within its word processing and spreadsheet applications. These tools can be used to enhance

and emphasize text, calculations, and graphs. To get started drawing, follow these directions.

1. Start up the Macintosh using the Works Startup and Program diskettes. (Remember how? See Section 1.4.1 if you need help.)
2. If the Works window in Figure 3.1 is not visible on the screen, open the Works Program disk icon (see Section 1.4.3).
3. Start Microsoft Works by selecting the Works icon (point and click) and selecting Open from the File menu.

Short Cut: Double click on the Works icon.

4. The Works desktop should appear. Select Word Processor by pointing to the icon and clicking. Create a new document by pointing and clicking on the New button (see Figure 3.2).
5. A word-processing document will be opened and the screen should appear as in Figure 3.3.

You have just created an Untitled word-processing document. In the following sections you will use this document to learn and practice

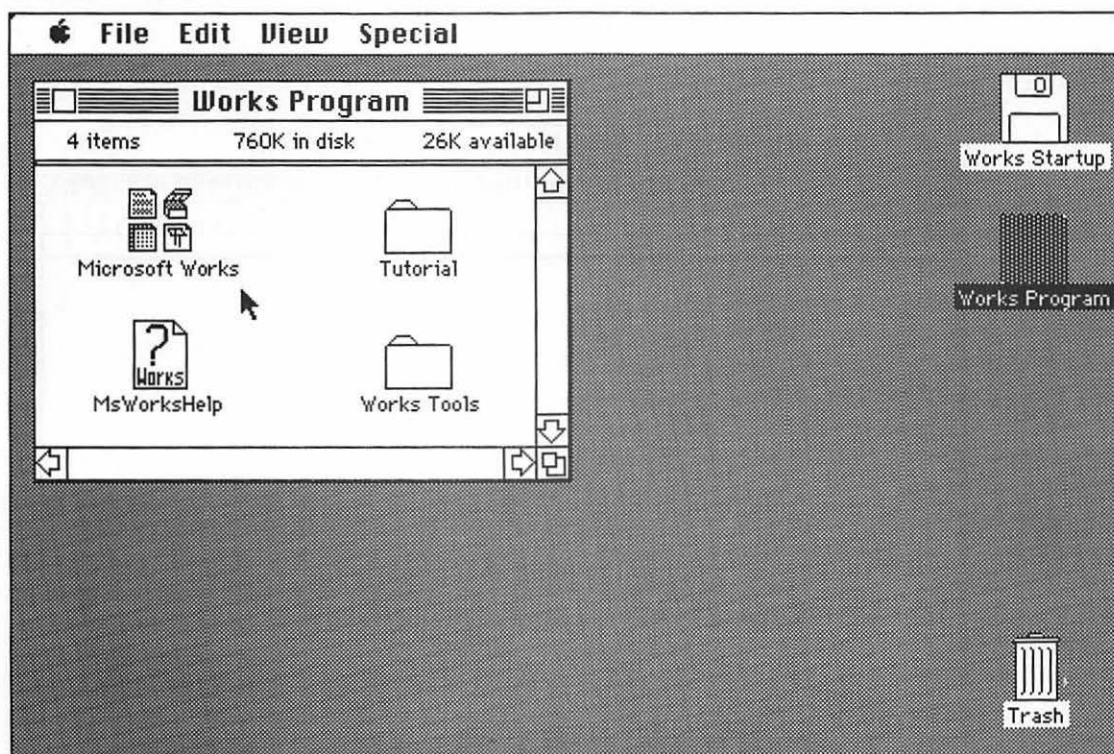


Figure 3.1. Starting Up Microsoft Works

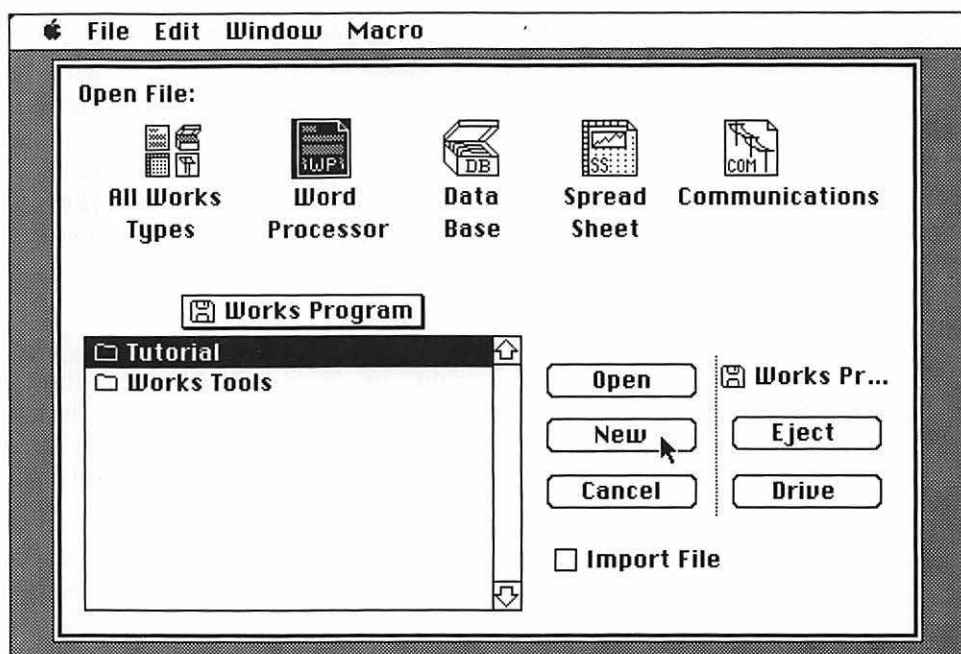


Figure 3.2. Creating a New Document

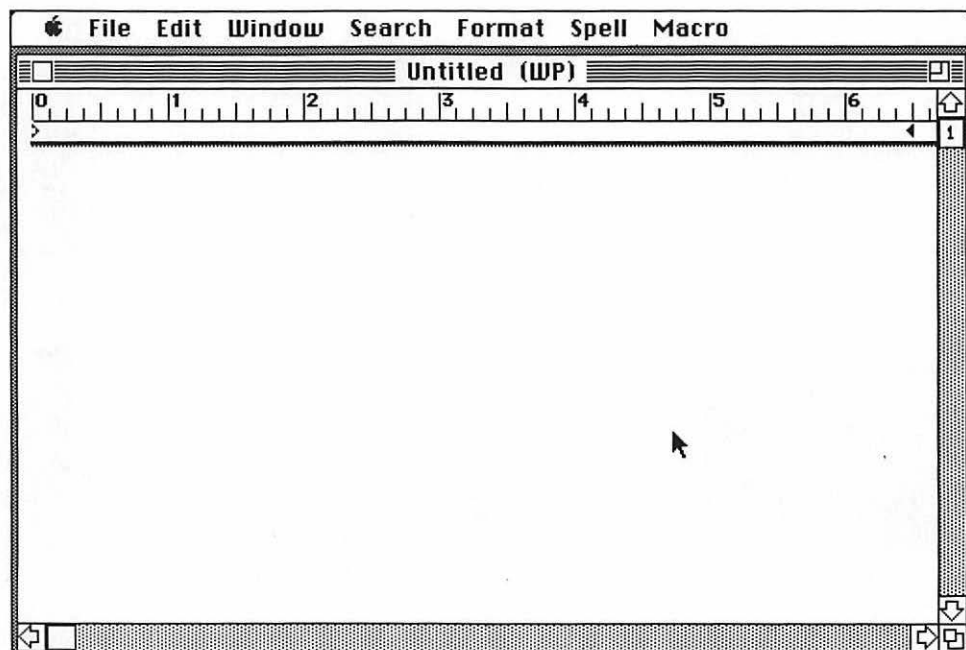


Figure 3.3. An Untitled Document

the drawing features of Works. Forget about word processing for now and let your creative juices flow. To begin drawing, choose Draw On from the Edit menu.

Short Cut: To select Draw On or Draw Off, hold down the Command (⌘) key and press the J key.

3.1.2 The Artist Within You: Drawing Objects

When you select Draw On from the Edit menu, the Tool Box (see Figure 3.4) will appear at the left edge of the screen. To select one of the tools, use the mouse to point to a tool and click the mouse button. Try it now. Select another tool by pointing to and clicking on a different one. The previous tool is canceled and a new one selected.

Select the Rectangle Tool (see Figure 3.4 if you need help). If you move the pointer into the document window, the pointer will turn into a cross hair. Cross hairs are used on a variety of instruments to make precise alignments. In Works, the cross hair will be used to locate the beginning and ending corners of your object. Place the cross hair where you want the upper left-hand corner of your

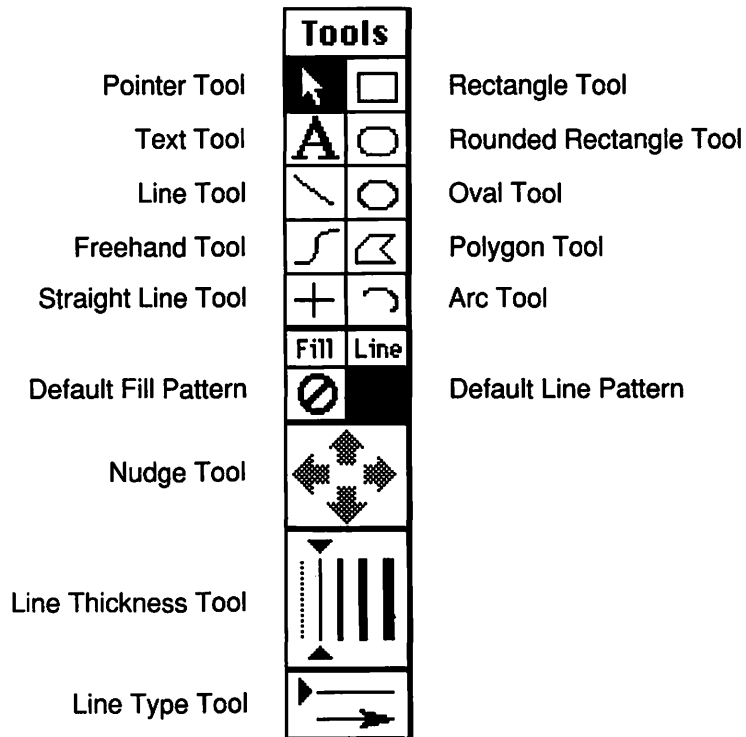


Figure 3.4. Works Draw Tools

rectangle to start. Holding the mouse button down, drag the cross hair to the lower right-hand corner of your desired rectangle. You should see the rectangle's outline on the screen. When you have positioned the cross hair exactly where you want the rectangle, release the mouse button (see Figure 3.5). Think of this process as having four components: point, click, drag, and release.

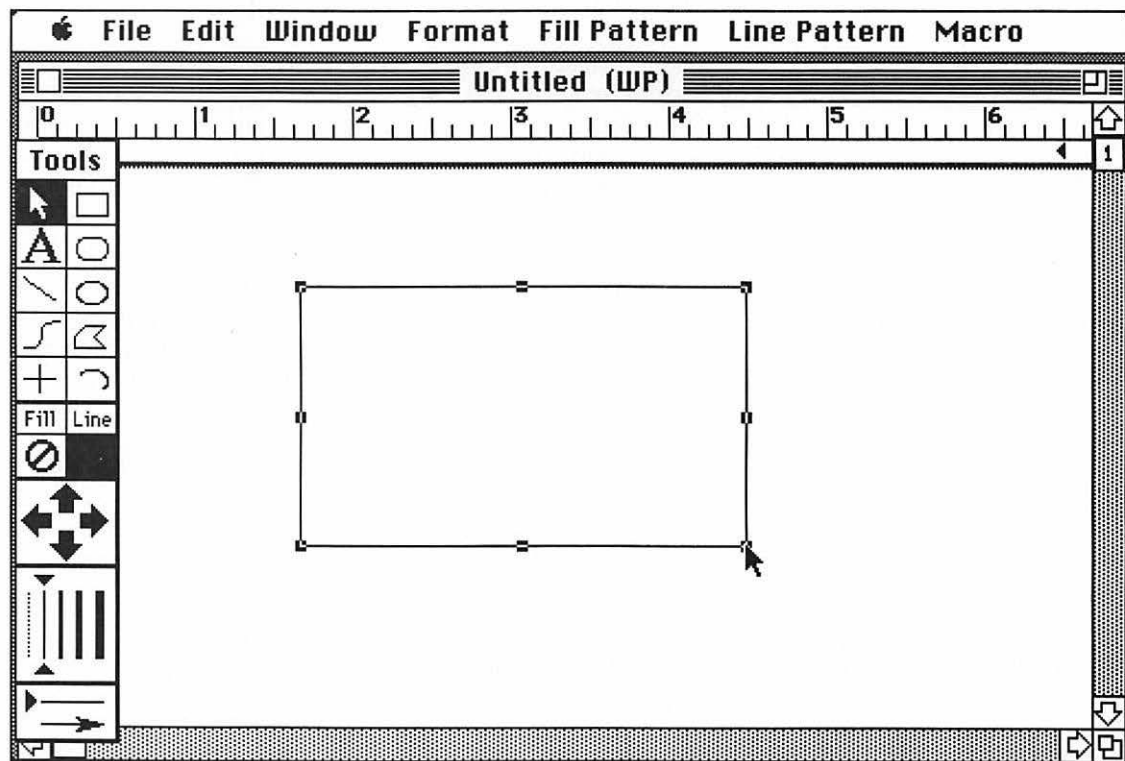


Figure 3.5. Drawing an Object

3.1.3 Properties of Objects

Objects in this application have six properties: size, location, line thickness, fill pattern, line pattern, and line type. The advantage of draw objects is that you can change these properties at any time in the future without affecting text or other objects. Using the single rectangle that you drew in the previous paragraph, explore these properties.

Size. An object can be changed in size, both vertically and horizontally. When you finished drawing your rectangle, the Rectangle Tool (the cross hair) changed back to the Pointer Tool (the arrow) and eight small boxes appeared at the corners and center of each side of the

rectangle (see Figure 3.5). These little boxes are called **handles**. The handles indicate when an object has been selected; they can be used to enlarge or shrink the rectangle. Point to any handle, hold the mouse button down, drag the rectangle to a new size, and release the mouse button.

Figure 3.6 shows the direction that each handle controls. For example, if you select the handle in the middle of the right side of the rectangle, you can only change the width of the rectangle. Similarly, if you “grab” the handle in the middle of the base of the rectangle, you can control only its height. Grabbing a corner handle will let you change both height and width at the same time. Try every handle and observe the results.

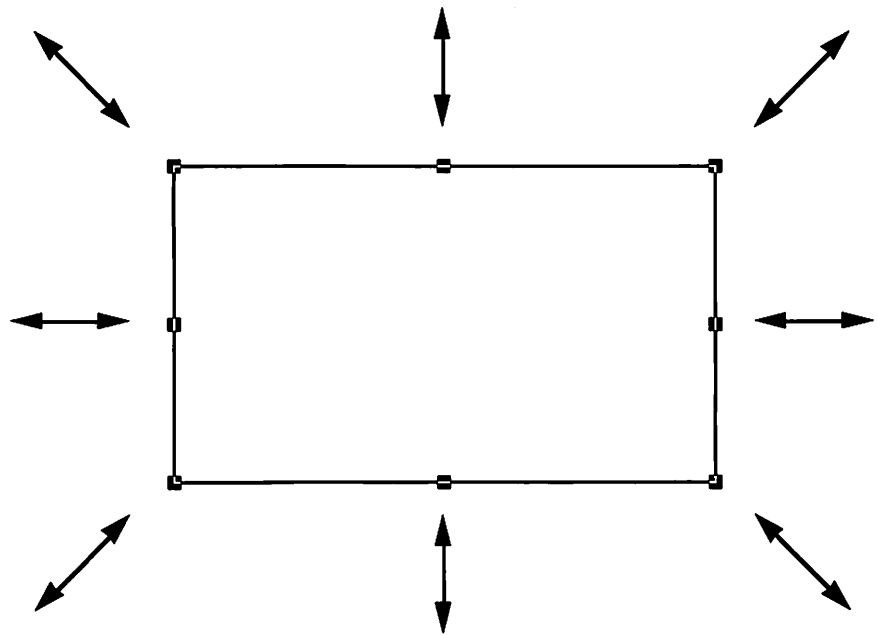



Figure 3.6. Resizing an Object

Helpful Hint: If the handles of an object disappear, it means that the object is no longer selected; you need to select it again if you want to change any of its properties. Point to any side of the object and click.

Location. An object can be relocated anywhere on the screen at any time. Point to any side of your rectangle (but not on a handle), hold the mouse button down, and drag. An outline of the object will follow your mouse. You can place the object anywhere on the screen by releasing the mouse button. Remember that the handles indicate that an object has been selected. None of the properties of an object can be changed unless the object is first selected.

Line Thickness. In Works, five line thicknesses are available for any object. The Line Thickness Tool, located in the Tool Box, indicates the width of the line. With an object selected, point to the line thickness desired and click. The line thickness will change to the newly selected one. Try it. What happens when you select the line thickness represented by the dotted line in the Tool Box? If you are going to be drawing several objects with the same line thickness, you can choose the desired line thickness before drawing. Every object will be drawn with the same thickness until a different thickness is selected. This process is analogous to a painter choosing a paint brush of a certain width.

Fill Pattern. Any object can be filled with a pattern. Point to the Fill Pattern menu in the Menu Bar and hold down the mouse button. The menu will display the 39 possible fill patterns for any object. The patterns include solid black, solid white, and no fill, represented by the  icon. No fill is transparent; objects in the background will show through. Solid white is opaque and will cover up background objects. To fill an object, select it and then choose a pattern from the Fill Pattern menu (see Figure 3.7).

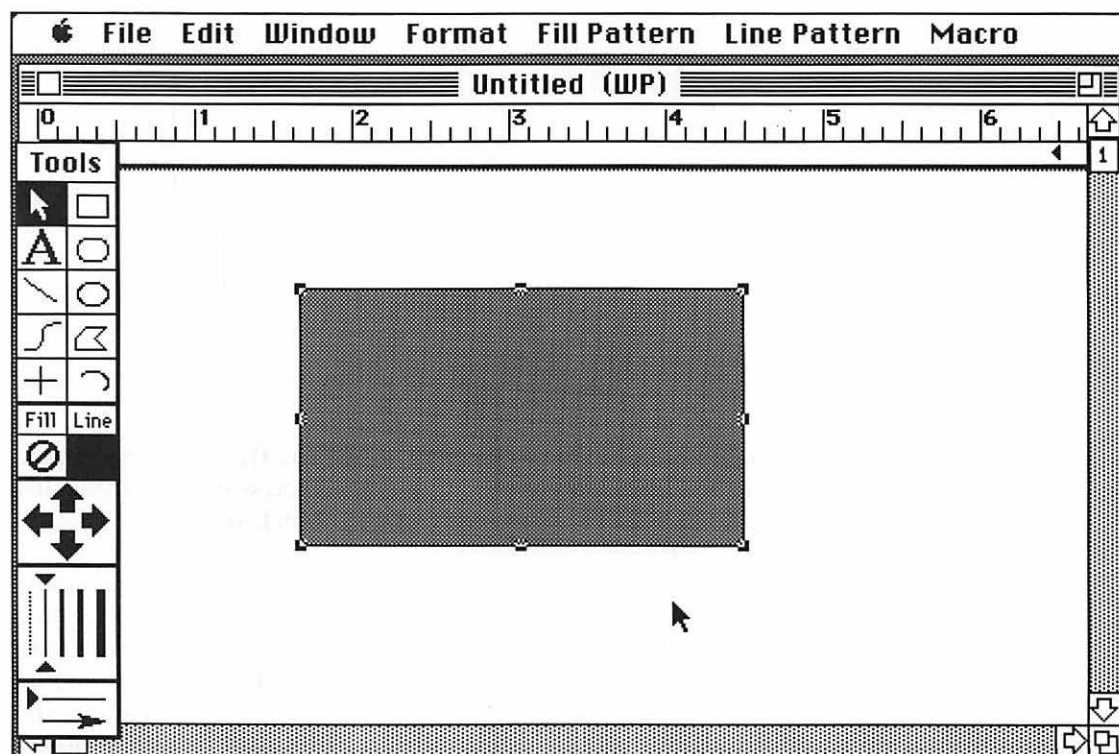


Figure 3.7. Filling an Object with a Pattern

A default fill pattern can be chosen so that any object drawn will automatically be filled with that pattern. The Tool Box displays the default fill pattern (see Figure 3.4). When you first choose the Draw On option in the Edit menu, the default fill pattern will be no fill. To change the default fill pattern you must not have an object selected, otherwise you will fill that object. Place the pointer outside of your rectangle and click the mouse. The handles should disappear. Select a fill pattern from the Fill Pattern menu. The default fill pattern will change in the Tool Box. Select the Rectangle Tool and draw another rectangle. Subsequent rectangles will be filled with the default fill pattern.

Line Pattern. Just as you can select the fill pattern for an object, you can select a pattern for the lines (sides) of the object. Select the original rectangle that you drew. (Remember, point to any side and click.) Using the Line Thickness Tool, choose the widest line. Using the Line Pattern menu, choose a new line pattern from the 39 patterns available (see Figure 3.8). Your object can have both a fill pattern and a line pattern. Just for fun, try different combinations.

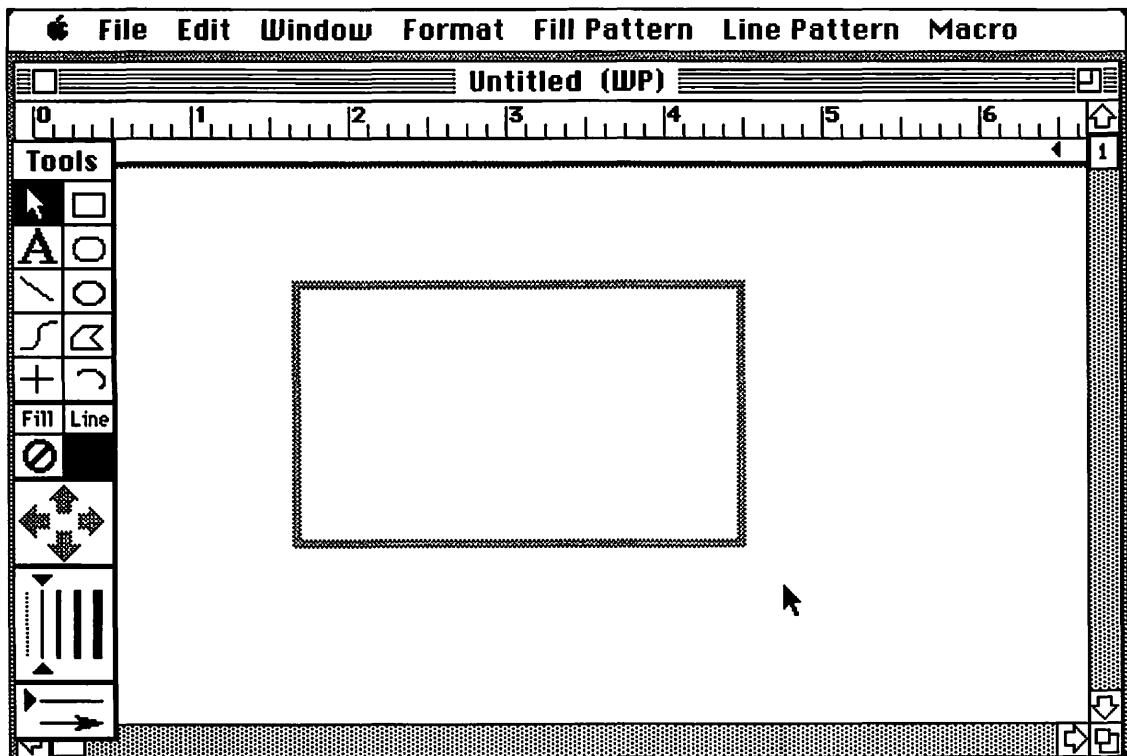


Figure 3.8. Changing an Object's Line Pattern

As for the fill pattern, there is a default for the line pattern: initially, it's solid black. You can change the default the same way you did for the default fill pattern. See if you can figure this one out for yourself.

Line Type. The Line Type Tool in the Tool Box determines whether a line terminates with an arrow or is plain. Only lines drawn by the Straight Line Tool or the Line Tool can have arrows. This is useful when you're adding text to a diagram to emphasize a feature.

Helpful Hint: If you have been following along on your Macintosh, you probably have several objects on your screen and are wondering how to erase them. Select the object that you wish to remove and press the Delete or Backspace key, or choose Clear from the Edit menu.

3.1.4 Back to the Tool Box

So far you have investigated the Rectangle Tool and the properties of objects. Seven other tools also draw objects. The Rounded Rectangle Tool, the Oval Tool, the Line Tool, and the Straight Line Tool are used in the same manner as the Rectangle Tool: select the tool, point, click, drag, and release. Try each of these tools and experiment with the various properties you've learned how to control.

The Polygon Tool allows you to draw objects with three or more sides. It works differently from the tools you already know how to use. Select the Polygon Tool from the Tool Box. Using the mouse, point to the starting point of the first side of your polygon and click *and release* the mouse button. As you move the mouse from the starting point, a "rubber band" line will be stretched until you reach the end of the side. Click and release the mouse again. Continue the process until all the sides have been drawn. The ending point of the last side of your polygon should be the starting point of the first side, to completely enclose your object. If you complete your polygon correctly, the cross hair will change into the pointer. Polygons have the same properties as rectangles.

The Arc Tool draws 90° arcs (one-quarter of an oval). Once the arc has been drawn, it can be resized to less than or greater than 90°. Select the Arc Tool. Draw an arc. Grab a handle at either end of the arc and drag. What happens if you fill the arc with a pattern?

The Freehand Tool lets you draw freehand on the screen as if you had a pencil in your hand. When you finish the object, a handle will appear at every change in direction of the freehand object. These handles can be used to correct any minor (or major) mistake. (Don't be discouraged; it takes time to improve your hand-eye coordination

enough to easily draw freehand objects.) Some interesting effects can be accomplished with fill and line patterns— experiment a little.

3.1.5 Putting Things in Their Place: Aligning Objects and Other Strategies

Several features have been added to Works that will help you get the objects on your screen exactly where you want them. This would seem easy enough to do, but after you have worked with object-oriented drawing you may become frustrated without these aids.

Nudging Objects. If you ever want to move an object over just one pixel, you will find it difficult to do by dragging with the mouse. The Tool Box contains just the solution: the Nudge Tool (see Figure 3.4). In the middle of the Tool Box are four arrows. When an object has been selected, it can be “nudged” up, down, left, or right. Each time the appropriate arrow is clicked with the mouse, the object will move one pixel in that direction.

Selecting Multiple Objects. Thus far, you only know how to select one object at a time. But at times you may want to move several objects together, fill several objects with the same pattern, or delete two or more objects. Time and effort can be saved by selecting multiple objects and changing their properties all at once.

The simplest technique for selecting multiple objects is to hold down the Shift key while you use the Pointing Tool. Try this. Draw several objects on the screen. Hold the Shift key down, select two objects in the normal manner, and release the Shift key. The handles on both objects will become visible. Try moving the objects. What happens?

Another method that works well when you want to select many objects at once uses just the Pointing Tool. This tool can designate an area in which all objects will be selected. Select the Pointing Tool and point to the upper corner of the area you want to define. Hold the mouse button down and drag. A dotted rectangle will appear on the screen. Release the mouse button. Any object that is entirely contained within this area will be selected.

Freezing an Object. No this isn't computer cryogenics, but there will be times when you want to prevent an object from moving. If you have a lot of small objects on the screen, you may accidentally select one and move it. Freezing it in advance will prevent this from happening. Select the object, hold down the F key (for Freeze), and select the object again. The second time the object is selected, the handles will

disappear. If you try to select the object, you cannot. To “thaw” the object, hold the F key down and select the object. The handles will reappear and the object will behave normally.

Restricting Movement. If you want to move an object but want to keep it aligned vertically or horizontally, there is a way.

1. Select the object.
2. Point to the object as if you were going to move it.
3. Hold down the mouse button, but do not move the mouse yet.
4. Hold down the shift key.
5. Now move the mouse. The object will move only horizontally, vertically, or diagonally.

Practice this procedure. If you have trouble, be sure you're following the steps in the exact order.

Helpful Hint: Using the Shift key in conjunction with the Rectangle, Rounded Rectangle, and Oval Tools also restricts movement. This is the procedure used to draw perfect squares and circles. Select the appropriate tool, hold down the Shift key, point, click, drag, and release.

Grouping Objects. Once you have completed a drawing made up of several objects, you can group them into one object. This is helpful if you want to duplicate it, relocate it in a document, or resize the objects proportionately. To group several objects into one picture, select every object using the techniques for selecting multiple objects described earlier and choose the Group Picture option in the Format menu. They are now one. To reverse the process, select the grouped object and choose Ungroup Picture from the Format menu. Each object will have its own handles and can be selected individually once again.

Aligning with the Grid. If several objects need to be aligned, the easiest method is to use the grid in Works. The Format menu contains two options: Grid Setting and Grid On or Grid Off. Grid Setting lets you select the spacing of the grid from 1/32 to 1/2 of an inch or from 1/14 to 1 centimeter. The Grid On or Off option lets you switch back and forth between using and not using the grid.

The grid lines are transparent on the screen. If the grid is on, the sides of an object snap to (align with) the spacing of the grid automatically when it is drawn. For example, if the grid is set at 1/2 inch, rectangles can be drawn only with sides of 1/2 inch, 1 inch, 1 1/2 inches, and so on. If an object is relocated when the grid is turned on, it will automatically snap to the grid. This feature is very

handy when you're drawing flowcharts or organizational charts. Boxes of the same size can quickly be drawn and aligned.

Bringing to Front and Sending to Back. Objects are drawn like a collage on the screen. Any object drawn after another one that overlaps the original object will appear in front. Objects can be rearranged by sending some to the back and bringing others to the front.

The best way to understand this process is to practice it yourself. Delete all the objects on your screen. (Remember how? Select the object and press Delete or Backspace.) Draw three circles on the screen and fill them with three different patterns. Drag the three circles so that one corner of each object overlaps a corner of the other two (see Figure 3.9). Select a circle that is partially covered. Choose Bring to Front from the Format menu. That circle will now come to the front. Choose Send to Back from the Format menu. The circle will go to the back. Practice with this process until you are comfortable with it. Then try rearranging the three circles so they are in exactly the opposite order, front to back, than they are now. What is the minimum number of steps necessary to reverse them?

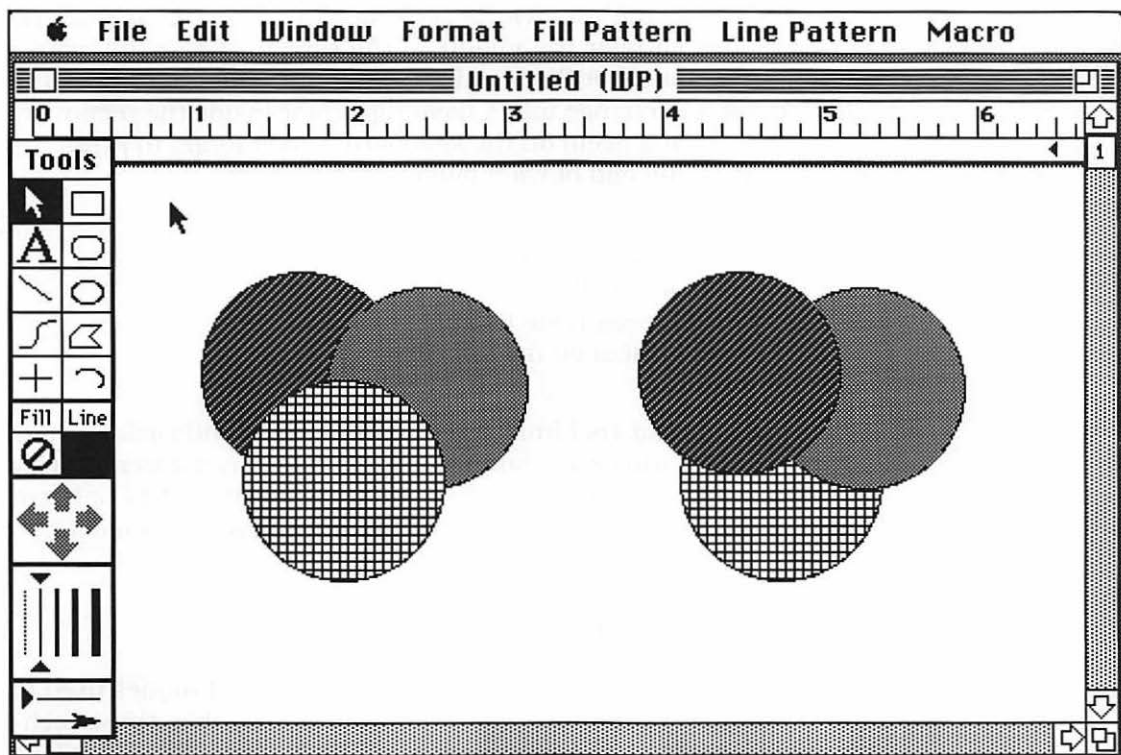


Figure 3.9. Using Send to Back and Bring to Front

Helpful Hint: To hide a portion of an object from view, draw an object with a white fill pattern and no line pattern and drag it on top of the original object. For example, to draw a crescent moon, draw a circle filled with gray. Draw a second circle with a white fill pattern and no line pattern. Drag the white circle on top of the gray one to create the crescent.

3.2 TEXT AS AN OBJECT

Text can be treated two ways in Microsoft Works: as normal text in the word processor and as a draw object. Chapter 2 describes how text can be managed in the word processor. The following section explains its use as an object in conjunction with other graphics.

3.2.1 Creating Text Objects

To create a text object, select the Text Tool from the drawing Tool Box (see Figure 3.4). When the pointer is dragged inside the word-processing window, it will change into an I-bar cursor. This cursor indicates where the text will begin. Move the mouse so that the cursor is located near the middle of the screen. Press the mouse button. A rectangle outlined with a dotted line will appear and the I-bar cursor will change into a flashing cursor inside the rectangle. Type the following poem on the keyboard. (Don't forget to press the Return key at the end of each line!)

Peas
 I eat my peas with honey,
 I've done it all my life.
 It makes the peas taste funny,
 But it keeps them on my knife.
 —Anonymous

Select the Pointing Tool from the Tool Box. Point and click on your poem. Handles will appear around your text just as if it were a draw object. You can move the text, change its size, or fill it with a pattern. A text object will behave in the same manner as a draw object.

3.2.2 Editing Text Objects

Text objects can be edited easily using the same techniques used to edit text in the word processor. Section 2.3 describes those techniques in detail. Here is a summary of the basics.

Inserting Text. Using the Text Tool, position the I-bar cursor between the characters where you want to insert the text. Click the mouse. Begin typing.

Deleting Text. Using the Text Tool, position the I-bar cursor at the beginning of the text you wish to delete. Holding down the mouse button, drag the mouse to select the text you wish to delete. The text will change from black on white to white on black. Release the mouse button when all the text is selected. Press the Delete or Backspace key. The text will disappear.

Replacing Text. Using the Text Tool, select the text to be replaced in the same manner as for deletion. Type the new text. The old will be replaced with the new.

Using the Peas poem, try your skill at rewriting. Try inserting, deleting, and replacing text until you are comfortable with these techniques. They will be used frequently in all types of applications on the Macintosh.

3.2.3 Formatting Text

One of the nicest features of the Macintosh is its ability to change the typeface, or **font**, of the text and show the result on the screen. Similarly, any change in the size and style (bold, italic, and so on) of the text is also shown exactly as it will appear on the final printed page. Section 2.4.4 provides detailed information on the formatting options.

To satisfy your curiosity, try changing the font of your poem. Choose the Text Tool from the Tool Box. Select the entire poem. (Remember how to select text? Review Section 2.4.1 if you need help.) Use the mouse to access the Format menu in the Menu Bar at the top of the screen. Select the Font option while continuing to hold down the mouse button. A separate Font menu will pop up to the right of the Format menu. Slide the mouse to the right so that the pointer moves into the Font submenu. An individual font in the Font submenu can be chosen by running the mouse up and down the menu until the desired font is highlighted (try New York). Release the mouse button. The entire poem will be converted to the selected font.

Now make the title, *Peas*, bold text. Using the mouse, select the title. Under the Format menu there is also a Style submenu. Select the Bold option from the Style submenu the same way you selected your new font. To make the title larger, select the title and 18 Point from the Size submenu of the Format menu. Your text object should now look like this:

Peas

I eat my peas with honey.
I've done it all my life.
It makes the peas taste funny.
But it keeps them on my knife.
– Anonymous

Helpful Hint: The Font, Size, and Style submenus will indicate the current characteristics of the selected text with a check mark in front of the name of the font, size, and style.

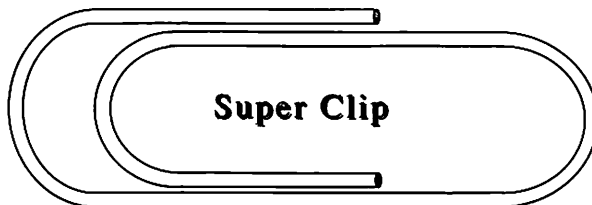
Experiment with creating text objects in different fonts, sizes, and styles. As you work, keep in mind that most text will be entered using the word processor, not the Text Tool from the drawing Tool Box. Text objects should be reserved for text that needs to be combined with drawings and for text that will appear in columns (as in a newsletter). The use of text objects in desktop publishing will be discussed in Chapter 9.

Helpful Hint: To return to the word-processing function of Works, you must turn off the draw functions. Choose Draw Off from the Edit menu.

3.3 POSERS, PROBLEMS, AND PROJECTS

Be sure to complete the Acme Paper Clip Company simulation introduced here. This drawing and subsequent assignments will be used to develop additional materials in the following chapters. If you need help, turn to Appendix G.

- *1. The Acme Paper Clip Company has just purchased several Macintosh computers and Microsoft Works for its employees. One of the first projects for Sidney Celmour, Acme's marketing director, is to design and develop catalog sheets describing Acme's newest product, Super Clip. Sidney has recruited the help of Art Klepp, the chief designer in the art department. Your assignment, should you choose to accept it, is to draw the Super Clip for Mr. Klepp using Works' draw tools.

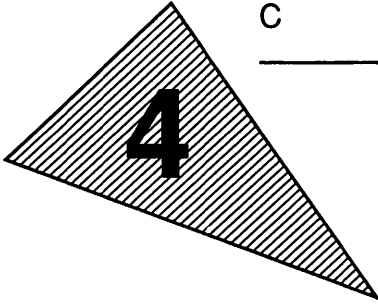


Be sure to save your work for Art Klepp. After you have completed your drawing of the Super Clip, choose the Save option under the File menu. When the Save dialog box appears, type *Super Clip* and press the Return key.

- \$2. Using the draw features of Works, design a company logo for the Acme Paper Clip Company. Use this logo to create letterhead stationery for the company. (You will find Acme's address in the letter in Figure 2.7.)

Helpful Hint: When you save your finished letterhead, click the Stationery box in the Save dialog box. When you want to type a letter on letterhead, open the letterhead file. It will be opened as Untitled, preventing you from accidentally erasing your letterhead. Type in your letter, save the finished letter, and print it.

3. Design a business card for Sidney Celmour. Use only the draw tools, including text objects. Include two fonts, two sizes, and two styles of text. See if you can shrink your company logo and put it on the business card also.



C H A P T E R

**FIGURES WON'T LIE,
BUT SPREADSHEETS
WILL FIGURE**

"Facts and Figures! Put 'em down!"

—Charles Dickens

"Statistics are like alienists—they will testify for either side."

—Fiorello La Guardia

"The difference between an accountant and a bookkeeper is a sizeable figure."

—Anonymous

OBJECTIVES

When you've completed this chapter, you'll be able to do the following.

1. Discuss the advantages of using electronic spreadsheets (Section 4.1.1)
2. Start up the Works program and create a new spreadsheet file from scratch (Section 4.2)
3. Enter labels, values, and formulas into a spreadsheet (Section 4.2.2)
4. Edit a spreadsheet by clearing cells, inserting rows and columns, deleting rows and columns, and editing the contents of a cell (Section 4.2.3)
5. Modify the spreadsheet format by setting the cell attributes, changing the column width, adding borders, and changing the font, size, and color (Section 4.2.4)
6. Save a spreadsheet on a data diskette and print a spreadsheet (Section 4.2.5)
7. Use the future value, summation, logical If, and table Lookup functions in a spreadsheet formula and use the Fill Right and Fill Down commands to copy a formula into adjacent cells (Sections 4.2, 4.3, and 4.4).

8. Explain the difference between a relative and an absolute cell reference (Section 4.3.2)
9. Sort a spreadsheet into any order, based on multiple sort keys (Section 4.4).

4.1 GETTING STARTED WITH SPREADSHEETS

An electronic spreadsheet is a computer program that turns the screen into a electronic columnar pad. For years accountants have been using large paper worksheets, or spreadsheets, containing many columns for entering financial data by hand. The numbers in each column and row are added, averaged, or otherwise manipulated to provide the accountant with the desired calculations or projections. Today's personal computers provide an electronic means of doing the same thing using spreadsheet software.

4.1.1 Advantages of Electronic Spreadsheets

Any accounting, budgeting, projection, or tabulation problem that can be solved with pencil and paper can be solved faster and more easily using a computerized spreadsheet. The spreadsheet program allows you to define each entry in its appropriate row and column. The entry could be a label (SALARIES, SUPPLIES, EQUIPMENT), a numeric value (\$99.95, 250, 3.14159), or a formula or calculation (B1+B2+B3-A5). Instead of having to manually add a row or column of figures, you can direct the spreadsheet to automatically solve all calculations. If a numeric entry is changed, all calculations related to that entry are recalculated. (An example of such a spreadsheet is shown in Figure 4.1.)

In a large spreadsheet, once a calculation is defined for a particular row or column it can easily be reproduced to apply to as many other rows or columns as you want. This feature saves the

Course	Test 1	Test 2	Test 3	Test 4	Average
Biology	75%	80%	78%		77.7%
Philosophy		73%	83%		78.0%
Art History	95%	90%	97%		94.0%
Computer Science	99%	98%	99%		98.7%
English	67%	72%			69.5%
Overall Average					83.6%

Figure 4.1. Sample Spreadsheet

experienced user time when designing a spreadsheet. Spreadsheet programs also have features for editing entries, saving and loading worksheets on floppy or hard disks, and printing reports.

In business contexts, spreadsheets have obvious management applications for budgeting, accounting, and financial modeling. But individuals also use spreadsheets for a variety of other purposes, such as calculating the board feet of lumber needed to build a room addition, keeping track of the value of a stamp collection, maintaining an inventory of household items, and analyzing professional or college football scores. Figure 4.1 shows an example of how you might use a spreadsheet to keep track of your grades. It is abbreviated to fit the printed page limitations of this text but could be expanded to include more scores or more courses.

Note in Figure 4.1 that Test 4 has not yet been taken in any course. After the exams are over and the grades received, the new percentages can be entered for each course. The Average for each course would automatically be recalculated to include the new test score. After each course average were updated, the Overall Average would also be recalculated. Notice that our student missed Test 1 in Philosophy. If the student made up this exam and entered the result, the Average for Philosophy would be recalculated, along with the Overall Average. This automatic calculation feature of spreadsheet software can save hours of manual work.

4.1.2 Using Works Spreadsheet

The Works integrated software contains an electronic spreadsheet in addition to word-processing, database, and other applications. The remainder of this chapter will assume that you are already familiar with the basic functioning of Works and have a floppy diskette initialized on which to store these examples. Be sure to complete the previous three chapters before continuing. If you feel you need a review of basic Works, reread the following sections.

- 1.4 How to Use the Macintosh
- 2.1 An Introduction to Microsoft Works
- 2.3.1 Entering Text
- 2.3.2 Saving Your Quotation
- 2.3.3 Printing Your Document
- 2.3.4 Quitting Works
- 2.4.1 Editing Text
- 2.4.3 Cut and Paste: Moving Text
- 2.4.7 More About Printing

This chapter will explain how to use the features of the Works spreadsheet by having you design and develop several example spreadsheets. To gain maximum benefit from this chapter, you should work the examples on a Macintosh while following the instructions in the text.

4.2 SPREADING THE WEALTH (A PERSONAL BUDGET EXAMPLE)

In this example, you will design and develop a simple personal budget using Microsoft Works. You will learn how to enter data, calculate projected expenses, edit data, customize the layout, save the spreadsheet on a diskette, and print a budget report. To begin, start up Works and create a new spreadsheet document following these directions.

1. Start up the Macintosh using the Works Startup and Program diskettes. (Remember how? See Section 1.4.1 if you need help.)
2. If the Works window is not visible on the screen, open the Works Program disk icon (see Section 1.4.3).
3. Start Microsoft Works by selecting the Works icon (point and click) and by choosing Open from the File menu.

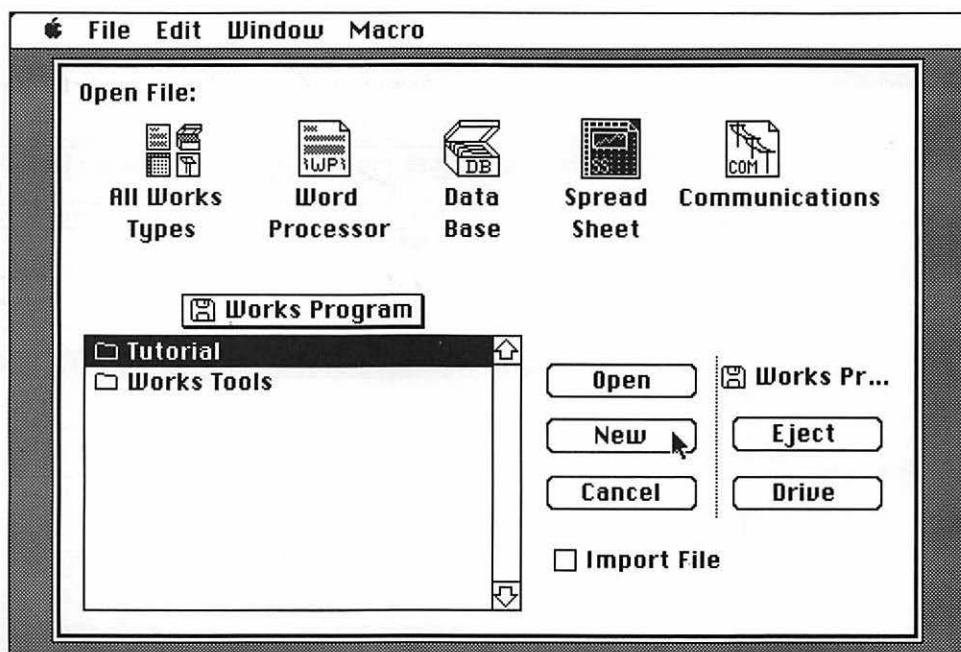
Short Cut: Double click on the Works icon.

4. The Works desktop should appear. Select Spread Sheet by pointing to its icon and clicking. Create a new document by pointing to and clicking on the New button (see Figure 4.2).
5. A spreadsheet document will be opened and the screen should appear as in Figure 4.3.

4.2.1 Mousing Around the Spreadsheet

The Works spreadsheet comprises 256 columns labeled from A to IV across the top of the window and 16,382 rows labeled down the left side of the window. Each entry in the spreadsheet is placed in a **cell**, and the cells are identified by their column-row coordinates. For example, the cell in the upper left-hand corner of the spreadsheet window (see the arrow in Figure 4.3) is identified as A1 because it is in column A, row 1. Likewise, the cell in the lower right-hand corner of the window is F17 (column F, row 17).

The **active cell** is the cell you are currently working in; it is identified by a shaded border around its edges. Using the mouse, point to cell A1 and press the mouse button. The cell location, A1, will appear in the cell reference box located just below the Apple menu,



Figures 4.2. Creating a New Spreadsheet

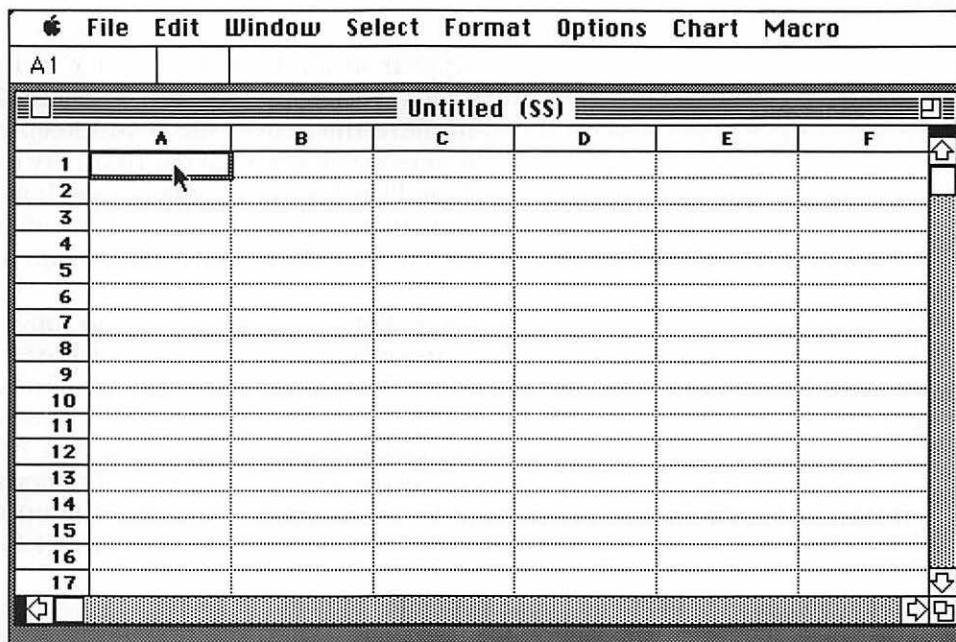


Figure 4.3. Untitled Spreadsheet

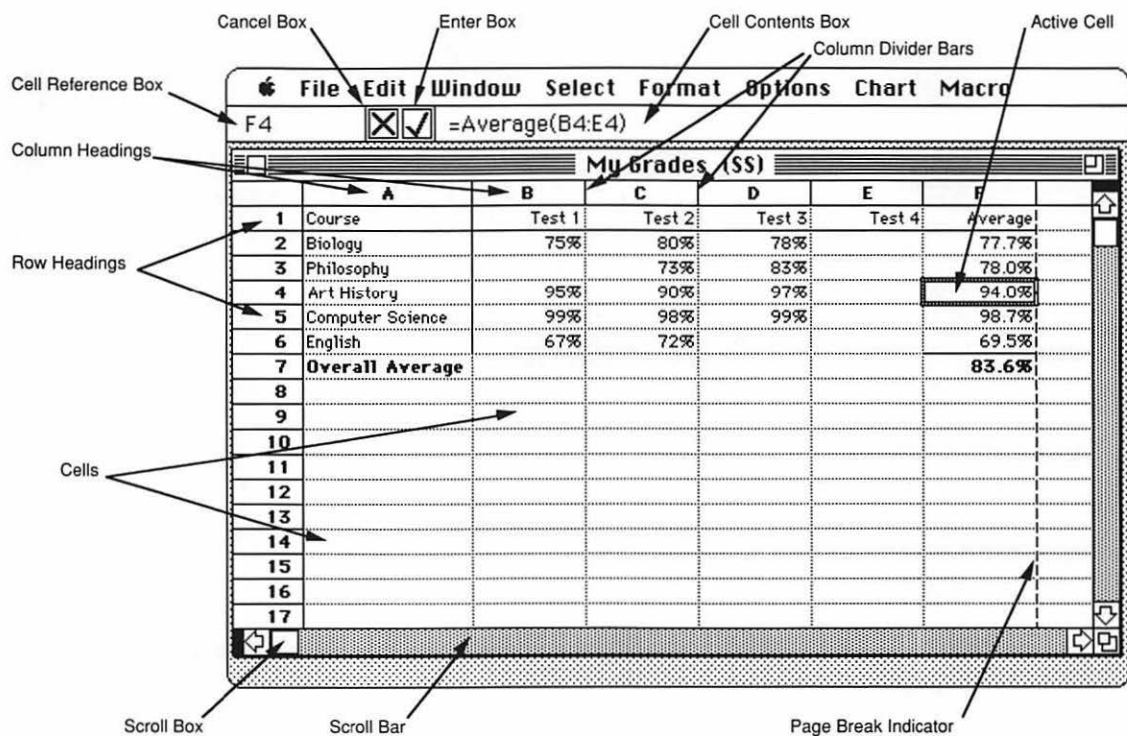


Figure 4.4. Works Spreadsheet Features

and a border will appear around the cell. (Refer to Figure 4.4 to identify the features of a Works spreadsheet.) Press the Right Arrow key several times to move the active cell. If you keep pressing the Right Arrow key, the screen will **scroll** to the right. Try using the Left Arrow, Down Arrow, and Up Arrow keys to discover how to move the active cell around the spreadsheet. Notice that the identification of the active cell changes in the cell reference box as you move around the spreadsheet.

In addition to using the arrow keys, you can move around the spreadsheet window using the scroll bars or scroll boxes. (If you need to review how to use the scrolling features of Macintosh windows, refer to Section 1.4.5.) You can also use the mouse to select an active cell by pointing to any cell in the window and clicking. After you have experimented with the arrow keys, scroll bars, and mouse, scroll the window to its original position, with cell A1 in the upper left-hand corner and make cell A1 the active cell (see Figure 4.3).

4.2.2 Entering Data

Entering data into the spreadsheet is as simple as entering text into the word processor. However, before entering data, you must

choose the appropriate active cell and determine which type of data you will be entering: labels, values, or formulas. To enter data, follow these steps.

1. Move the active cell to the desired location using the techniques described in Section 4.2.1.
2. Type in the data. Use the Delete or Backspace key to erase mistakes.
3. Press the Return, Enter, Tab, or any Arrow key.

Helpful Hint: As you type the data, they appear in the cell contents box (see Figure 4.4). They will appear in the active cell after Step 3 is executed.

The key you press in Step 3 will determine which cell becomes the next active cell. The Return key and Down Arrow key move the active cell to the one immediately below the one into which you just entered data. The Tab and Right Arrow keys move the active cell one cell to the right after data are entered. The Left and Up Arrow keys move the active cell in the direction indicated on the key. The Enter key “enters” the data into the cell without moving the active cell.

Labels. Spreadsheet labels are alphabetic letters, numbers, and punctuation marks that help to describe the data but that are not used in any calculations. Examples of labels are titles, column and row headings, and footnotes. For your personal budget example, move the active cell to cell B4, type *January*, and press the Tab or Right Arrow key. You have just entered *January* into cell B4 and are ready to enter the next label into cell C4. Type *February* and press the Right Arrow key again. Continue with this procedure, entering *March* in cell D4 and *Total* into cell E4. You have just entered the column headings for your budget. Now move the active cell to A5 and enter the following row headings.

Cell	Enter Text
A5	Rent
A6	Groceries
A7	Automobile
A8	Utilities
A9	Entertainment
A10	Total

Finally, move to cell C2 and enter your name and the word *Budget* (for example, *Michelle’s Budget*). Your spreadsheet should now look like Figure 4.5.

Values. A value entry in a cell includes any numeric data that will be used for calculation purposes. In your sample budget, you need to budget some values for each month and expense category. Move

	A	B	C	D	E	F
1						
2			Michelle's Budget			
3						
4		January	February	March	Total	
5	Rent					
6	Groceries					
7	Automobile					
8	Utilities					
9	Entertainment					
10	Total					
11						
12						
13						
14						
15						
16						
17						

Figure 4.5. Personal Budget Labels

to cell B5 and enter 400 for January rent. Do not enter a dollar sign, and do not be alarmed that the amount does not align with the January heading. Techniques for formatting your layout will be discussed later. Continue entering values for the remainder of the months and expenses, using Figure 4.6 as a guide. Do not enter totals, because you will program the spreadsheet to calculate them automatically.

Formulas. You can enter a formula into a cell to *program* the spreadsheet to perform automatic calculations. To enter a formula, you type an equal sign (=) followed by a mathematical expression. In your personal budget, you need to sum the expenses for each month and sum the expenses for each expense category. Move to cell B10, enter the formula `=B5+B6+B7+B8+B9`, and press the Enter key. This formula says that cell B10 equals the values of B5, B6, B7, B8, and B9 added together. The value 900 should now appear in cell B10 and the formula should appear in the cell contents box just below the Menu Bar (see Figure 4.4). Move to cell C10 and enter the formula for February's total.

Helpful Hint: `=C5+C6+C7+C8+C9`.

Now enter the formula for March's total expenses.

	A	B	C	D	E	F
1						
2			Michelle's Budget			
3						
4		January	February	March	Total	
5	Rent	400	400	400		
6	Groceries	150	175	150		
7	Automobile	200	200	200		
8	Utilities	85	90	75		
9	Entertainment	65	100	65		
10	Total	900	965	890		
11						
12						
13						
14						
15						
16						
17						

Figure 4.6. Selecting Cells to Be Summed

Short Cut: To simplify typing formulas, Works allows you to use the mouse to identify cells to be added to a formula. In your budget example, make cell D10 the active cell and type the equal sign (=). Using the mouse, point to cell D5 and click the mouse. D5 will be added to your formula. Continue using the mouse to point and click on cells D6, D7, D8, and D9. One by one, each cell will be added to the formula. By default, Works puts the addition sign (+) between each cell reference. Press the enter key to complete your formula.

Helpful Hint: If you point and click on the wrong cell as you define your formula, the formula will be incorrect. Be sure to look at the cell contents box as you define your formula. If you click on a cell by mistake, use the Backspace or Delete key to erase the last entry. Sometimes the formula becomes totally incomprehensible as a result of accidental mouse clicks. Click on the cancel box (the box with the X to the left of the cell contents box; see Figure 4.4) and start over.

Built-in Functions and Formula Filling. In your budget example you have only a few columns and a few rows. But what if you had all 12 months and 20 expense categories? It would seem to take forever to

enter the formulas. Fortunately, Works offers several features that simplify the task. One of them is the use of a built-in **function** to sum a long column or row of values. Follow these directions to use the Sum function to calculate the 3-month total expenses for rent in your sample budget.

1. Move the active cell to the desired location (in your example, E5).
2. Type `=Sum(`
3. Using the mouse, point to the first cell in the series of cells to be summed (in your example, B5).
4. Hold the mouse button down and drag the mouse toward the last cell in the series of cells to be summed (in your example, D5). As you drag the mouse, a shaded border will appear around the cells being summed (see Figure 4.6).
5. When you have identified the cells to be summed, release the mouse button. Be sure you stop dragging the mouse when you reach the last cell to be summed. The formula in the cell contents box should read `=Sum(B5:D5`. If it does not, click on the Cancel box and repeat Steps 2 through 5.
6. Type `)` and press the Enter key.

This technique greatly reduces the amount of typing necessary to enter the formula for summing a long row or column of numbers.

Helpful Hint: For very long rows or columns of numbers it is easier *not* to use the mouse to identify the cells to be summed. Follow Steps 1 and 2; then type the first cell to be summed in the row or column (in your example, B5). Type a colon. Now type the last cell to be summed in the row or column (in your example, D5). Finish with Step 6.

Now that you have entered the formula to calculate your total expenses for rent, you can copy that formula into the cells to total the other expense categories. In the Works spreadsheet, this process is called **filling down** or **filling right**. This general concept of duplicating the contents of a cell into other cells is common to all spreadsheet programs. Other programs call this function replicating or copying a formula.

Follow these general directions for filling formulas to complete your personal budget.

1. Using the mouse, point to the cell that contains the formula to be copied (in your example, E5).
2. Click and drag the mouse down the column or across the row to select the cells into which the formula will be copied (in your example, drag down the column to cell E10). When you release the mouse button, a shaded border will appear around the selected cells. The cell with the formula's source will be white and the destination cells will be black.

	A	B	C	D	E	F
1						
2			Michelle's Budget			
3						
4		January	February	March	Total	
5	Rent	400	400	400	1200	
6	Groceries	150	175	150	475	
7	Automobile	200	200	200	600	
8	Utilities	85	90	75	250	
9	Entertainment	65	100	65	230	
10	Total	900	965	890	2755	
11						
12						
13						
14						
15						
16						
17						

Figure 4.7. Copying a Formula with the Fill Down Command

- Choose Fill Down from the Edit menu if you are filling a formula down a column or choose Fill Right from the Edit menu if you are filling a formula across a row. (Which option should you choose for your budget example?)

Using this technique, the source formula will be copied into each of the selected destination cells. The cell references in the source formula will be changed automatically to the appropriate cell references for the destination cell. For example, the source formula for cell E5, `=Sum(B5:D5)`, will be changed to `=Sum(B6:D6)` for destination cell E6. These are called **relative cell references** and will be discussed in greater detail later. You have now completed entering data for your personal budget. Your spreadsheet should look like the example in Figure 4.7.

4.2.3 Editing the Spreadsheet

Any cell can be edited at any time by moving the active cell to the desired location, entering the new data, and pressing the Enter key. If any formulas in the spreadsheet use the edited cell, they will

automatically be recalculated. For example, make the active cell B8, the cost of utilities for January. The current value in B8 is 85. Enter the value 100 and press the Enter key. Watch carefully to see the spreadsheet change the value of E8, *total utilities*, to 265; the value of B10, *January total*, to 915; and the value of E10, *grand total*, to 2770. In actual practice, the budgeted amounts in the spreadsheet can be replaced monthly with actual expenditures, so you can track how closely you stay within your budget.

Clearing Cells. Sometimes you need to erase the contents of a cell or group of cells. Select the cell to be erased as the active cell and choose Clear from the Edit menu. If you wish to erase the contents of several adjacent cells, select them by holding the mouse button down while dragging over all the cells until they are highlighted. Selecting the Clear option from the Edit menu will erase the contents of all cells selected.

Helpful Hint: You can retrieve the “cleared” contents of a cell or group of cells by *immediately* choosing Undo from the Edit menu.

Inserting Rows or Columns. If you wish to add one or more rows or columns between adjacent rows or columns, use the Insert option in the Edit menu. In your personal budget example, suppose you wanted to insert a row between rows 5 and 6. Click on the row heading for row 6, Groceries (that is, click directly on the number 6 at the left side of the window). Choose the Insert option from the Edit menu. A new row will be inserted immediately above the Groceries row. You can insert a new column in a similar manner. Click on the column heading for column E and choose Insert from the Edit menu. A new column will be inserted between March and Total. Add the data for insurance in row 6 and the data for April in column E, using Figure 4.8 for reference. On your own, use the Fill Down and Fill Right options to enter the formulas for F6 and E11.

Deleting Rows or Columns. An entire row can be deleted by clicking on the row heading and choosing Cut from the Edit menu. Multiple rows can be selected by dragging the mouse over adjacent row headings and using the Cut option. Similarly, one or more columns can be deleted by clicking on the column heading and choosing Cut from the Edit menu. In both cases, Cut will remove the row or column and bring the adjacent rows or columns together. If you want to erase the contents of a row or column but not eliminate it completely, use the Clear option in the Edit menu.

Editing the Contents of Cell. At the beginning of this section you learned how to replace the data in a cell. Another way of editing the

	A	B	C	D	E	F
1						
2			Michelle's Budget			
3						
4		January	February	March	April	Total
5	Rent	400	400	400	425	1625
6	Insurance	100	100	100	100	400
7	Groceries	150	175	150	160	635
8	Automobile	200	200	200	200	800
9	Utilities	85	90	75	65	315
10	Entertainment	65	100	65	70	300
11	Total	900	965	890	920	3675
12						
13						
14						
15						
16						
17						

Figure 4.8. Editing a Formula

contents of a cell is to use the basic text-editing features of the cell contents box. In your budget example, select B11 as the active cell. The cell contents box beneath the Menu Bar will contain the formula for this cell ($=B5+B7+B8+B9+B10$). Notice that when you inserted the Insurance row, row 6, the formula did not include the new row. To correct the formula, move the mouse pointer into the cell contents box. The pointer will change into an I-bar like the editing cursor in the word processor. When the cursor is an I-bar, you can use any of the text-editing techniques that you learned in Section 2.4.1. Place the I-bar cursor to the right of B5 in the formula, click the mouse button, type +B6, and press the Enter key. The formula will be edited to read $=B5+B6+B7+B8+B9+B10$. For practice, edit the formulas in cells C11, D11, and E11. Do the formulas in F5 through F11 need editing? Why not?

Helpful Hint: When editing the contents of a cell, try out the two useful tools that appear in front of the cell contents box (see Figure 4.4). If the cancel box, indicated by a large X, is clicked on, the contents of the cell prior to editing will be restored, provided that you have not pressed the Enter key. This is similar to the Undo option but only applies to

editing in the cell contents box. The enter box, indicated by the check mark, has the same function as the Enter key. When clicked on, the enter box enters the edited label, value, or formula into the cell.

4.2.4 Changing the Format

By now you have probably noticed what seem to be limitations on the formatting of data entered into the spreadsheet. For example, all columns are 12 characters wide, values are printed as real numbers, labels are left justified, values are right justified, and so on. But you can override these default settings by using options from the Format menu in the Menu Bar.

Setting the Cell Attributes. Each cell has three attributes: the display type, the alignment, and the style. Figure 4.9 shows the dialog box that appears on the screen when Set Cell Attributes is chosen from the Format menu. The display type determines how numbers are displayed on the screen. The following table describes each type and gives several examples. The default display type is General.

General	Displays real numbers with the minimum number of significant digits. The number 3.00 is displayed as 3, the number 5.70 as 5.7.
Fixed	Displays decimal numbers with a fixed number of decimal places as defined by the Decimal Places option in the dialog box. The displayed values are rounded. The number 3.14159 is displayed as 3.14. However, the value 3.14159 is stored and used in calculations.
Dollar	Displays numbers in a dollars-and-cents format with a leading dollar sign. Two decimal places are displayed unless otherwise specified in the Decimal Places option. Negative numbers are enclosed in parentheses. Examples: \$99.99, \$2, and (\$854.32).
Percent	Displays numbers as a percentage (that is, the numeric value entered in the cell is multiplied by 100) and followed by a percent sign. If you enter .12, it is displayed as 12%.
Scientific	Displays very large or very small numbers using scientific notation. The number 1,230,000 is displayed as 1.23E+06, which means 1.23×10^6 . A small number such as .000056 is displayed as 5.6E-05 or 5.6×10^{-5} .
Date Short	Displays the date in the form 8/25/73.

Set Cell Attributes:

Display:

☒ General ☐ Date Short

☐ Fixed ☐ Date Medium

☐ Dollar ☐ Date Long

☐ Percent ☐ Time

☐ Scientific ☐ Show Day

Align:

☐ Left ☐ Center ☐ Right

Style:

☐ Bold ☐ Underline ☐ Commas

Decimal Places

Cancel OK

Figure 4.9. The Set Cell Attributes Dialog Box

Date Medium	Displays the date in the form Aug 25, 1973. If the Show Day box is checked, the date is displayed as Sat, Aug 25, 1973.
Date Long	Displays the date in the form August 25, 1973. If the Show Day box is checked, the date is displayed as Saturday, August 25, 1973.
Time	Displays the time in a 12-hour format. You must enter <i>AM</i> or <i>PM</i> ; otherwise Works will assume <i>AM</i> . Examples: 9:10 <i>AM</i> and 3:55 <i>PM</i> .

Alignment options include Left justify, Center justify, and Right justify, as in the word processor. Numeric values and the results of formulas are automatically set to Right justify. Labels are set to Left justify. Style options are limited to **Bold** and Underline. Clicking in the Commas box will position commas at the appropriate places in numeric values. For example, \$1000000 is displayed as \$1,000,000 if the Commas box is checked.

Helpful Hint: The cell contents box shows how data were actually entered (as formulas, numbers, or labels). The active cell displays the contents using its cell attributes.

In your personal budget example, set the cell attributes to the Dollars display type.

1. Using the mouse, select all the cells with numeric values (point to B5, click, and drag the mouse to F11).
2. Choose Set Cell Attributes from the Format menu.
3. Click on the Dollar display option.
4. Click the OK button.

Now set the column labels—January, February, and so on—to Right justify.

1. Using the mouse, select all the column labels (point to B4, click, and drag the mouse to F4).
2. Choose Set Cell Attributes from the Format menu.
3. Click on the Right alignment option.
4. Click the OK button.

Your personal budget spreadsheet should look like Figure 4.10.

Changing the Column Width. Follow these steps to increase or decrease the width of a column.


1. Make active any cell in the column whose width you want to change. If you want to change the width of several columns, use the mouse to select the columns by dragging across the appropriate column headings.
2. Choose Column Width from the Format menu.
3. Type the number of digits for the new column width.
4. Click the OK button.

Use this method to change the column width of columns A through F to 10 digits in your personal budget example.

Untitled (SS)						
	A	B	C	D	E	F
1						
2		Michelle's Budget				
3						
4		January	February	March	April	Total
5	Rent	\$400.00	\$400.00	\$400.00	\$425.00	\$1625.00
6	Insurance	\$100.00	\$100.00	\$100.00	\$100.00	\$400.00
7	Groceries	\$150.00	\$175.00	\$150.00	\$160.00	\$635.00
8	Automobile	\$200.00	\$200.00	\$200.00	\$200.00	\$800.00
9	Utilities	\$85.00	\$90.00	\$75.00	\$65.00	\$315.00
10	Entertainment	\$65.00	\$100.00	\$65.00	\$70.00	\$300.00
11	Total	\$1000.00	\$1065.00	\$990.00	\$1020.00	\$4075.00
12						
13						
14						
15						
16						

Figure 4.10. Personal Budget After Setting Cell Attributes

Helpful Hint: If you change the column width to be narrower than the space needed to display its contents, the contents will be displayed as #####. Simply widen the column until its contents are correctly displayed.

An alternative method for changing the width of one column is to use the column divider bars. These vertical bars are located between the column headings (see Figure 4.4). When the pointer is placed on the column divider bar it will change to a vertical bar with an arrow pointing away from each side (). Hold down the mouse button and drag. A dotted line will follow the mouse in the direction dragged—left or right. When the mouse button is released, the column will adjust to the newly defined width and the adjacent column will be shifted appropriately. In your budget example, try this method to change the width of column A so that cell A10, Entertainment, is completely displayed.

Adding Borders. Any cell in a Works spreadsheet can have a border. The border is a thin black line that can outline the entire cell or any combination of sides. These borders can be used to highlight information, draw lines under titles, or simply dress up the spreadsheet. The Borders option is located under the Format menu. It contains a submenu that will let you choose from Outline, Left, Right, Top, Bottom, and None. To demonstrate this feature, place a border under the column titles.

1. Using the mouse, select cells A4 through F4.
2. Choose Borders from the Format menu. Continue holding down the mouse button so that the Borders submenu appears.
3. Choose Bottom from the Borders submenu.

On your own, try adding a border on the right side of cells A4 through A11. See Figure 4.11 for the finished spreadsheet.

Changing the Font, Size, or Color. The Format menu also has options to change the Font, font Size, and font Color. These options work just as the same options in the Format menu of the word processor do. Select the cell or cells whose attributes you want to change, choose the appropriate option from the Format menu, and then choose the desired option from the submenu. A detailed description of the process can be found in Section 2.4.4.

4.2.5 Saving and Printing a Spreadsheet

Before printing a spreadsheet it is always a good idea to save it, just in case something goes wrong during the printing process. To save your spreadsheet, follow these directions.

Untitled (SS)						
	A	B	C	D	E	F
1						
2			Michelle's Budget			
3						
4		January	February	March	April	Total
5	Rent	\$400.00	\$400.00	\$400.00	\$425.00	\$1625.00
6	Insurance	\$100.00	\$100.00	\$100.00	\$100.00	\$400.00
7	Groceries	\$150.00	\$175.00	\$150.00	\$160.00	\$635.00
8	Automobile	\$200.00	\$200.00	\$200.00	\$200.00	\$800.00
9	Utilities	\$85.00	\$90.00	\$75.00	\$65.00	\$315.00
10	Entertainment	\$65.00	\$100.00	\$65.00	\$70.00	\$300.00
11	Total	\$1000.00	\$1065.00	\$990.00	\$1020.00	\$4075.00
12						
13						
14						
15						
16						
17						

Figure 4.11. Completed Personal Budget

1. Using the mouse, select the Save option from the File menu at the top of the screen.
2. The Save dialog box will appear. Type *Personal Budget* into the Save Document As box. This will be the name of your file. You must type in a name. Works will not let you name your file Untitled.
3. Insert the floppy data diskette that you formatted in Chapter 1 into the vacant disk drive. (If there is no vacant disk drive, click the Eject button to eject the Works Program disk and insert your data diskette.) The name of your diskette will now appear at the top of the dialog box.
4. With the mouse, point to the button labeled Save and click the mouse button. In a few seconds the dialog box will disappear and your document window will reappear. Your spreadsheet has been saved and is now titled Personal Budget.

Short Cut: Now that you have named and saved your document, the next time you select Save from the File menu you will not have to type the file name. The Macintosh will automatically save your document under its name. This process will replace the old document with the latest revisions. If you do not want to replace the original document, select the Save As command from the File menu and give the new document a different name.

To print your spreadsheet, follow these instructions.

1. Turn on the ImageWriter by pressing the Power and Select buttons. Both power light and select light should be on. Adjust the paper to your liking.
2. Select Print from the File menu. The ImageWriter printing dialog box should appear on the screen.
3. Select Best, Faster, or Draft mode by pointing to the desired option and clicking.
4. Remember that you can enter the number of extra copies desired or a specific range of page numbers if you do not want to print the entire document. Other options allow you to hand-feed paper into the ImageWriter and to preview on the Macintosh's screen what will print on the ImageWriter.
5. Point to and click on the OK button and your document will be printed. If you wish to stop the printing, hold down the Command (⌘) key and simultaneously press the Period key.

Helpful Hint: To print an exact copy of only what appears within the spreadsheet window on your screen, select the Print Window command in the File menu. Be sure that the power for your ImageWriter printer is turned on and that the printer is selected.

Congratulations! You have successfully designed, entered, programmed, saved, and printed your first spreadsheet. Your printed output should resemble Figure 4.12. If you feel up to a more complicated example, continue on with the next section. If you are confused about any of the steps you took in creating the example spreadsheet, it would be a good idea to review those sections before continuing.

	Michelle's Budget				
	January	February	March	April	Total
Rent	\$400.00	\$400.00	\$400.00	\$425.00	\$1625.00
Insurance	\$100.00	\$100.00	\$100.00	\$100.00	\$400.00
Groceries	\$150.00	\$175.00	\$150.00	\$160.00	\$635.00
Automobile	\$200.00	\$200.00	\$200.00	\$200.00	\$800.00
Utilities	\$85.00	\$90.00	\$75.00	\$65.00	\$315.00
Entertainment	\$65.00	\$100.00	\$65.00	\$70.00	\$300.00
Total	\$1000.00	\$1065.00	\$990.00	\$1020.00	\$4075.00

Figure 4.12. Personal Budget Printout

4.3 INVESTING IN YOUR FUTURE (A POSITIVE CASH FLOW EXAMPLE)

In this section you'll explore some additional features of the Works spreadsheet that will provide you with more information about the use of formulas and functions. You'll work through another example spreadsheet, this time one that will calculate the future value of an investment. Instructions for commands you learned before will be abbreviated, but complete instructions will be given for new commands.

4.3.1 Getting Down to Basics

Your new challenge is to design and develop a spreadsheet to calculate the future value of your savings account and the amount of interest earned based on the following information.

- The present balance in the account
- The amount of monthly deposits
- The number of months of saving
- The annual interest rate

It is best to base your design of a spreadsheet on the basic known information and to add the calculations later. The formatting and layout can be modified as you feel the need to perfect the appearance of the spreadsheet. In your example, assume that you currently have \$2,000 in your savings account, that you want to save \$100 per month for 12 months, and that your bank is paying you 6 percent interest.

Start up Microsoft Works and create a new spreadsheet file (to review, see Section 4.2). If you are already using Works, choose New from the File menu, select the Spreadsheet icon, and click the OK button. Figure 4.13 shows the basic labels and values you need to enter into your spreadsheet. Use the skills you learned in prior sections to replicate this spreadsheet on your screen. If you have trouble, review the example in Section 4.2 before continuing. Your spreadsheet must match Figure 4.13 exactly before you can proceed with this exercise.

4.3.2 Calculated Risks (More About Formulas and Functions)

The Works spreadsheet contains arithmetic operators and many mathematical functions that can be used in formulas. In the previous example, your personal budget, you used the Sum function and the addition (+) operator to sum the columns and rows of the

	A	B	C	D	E
1					
2		Account Balance (Present Value)	\$2000.00		
3		Monthly Deposit (Payment)	\$100.00		
4		Number of Months (Periods)	12		
5		Annual Interest Rate	6.00%		
6					
7		Future Value			
8		Interest Earned			
9					
10					
11					
12					
13					
14					
15					
16					
17					

Figure 4.13. Basic Data for Savings Account Spreadsheet

spreadsheet. Works arithmetic operators duplicate the standard functions on a calculator.

Operator	Function	Example
+	Addition	=A5+B6
-	Subtraction	=A5+B6-D3
*	Multiplication	=(A5+B6-D3)*C1
/	Division	=(A5+B6-D3)/F9
^	Exponentiation (Raise to a Power)	=(A5+B6-D3)^A1

Helpful Hints: Remember to use an asterisk, *not* an \times , for multiplication. Parentheses should be used to specify the order of calculations. If there were no parentheses in the multiplication example above, a very different answer would be obtained. Assume that A5=2, B6=5, D3=3, and C1=2. The formula =(A5+B6-D3)*C1 will result in a value of 8 because the calculations contained within parentheses are performed prior to multiplying by C1. The formula =A5+B6-D3*C1 would result in a value of 1 because Works always performs calculations in the following order: exponentiation, multiplication and division, addition and subtraction.

Works functions include mathematical functions such as absolute value and logarithm (Abs and Log10), statistical functions such as the sum and average of values (Sum and Average), trigonometric

functions such as the sine or cosine of a number (Sin and Cos), financial functions such as the future value and net present value (FV and NPV), logical functions such as "if" statements (If), date and time functions such as the current date and time (Now), and special-purpose functions such as looking up data from a table (Lookup).

In your savings example, you need to calculate the future value of your investment, the interest earned, and a monthly record of deposits. To simplify this process, break it down into steps.

Step 1: Calculate the Future Value

The future value function needs to have specific data supplied to perform the calculation correctly. The format of the data is as follows.

`=FV(interest rate, # of periods, payment, present value, type)`

Follow along carefully to enter this function.

1. Make C7 the active cell.
2. Type an equal sign (=) to begin the formula.
3. Choose Paste Function from the Edit menu. The Paste Function dialog box will appear on the screen. This box contains a list of all the Works functions.
4. Scroll the dialog box until you locate the future value function, FV(). Choose the FV() function by pointing to and clicking on it. It should become highlighted. Click the OK button.
5. The future value function needs to know the interest rate for the chosen period, which in this case is the monthly rate. With the mouse, point to and click on cell C5, the annual interest rate. To calculate the monthly rate, divide the annual rate by 12: type the division operator and the number 12. The formula in the cell contents box should read `=FV(C5/12)`.
6. Type a comma. Point to and click on cell C4. This specifies the number of periods (months).
7. Type a comma. Now specify the monthly payments (deposits). The cash flow convention that Works uses requires cash paid out to be represented by a negative number. So type a minus sign (-) and then point to and click on cell C3. The formula in the cell contents box should now read `=FV(C5/12,C4,-C3)`.
8. Type a comma. To enter the present value, type a minus sign and then point to and click on cell C2. The minus is needed because you have already paid out cash into your savings account.
9. Type a comma and type the number one. This tells the function that the payment or deposit occurs at the beginning of each period. (A zero would indicate that the payment occurred at the end of each period, as in a loan.) The completed formula should read `=FV(C5/12,C4,-C3,-C2,1)`.
10. Press the Enter key. The future value of your savings account will be \$3,363.08 after 12 months.

Step 2: Calculate the Amount of Interest Earned

The interest earned is equal to the future value, less the present value, less the sum of the monthly deposits.

1. Make C8 the active cell.
2. Type an equal sign to begin the formula.
3. Point to and click on cell C7, the future value.
4. Subtract the present value: type the subtraction operator and point to and click on cell C2.
5. Subtract the value of all the deposits: type the subtraction operator, point to and click on cell C3 (the amount of each deposit), type the multiplication operator, and point to and click on cell C4 (multiply by the number of payments). The formula should read $=C7-C2-C3*C4$.
6. Press the Enter key. You have earned \$163.08 in interest.

Step 3: Create a Monthly Record of Deposits

To complete your savings account spreadsheet, create a monthly record of deposits including a column for the payment number, a column for the deposit amount, a column for the interest earned, and a column for the monthly balance.

1. Enter the labels *Payment Number*, *Payment*, *Interest*, and *Balance* in cells B10, C10, D10, and E10, respectively (see Figure 4.14).
2. Make E11 the active cell. Type an equal sign (=) and point to and click on cell C2. This will establish the beginning account balance.
3. Enter the numbers 1 through 12 into cells B12 through B23.

Short Cut: Type the number 1 into cell B12 and press the Return key. B13 should now be the active cell. Type $=B12+1$ and press the Enter key. Use the Fill Down command in the Edit menu to copy the formula from B13 into B14 through B23. This technique is extremely helpful for numbering a column.

4. Put the monthly deposit amount into cells C12 through C23. Move the active cell to C12. Type an equal sign and point to and click on cell C3. Continue using this same process to place the formula $=C3$ into cells C13 through C23.

Short Cut: To save time, you can use the Fill Down command again. However, you must make the reference to cell C3 an **absolute cell reference**. Otherwise Fill Down will use a relative cell reference and C13 would contain $=C4$, C14 would contain $=C5$, C15 would contain $=C6$, and so on. To make the formula in cell C12 an absolute reference, edit the cell contents box to read $=\$C\3 . A dollar sign before a column or row identifier indicates an absolute cell reference. Now use the Fill Down

Untitled (SS)					
	A	B	C	D	E
1					
2		Account Balance (Present Value)	\$2000.00		
3		Monthly Deposit (Payment)	\$100.00		
4		Number of Months (Periods)	12		
5		Annual Interest Rate	6.00%		
6					
7		Future Value	\$3363.08	← Step 1	
8		Interest Earned	\$163.08	← Step 2	
9					
10		Payment Number	Payment	Interest	Balance
11					\$2000.00
12	Step 3.1	1	\$100.00	\$10.50	\$2110.50
13		2	\$100.00	\$11.05	\$2221.55
14		3	\$100.00	\$11.61	\$2333.16
15		4	\$100.00	\$12.17	\$2445.33
16		5	\$100.00	\$12.73	\$2558.05
17		6	\$100.00	\$13.29	\$2671.34
18		7	\$100.00	\$13.86	\$2785.20
19		8	\$100.00	\$14.43	\$2899.63
20		9	\$100.00	\$15.00	\$3014.62
21		10	\$100.00	\$15.57	\$3130.20
22		11	\$100.00	\$16.15	\$3246.35
23		12	\$100.00	\$16.73	\$3363.08
24					
25					
26	Step 3.3				
27					
28					

Figure 4.14. Savings Account Spreadsheet—Step by Step

command in the Edit menu to copy the formula from C12 into C13 through C23. In your example, the value of each of these cells should be \$100.00.

- Calculate the interest earned. Move the active cell to D12 and enter the formula $= (E11 + C12) * (\$C\$5 / 12)$. This adds the deposit to the previous balance and multiplies the sum by the monthly interest rate. Note that the reference to the annual interest rate is an absolute reference. Use the Fill Down command to copy the formula from D12 into D13 through D23.
- Calculate the monthly balance. Move the active cell to E12 and enter the formula $= E11 + C12 + D12$. This calculates the sum of the previous balance, the monthly deposit, and the interest earned. Use the Fill Down command to copy the formula from E12 into E13 through E23. Why are the cell references in the formula in E12 not absolute references?

Helpful Hints: Before saving and printing your spreadsheet, try some of these features to improve the looks of your accomplishment.

1. Choose Show Grid from the Options menu. This feature will prevent the grid lines between columns and rows from showing on the screen and printed output. Choose Show Grid again. What happened?
2. Select cells C7 and C8 and choose Protected from the Options menu. This feature locks the contents of a cell and prevents them from being accidentally erased or edited. You must “unprotect” a protected cell before you can make any changes to its contents.
3. Make A10 the active cell. Choose Set Page Break from the Options menu. A dotted page break indicator will appear above row 10. Everything above this indicator will print on one page, everything below it on another. To eliminate a page break you can use the Remove Page Break command.
4. If you want to see the cell formulas instead of the cell values, choose the Show Formulas command from the Options menu. If you print the window or print the spreadsheet when Show Formulas is selected, the formulas will be printed. To reset the spreadsheet to showing values, choose Show Values from the Options menu.

Congratulations! You have completed a very complicated spreadsheet. Your results should match the spreadsheet in Figure 4.14. First save the spreadsheet on your data diskette entering a file name of *Savings Account* and then print the spreadsheet (see Section 4.2.5 if you need help).

4.3.3 What If?

Now that you have completed your spreadsheet and have analyzed what the value of your \$100-per-month investment will be, you might want to ask some of the following questions.

- What if I invested \$200 per month—how much would I save in 12 months?
- What if I changed banks and got 7 percent interest?
- What if I saved for 18 months instead of 12?
- What if I needed to save \$5000—how long would it take?

Once a spreadsheet has been properly designed, what-if questions can be easily answered by changing the values in the spreadsheet. For example, to determine the future value of your savings account if you invested \$200 per month, make C3 the active cell, type 200, and press the Enter key. Your account balance is recalculated automatically because of the formula in cell C7. Try answering these four what-if questions on your own.

Helpful Hint: The fourth what-if question can be answered by a technique called successive approximations. To use this technique, make a guess at the number of months it might take to save \$5,000 and enter that guess into cell C4 of the savings account spreadsheet. Adjust your guess upward if the future value is less than the desired amount. Adjust your guess downward if the future value is more than \$5,000. After several guesses, you will narrow in on the answer.

4.4 THE BIG PAYOFF (A PAYROLL EXAMPLE)

The following example builds a payroll ledger for a fictitious company and demonstrates three commonly used features of the Works spreadsheet: the logical If function, the table Lookup function, and the Sort command. Start up Microsoft Works and create a new spreadsheet file (for a review, see Section 4.2). If you are already using Works, choose New from the File menu, select the Spreadsheet icon, and click the OK button. Figure 4.15 presents the basic labels and values that need to be entered into the spreadsheet. Use the skills you learned in prior sections to replicate this spreadsheet on your screen. If you have trouble, review the example in Section 4.3 before continuing. Your spreadsheet must match Figure 4.15 exactly before you can proceed with this exercise.

Our fictitious company has 15 employees (see columns A and B) earning from \$460 to \$6,020 per month (see column D). Column C indicates each employee's status: 1 = full-time; 2 = part-time. These data are important because part-time employees do not have medical benefits and full-time employees are required to pay \$50.00 per month for their medical insurance. The income tax to be withheld is based on the following table:

Annual Income	Tax Rate
under 24,000	.02
24,000 to 35,999	.03
36,000 to 49,999	.04
over 49,999	.05

Your assignment is to compute the medical deduction (column E), the income tax to be withheld (column F), and the monthly take-home pay for each employee (column G). Finally, you will need to sort the payroll ledger into alphabetical order by name.

The Logical If Function. The logical If function checks a logical comparison, testing whether it is true or false. If the result of the

	A	B	C	D	E	F	G
	First Name	Last Name	Status	Salary	Medical	Income Tax	Take Home
1	Brian	Downing	1	2540.00			
2	Jack	Howell	1	5000.00			
3	Wally	Joyner	1	5970.00			
4	Lance	Parrish	1	4080.00			
5	Bert	Blyleven	1	4520.00			
6	Chuck	Finley	1	2333.00			
7	Mark	McLemore	1	6020.00			
8	Devon	White	1	5270.00			
9	Mike	Witt	1	4140.00			
10	Urbano	Lugo	1	3680.00			
11	Darrell	Miller	2	460.00			
12	Dick	Schofield	2	1230.00			
13	Chili	Davis	2	1130.00			
14	Claudel	Washington	2	1410.00			
15	Willie	Fraser	2	1400.00			
16							
17							

Figure 4.15. Payroll Ledger Basic Data

comparison is true, the function performs a specified action. If the comparison is false, the function performs a different action. In your payroll ledger the If function can be used to test whether an employee's status (column C) equals a 1 (full-time). If the status is a 1, the function can place the value of 50 in column E, the medical deduction for full-time employees. If the status is a 2 (part-time), the function can place the value of zero in column C.

The If function has the following format:

If (logical expression, value if true, value if false)

The logical expression commonly compares two cells with one another or a cell with a value, but it can take many forms. The logical expression usually contains one of these comparison operators:

- = Equals
- < Less than
- <= Less than or equal to
- > Greater than
- >= Greater than or equal to
- <> Not equal to

To compute the medical deduction on your payroll ledger, follow these steps.

1. Move the active cell to E2, type an equal sign to indicate a formula, and enter the If function by typing *IF*(
2. Type the logical expression *C2=1* This will check C2 to see whether it equals a 1.
3. Type a comma followed by the value *50* This places 50 into E2 if *C2=1*.
4. Type a comma followed by the value *0* This places 0 into E2 if *C2<>1*.
5. Type a parenthesis and press the Enter key.
6. Use the Fill Down command from the Edit menu to copy this formula into columns E3 to E16 (see Figure 4.16).

The Table Lookup Function. The Lookup function is used to compare a value—usually the contents of a cell—to a table to look up a corresponding value. In your payroll example, you need to look up the income tax rate based on the annual income of each employee. The first step is to enter the Lookup table into the spreadsheet. You want to choose a section of the spreadsheet that you will not be using for payroll data. Move the active cell to D19 and enter the table shown

File Edit Window Select Format Options Chart Macro							
E2	=If(C2=1,50,0)						
Untitled (SS)							
	A	B	C	D	E	F	G
1	First Name	Last Name	Status	Salary	Medical	Income Tax	Take Home
2	Brian	Downing	1	2540.00	50.00		
3	Jack	Howell	1	5000.00	50.00		
4	Wally	Joyner	1	5970.00	50.00		
5	Lance	Parrish	1	4080.00	50.00		
6	Bert	Blyleven	1	4520.00	50.00		
7	Chuck	Finley	1	2333.00	50.00		
8	Mark	McLemore	1	6020.00	50.00		
9	Devon	White	1	5270.00	50.00		
10	Mike	Witt	1	4140.00	50.00		
11	Urbano	Lugo	1	3680.00	50.00		
12	Darrell	Miller	2	460.00	0.00		
13	Dick	Schofield	2	1230.00	0.00		
14	Chili	Davis	2	1130.00	0.00		
15	Claudel	Washington	2	1410.00	0.00		
16	Willie	Fraser	2	1400.00	0.00		
17							

Figure 4.16. Calculating Column E by Using the If Function

Untitled (SS)							
	A	B	C	D	E	F	G
17							
18							
19				Salary	Tax Rate		
20				0.00	0.02		
21				24000.00	0.03		
22				36000.00	0.04		
23				50000.00	0.05		
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							

Figure 4.17. Payroll Ledger Lookup Table

in Figure 4.17. Carefully compare the data in the Lookup table with the table presented in the second paragraph of Section 4.4. When entering a table to be used by the Lookup function, the data must be in ascending order (lowest to highest). The value entered into the comparison column (Salary) must therefore be the lowest possible value for that range. The corresponding result is entered into the next column of the same row.

The Lookup function has the following format:

Lookup(lookup value, comparison range, result range)

Move the active cell to F2 and enter the following formula:

`=Lookup(D2*12,D20:D23,E20:E23)*D2`

The monthly salary, D2, is multiplied by 12 to calculate the annual salary. That value is looked up in the comparison range starting with D20 and continuing through D23. The corresponding result will be found starting with E20 and continuing through E23. Finally multiply the Lookup result by the monthly salary, D2, to get the withholding. Do you remember why dollar signs are used to specify the cells?

Use the Fill Down command to complete column F for each employee. Then calculate the take-home pay, column G, by subtracting the medical and income tax from the salary. Your calculations should match those shown in Figure 4.18.

Untitled (\$\$)							
	A	B	C	D	E	F	G
1	First Name	Last Name	Status	Salary	Medical	Income Tax	Take Home
2	Brian	Downing	1	2540.00	50.00	76.20	2413.80
3	Jack	Howell	1	5000.00	50.00	250.00	4700.00
4	Wally	Joyner	1	5970.00	50.00	298.50	5621.50
5	Lance	Parrish	1	4080.00	50.00	163.20	3866.80
6	Bert	Blyleven	1	4520.00	50.00	226.00	4244.00
7	Chuck	Finley	1	2333.00	50.00	69.99	2213.01
8	Mark	McLemore	1	6020.00	50.00	301.00	5669.00
9	Devon	White	1	5270.00	50.00	263.50	4956.50
10	Mike	Witt	1	4140.00	50.00	165.60	3924.40
11	Urbano	Lugo	1	3680.00	50.00	147.20	3482.80
12	Darrell	Miller	2	460.00	0.00	9.20	450.80
13	Dick	Schofield	2	1230.00	0.00	24.60	1205.40
14	Chili	Davis	2	1130.00	0.00	22.60	1107.40
15	Claudel	Washington	2	1410.00	0.00	28.20	1381.80
16	Willie	Fraser	2	1400.00	0.00	28.00	1372.00
17							

Figure 4.18. Completed Payroll Ledger

The Sort Command. Now that you have finished all the necessary calculations, you need to sort the employees into alphabetical order. Works has a built-in Sort command that will do the task. See if you can apply the general steps listed here to sort your payroll example.

1. With the mouse, point and drag to highlight the entire portion of the spreadsheet that you want sorted. In addition to the columns to be sorted, you must include any with corresponding data. Data in cells not selected will *not* be rearranged.

Helpful Hint: In your payroll example, select all the cells from A2 to G16. Why?

2. Choose Sort from the Edit menu. The Sort dialog box will appear on the screen (see Figure 4.19).
3. A **sort** key tells the Works program which column to use to sort the data and in which order to sort them. You can define three sort keys. The data will be sorted by the first key, then the second, and finally the third. For example, if you wanted information sorted alphabetically by full name the first key would be the last name, the second the first name, and the third the middle name. In the appropriate boxes, enter the column heading (A, B, C, and so on) for each sort key. Select whether the column should be sorted into ascending order (A to Z or 0 to 9) or into descending order (Z to A or 9 to 0).
4. Click the OK button to perform the sort.

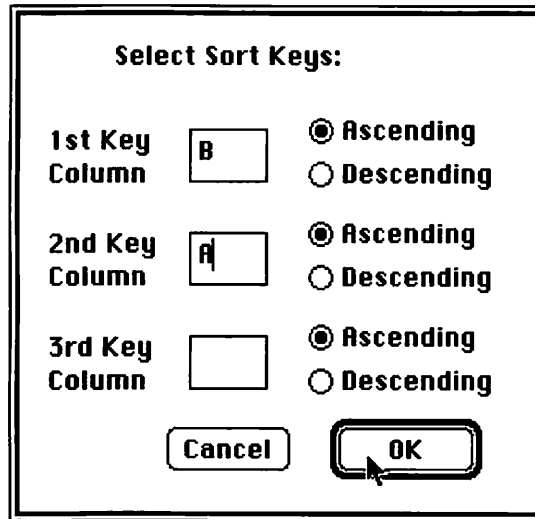


Figure 4.19. Sort Dialog Box

Helpful Hint: If you sorted incorrectly, you can use the Undo command in the Edit menu to undo the sort.

If you completed the sort correctly, your spreadsheet should resemble Figure 4.20. Save this spreadsheet with the file name Payroll Ledger. For practice, print out a copy.

Untitled (\$\$)							
	A	B	C	D	E	F	G
1	First Name	Last Name	Status	Salary	Medical	Income Tax	Take Home
2	Bert	Blyleven	1	4520.00	50.00	226.00	4244.00
3	Chili	Davis	2	1130.00	0.00	22.60	1107.40
4	Brian	Downing	1	2540.00	50.00	76.20	2413.80
5	Chuck	Finley	1	2333.00	50.00	69.99	2213.01
6	Willie	Fraser	2	1400.00	0.00	28.00	1372.00
7	Jack	Howell	1	5000.00	50.00	250.00	4700.00
8	Wally	Joyner	1	5970.00	50.00	298.50	5621.50
9	Urbano	Lugo	1	3680.00	50.00	147.20	3482.80
10	Mark	McLemore	1	6020.00	50.00	301.00	5669.00
11	Darrell	Miller	2	460.00	0.00	9.20	450.80
12	Lance	Parrish	1	4080.00	50.00	163.20	3866.80
13	Dick	Schofield	2	1230.00	0.00	24.60	1205.40
14	Claudel	Washington	2	1410.00	0.00	28.20	1381.80
15	Devon	White	1	5270.00	50.00	263.50	4956.50
16	Mike	Witt	1	4140.00	50.00	165.60	3924.40
17							

Figure 4.20. Payroll Ledger Sorted Alphabetically by Name

4.5 ON YOUR OWN

It is the objective of this chapter to introduce you to basic spreadsheet functions only. Consequently, many features of the spreadsheet are not covered in its examples. Some additional features are briefly presented below so that you can experiment with the three spreadsheets that you have completed. A full listing of the spreadsheet menu commands appears in Appendix C.

Linking Spreadsheets. Many sophisticated spreadsheet programs such as Excel™ and Lotus allow the user to link a cell in one spreadsheet with a cell in another. When a linked cell is updated it is automatically changed in the linked spreadsheet if it is open or when it is opened. This is useful when you are producing a summary report whose data were computed in different spreadsheets, such as a profit-and-loss statement. This feature is not available in Works, however.

Splitting the Window. The spreadsheet window can be split, both vertically and horizontally. Drag the horizontal split bar to split the screen into two subwindows, top and bottom (see Figure 4.21). Drag the vertical split bar to split the screen into two subwindows, left and right. Try doing both at once. How many subwindows do you have now? Each of the subwindows has its own scroll bar to control it.

Helpful Hint: One reason for splitting the window is to keep row or column titles from scrolling when you have a large spreadsheet. Using the Payroll Ledger spreadsheet, drag the horizontal split bar just below row 1 (the titles). Choose Freeze Horizontal Titles from the Options menu. Now you can scroll the spreadsheet without losing your view of the titles.

Cell Notes. Short notes can be attached to individual cells as reminders, like electronic Post-It™ notes. A cell note can be added to the active cell by choosing Open Cell Note from the Edit menu. A window will appear in which you can type your note. When a cell note has been created for a cell, a small black square will appear in the upper right-hand corner of the cell. To read the note, use the Open Cell Note command. If you want to print the cell notes, there is an option in the Page Setup command.

Draw Tools. The same draw tools you learned to use with the word processor in Chapter 3 are also available for the spreadsheet. Choose the Draw On command in the Edit menu to turn on the draw mode and choose Draw Off to return to the spreadsheet mode.

	A	B	C	D	E	F	G
1	First Name	Last Name	Status	Salary	Medical	Income Tax	Take Home
2	Bert	Blyleven	1	4520.00	50.00	226.00	4244.00
3	Chili	Davis	2	1130.00	0.00	22.60	1107.40
4	Brian	Downing	1	2540.00	50.00	76.20	2413.80
5	Chuck	Finley	1	2333.00	50.00	69.99	2213.01
6	Willie	Fraser	2	1400.00	0.00	28.00	1372.00
7	Jack	Howell	1	5000.00	50.00	250.00	4700.00
8	Wally	Joyner	1	5970.00	50.00	298.50	5621.50
9	Urbano	Lugo	1	3680.00	50.00	147.20	3482.80
18				Salary	Tax Rate		
19				0.00	0.02		
20				24000.00	0.03		
21				24000.00	0.03		
22				36000.00	0.04		
23				50000.00	0.05		
24							
25							

Vertical Split Bar

Horizontal Split Bar

Figure 4.21. The Split Bars

Select Menu. The Select menu contains several commands to help you move around large spreadsheets. The best way to learn them is to experiment.

Cut, Copy, Paste, and Move. As in all Works applications, you can cut and copy information from the spreadsheet to the Clipboard. The information can be a single cell, a group of cells, an entire row or column, or a group of rows or columns. Once it's on the Clipboard the information can be pasted back onto the spreadsheet, to another spreadsheet, to a word-processing document, to a database, or to just about any Macintosh file. However, the Move command is unique to the spreadsheet. It will let you move one or more cells to a new location in the same spreadsheet in one command. Cut, Copy, Paste, and Move can be found in the Edit menu.

Page Setup. As it does in the word processor, the Page Setup command in the File menu defines the way your spreadsheet will be printed on paper. Refer to Section 2.4.7 and Figure 2.14 for a review of this option.

4.6 POSERS, PROBLEMS, AND PROJECTS

1. Using Works, create a spreadsheet to budget your own personal finances. Include entries for each of the 12 months and for rent, auto expenses, utilities, and your other expenses. Enter your monthly income and calculate how much you save or overextend each month. Calculate the monthly totals and the average monthly expenditure for each expense category. Save your spreadsheet to be used in the next chapter.
2. Create a spreadsheet to calculate the cost per mile of operating your automobile. For each month include your car payment, gasoline expenses, maintenance and repair costs, insurance, license fees, and any other expenses. Enter your monthly mileage. Sum the annual costs for all items and divide by the total miles driven to calculate the total cost per mile.
- \$3. Using the savings account example in Section 4.3 as a model, create a spreadsheet for a loan amortization. Enter the data for the loan amount, number of payments, and interest rate. Calculate the monthly payment using the PMT function. Calculate a monthly ledger showing the payment number, payment amount, interest paid, principal paid, and loan balance.

Loan Amount	\$ 0.00
Number of Months	0
Annual Interest Rate	0%
Monthly Payment	\$ 0.00

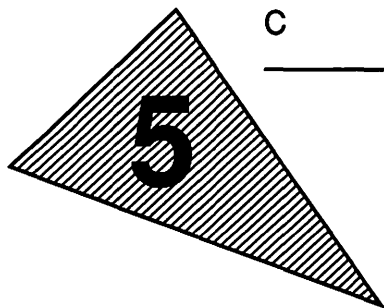
Helpful Hint: PMT(interest rate, # of periods, present value, future value, type)

- *4. Mary Dynamo, the Administrative Assistant to the President of Acme Paper Clip Company, needs to compare and contrast the company's paper clip sales over the past 2 years. She brings you all of the data written on little slips of paper. After you spend hours deciphering the slips of paper, she brings you a reference book reporting the paper clip sales for Acme and its competitors. Create a table using the Works spreadsheet and the data below. Calculate a second table showing the percentage of increase in sales for each company for each year. Calculate a third table showing the percentage of the market share held by each company each year. Save the spreadsheet to be used later.

Company	1987 Sales	1988 Sales	1989 Sales
Acme Paper Clip	12,376,890	14,610,923	20,387,200
United Plastics	3,945,611	5,100,679	6,145,372
Mitsubishi Paper Clip	9,399,789	7,290,098	10,123,533
A.O.S. Paper Clip	7,599,000	6,777,213	3,433,678

Company	% Increase 1987–1988	% Increase 1988–1989
Acme Paper Clip	???	???
United Plastics	???	???
Mitsubishi Paper Clip	???	???
A.O.S. Paper Clip	???	???

Company	% Market Share 1987	% Market Share 1988	% Market Share 1989
Acme Paper Clip	???	???	???
United Plastics	???	???	???
Mitsubishi Paper Clip	???	???	???
A.O.S. Paper Clip	???	???	???



MAKING YOUR POINT: BUSINESS GRAPHICS

"We must never forget that art is not a form of propaganda; it is a form of truth."

—*John F. Kennedy*

"Put all your eggs in the one basket and—WATCH THAT BASKET."

—*Mark Twain*

OBJECTIVES

When you've completed this chapter, you'll be able to do the following.

1. Differentiate among pie, line, bar, stacked, and combination charts (Sections 5.1.1 and 5.1.2)
2. Draw a pie chart (Section 5.1.1)
3. Draw a bar and line chart (Section 5.1.2)
4. Edit, duplicate, and erase charts (Section 5.1.3)

5.1 DRAWING CHARTS

The old adage proclaims “It’s not what you say, but how you say it.” Although most corporate executives will not agree entirely with this statement, the importance of the presentation of data in the business world cannot be overemphasized. Computers now play a vital role in the production of **presentation graphics**. The Works software will take spreadsheet data and turn it into a meaningful visual presentation by means of charts and graphs. Other software can take the charts and add color, titles, music, animation, and even digitized photographs. Entire audiovisual productions can be created with the Macintosh and displayed by means of computer projection equipment. Put that old slide projector in the closet and prepare for the 21st century!

The Works spreadsheet application can produce pie charts, bar charts, and line charts from data in a spreadsheet. The charts are saved with the spreadsheet and can easily be updated if the spreadsheet data changes. They can be printed from the spreadsheet application or copied to the Clipboard and pasted into the Works word processor or any other Macintosh application. Once pasted into the word processor, titles, notes, arrows, borders, and other information can be added before printing. Several charts can be pasted into a word processor document and resized to print on one page. All you need to produce effective graphics are the skills to use Works and a little imagination.

5.1.1 Drawing Pie Charts

A pie chart is the easiest chart to draw with Works. We all remember drawing our first pie chart in school, probably with crayons. *USA Today* uses pie charts frequently to depict, for example, what percentage of the state or federal budget is spent on education or military spending. Pie charts are most effectively used in that way—to depict what percentage of a whole the components make up.

Suppose you wanted to show what percentage of your total budget was spent on rent, insurance, groceries, and so on. In the spreadsheet you could calculate the percentages and print out a table. But think how much more effective it would be if you drew a pie chart. Follow along on your Macintosh to learn how.

1. Open the Personal Budget spreadsheet that you saved in Section 4.2.5. Use the Open command in the File menu. Your screen should resemble Figure 4.11 in the previous chapter.
2. Choose New Pie Chart from the Chart menu. The Pie Chart dialog box will appear on the screen.

3. Type the Chart Title in the box provided. For this example, type *My Personal Budget* and press the Tab key.
4. In the second box, enter the column in which the values you want to plot are located. As you want to plot your total expenses, type *F* and press the Tab key.
5. Next enter the row number in which the values to be plotted begin and then the row number in which they end. As you want to plot from the row for rent through the row for entertainment, type *5*, press the Tab key, type *10*, and press the Tab key.

Helpful Hint: Never include the total of the parts when defining the values to be plotted. The program will calculate the total for you.

6. In the last box, enter the column in which the titles for the values are located. In your example, the row titles are located in column A. Because column A is already entered in the last box, do nothing.
7. Check the dialog box for the correct entries (see Figure 5.1). When you are ready to plot, click the Plot It! button.

Helpful Hint: If your data are in a row, you will need to transpose them to a column. Select the cells to be transposed with the mouse and choose Copy from the Edit menu. Click on the first cell in any

The image shows a dialog box titled "Personal Chart 1". Inside, under the heading "Pie Chart Definition:", there are several input fields. The "Chart Title:" field contains the text "My Personal Budget". The "Plot Values in Column:" field contains the letter "F". The "From Row:" field contains the number "3", and the "Through Row:" field contains the number "10". The "Column of Value Titles:" field contains the letter "A". At the bottom right of the dialog box are two buttons: "Cancel" and "Plot It!". A mouse cursor is pointing at the "Plot It!" button.

Figure 5.1. Pie Chart Dialog Box

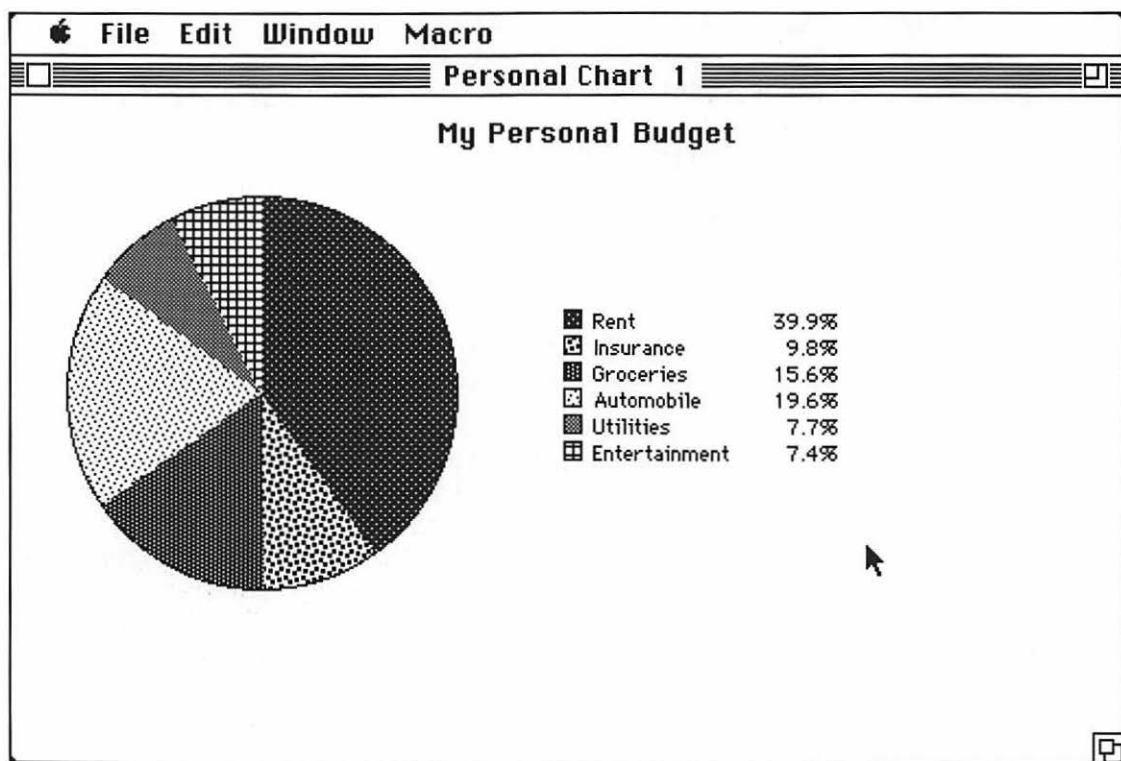


Figure 5.2. My Personal Budget Pie Chart

empty column. Choose Paste with Options from the Edit menu. Click the Transpose button in the Paste with Options dialog box. Click the OK button. Your data will be transposed from a row to a column and can now be plotted.

That's as simple as it gets! Your completed pie chart should resemble Figure 5.2. On your own, draw a pie chart showing your personal budget for the month of February. Use the Window menu to display your Personal Budget spreadsheet; then follow the steps above, substituting the data for February. Your pie chart will look like Figure 5.3.

Helpful Hint: Choose the Save command from the File menu to save the charts with your spreadsheet.

5.1.2 Drawing Series Charts

Series charts include line charts, comparative bar charts, stacked bar charts, and combination bar-and-line charts. Figure 5.4 de-

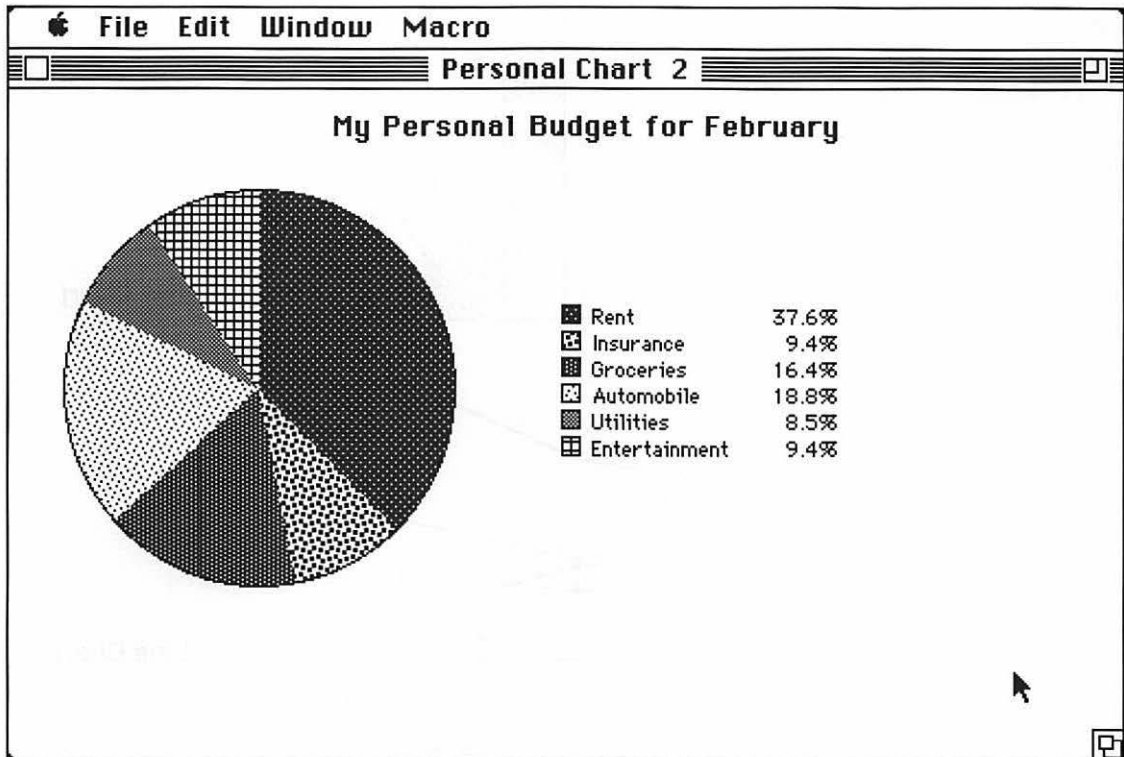
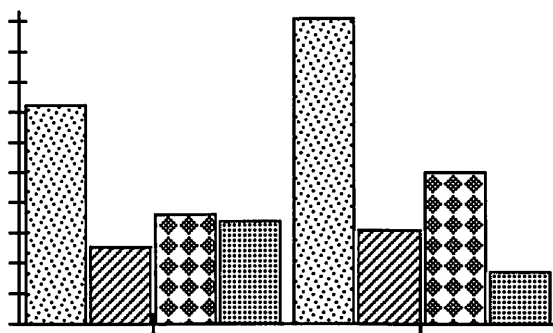


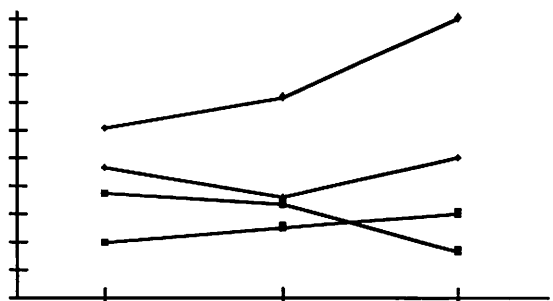
Figure 5.3. My Personal Budget for February Pie Chart

picts the various types of series charts. The process for drawing a series chart is similar to that for a pie chart: create a spreadsheet, choose New Series Chart from the Chart menu, enter the chart information into the Series Chart dialog box, and click the Plot It! button. A detailed explanation of the general steps follows.

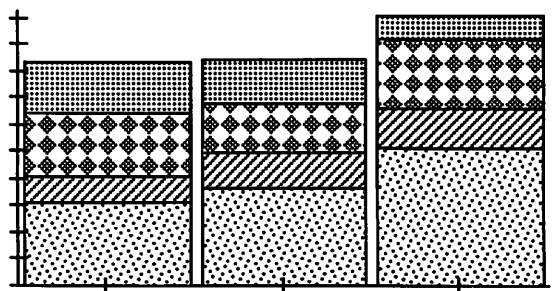
1. Create a new spreadsheet or open an existing one.
2. Choose New Series Chart from the Chart menu. The Series Chart dialog box will appear on the screen (see Figure 5.5).
3. Enter the Type of Chart by clicking on the desired chart: Line, Bar, Stack (stacked bar chart), or Combo (combination bar and line chart).
4. Enter the Chart Title in the box provided and press the Tab key.
5. Enter the Vertical Scale Title and press the Tab key. This title will appear on the vertical (Y) axis.
6. Enter the Horizontal Scale Title and press the Tab key. This title will appear on the horizontal (X) axis.



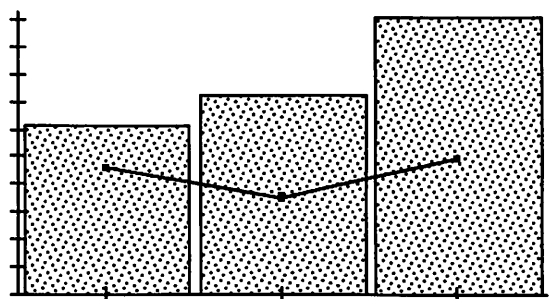
Bar Chart



Line Chart



Stack Chart



Combo Chart

Figure 5.4. Types of Series Charts

Personal Chart 3		
Type of Chart:	Values to be Plotted:	Vertical Scale:
<input type="radio"/> LINE	1st Row: 9	<input checked="" type="radio"/> Numeric
<input checked="" type="radio"/> BAR	2nd Row: 10	<input type="radio"/> Semi-Logarithmic
<input type="radio"/> STACK	3rd Row:	Maximum:
<input type="radio"/> COMBO	4th Row:	Minimum: 0
	From Column: B	
	To Column: E	
	Data Legends in Column: A	<input type="checkbox"/> Draw Grid
	Horizontal Titles in Row: 4	<input checked="" type="checkbox"/> Label Chart
Chart Title:	Comparison of Utilities and Entertainment	
Vertical Scale Title:	Dollars	
Horizontal Scale Title:	Months	
<input type="button" value="Cancel"/> <input type="button" value="Plot It!"/>		

Figure 5.5. Series Chart Dialog Box

- Next, enter the location of the Values to be Plotted. You can plot from one to four rows of data. Enter the row number of the first series to be plotted and press the Tab key. Enter the row numbers for the remaining series in the same manner. Enter the column heading (A, B, C, and so on) in which the data to be plotted begin and press the Tab key. Enter the column heading in which the data end and press the Tab key.

Helpful Hint: Each series of data to be plotted must be located in a row and in adjacent columns. If your data are organized differently, use the Copy and Paste with Options commands to reorganize your spreadsheet.

- Enter the column heading for the location of the Data Legends (the labels that identify each series) and press the Tab key.
- Enter the row number for the Horizontal Titles (the X-axis labels) and press the Tab key.
- Choose the Vertical Scale. Numeric is the normal choice. Semi-Logarithmic uses a logarithmic scale on the Y axis to

exaggerate the size of the smaller numbers and minimize the size of the large ones for showing very large and very small numbers on the same chart. Works will automatically scale the vertical axis. If you want to specify the Maximum and Minimum value on the vertical scale, enter the values in the boxes provided.

11. Check the Draw Grid box if you want grid lines drawn on the chart. The grid lines are sometimes helpful in reading the values on the vertical axis. Check the Label Chart box if you want the chart labeled. You may not want the chart labeled if you plan on adding your own labels in the word processor.
12. Click the Plot It! button.

Follow these instructions to create a bar chart comparing your budgeted expenditures for utilities with those for entertainment for January through April, based on your Personal Budget spreadsheet. Try it on your own first. If you need help, refer to Figure 5.5 for the proper information to be entered in the Series Chart dialog box. Compare your results with the bar chart in Figure 5.6.

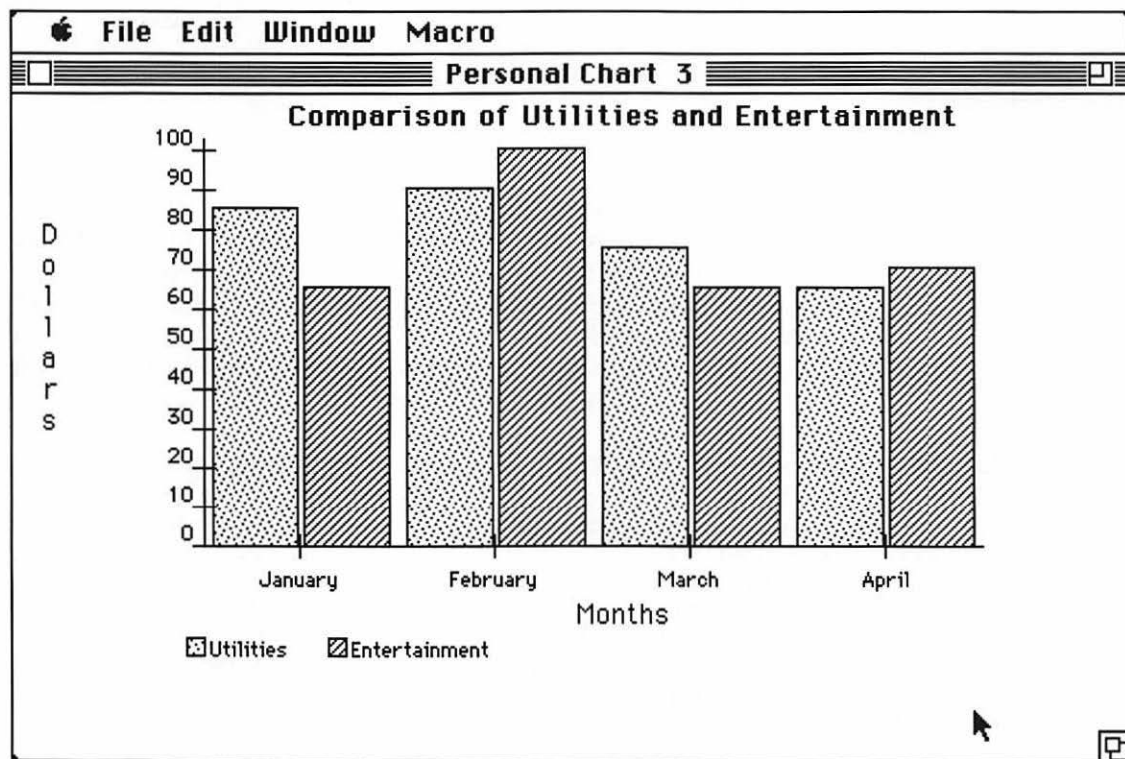


Figure 5.6. Comparative Bar Chart

5.1.3 Editing and Maintaining Charts

When you save your spreadsheet, every chart that you have drawn is saved with it. You may have noticed that each chart drawn is automatically assigned a name. If you have been working the examples along with the text, you should have three charts associated with your Personal Budget spreadsheet. Choose Draw Chart from the Chart menu. The Draw Chart dialog box should appear (see Figure 5.7). This box lists each chart that has been created. To redraw any one, point to and click on the desired chart and click the OK button.

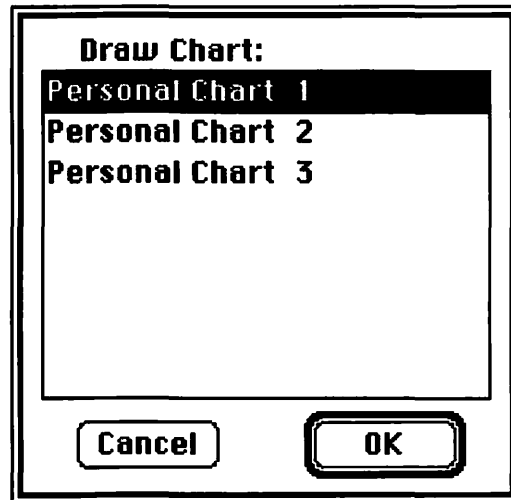


Figure 5.7. Draw Chart Dialog Box

If you want to edit or change a chart, choose the Select Chart Definition command from the Chart menu. A dialog box will appear (see Figure 5.8). Select the chart to be edited and click OK. The Chart dialog box will appear, and you can change any or all of the chart definition information.

In a similar fashion, the Duplicate Chart command in the Chart menu will duplicate the Chart dialog box for any previously drawn chart. This allows you to make changes to the chart without deleting the original one. This is analogous to the Save As command, which saves a file under a new name without deleting the original file. The Erase Chart command in the Chart menu will delete charts associated with a spreadsheet. Unwanted charts should be erased, because only eight charts can be saved with a Works spreadsheet.

Helpful Hint: Because the automatic naming of charts does not describe their contents, you may want to change the assigned name. When the

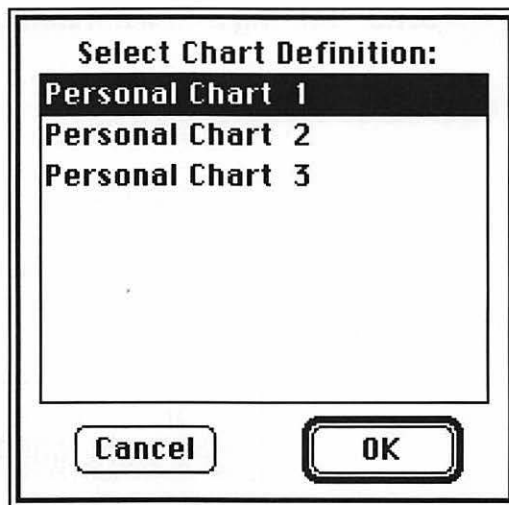


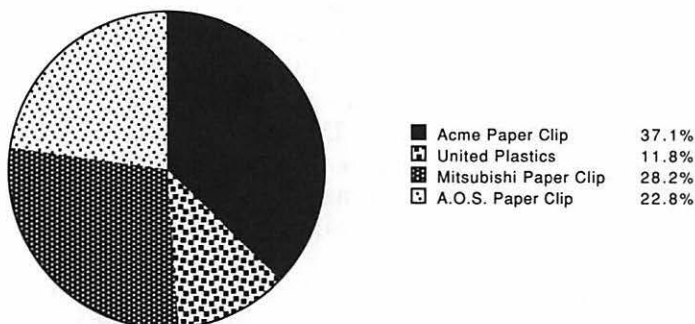
Figure 5.8. Select Chart Definition Dialog Box

Plot Chart or Series Chart dialog box is displayed on the screen, choose the Change Chart Name command from the Edit menu. Enter a more descriptive name and click the OK button.

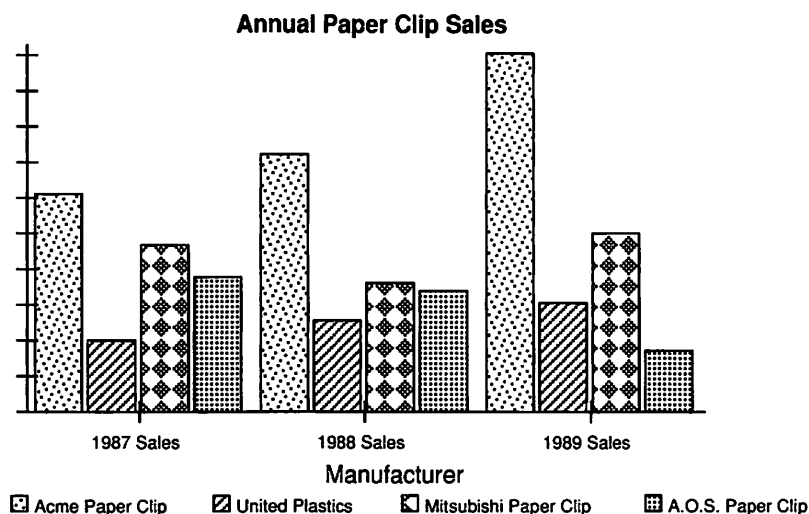
5.2 POSERS, PROBLEMS, AND PROJECTS

1. Using the Personal Budget spreadsheet that you created in Section 4.6, Problem 1, create a bar chart comparing your total monthly expenditures with your monthly income.
- \$2. Using the spreadsheet comparing Acme Paper Clip Company sales (see Section 4.6, Problem 4), create three pie charts—one for each year—comparing the market share of each company. See the following example.

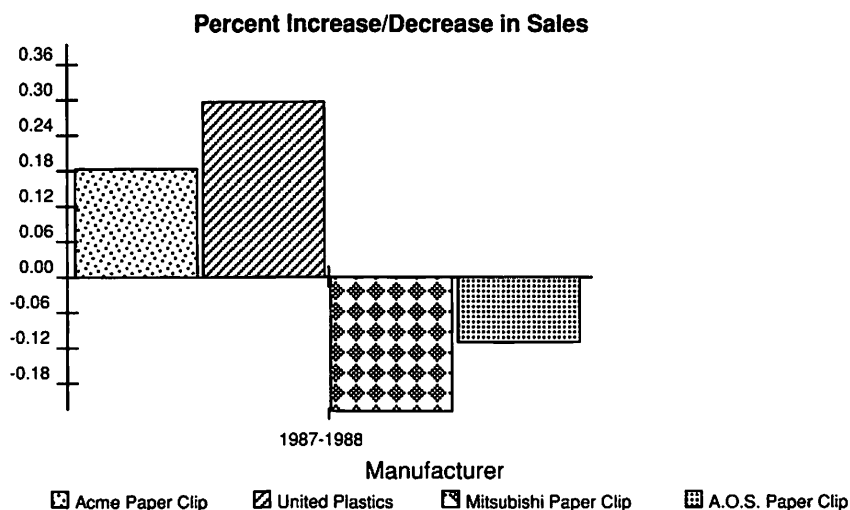
Percent Market Share 1987

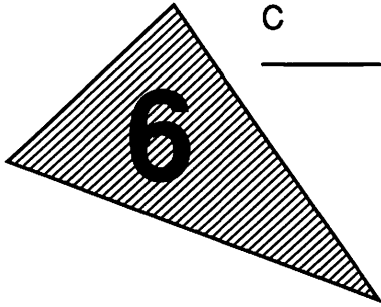


- \$3. Using the spreadsheet comparing Acme Paper Clip Company sales (see Section 4.6, Problem 4), create one bar chart comparing the sales for each company for every year. See the following example.



- \$4. Using the spreadsheet comparing Acme Paper Clip Company sales (see Section 4.6, Problem 4), create a bar chart comparing the percentage of increase or decrease in sales for each company for 1988–1989. See the following example.





C H A P T E R

**I KNOW IT'S HERE
SOMEWHERE!**

"When to the sessions of sweet silent thought
I summon up remembrance of things past,
I sigh the lack of many a thing I sought,
And with old woes new wail my dear times' waste."

—*William Shakespeare*

"Things that live in memory have no visible means of support."

—*Anonymous*

"If I do not remember thee, let my tongue cleave the roof of
my mouth . . ."

—*Psalms, 137:6*

OBJECTIVES

When you've completed this chapter, you'll be able to do the following.

1. Start up the Works program and open a new database file (Section 6.2)
2. Design a database file and define the fields (Section 6.2.1)
3. Enter, edit, and save records in a database file (Section 6.2.2)
4. Move back and forth between the form format and the list format, move fields around in the database window, and change the widths of the fields (Section 6.3.1)
5. Sort records into alphabetical, numerical, or chronological order (Section 6.3.2)
6. Search the database for information using the Find Field and Match Records commands (Section 6.3.3)
7. Select records from the database that match specific criteria (Section 6.3.4)
8. Design and print a database report (Section 6.4)

6.1 WHAT IS A DATABASE?

A computer application that is designed to store and retrieve information much as you or I would use a filing cabinet is called a **database** program. These programs are also referred to as electronic filing programs. They allow you to define what information is to be stored in the datafile on the diskette, input the information from the keyboard, edit or correct the information as necessary, and print the information out on a printer. You also have the option of sorting the information alphabetically or numerically, selecting only a portion of the data, based on specific criteria, and defining a report to be printed out. Anyone who needs to store information, manipulate it, and print lists or other kinds of reports will benefit from database software.

A variety of database software is available for the Macintosh family of computers. Some are inexpensive programs costing under \$100. These are usually slow, have limited storage capacity, can only process one file at a time, and have minimal report-generating capabilities. At the opposite end of the complexity and price scale (over \$500) are sophisticated database packages, including dBase Mac®, Double Helix®, 4th Dimension®, and Omnis 3™. These advanced database languages let you correlate information between files; hence they are known as **relational database** applications. Once you've defined a relationship between information in two or more files, the database can look up information in the linked files. If you plan to manage large files and want to limit the duplication of information, you should consider one of the relational database packages.

Microsoft Works falls in the middle of the range of database software available for the Macintosh. It is responsive to the user's needs, easy to use, and handles very large databases depending on the memory available in your Macintosh. Works is designed to manage lists of information. It works on **flat file** databases so that you need not understand relational databases. The real strength of Microsoft Works database is the ease with which it can be integrated with the word processor and spreadsheet. This chapter explores the features of the database application; the following one demonstrates its expanded capabilities when integrated with the other applications of Works.

6.1.1 What Can You Do with a Database?

You probably use noncomputerized databases daily: telephone books, cookbooks, dictionaries, and so on. Here are a few examples of computerized database applications in use today.

Mailing Lists. The creation of mailing lists is one of the major uses of database programs. Names and addresses of your friends, clients, customers, prospects, or club members can easily be entered and updated. By integrating the database with the word processor, the names and addresses can be merged into a letter or into promotional material. Pressure-sensitive labels can be used in a printer, so mailing labels can be printed for applying to your mailer. For longer lists entries can be sorted into ZIP code order for bulk mailings, or subsets of lists can be selected for printing (for example, you could choose to print only the names and addresses of single men over the age of 25).

Reading Lists. Bibliographies can be stored on diskette and printed out as reading lists selected by author, subject matter, or call number. Large libraries use automated database software and mainframe computers to catalog their entire collections. Many branch and school libraries use microcomputers and programs like Works to provide patrons with an *on-line* card catalog.

Statistics. Databases are used to store financial information about companies, personal information about prospective customers, sports records of favorite teams, and so on. Because computational features are available in the database software, you could also sort, select, and analyze data in order to be bullish in the market, pick the best prospects, or lay down that bet on Monday night's game.

Inventories. Many small businesses use microcomputers and database software to keep track of the quantities of goods they sell. Hobbyists use databases to catalog their collections of coins, stamps, dolls, and so on. Schools use them to keep track of audiovisual resources, band instruments and sheet music, and other instructional equipment. Homeowners record their household inventories for insurance purposes with databases.

Record Keeping. Businesses and individuals frequently keep accounting data with database software. Federal and state tax reports can be prepared, printed, and submitted with less effort. Just about any kind of personal or business records can be stored in a database.

Suppose you were organizing a community symphony. You might enter the names and addresses of each member, the board of directors, and the donors. You might also enter which instruments the members play, their age, when they joined the orchestra, or how much money donors gave and when they gave it.

Once the data are entered, what can you do with them? Well, you could print mailing labels for the entire orchestra or for just the

brass section, just the donors, or just the board members. You could answer questions such as these: How long, on the average, have the members been playing? What is the average age of the string section? How much equipment does the orchestra have? Who gave the most money? Who gives most consistently? You could print a list of the orchestra members and their instruments to go into the program. You could merge donor information with a word processor letter offering season ticket reservations. The options are almost unlimited.

6.1.2 Using Works Database

The Works integrated software contains a database in addition to its other applications. The remainder of this chapter will assume that you are already familiar with the basic functioning of Works and have a floppy diskette initialized to store the examples. You should have completed the previous five chapters before continuing. If you feel you need a review of basic Works, see the following sections.

- 1.4 How to Use the Macintosh
- 2.1 An Introduction to Microsoft Works
- 2.3.1 Entering Text
- 2.3.2 Saving Your Quotation
- 2.3.3 Printing Your Document
- 2.3.4 Quitting Works
- 2.4.1 Editing Text
- 2.4.3 Cut and Paste: Moving Text
- 2.4.7 More About Printing
- 4.2.2 Entering Data
- 4.3.2 More About Formulas and Functions

To gain maximum benefit from this chapter, you should work through its examples on a Macintosh while following the instructions in the text.

6.2 CREATING A DATABASE

Creating a database takes patience, practice, but most of all planning. It is important to identify all items of information and consider how you will sort or select the data before you actually enter them. Otherwise you may have to reenter data or, in the worst case, start over. The items of information are called **fields**. For a mailing list,

your fields would be name, street address, city, state, and ZIP code. A **record** is a collection of related fields. For a mailing list, all the fields of data relating to one person would comprise a record. A file contains all the records in a database. In summary, a database *file* is composed of *records*, which in turn are composed of *fields*.

The example in this chapter will teach you to design and develop a simple database, a personal dictionary. You can enter a new and unfamiliar word, its definition, a synonym, and an antonym. This technique is commonly used with 3" × 5" index cards to increase vocabulary. Using a computer database instead adds a new dimension: quick retrieval, sorting, and reorganizing of the words. Through this example, you will learn how to create the database, enter and edit the data, customize the layout, save the file on diskette, and print a report. To begin, start up Works and create a new database document following these directions.

1. Start up the Macintosh using the Works Startup and Program diskettes. (Remember how? See Section 1.4.1 if you need help.)
2. If the Works window is not visible on the screen, open the Works Program disk icon (see Section 1.4.3).
3. Start Microsoft Works by selecting the Works icon (point and click) and choosing Open from the File menu.

Short Cut: Click twice on the Works icon.

4. The Works desktop should appear. Select Database by pointing to the icon and clicking. Create a new document by pointing to and clicking on the New button.
5. A database document will be opened and the screen should appear as in Figure 6.1.

6.2.1 Creating Fields

If you followed the instructions, the Field Name dialog box should appear (see Figure 6.1). The name, Untitled1, is highlighted in the Field Name box. You need to replace this name with the first field in your database and click the Add Field button or press the Return key. Then repeat the process for the remaining fields. In your dictionary database, you will want the following fields: New Word, Definition, Synonym, Antonym. Field names cannot exceed 64 characters in length, but they can contain uppercase or lowercase letters, numbers, and some special characters (~ ` ! @ # \$ % & _ { } [] | \ : ; " ' ?). A field name must begin with a letter. If you make a mistake before you press the Return key, you can correct the error by using the Delete key or any of the other Macintosh text-editing techniques using the mouse. After you've named the first field, your

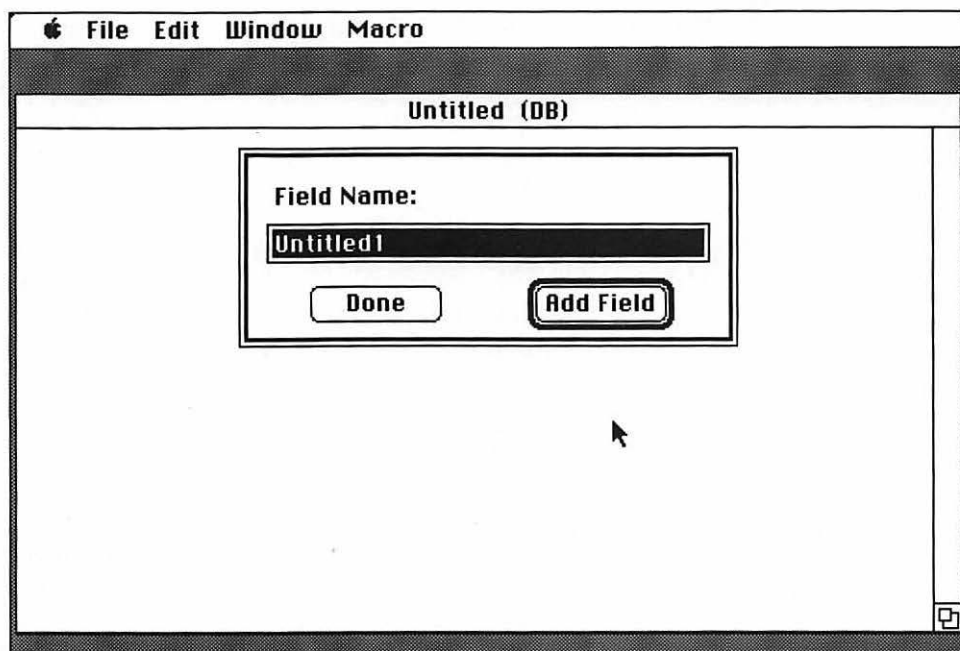


Figure 6.1. Field Name Dialog Box

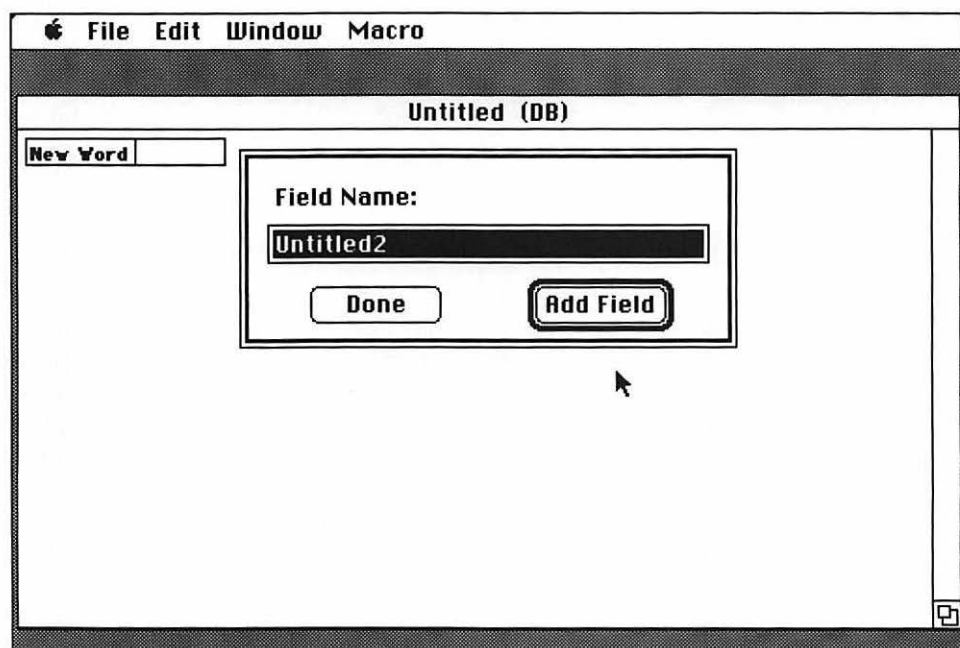


Figure 6.2. Entering a Field Name

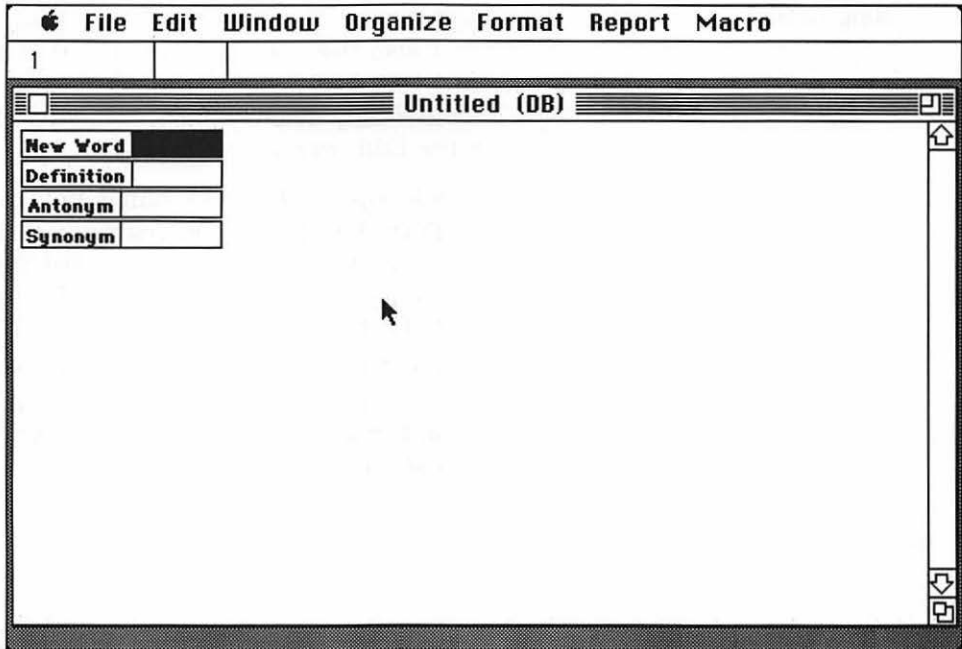



Figure 6.3. Database Fields Defined


screen should resemble Figure 6.2. After you enter the last field, the Field Name dialog box for the Untitled5 field will be visible on the screen. Click the Done button to indicate that you are through defining field names (see Figure 6.3).

If you discover an error in a previously entered field name, point to and click on the field name with the mouse. Select Change Field Name from the Edit menu. The Field Name dialog box will reappear on the screen and you can edit the name.

Short Cut: Double click on the field name.

To add a new field, select the Add New Field command from the Edit menu. The Field Name dialog box will appear so that you can add a new field. The new field will be added to the bottom of the defined fields. You can rearrange the fields in the database window in any order that you wish: When you point the mouse at a field name, the cursor will turn into the hand icon (). To relocate a field, hold the mouse button down while dragging the field to its new location and then release the button. A field can be deleted by clicking on the field and selecting the Delete Field command from the Edit menu.

Helpful Hint: Be very careful when using the Delete Field command. It deletes not only the field but also the data contained in that field. It does *not* confirm whether you really want to delete the field before it deletes it. If you accidentally delete a field, immediately select the Undo command in the Edit menu.

Each field is made up of the field name box and the field contents box (see Figure 6.4). It may be desirable to increase the width of the box so that the entire contents are visible on the screen. In your dictionary example, point with the mouse to the right-hand border of the Definition field. The cursor will change (). Hold the mouse button down and drag to resize the field. Practice rearranging the fields in the window and changing their size until you are comfortable with this process. When you have finished, your screen should resemble Figure 6.5.

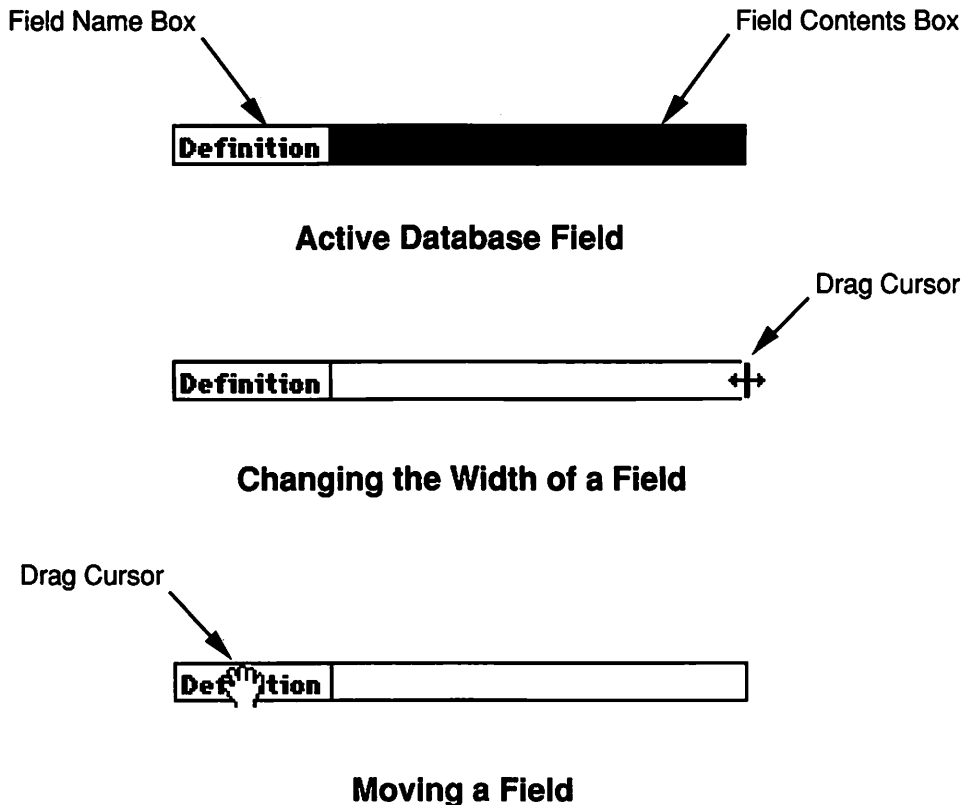


Figure 6.4. Customizing a Field

Record 2:

New Word: *rejuvenation*

Definition: *act of making new again*

Synonym: *renovation*

Antonym: *destruction*

Record 3:

New Word: *abnegation*

Definition: *act of self-denial*

Synonym: *renunciation*

Antonym: *gratification*

Record 4:

New Word: *repugnant*

Definition: *arousing strong dislike*

Synonym: *repulsive*

Antonym: *estimable*

Record 5:

New Word: *loquacious*

Definition: *given to excessive talking*

Synonym: *garrulous*

Antonym: *silent*

Record 6:

New Word: *alluring*

Definition: *having a quality of fascination*

Synonym: *captivating*

Antonym: *repulsive*

Record 7:

New Word: *abhorrent*

Definition: *inspiring extreme distaste*

Synonym: *repulsive*

Antonym: *admirable*

Record 8:

New Word: *diminutive*

Definition: *small in size or stature*

Synonym: *petite*

Antonym: *gargantuan*

Record 9:

New Word: *conjectural*

Definition: *subject to speculation*

Synonym: *hypothetical*

Antonym: *factual*

Record 10:

New Word: *repellent*

Definition: *tending to drive away*

Synonym: *repulsive*

Antonym: *attractive*

The Up, Down, Left, and Right Arrow keys can be used to review the records. If the Up or Left Arrow key is pressed when the first field in a record is highlighted, the window will display the previous record. If the Down or Right Arrow key is pressed when the last field is highlighted, the screen will display the following record. Review the data for correctness. If the complete definition for a word is not printed in the field data box, change the width of the field using the technique you learned in the previous section. Save your file on your data diskette under the name *My Dictionary*. If you need to review the procedure for saving a file, see Section 2.3.2.

6.3 CHANGING HOW DATA ARE DISPLAYED

Works gives you two ways of viewing data: the list format and the form format. When you entered your data, the screen only showed one record at a time: that's the form format. If you select the Show List command from the Format menu, the screen will display several records in a list: that's the list format. You can switch back to the form format by selecting Show Form from the Format menu. Try selecting the Show List command in your dictionary example (see Figure 6.6).

Short Cut: Hold down the Command key (⌘) and simultaneously press the L key to switch back and forth between the Show List window and the Show Form window.

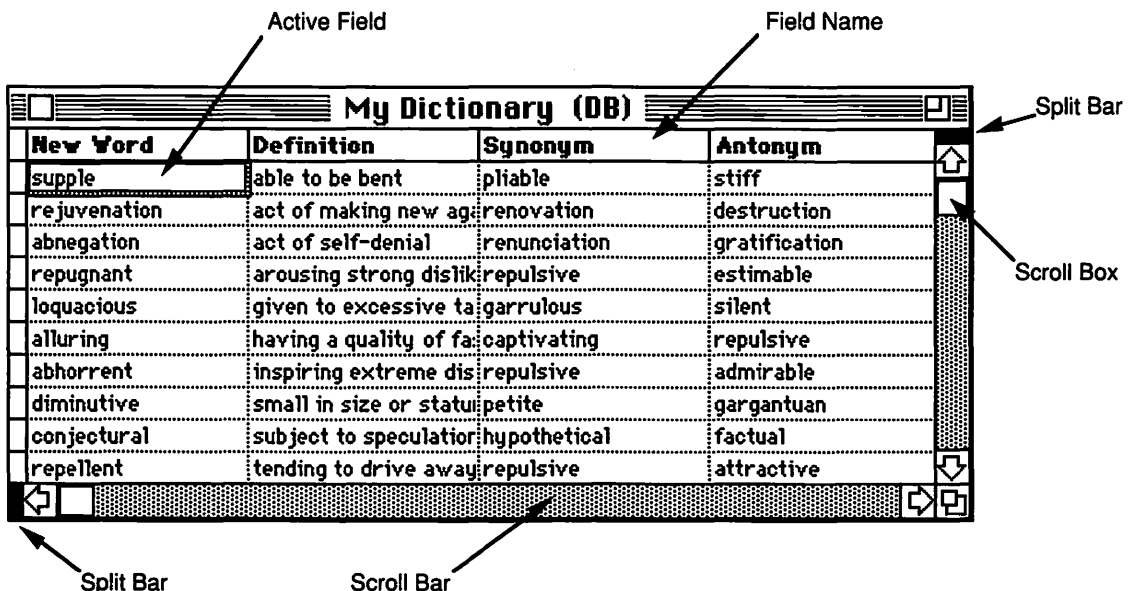


Figure 6.6. The List Format

The list format in the database shares another feature with the spreadsheet. The window can be scrolled to view all the fields and records or split to view different parts of the database at the same time. Figure 6.6 identifies the scroll and split bars. If you need to review how to split the window, see Section 4.5.

6.3.2 Sorting Records

One of the most common uses of database programs is arranging (sorting) records. The Works database will allow you to sort records in an order based on any field. The order can be alphabetical (A to Z or Z to A), numerical (0 to 9 or 9 to 0), or chronological (forward or reverse), depending on the type of field. In your dictionary example, you probably want to alphabetize the record by the New Word field. To do so, follow these steps.

1. Highlight the field that you wish to sort on by pointing to its name and clicking the mouse button. In your example, click on New Word.
2. Select Sort from the Organize menu. The Sort dialog box will appear on the screen (see Figure 6.8).
3. Select the sort order From A to Z by clicking on the appropriate button. Click the OK button.

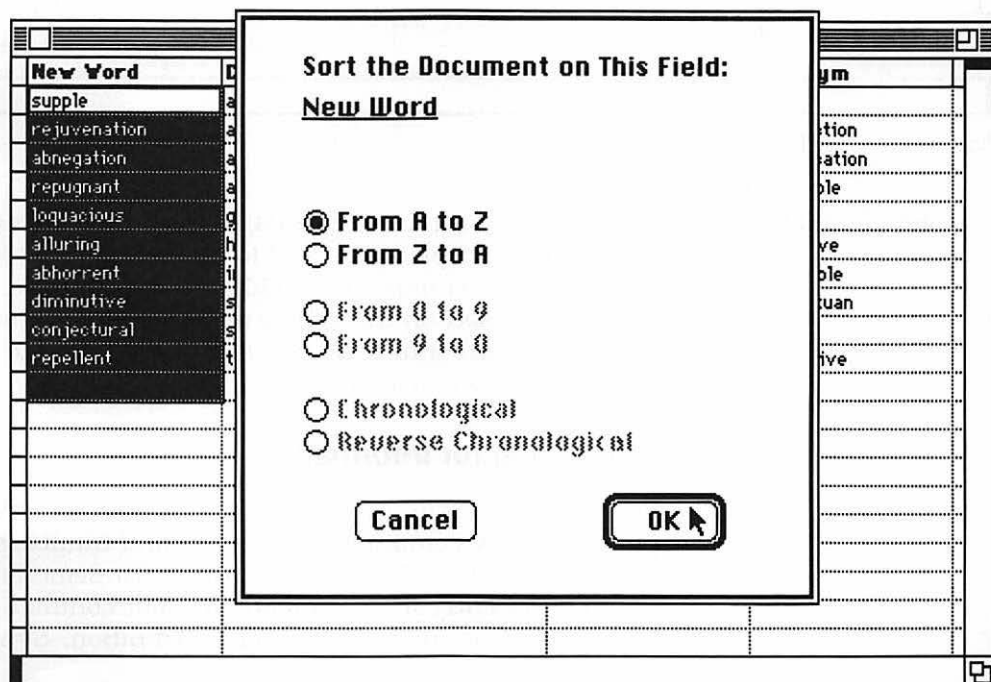


Figure 6.8. Sort Dialog Box

Figure 6.9 shows the result of sorting New Word in alphabetical order. Note that the entire record and its associated fields are sorted together. In the spreadsheet you can sort a single column without disturbing the contents of other columns, but in the database the Sort command sorts entire records.

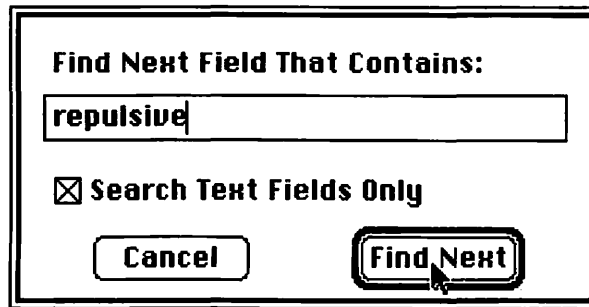
[illegible]

Figure 6.9. Sorted Dictionary Example

Helpful Hint: To sort a database on multiple fields (last name, first name, and middle name, for example), you need to sort on the *least* important field first and the *most* important field last. For example, to sort a database by name, sort on the middle name, first name, and finally last name. The sorts must be done in this order to properly alphabetize a database by name.

6.3.3 Searching for Information

To search all the records in a database for any occurrence of a word, phrase, or any combination of letters and numbers, use the Find Field command in the Organize menu. To demonstrate this feature, find every entry in your dictionary that contains the word *repulsive*. It could be in the New Word, Definition, Synonym, or Antonym fields.



Next occurrence of
repulsive found

New Word	Definition	Synonym	Antonym
abhorrent	inspiring extreme distaste	repulsive	admirable
abnegation	act of self-denial	renunciation	gratification
alluring	having a quality of fascination	captivating	repulsive
conjectural	subject to speculation	hypothetical	factual
diminutive	small in size or stature	petite	gargantuan
loquacious	given to excessive talking	garrulous	silent
rejuvenation	act of making new again	renovation	destruction
repellent	tending to drive away	repulsive	attractive

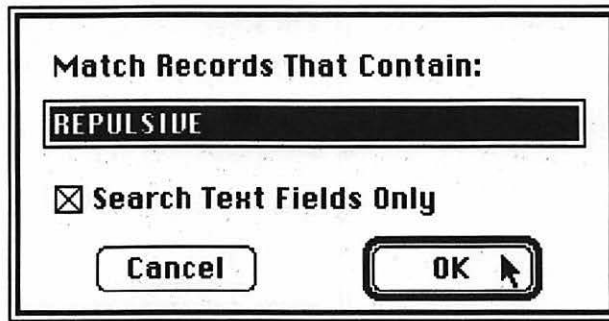
Figure 6.10. Find Field Dialog Box

1. Select the Find Field command in the Organize menu. The Find Field dialog box will appear on the screen (see Figure 6.10).
2. Type in the comparison information. For this example, type *repulsive* and click the Find Next button. The next occurrence of the text *repulsive* will be highlighted on the screen.

Short Cut: To find additional occurrences of the text, hold down the Command key (⌘) and press the F key. The Find Field dialog box will appear. Press the Return key. When all occurrences of the text have been found, a dialog box will appear to warn you.

Did you find all four occurrences of the text *repulsive*?

Another way to search for information is to use Match Records. This command selects and displays every record containing a field whose contents match the criterion. In the previous example, you found the four records that contained *repulsive*. But you had to locate them one at a time. To select all the records with one command, try the Match Records option.



The image shows a window titled "My Dictionary (DB)". Inside is a table with four columns: "New Word", "Definition", "Synonym", and "Antonym". The table contains five rows of data. Arrows from the text "Only records with the text *repulsive* displayed" point to the "repulsive" entries in the "Synonym" column of the first four rows.

New Word	Definition	Synonym	Antonym
abhorrent	inspiring extreme distaste	repulsive	admirable
alluring	having a quality of fascination	captivating	repulsive
repellent	tending to drive away	repulsive	attractive
repugnant	arousing strong dislike	repulsive	estimable

Only records with the text *repulsive* displayed

Figure 6.11. Match Records Dialog Box

1. Select Match Records in the Organize menu. The Match Records dialog box will appear on the screen (see Figure 6.11).
2. Type in the comparison information and click the OK button. (From the previous example, *repulsive* has already been entered.) Only the records with the text *repulsive* in any field will be displayed in the window.

Helpful Hint: To restore the window to display all records, select the Match Records command again.

Yet another way to search for information is to select records based on certain criteria in specific fields. In your dictionary, suppose you wanted to locate only records with the word *repulsive* in the Synonym field. Follow these directions.

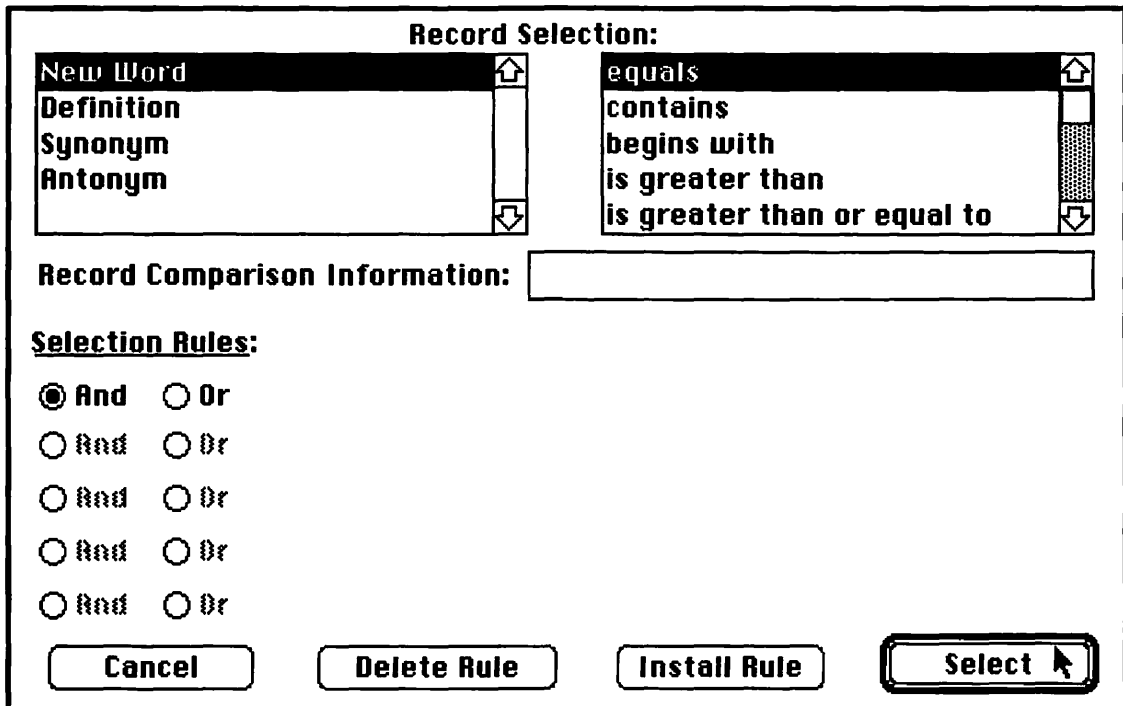


Figure 6.12. Record Selection Dialog Box

1. Select the Record Selection command in the Organize menu. The Record Selection dialog box will appear (see Figure 6.12).
2. In the upper left-hand corner of the dialog box, the field names appear in a scrolling window. With the mouse, point to and click on the field name you want to search. In this case, you want to search the Synonym field.
3. In the upper right-hand corner of the dialog box, a list of comparisons appears in a scrolling window. With the mouse, point to and click on the desired comparison. In the example, you want to select records whose Synonym field equals the text you're searching for.
4. Type the comparison text (*repulsive*) in the box provided.
5. Click the Install Rule button to complete the comparison information.
6. Click the Select button.

If you followed the directions, only those dictionary entries for which *repulsive* was a synonym were listed. After viewing the entries, you can display all your records by selecting the Show All Records command in the Organize menu.

6.3.4 Selection Rules

You can define selection rules that are much more complex than those in the simple dictionary example. Suppose you had a database of customer addresses and only wanted to mail an advertisement to those who lived in Texas, Louisiana, and Mississippi. More specifically, you need to mail the ad only to female customers between the ages of 20 and 30 with blonde hair. The Record Selection rules will allow you to do this.

Each record selection rule contains the field name, a comparison operator, and the comparison text. The comparison operator defines the type of comparison that will be applied to test the comparison text. The following operators are available.

equals	is not equal to
contains	is blank
begins with	is not blank
is greater than	ends with
is greater than or equal to	does not contain
is less than	does not begin with
is less than or equal to	does not end with

In your dictionary example, Synonym equals repulsive was a single-selection rule. Complex rules can be defined by combining several single-selection rules with the connection operators, And and Or, often called **boolean** operators.

And. When the And operator is used to join two selection rules, *both* rules must be satisfied for Works to select a record. For example,

```

Sex equals female
And Hair equals blonde
And Age is greater than or equal to 20
And Age is less than or equal to 30

```

will select only those records that have the text *female* in the Sex field, the text *blonde* in the Hair field, and a number between 20 and 30, inclusive, in the Age field.

Or. When the Or operator is used to join two selection rules, one or the other, but not both, must be satisfied for Works to select a record. For example,

```

State equals Texas
Or State equals Louisiana
Or State equals Mississippi

```

will select those records that have the text *Texas*, *Louisiana*, or *Mississippi* in the State field.

Combinations of And and Or. Sometimes it is necessary to mix operators to define your desired selection. This is permissible in Works, but you are limited to six selection rules. What would the following rules produce?

Sex equals female
And Hair equals blonde
Or Sex equals female
And Hair equals black

To enter a complex set of selection rules, follow these steps.

1. Select the Record Selection command in the Organize menu. The Record Selection dialog box will appear.
2. In the upper left-hand corner of the dialog box, the field names appear in a scrolling window. With the mouse, point to and click on the field name you want to search.
3. In the upper right-hand corner of the dialog box, a list of comparison operators appears in a scrolling window. With the mouse, point to and click on the desired comparison operator.
4. Type the comparison text in the box provided.
5. Click the Install Rule button to define the selection rule.
6. Click the appropriate button to specify the And or the Or connection operator.
7. Repeat Steps 2 through 6 to install the additional selection rules.
8. Click the Select button when all the rules have been installed.

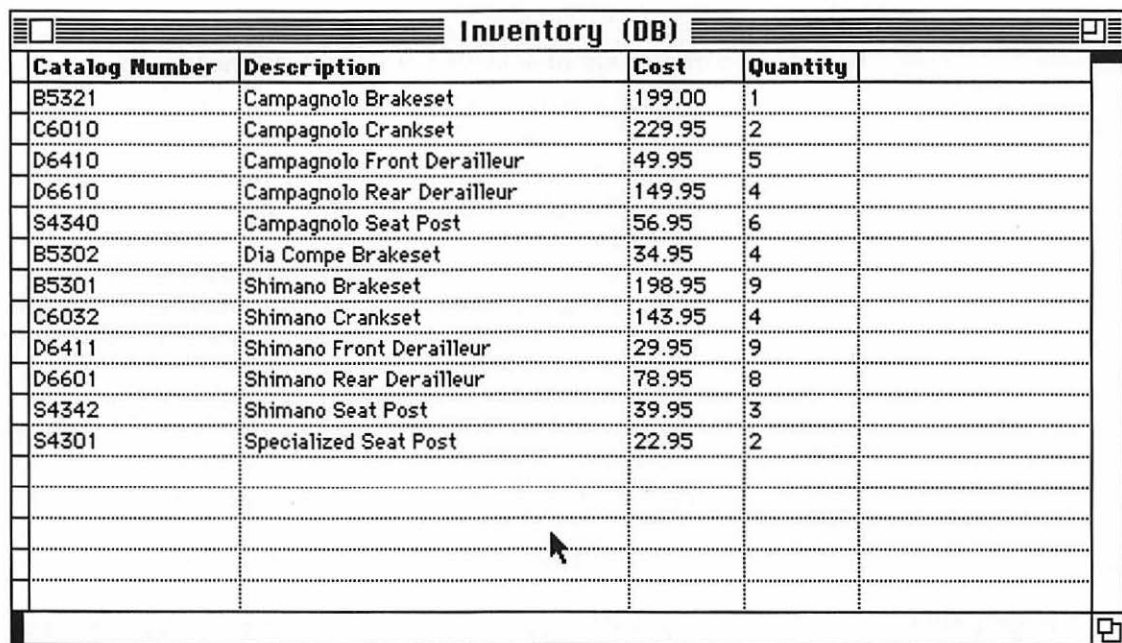
Helpful Hint: If you make a mistake and need to edit a selection rule, you must delete the selection rules in *reverse* order (last to first), make the correction, and reinstall the deleted rules. Use the Delete Rule button at the bottom of the Record Selection dialog box (see Figure 6.12) to delete the last rule installed.

For practice, try to select the records that have the text *repulsive* in the Synonym field and have a New Word that does not begin with the letter *R* in your dictionary. If you are successful, the record for *abhorrent* should be selected.

6.4 CREATING A REPORT

This section will describe how to create a printed report from the Works database. To explore the various report-generation options, you will create a sample database for the Big Wheel Bicycle Shop's parts inventory. Information provided by the shop's owner, Ben Biken, includes the catalog number of each part, a description, the cost, and the quantity in stock. Ben needs a report showing him the

total inventory value for each part, the subtotal of the inventory value, the quantity of parts in stock for each type of part, and the grand total value of his inventory. Your first step is to design and enter the basic data that Ben provided. Figure 6.13 shows the completed Works database. Reviewing previous sections if necessary, create a new database and enter the data from Figure 6.13.



Catalog Number	Description	Cost	Quantity	
B5321	Campagnolo Brakeset	199.00	1	
C6010	Campagnolo Crankset	229.95	2	
D6410	Campagnolo Front Derailleur	49.95	5	
D6610	Campagnolo Rear Derailleur	149.95	4	
S4340	Campagnolo Seat Post	56.95	6	
B5302	Dia Compe Brakeset	34.95	4	
B5301	Shimano Brakeset	198.95	9	
C6032	Shimano Crankset	143.95	4	
D6411	Shimano Front Derailleur	29.95	9	
D6601	Shimano Rear Derailleur	78.95	8	
S4342	Shimano Seat Post	39.95	3	
S4301	Specialized Seat Post	22.95	2	

Figure 6.13. Inventory Example

6.4.1 Setting Field Attributes and Computing Fields

If you carefully compare Figure 6.15 (on p. 147) with the database that you have just created, you will notice a difference in the way the data in the Cost and Quantity fields are displayed: Cost is in a dollar-and-cents format and Quantity is right justified. The Set Field Attributes command in the Format menu controls how data are displayed in the database. To change a field's attributes, do the following.

1. Select the field whose attributes you want to change by pointing to and clicking on the field name. The field will become highlighted when selected.
2. Choose Set Field Attributes from the Format menu. The Set Field Attributes dialog box will appear on the screen (see Figure 6.14).

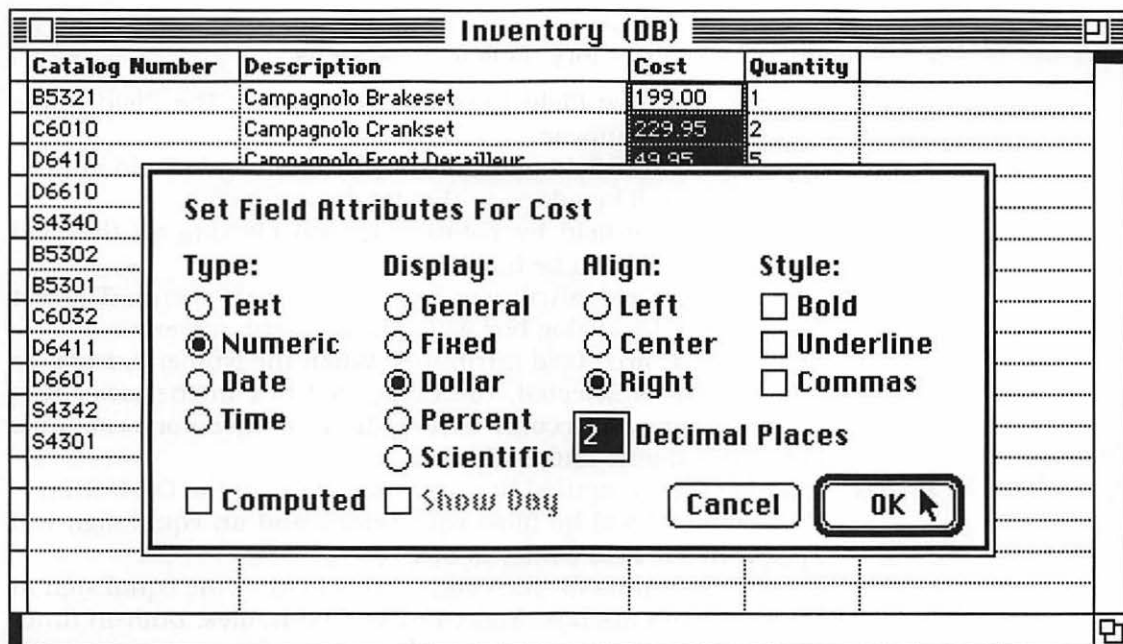


Figure 6.14. Set Field Attributes Dialog Box

3. With the mouse, click on the desired attributes for Type, Display, Align, and Style. The field attributes are the same as the cell attributes in the spreadsheet. Refer to Section 4.2.4 for a detailed description of each attribute.
4. Type the number of decimal places desired for numeric data; if decimal places aren't needed, use 0.
5. Click the OK button.

When you enter a new field, Works assumes that all fields are text fields. If you have numeric, date, or time data, you must set the field attributes appropriately. If you plan to do any calculations with your data, you must set the field attributes to Numeric. In your inventory example, set the fields as follows.

Cost	Type: Numeric Display: Dollar
Quantity	Type: Numeric Display: Fixed Decimal Places: 0

Once you've defined the numeric fields, Works can create the computed fields. A computed field is a numeric field whose contents are computed using a formula specified by the user. For Ben's inventory you need to compute the total value of the inventory for

each part. To do this, you must multiply the cost of each item by the quantity in inventory. Follow these steps.

1. Choose Add New Field from the Edit menu. The Field Name dialog box will appear.
2. Type *Total* in the field name box and click the Add Field button. A new field will be added in the database window.
3. Select the new field by pointing to and clicking on the field name. The field will be highlighted on the screen.
4. Choose Set Field Attributes from the Format menu. The Set Field Attributes dialog box will appear on the screen.
5. Select the desired field attributes. When the Numeric, Date, or Time option is selected, the Computed box in the lower left-hand corner will become active. (In your inventory example, click on Numeric and Dollar.)
6. Click on the Computed box and then click on the OK button.
7. The new field will be filled with zeroes and an equal sign will appear in the field contents box.
8. Enter the formula for the computed field after the equal sign in the field contents box. You can use field names, built-in functions, and arithmetic operators (+ - * / ^), the same way you do in the spreadsheet (see Section 4.3.2). In your inventory example, type *Cost * Quantity*.
9. Press the Enter key. The new field will be computed for each record in the database.

Figure 6.15 shows the results of Ben's parts inventory after the Total field has been computed.

6.4.2 Setting Up a Report

The relation of a Works database to a report is analogous to the relation of a Works spreadsheet to a chart. You can have several reports associated with a database just as you can have several charts associated with a spreadsheet. As with a chart, you can select, edit, delete, or print a report. This feature allows you to define a report once and then print it out as often as you want. For example, Ben Biken will probably want you to update his inventory data and print out a new report each month.

Before creating a new report, take these preliminary steps.

1. Review the display format for each field and set the field attributes, if necessary.
2. Create any necessary computed fields.
3. Sort the database, if necessary (the sort criterion will not be saved with the report).

Selection Rules: No Rules Are In Effect

Catalog Number	Description	Cost	Quantity	Total
B5301	Shimano Brakeset	\$198.95	9	\$1790.55
B5302	Dia Compe Brakeset	\$34.95	4	\$139.80
B5321	Campagnolo Brakeset	\$199.00	1	\$199.00
C6010	Campagnolo Crankset	\$229.95	2	\$459.90
C6032	Shimano Crankset	\$143.95	4	\$575.80
D6410	Campagnolo Front Derailleur	\$49.95	5	\$249.75
D6411	Shimano Front Derailleur	\$29.95	9	\$269.55
D6601	Shimano Rear Derailleur	\$78.95	8	\$631.60

Figure 6.17. Report Definition Window

have set the paper to US Letter (8.5 inches wide) and have set the left and right margins to 1 inch, your report will be 6.5 inches wide. The right-margin indicator in the Report Definition window will not move past the 6.5-inch mark on the ruler. If you want your report wider, choose Page Setup from the File menu and enter smaller margins.

Record Selection Criteria. The next step is to define the record selection criteria. Choose Record Selection from the Organize menu. The Record Selection dialog box (see Figure 6.12) will appear on the screen. Review Section 6.3.4 for instructions. (In your inventory example, you do not need any record selection.)

Changing the Font and Size. You can change the font in which the report will be printed by selecting the desired font from the Font submenu under the Format menu. The size of the font can be changed by choosing the Size submenu in the Format menu. The

font and size selected will affect all fields in the report. Consequently, the field widths will have to be adjusted.

Eliminating the Grid. The dotted grid lines separating each field and each record can be eliminated. Choose the Show Grid command in the Format menu to toggle between showing and hiding the grid. Remember, What You See in the Report Definition window Is What You Get on the printer.

Totaling Fields. In your example, Ben wanted subtotals for each type of part, grand totals for the number of parts in his inventory, and the grand total inventory value. The TotalsPage menu has several commands that will make this task easy. The first step is to define which fields are to be totaled.

1. Select the field to be totaled by clicking on the field name. The field will be highlighted on the screen. (In your example, click on the Total field.)
2. Choose Sum This Field from the TotalsPage menu.

Nothing will happen on the screen; the totals will be computed when you print the report. Now, on your own, total the Quantity field in your inventory example.

The next step is to define which field will be the criterion for the subtotals. Ben wants subtotals after each type of part. You sorted the database on the Catalog Number field because the initial letter of the catalog number represented the type of part. Therefore, every time the letter changes, Ben wants a subtotal.

1. Select the field that will be the criterion for the subtotals by clicking on the field name. The field will be highlighted on the screen. (In your example, click on the Catalog Number field.)
2. Choose Take a Sub-Total on 1st Char from the TotalsPage menu.

This option will compute and print a subtotal for every field to be totaled each time the first letter in the criterion field changes. (See the printed inventory report in Figure 6.18.)

The other option is to take a subtotal whenever the criterion field changes. Suppose Ben had a field showing the manufacturer of each part. If the database were sorted on the manufacturer field and the Take a Sub-Total on Field Change option were chosen from the TotalsPage menu, the printed report would have subtotals by manufacturer.

The last option in the TotalsPage menu is New Page After Total. If you choose this option, the printer will eject a page after each

Catalog Number	Description	Cost	Quantity	Total
B5301	Shimano Brakeset	\$198.95	9	\$1790.55
B5302	Dia Compe Brakeset	\$34.95	4	\$139.80
B5321	Campagnolo Brakeset	\$199.00	1	\$199.00
			14	\$2129.35
C6010	Campagnolo Crankset	\$229.95	2	\$459.90
C6032	Shimano Crankset	\$143.95	4	\$575.80
			6	\$1035.70
D6410	Campagnolo Front Derailleur	\$49.95	5	\$249.75
D6411	Shimano Front Derailleur	\$29.95	9	\$269.55
D6601	Shimano Rear Derailleur	\$78.95	8	\$631.60
D6610	Campagnolo Rear Derailleur	\$149.95	4	\$599.80
			26	\$1750.70
S4301	Specialized Seat Post	\$22.95	2	\$45.90
S4340	Campagnolo Seat Post	\$56.95	6	\$341.70
S4342	Shimano Seat Post	\$39.95	3	\$119.85
			11	\$507.45
			57	\$5423.20

Figure 6.18. Inventory Report

subtotal. This makes the subtotal the last line printed on each page and you get a separate page, with a subtotal, for each category.

6.4.3 Printing a Report

Defining a database report can be a lengthy process. Here is a summary of the steps.

1. Review the display format for each field and set the field attributes, if necessary.
2. Create any necessary computed fields.
3. Sort the database, if necessary.
4. Choose New Report from the Report menu.
5. Choose Page Setup from the File menu and set the paper, printing orientation, margins, header, and footer.
6. Drag the desired fields inside the margins and drag unwanted fields outside the right margin. Adjust the field widths. Drag the right-margin indicator to the right edge of the last field to be printed.

7. Define the record selection criteria by choosing Record Selection from the Organize menu.
8. Select the desired font and font size from the Format menu. Show or hide the grid lines as desired.
9. Select each field to be totaled and choose Sum This Field from the TotalsPage menu.
10. Select the criterion field for subtotals and choose the appropriate subtotal options from the TotalsPage menu.
11. Choose New Page After Total from the TotalsPage menu if you want each category to appear on a new page.

You should be ready to print your inventory example. Choose Print from the File menu. Your results should match Figure 6.18.

As mentioned previously, Works will allow up to eight reports to be defined per database. The Report menu has options to select a previously defined report to be printed, to duplicate a previously defined report for revision, and to delete a report that is no longer needed. The Change Report Title command in the Edit menu will let you enter report titles that are more meaningful. All these options help you work easily with database reports.

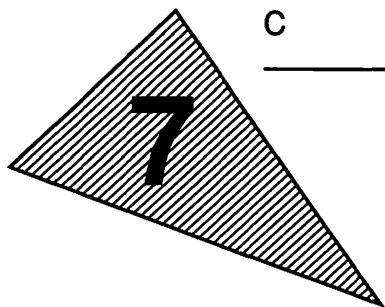
The report feature of the database prints only lists of the data. In the next chapter, you will explore integrating the Works database with the Works word processor to generate other types of printed output, such as mailing labels.

6.5 POSERS, PROBLEMS, AND PROJECTS

- \$1. Using Works, design a database in which to store Acme Paper Clip Company's customers. The following fields will be necessary: Title (Mr., Mrs., and so on), First Name, Last Name, Street Address, City, State, and ZIP Code. Enter at least 25 names and addresses (use your imagination). Sort the database alphabetically by Last Name and print out a list. Name the database file *Acme's Customers* and save it on your disk for use in the next chapter.
2. Acme's chief research engineer, Ben Dremin, asks you to use your computer to help his son finish his science project. All you have to do is catalog Little Ben's collection of parrots. Using the data here, create a database, select out only the South American parrots, and print separate lists of the parrots by color, distribution, and species. (Ben had the nerve to tell you that he needs it by 4:30 today!)

Common Name	Species	Length (inches)	Color	Distribution
African Gray Parrot	<i>Psittacus erithacus</i>	14	Gray	Africa
Bare-eyed Cockatoo	<i>Cacatua sanguinea</i>	15	White	Australia
Black-headed Caique	<i>Pionites melanocephala</i>	9	Green	South America
Blue and Gold Macaw	<i>Ara ararauna</i>	34	Blue	South America
Blue-fronted Amazon	<i>Amazona aestiva</i>	15	Green	South America
Bronze-winged Parrot	<i>Pionus chalcopterus</i>	11	Blue	South America
Eclectus Parrot	<i>Eclectus roratus</i>	14	Green	South Pacific
Finsch's Amazon	<i>Amazona finschi</i>	13.5	Green	Mexico
Goffin's Cockatoo	<i>Cacatua goffini</i>	12.75	White	South Pacific
Great Green Macaw	<i>Ara ambigua</i>	34	Green	Central America
Greater Sulfur Cockatoo	<i>Cacatua galerita</i>	20	White	Australia
Green-cheeked Amazon	<i>Amazona viridigenalis</i>	13.5	Green	Mexico
Green-winged Macaw	<i>Ara chloroptera</i>	36	Red	South America
Hyacinth Macaw	<i>Andorhynchus hyacinthinus</i>	40	Blue	South America
Illiger's Macaw	<i>Ara maracana</i>	17	Green	South America
Jardine's Parrot	<i>Poicephalus gultelmi</i>	11	Green	Africa
Lesser Sulfur Cockatoo	<i>Cacatua sulphurea</i>	13.5	White	South Pacific
Maximilian's Parrot	<i>Pionus maximiliani</i>	11.5	Green	South America
Mealy Amazon	<i>Amazona farinosa</i>	16	Green	South America
Meyer's Parrot	<i>Poicephalus meyeri</i>	8.5	Gray	Africa
Military Macaw	<i>Ara militaris</i>	28	Green	Central America
Moluccan Cockatoo	<i>Cacatua moluccensis</i>	22	White	South Pacific
Noble Macaw	<i>Ara nobilis</i>	12	Green	South America
Orange-winged Amazon	<i>Amazona amazonica</i>	13	Green	South America
Red-vented Parrot	<i>Pionus menstruus</i>	11	Green	South America
Rose-breasted Cockatoo	<i>Eolophus roseicapillus</i>	14	Gray	Australia
Scarlet Macaw	<i>Ara macao</i>	34	Red	South America
Senegal Parrot	<i>Poicephalus senegalus</i>	9	Gray	Africa
Severe Macaw	<i>Ara severa</i>	18	Green	South America
Umbrella-crested Cockatoo	<i>Cacatua alba</i>	18	White	South Pacific
White-bellied Caique	<i>Pionites leucogaster</i>	9	Yellow	South America
White-fronted Amazon	<i>Amazona albifrons</i>	10.5	Green	Mexico
Yellow-cheeked Amazon	<i>Amazona autumnalis</i>	13.5	Green	Central America
Yellow-fronted Amazon	<i>Amazona ochrocephala</i>	14	Green	South America
Yellow-naped Macaw	<i>Ara auricollis</i>	15.5	Green	South America

3. Using Works, design a database for one of the example applications listed in Section 6.1.1 and print out meaningful reports. Choose something useful to you: the best way to learn a computer application is to do something practical and of immediate personal value.
- *4. Using the Big Wheel Bicycle Shop inventory database you created in Section 6.4, design and print a report sorted by the manufacturer of each part. Print subtotals for the quantity of parts by manufacturer and for the total value of the inventory. The report will resemble Figure 6.18, but it will be organized by manufacturer instead of by type of part.



C H A P T E R

GET IT TOGETHER!

"The young do not know enough to be prudent and therefore they attempt the impossible—and achieve it, generation after generation."

—*Pearl S. Buck*

"The opportunities of man are limited only by his imagination. But so few have imagination that there are ten thousand fiddlers to one composer."

—*Charles F. Kettering*

"Man's mind stretched to a new idea never goes back to its original dimensions."

—*Oliver Wendell Holmes*

OBJECTIVES

When you've completed this chapter, you'll be able to do the following.

1. List the general steps for copying and pasting information (Section 7.2.1)
2. Copy information from the Works spreadsheet and database into the word processor (Section 7.2.2)
3. Copy information from the Works word processor and database into the spreadsheet (Section 7.2.2)
4. Copy information from the Works word processor and spreadsheet into the database (Section 7.2.2)
5. Copy information from the Works communications and graphics applications into the word processor, spreadsheet, and database (Section 7.2.2)
6. Paste information into and copy information from the Scrapbook (Section 7.2.3)
7. Merge data from the database with the word processor using the Prepare to Merge and Print Merge functions (Section 7.3)
8. Print labels (Section 7.3.3)

7.1 THE POWER OF WORKS: INTEGRATING APPLICATIONS

The ability to combine information from word processor, spreadsheet, database, and communications applications is a powerful tool that can increase your personal productivity. Suppose your boss assigned you to analyze the company's sales. With the Works tools available you could log on the company's mainframe computer and retrieve the sales figures for the past 3 years, copy the data from the communications application into a spreadsheet, calculate statistics on sales growth, create several pie and bar charts, write your report using the word processor, copy the charts into your report, and merge your report with a database of company executives, printing up a personalized memo to each. Pretty impressive! Yet, all this is easy to do with a knowledge of each of the Works applications and the techniques to integrate them.

This chapter covers the two techniques of integrating information in Works: using Copy and Paste to move information between two different documents and using the Print Merge feature to combine information from the database with the word processor. Once you master these techniques, the capabilities of Works with the Macintosh are limited only by your imagination.

7.2 COPYING INFORMATION BETWEEN APPLICATIONS

In Chapter 2 you learned how to copy text from one location in a word-processing document and paste it into another location in the same document (Section 2.4.3). Similar concepts are used in moving text and graphics between the word processor, spreadsheet, database, and communications applications.

7.2.1 Cut and Paste

The Macintosh has some very powerful features that allow blocks of text and graphics to be copied from one place to another within a document, to another document in the same application, or to another application. All three functions are performed in similar fashion in that they require the use of the Clipboard.

The Clipboard is a special storage area set aside in main memory and accessible from all the Works applications. It can store only one block of text, one block of text with graphics, or one single graphic at a time and is limited by the amount of main memory your Macintosh has and the number of files open in Works. When

you select the information and choose Copy from the Edit menu, the information selected is moved to the Clipboard. When you choose Paste from the Edit menu, the information is moved from the Clipboard and inserted at the location of your cursor. Because the Clipboard contains only one item at a time, you must paste an item before you can copy the next one. Figure 7.1 diagrams copying and pasting to and from the Clipboard.

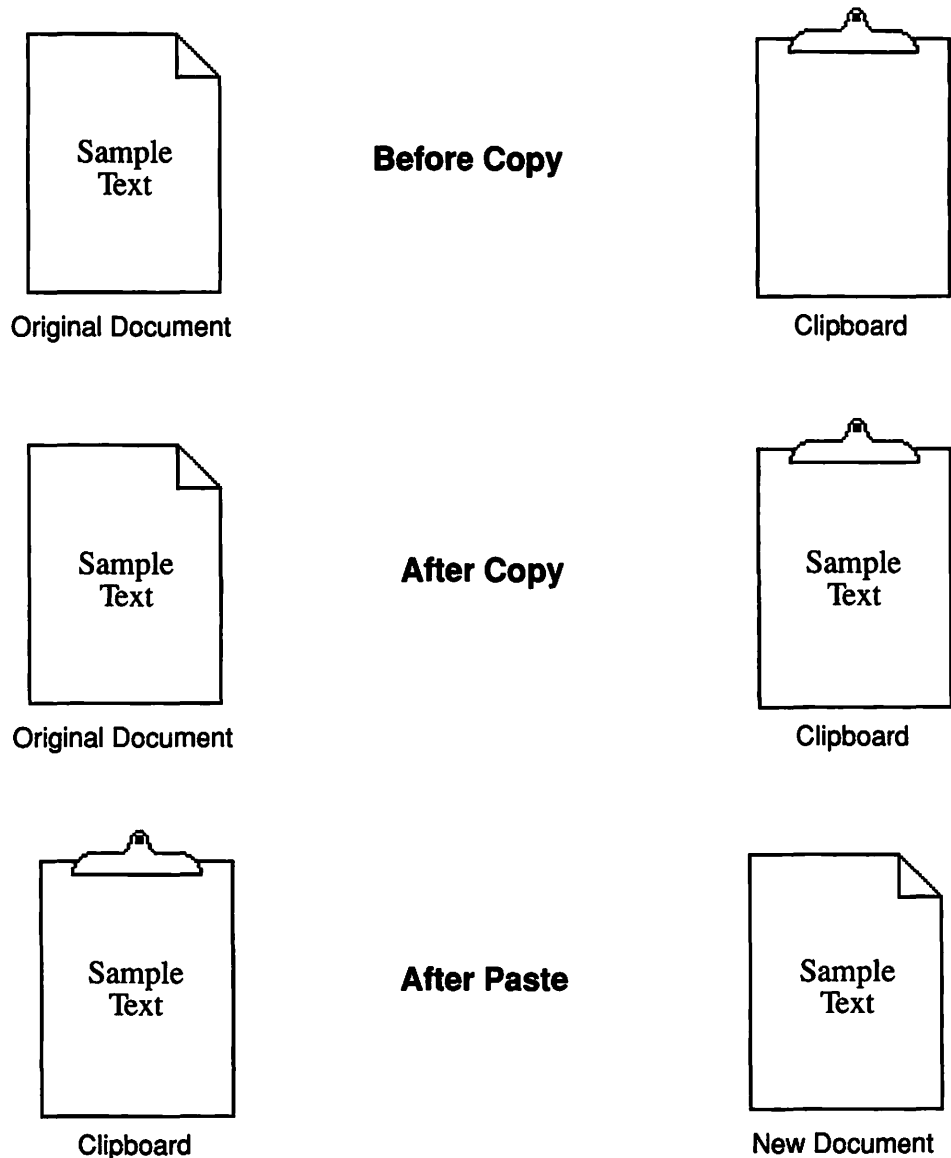


Figure 7.1. Using the Clipboard to Copy and Paste

General Steps for Copying Information

1. Open the document you wish to copy from (the source) and the document you wish to paste to (the destination). In the Window menu, choose the name of the document from which you wish to copy. This will bring that document to the foreground of your screen.
2. With the cursor, select the text, graphics, cells, or fields that you wish to copy.
3. Choose Copy from the Edit menu in the Menu Bar.
4. The selected data will remain in your source document and a copy will be placed on the Clipboard.

Helpful Hint: To check the contents of the Clipboard, choose the Show Clipboard option in the Window menu. To hide the Clipboard window, click its close box or choose Hide Clipboard in the Window menu.

General Steps for Pasting Information

5. Choose the name of the destination document from the Window menu to bring it to the foreground.
6. Place the cursor at the exact location where you want the information pasted. Click the mouse button. (In the database and spreadsheet, you need only select the upper left-hand cell or field in the area to be pasted.)
7. Choose Paste from the Edit menu in the Menu Bar.
8. The data will be copied from the Clipboard and pasted into your destination document.

Helpful Hint: If you are only pasting graphics, you do not need to position the cursor. When the Paste command is chosen, the graphic will be pasted in the center of the screen. You can then use the Pointer tool to drag the graphic into place and change its size if desired.

7.2.2 Considerations When Copying Between Applications

Because of natural differences between the word processor, spreadsheet, database, and communications data, some considerations must not be ignored when copying information between certain applications. The procedure for copying all information is as outlined in the previous section; however, the results may differ. The following sections describe these special circumstances.

Helpful Hint: Regardless of the source or the destination, you will probably have to change the appearance of the information copied. This could mean changing the font, size, style, justification, and spacing;

moving tab stops, margins, and paragraph indentations; inserting Returns, tabs, and page breaks; relocating and sizing drawings and charts; and adding headers, footers, and other Page Setup information.

Copying to the Word Processor. Information copied to the word processor maintains the format of the source document. In other words, the pasted text will have the same font, style, size, and justification as the original text. Text copied from one word-processing document to another will also have the same spacing and ruler settings (margins, paragraph indentation, and tab settings).

When information is copied from the spreadsheet to the word processor, the data that were separated in columns will be separated by tabs. Because the word processor automatically sets tab stops every 1/2 inch, the information may be too wide or improperly spaced when it is pasted. The solution is simple: add, delete, or move tab stops in the ruler (see Section 2.4.5). When information is pasted, it remains selected (highlighted); the ruler settings can be changed until the pasted selection is formatted properly. Figure 7.2 illustrates copying information from the spreadsheet to the word processor.

Information copied from the database to the word processor is handled in the same manner, with tabs separating the fields. However, the field names are automatically copied to the top of each column. If you do not want the field names pasted to the word processor, hold down the Option key while choosing the Paste command. Refer to Figure 7.3 for an example of copying from the database to the word processor.

If formulas are part of the information copied from either the spreadsheet or the database, only the value of the formula is pasted to the word processor. The relationship between cells that existed in a spreadsheet formula will not exist in the word processor. For example, if a value is changed after pasting data from the spreadsheet to the word processor, the total of the column will not be recalculated, as it would have been in the spreadsheet.

Copying to the Spreadsheet. In contrast to the word processor, the spreadsheet will adjust information copied to match the font, size, style, cell attributes, and border of the cell into which it is pasted. The word processor, then, uses the attributes of the source information; the spreadsheet uses the attributes of the destination cells. Works pastes information into adjacent cells if the source information is separated by either a tab or two or more spaces. Whenever a Return character appears in the source information, Works pastes the information following the Return into the next row. A blank line in the word processor will skip a row in the spreadsheet.

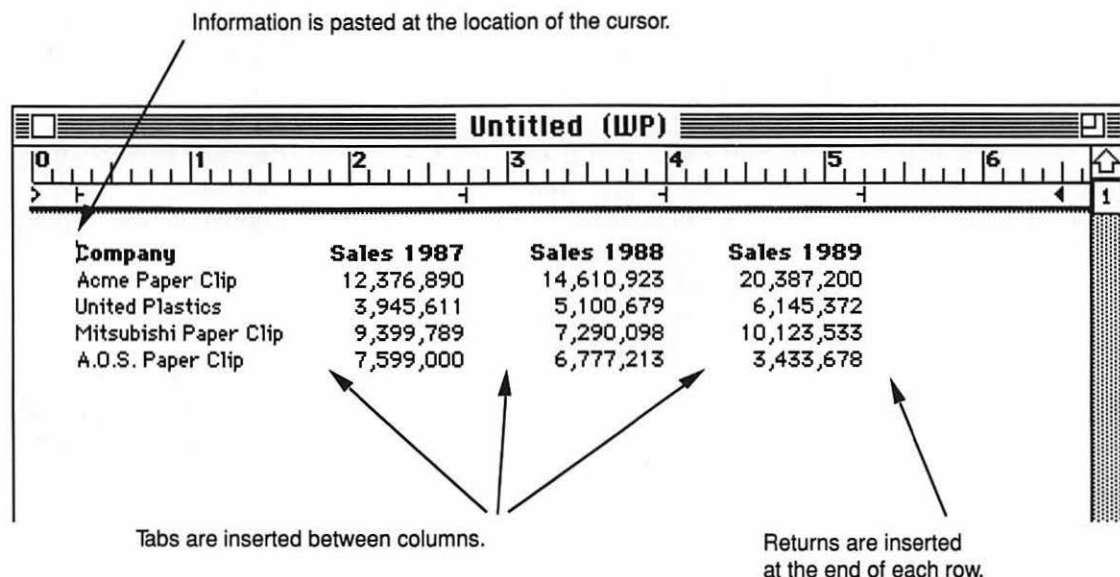
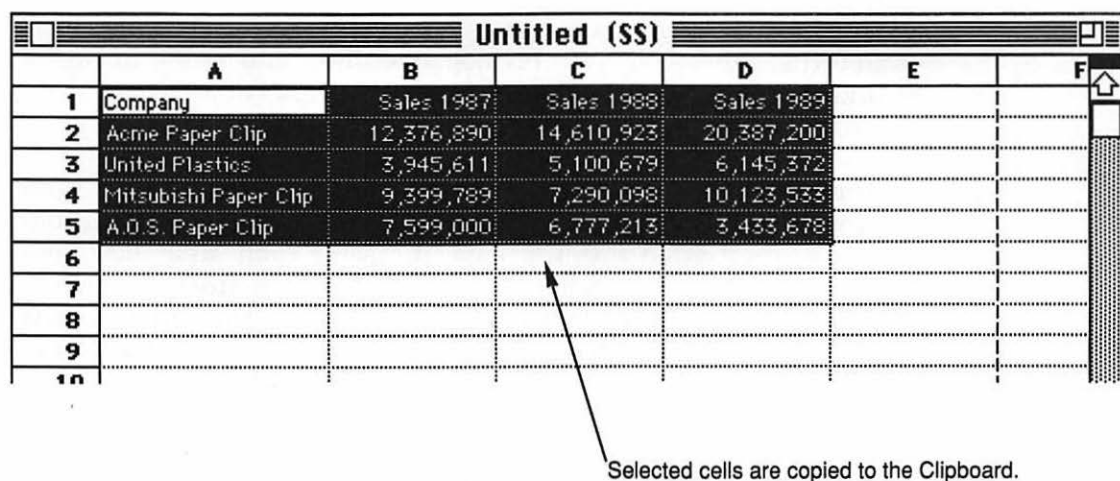


Figure 7.2. Copying Information from the Spreadsheet to the Word Processor

Short Cut: In the spreadsheet, the destination location can be specified by clicking on the cell in the upper left-hand corner of the area to be pasted. When the information is pasted, any existing data in the destination cells is lost. A dialog box will warn you that you will lose data and will let you cancel the paste if you so desire.

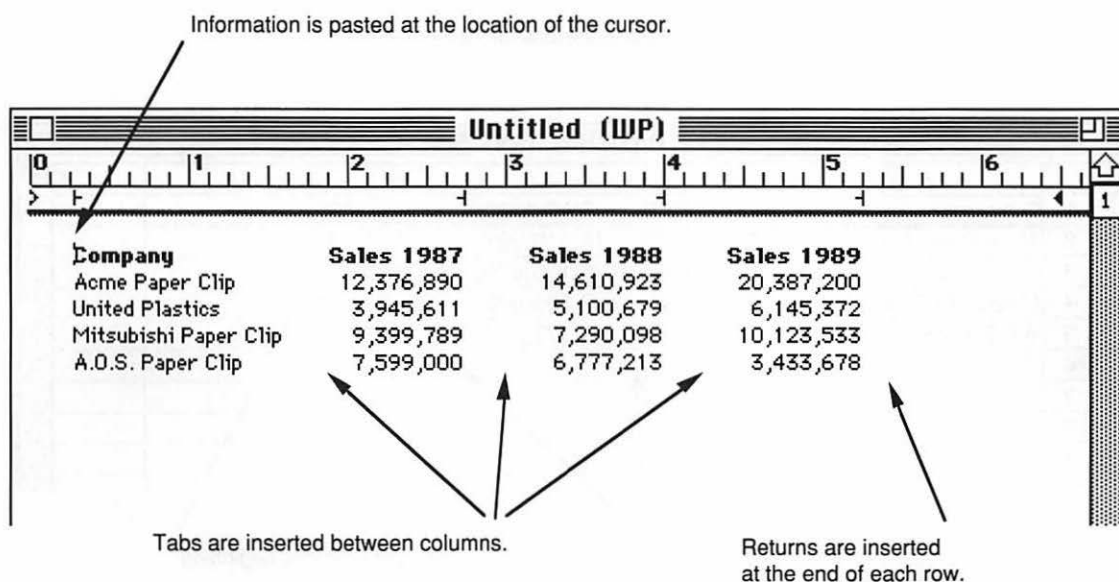
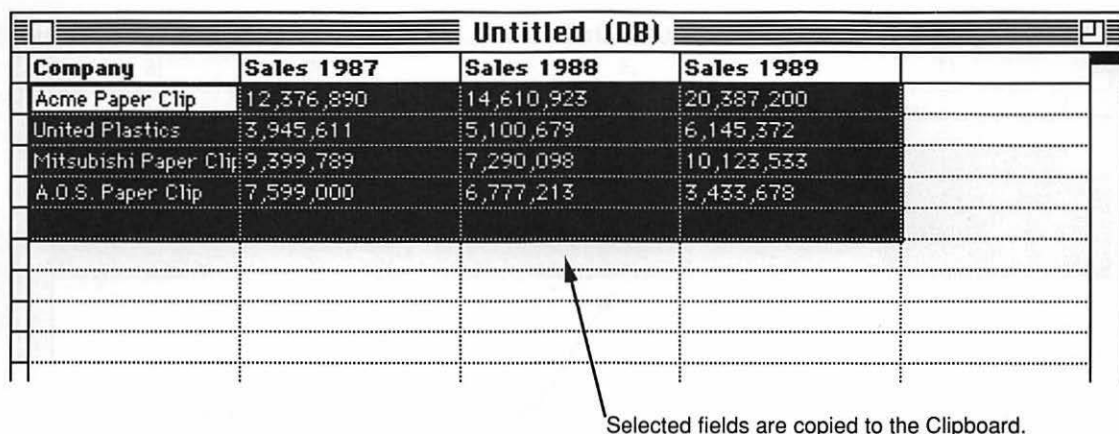


Figure 7.3. Copying Information from the Database to the Word Processor

When information is copied from the database to the spreadsheet, the source information should be copied from the List window, as opposed to the Form window. Information in adjacent fields in the database will be pasted to adjacent cells in the spreadsheet; information in adjacent records in the database will be pasted to adjacent rows in the spreadsheet. Works automatically pastes the field names across the top of the spreadsheet columns

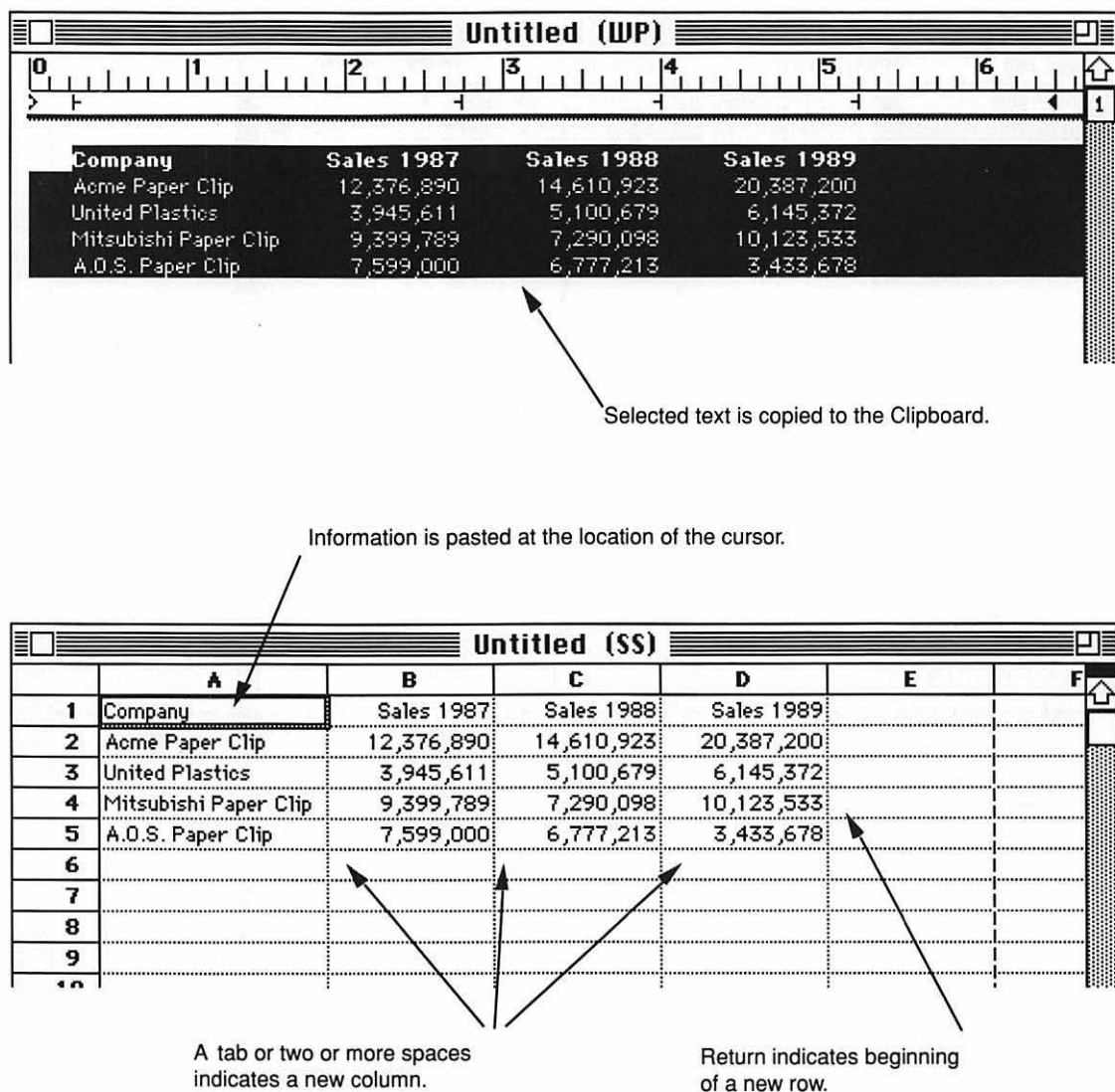


Figure 7.4. Copying Information from the Word Processor to the Spreadsheet

unless you hold down the Option key while choosing the Paste command. Figures 7.4 and 7.5 illustrate copying information from the word processor and database to the spreadsheet.

Copying to the Database. Copying information to the database is very similar to copying to the spreadsheet. Information copied to

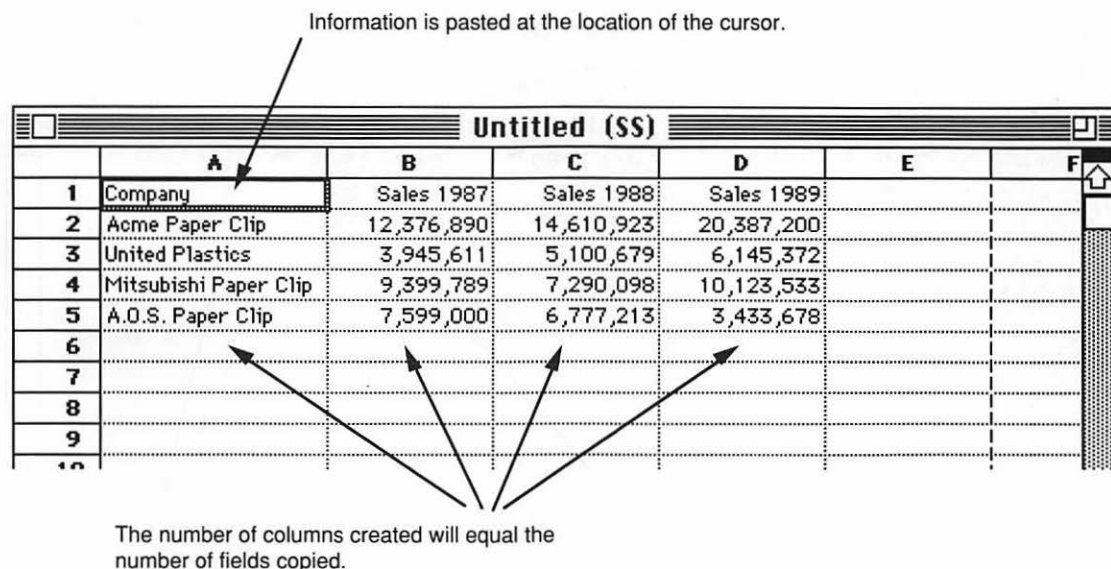
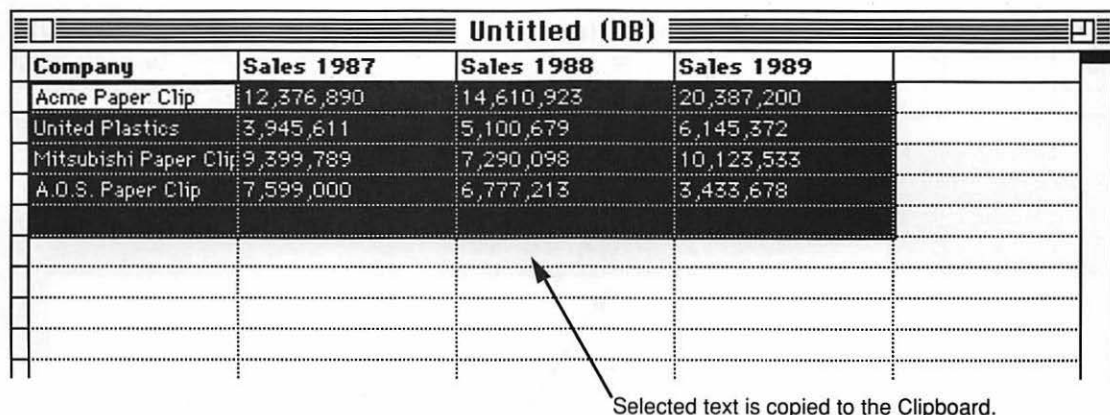


Figure 7.5. Copying Information from the Database to the Spreadsheet

the database takes on the attributes (font, size, style, and so on) of the destination field, a tab (or two or more spaces) indicates that data should go into the next field, and a Return character indicates the start of a new record. Graphics, however, cannot be pasted into the database. Refer to Figures 7.6 and 7.7 for examples of copying information to the database.

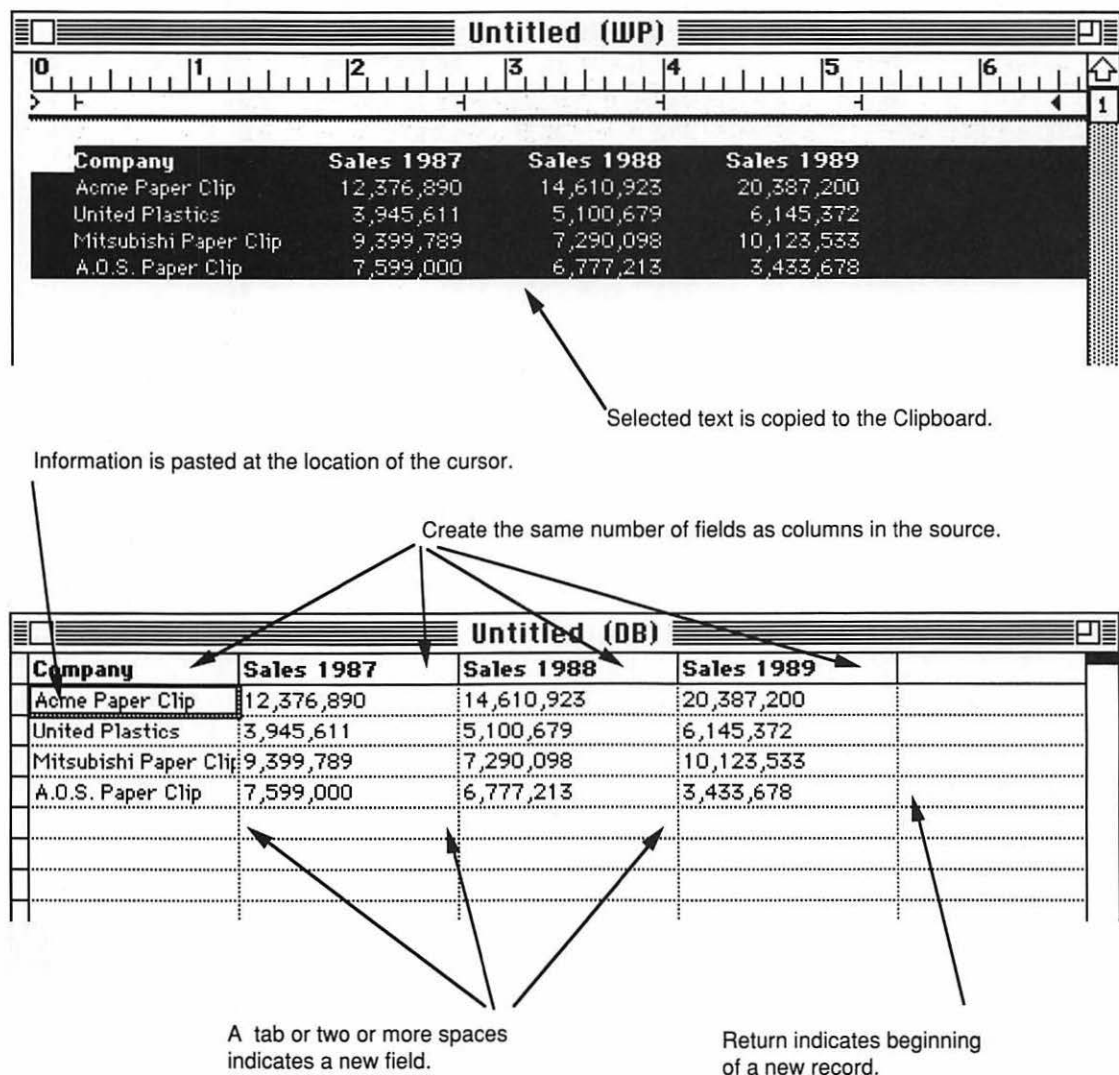
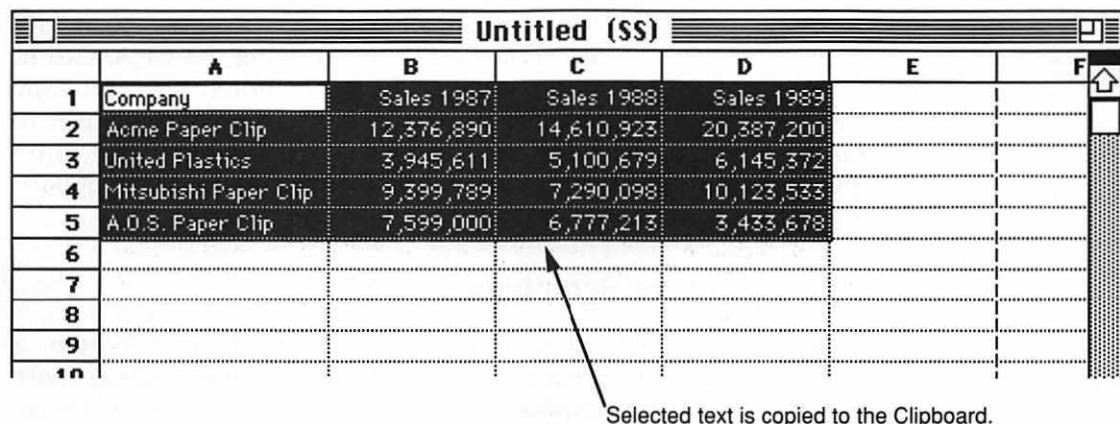


Figure 7.6. Copying Information from the Word Processor to the Database

Helpful Hint: It is important to define the same number of fields in the database as there are columns of information to be pasted. That is, to copy a spreadsheet with data in six columns, you need to define six fields in the database.

Copying and Pasting Communications Information. The communications application combines with the other Works applications in several ways. Word-processing, spreadsheet, and database files



Information is pasted at the location of the cursor.

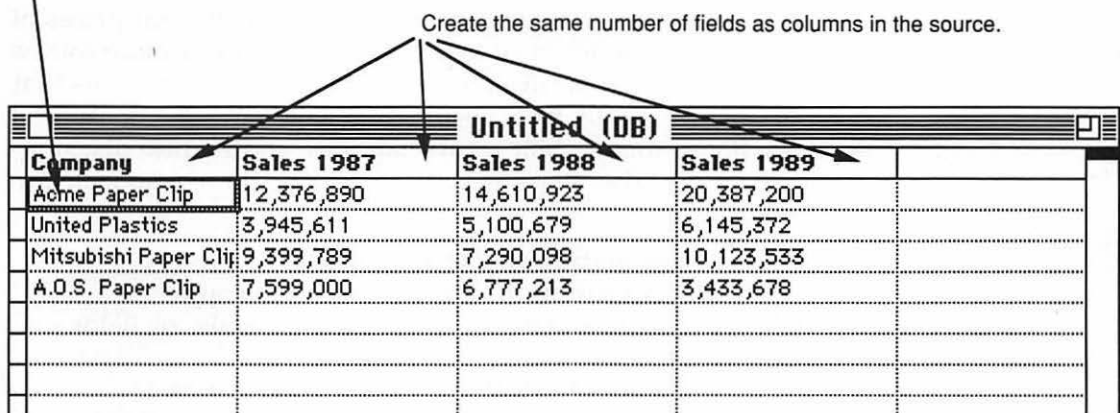


Figure 7.7. Copying Information from the Spreadsheet to the Database

can be sent and received by following the instructions in Section 8.2. The Capture Text command (see Section 8.2.2) stores an entire communications session in a word processor file. In both cases, the information received in the communications application can be dealt with as a word-processing, spreadsheet, or database document and copied to another application using the instructions in this section.

The Clipboard can be used in the normal manner to copy information from a source or paste it to a destination during a communications session. Graphics, however, cannot be pasted to the communications application.

Copying Graphics. Graphics, objects created with draw tools and spreadsheet charts, are copied and pasted using the Clipboard in the normal manner with the following restrictions. You can copy only from word processor to word processor, from spreadsheet to spreadsheet, from word processor to spreadsheet, and from spreadsheet to word processor. Charts are copied to the Clipboard by choosing Copy when the chart window is active.

7.2.3 Using the Scrapbook

Because the Clipboard can contain only one item at a time, a Macintosh desk accessory is available to store information more permanently. The **Scrapbook** is a special storage area set aside on the start-up disk. Information from any of the applications can be stored in the Scrapbook and retrieved from it, using the Clipboard as an intermediate storage area. The number of items stored in the Scrapbook is limited only by the amount of memory available on the start-up disk.

The Scrapbook is a useful tool when several different pieces of information or drawings need to be copied from one or more source documents. Some people design their Scrapbook to store items that they frequently paste into documents: company logos, special symbols, illustrations, their return address, contractual disclaimers, and so on. The steps necessary to use the Scrapbook are outlined below.

To Copy Information to the Scrapbook

1. Open the document from which you wish to copy.
2. With the mouse, select the text, graphics, cells, or fields you wish to copy.
3. Choose Copy from the Edit menu in the Menu Bar.
4. The data selected will remain in your source document and a copy will be placed on the Clipboard.
5. Choose Scrapbook from the Apple menu.
6. Choose Paste from the Edit menu. The information on the Clipboard will be copied into the Scrapbook.
7. Close the Scrapbook by clicking the close box or choosing Close from the File menu.

To Copy Information from the Scrapbook

1. Open the document into which you wish to copy information.
2. Choose Scrapbook from the Apple menu.
3. Scroll the Scrapbook using the scroll box and bars at the bottom of the window until the information you wish to copy is in view. Do not worry if all the information is not visible in the window. The entire contents of the Scrapbook item will be copied to the Clipboard.

4. Choose Copy from the Edit menu.
5. Close the Scrapbook by clicking the close box or choosing Close from the File menu.
6. Place the cursor at the exact location where you want the information pasted. Click the mouse button. (In the database and spreadsheet, you need only select the first cell or field in the area to be pasted.)
7. Choose Paste from the Edit menu in the Menu Bar.
8. The data will be copied from the Clipboard and pasted into your destination document.

To Delete Information from the Scrapbook

1. Choose Scrapbook from the Apple menu.
2. Scroll the Scrapbook using the scroll box and bars at the bottom of the window until the information you wish to delete is in view.
3. Choose Cut from the Edit menu.
4. Close the Scrapbook by clicking the close box or choosing Close from the File menu.

Because the Scrapbook is kept on the start-up disk, the information is more permanent than information stored in the Clipboard. Consequently, it is useful for copying information from Works to other Macintosh programs. To do so, follow these steps.

1. Start up Works and open the source documents.
2. Copy the desired drawings, charts, text, and tables to the Scrapbook.
3. Close the Scrapbook and quit Works.
4. Start up the other application and open the destination document.
5. Copy each item, one by one, from the Scrapbook and paste it into the destination document.

7.3 MERGING DATA FROM THE DATABASE WITH THE WORD PROCESSOR

One of the most powerful features of Microsoft Works is its ability to merge fields from the database with the word processor. This allows you to extend the report-generation capability of the database to include form letters, labels, business forms, and other customized documents. For example, a letter in the word processor can be individualized by addressing each person on a mailing list in the database, gummed price labels can be printed in the word processor using an inventory database, or a statement form can be designed in the word processor and merged with the company's accounts receivable database to print monthly statements for each customer.

The merge process can be broken down into five general steps.

1. Design the database and type in the information.
2. Create the word-processing document: letter, label, or form.
3. Use the Prepare to Merge command to merge the desired fields from the database into the word processor.
4. Perform any desired sorting or record selections in the database.
5. Use the Print Merge command to print the documents. One document will print for every record selected in the database.

A practical example is probably the best teacher. The letter in Figure 7.8 announces Acme's new Super Clip to its customers.

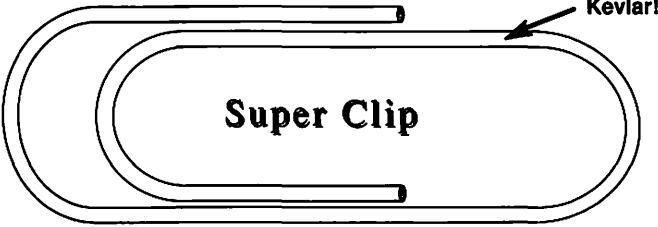
Acme Paper Clip Company

123 Main Street
Los Angeles, California 90001

April 1, 1990

Dear

I am pleased to announce to our valued customers the new **Super Clip**. This revolutionary paper clip is made from kevlar, the bulletproof vest material used by all major metropolitan police forces. This new paper clip will not bend, break, or rust. Yet it costs only pennies more than standard paper clips. I have enclosed a sample for your inspection. Put it to the test and see if you don't agree that the **Super Clip** is the best paper clip ever designed!



To introduce the **Super Clip** to our customers, I am offering special introductory prices. I hope that you will stock the **Super Clip**, for obvious reasons. Thank you for your patronage.

Sincerely,

Sidney Celmour
Marketing Director

Figure 7.8. Sample Form Letter

Acme's Customers (DB)						
Title	First Name	Last Name	Street Address	City	State	Zip
Mr.	Abraham	Jones	987 First St.	Riverside	CA	92502
Mrs.	Mary	Sweet	2000 Hershey Ave.	San Bernardino	CA	92401
Prof.	Joe K.	Stir	555 Howler Dr.	Hacienda Heights	CA	91746
Mr.	Al	Heart	555 Cardiac Dr.	Long Beach	CA	90840
Miss	Ima	Darling	6969 Pacific Grove	Monterey	CA	93950

Figure 7.9. Acme's Customers Database

Figure 7.9 contains a partial list of those customers. The merge feature of Works will allow you to print a customized letter to each individual on the mailing list. Before continuing with the remainder of this chapter, follow these steps to set up the example. (Note: If you already created a database of Acme customers in Section 6.5, Problem 1, skip Steps 4 and 5.)

1. Create a New word-processing document by typing and editing the text in Figure 7.8. Follow the spacing very carefully.
2. **Optional:** If you drew Acme's Super Clip in Section 3.4, Problem 1, use the Clipboard to Copy and Paste the drawing into your letter. (If you need help, see Section 7.2; the Super Clip is also on the diskette that accompanies this text.)
3. Save the document as *Super Clip Letter*.
4. Create a New database file defining seven fields: Title, First Name, Last Name, Street Address, City, State, ZIP.
5. Type the customer names shown in Figure 7.9 into the database and save the file as *Acme's Customers*.

7.3.1 Preparing to Merge

The object of the Prepare to Merge command in the Edit menu is to define which fields from the database are to be merged and where the fields will be located in the word-processing document. The first step requires positioning the cursor at the *exact* location where the data are to appear in the word-processing document. Next choose the Prepare to Merge command and select the field to be merged. This process is repeated for every field that needs to be merged. A field that is not wanted in the word-processing document can be skipped, or a field can be selected more than once if you want it to appear multiple times in the document.

Follow these steps to merge *Acme's Customers* with the *Super Clip Letter*.

1. Open the database (*Acme's Customers*), if it is not already open.
2. Open the word-processing document (*Super Clip Letter*), if it is not already open.

3. Position and click the cursor at the beginning of the blank line immediately above the word *Dear*.
4. Choose Prepare to Merge from the Edit menu. A dialog box will appear (see Figure 7.10).
5. Select *Acme's Customers* database and select the Title field. Click the Merge button.

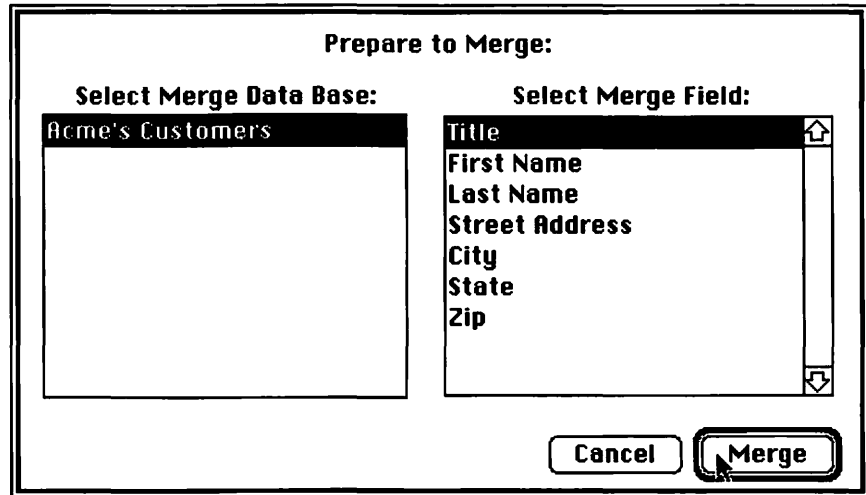


Figure 7.10. Prepare to Merge Dialog Box

Helpful Hint: Choose the Show Field Names command in the Edit menu to display the names of the merged fields in the word processor.

6. Because you want a space between Title and First Name, press the Space Bar once.
7. Choose Prepare to Merge and select the First Name field. Click the Merge button. Press the Space Bar again to add a space between First Name and Last Name. Choose Prepare to Merge and select the Last Name field. Click the Merge button. Your screen should look like Figure 7.11.

Helpful Hint: Do not be alarmed that the Last Name field is displayed on the line below the Title and First Name fields. There simply is not enough room for the field names to print on the same line. However, the data will be printed on the same line. Choose Show Field Data in the Edit menu and view the data.

8. Press the Return key to start the address on a new line. Choose Prepare to Merge and merge the Street Address field.
9. Press the Return key to start the City, State, and ZIP on a new line. Merge the City field in the same manner as you merged the

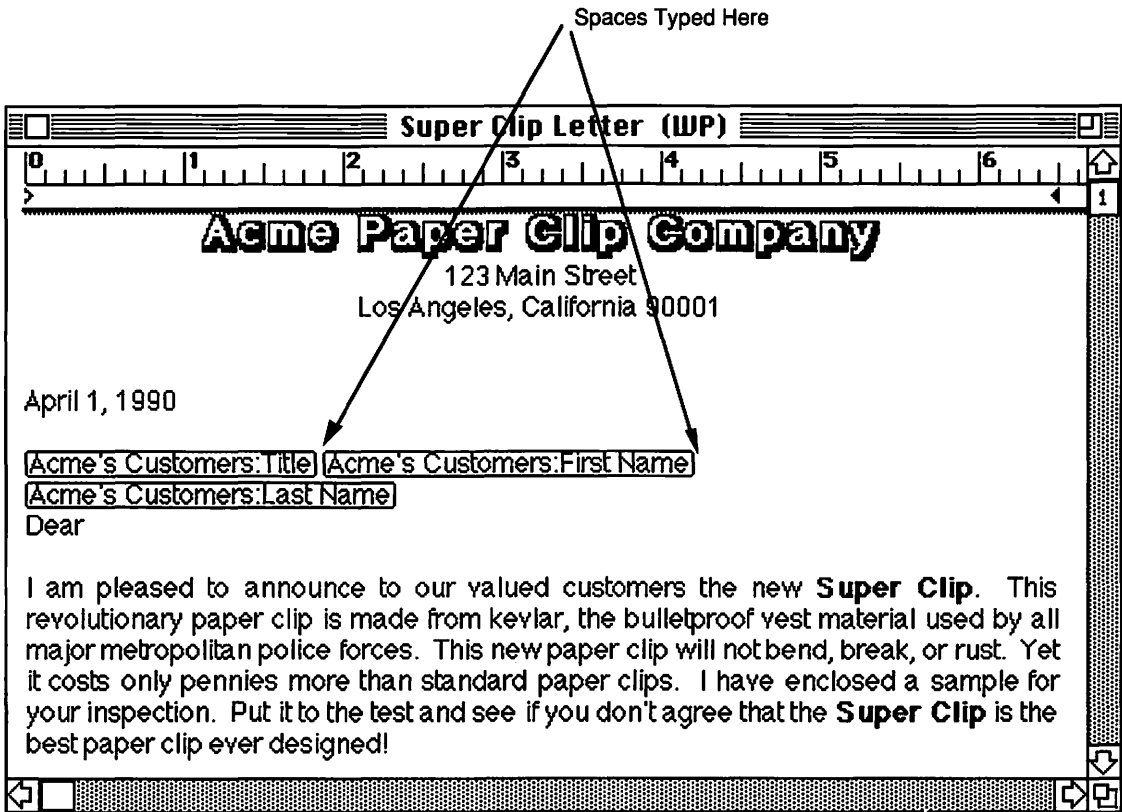


Figure 7.11. Super Clip Letter After Merging First Address Line with Show Field Names in Effect

other fields. This time, however, type a comma and press the Space Bar to place a comma between City and State. Merge the State field. Press the Space Bar twice and merge the ZIP field. Press the Return key to add a blank line between the address and the salutation.

10. Click the cursor immediately after the salutation *Dear*. Press the Space Bar once and merge the Title field. Press the Space Bar and merge the Last Name field. Type a colon. Your final merged document should look like Figure 7.12.
11. Save your merged document. The reference or link to the database fields will be saved, *not* the data showing in the window.

You can preview how a document will look for a specific database record by selecting any field in the record. For example, if you wanted to review how the letter to Professor Joe K. Stir would look, click on any field in his record in the database window and choose the word-processing window to view the customized letter.

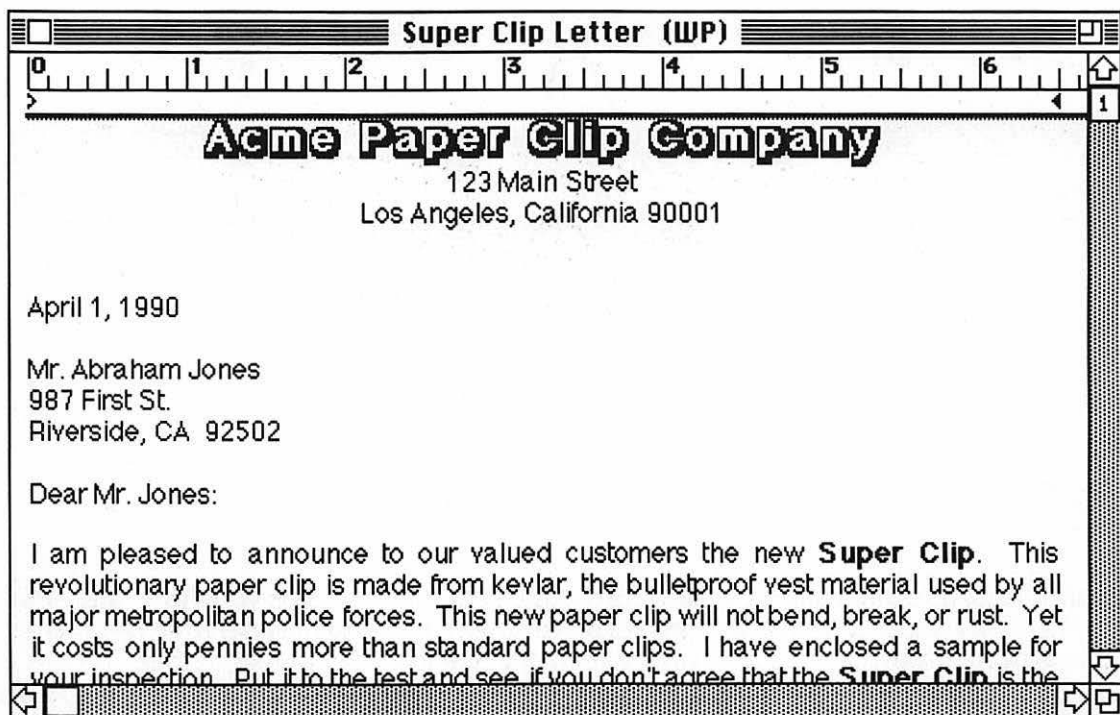


Figure 7.12. Acme's Customers Database After Merging Entire Address with Show Field Data in Effect

(Remember to choose the Show Field Data option in the Edit menu to see the data in the merged document.)

Helpful Hint: You can change the font, style, and size of the merged fields by selecting fields with the cursor just as you would any other text and choosing the desired attributes.

7.3.2 Printing Merged Documents

There are two ways to print documents with merged database fields: as a single document with the data from one specific record, or as multiple documents—one for each record in the database. The Print command in the File menu will print only one document. If the Show Field Names option has been chosen from the Edit menu, the printed document will contain the names of the fields. If the Show Field Data option has been chosen from the Edit menu, the printed document will contain the data showing in the document window. Take the following steps to print a single document.

1. Open the database and word-processing documents.
2. Choose the Show Field Data option in the Edit menu.

3. Choose the database in the Window menu. Click on any field in the record that you want to merge.
4. Choose the word-processing document in the Window menu.
5. Review the document, checking to see that the merged fields have been selected properly, the correct record was selected, and the spacing and type attributes are correct.
6. Choose Page Setup in the File menu to specify printing features.
7. Choose Print from the File menu.

The second printing technique uses the Print Merge command in the File Menu. This command will be available only when a word-processing document has merged database fields and the database has been opened. This feature will print one document for each record in the database. For example, if *Acme's Customers* contained 500 names, 500 letters would be printed. Note that the Record Selection and the Sort commands can be used in the database prior to Print Merge to select a subset based on certain criteria and to sort the data into a specific order. The printed documents will be merged and printed in the order of the database. The general steps to use the Print Merge command follow.

1. Open the database and word-processing documents. Choose the database as the active window.
2. Perform any sorting or record selection that needs to be done.
3. Choose the word-processing document from the Window menu. Review the document, checking to see that the merged fields have been selected properly and the spacing and type attributes are correct.
4. Choose Page Setup in the File menu to specify printing features.
5. Choose Print Merge from the File menu.

Follow these steps to Print Merge *Acme's Customers* with the *Super Clip Letter*. Your result: a personalized letter to each of the five customers in the database!

7.3.3 Setting Up Labels

Printing labels is similar in concept to printing form letters or business forms. However, more than one record is usually printed on a page because there are usually twelve 1" × 3 1/2" labels to each page. The Multiple Labels option in the Edit menu provides the means to print 12 labels to a page.

One challenge in printing labels is aligning the vertical spacing (the number of lines on the page). Given the variety of fonts and sizes on the Macintosh, getting the correct number of lines to fit on a label is difficult. In the Spacing submenu of the Format menu is an option for 6 Lines per inch. This option will print six lines per

inch regardless of the font size selected. Therefore, you should use a font size of 12 points or less to avoid lines printing over each other. As most computer labels are exactly 1 inch apart on the continuous forms, five lines can be printed on each label, with a blank line separating each one (6 lines = 1 inch).

An example may best explain how to print labels. Ben Biken needs to print price labels for each bicycle part in the Big Wheel Bicycle Shop's inventory. He wants to include on the label the name of the store, the part number, the description of the part, and its price. To try this out, you will need to use the Inventory database that you created and saved in Section 6.4.

1. Open the *Inventory* database.
2. Create a New word-processing document.
3. Choose Page Setup from the File menu. Select Custom Size paper and type 12 in the Paper Height box. Select No Gaps Between Pages to print on continuous label forms. Remove all margins. (See Figure 7.13 for an example of the Page Setup dialog box.)
4. Choose 6 Lines per inch from the Spacing submenu in the Format menu, and choose Center from the Justification submenu in the Format menu. Set the right-margin indicator at 3.5 inches (the width of the label).

ImageWriter v2.7 OK Cancel

Paper: ☐ US Letter ☐ A4 Letter
☐ US Legal ☐ International Fanfold
☐ Computer Paper ☒ Custom Size

Orientation Special Effects: ☒ Tall Adjusted
☐ 50 % Reduction
☒ No Gaps Between Pages

☐ Print Row and Column Numbers Paper Width:
☐ Print Cell Notes Paper Height:

Header:

Footer:

Left Margin: **Right Margin:**
Top Margin: **Bottom Margin:**

Figure 7.13. Page Setup for Computer Labels

5. Type *Big Wheel Bicycle Shop* and press the Return key twice.
6. Choose Prepare to Merge and select the Catalog Number field. Press the Space Bar once. Choose Prepare to Merge and select the Description field. Press the Return key twice.
7. Choose Bold from the Style submenu in the Format menu. Choose Prepare to Merge and select the Cost field. Press the Return key twice. Your screen should resemble Figure 7.14.
8. Choose Select All from the Edit menu. Choose Copy from the Edit menu. Point and click the mouse in the empty part of the window below your first label. This will locate the cursor after the first label.
9. Choose Paste from the Edit menu. Another label will appear immediately below the first one. Continue pasting labels until you have 12 on the page. (Stop when you see the cursor immediately below the page break indicator.) Press the Backspace or Delete key to eliminate the page break indicator.
10. Choose Multiple Labels from the Edit menu. Your completed label page will resemble Figure 7.15.
11. Put label forms into the printer and choose the Print Merge command.

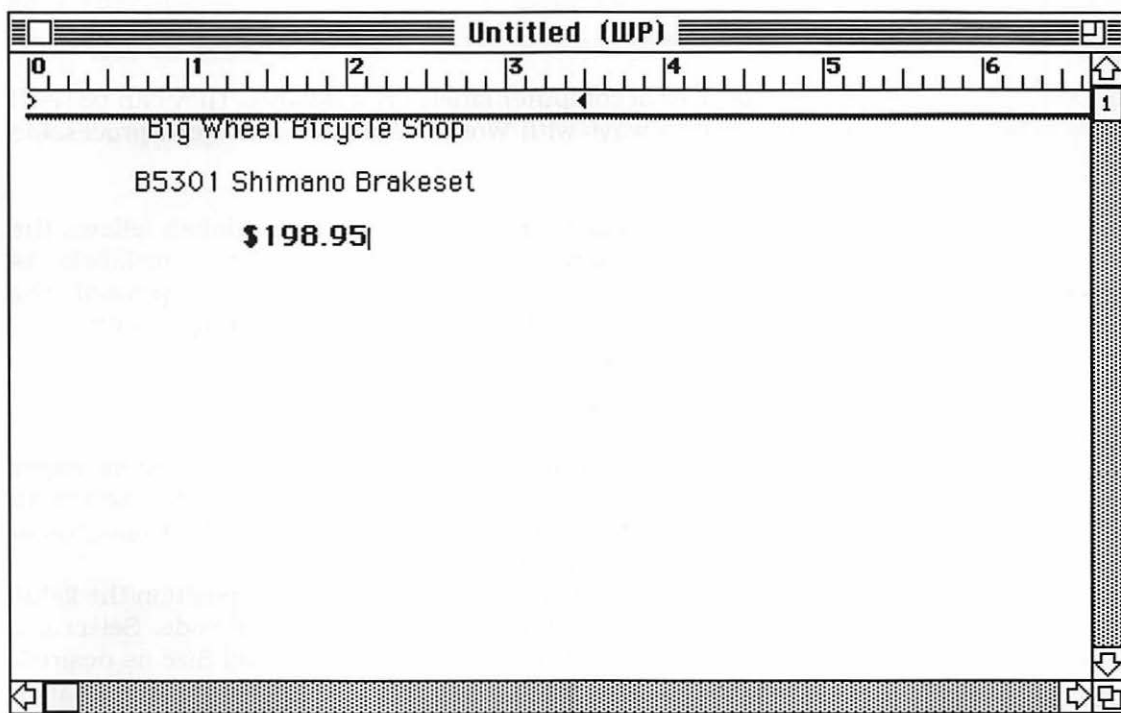


Figure 7.14. Label Document After One Label Is Defined

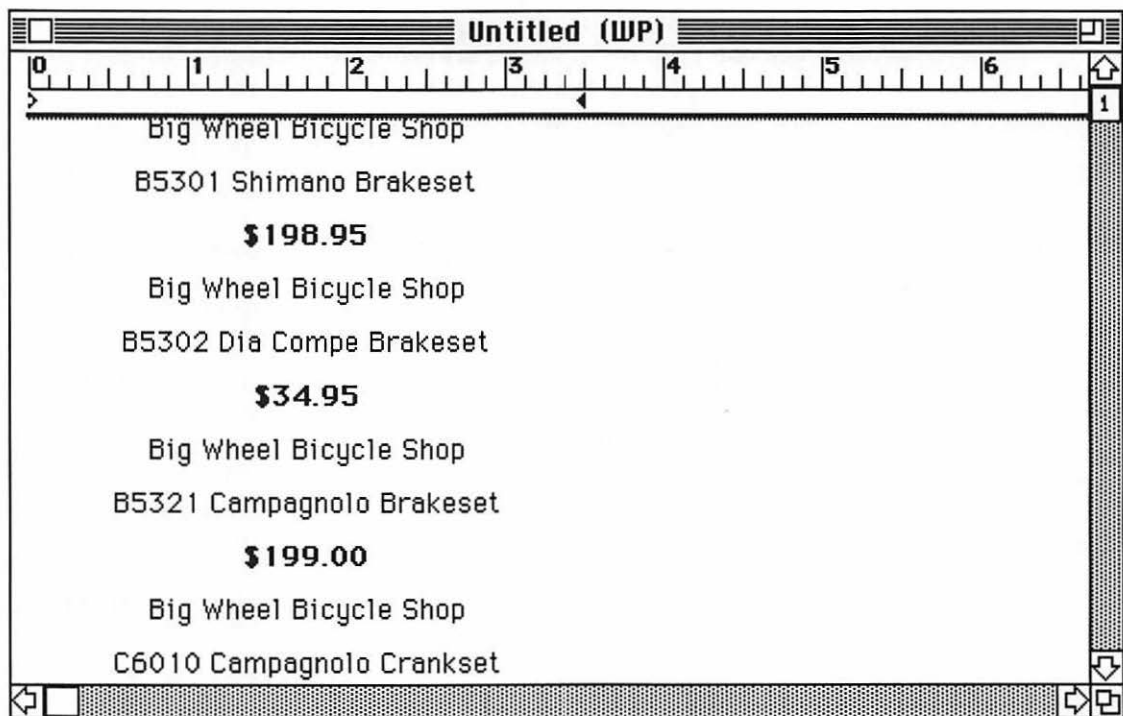


Figure 7.15. Label Document with Multiple Labels

A variety of sizes of computer labels are available. They can be used in many creative ways with Works databases and word-processing documents.

Mailing Labels. Another technique for printing labels allows the user to use different fonts, sizes, and styles of text on the labels. As mailing labels are the most common type of label printed, the following example will produce labels from any database with name and address information.

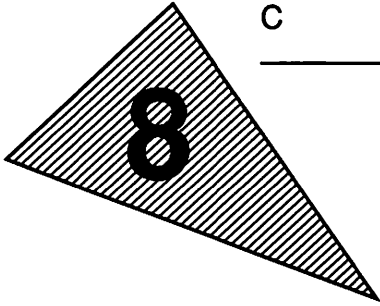
1. Open the database.
2. Create a New word-processing document.
3. Choose Page Setup from the File menu. Select Custom Paper and type 1 for Paper Height and 3.5 for Paper Width. Select No Gaps Between Pages and Tall Adjusted. Set all four margins to .125 (1/8 inch). Click the OK box.
4. Using the Prepare to Merge option, select and position the fields for name, street address, city, state, and ZIP code. Select the appropriate fields and choose Font, Style, and Size as desired. The dotted page break line will indicate the bottom of the label, and the right-margin indicator will determine the right edge of

the label. Adjust the spacing as necessary to fit the fields on a single label.

5. Align label forms in the printer and choose the Print Merge command. (Do *not* choose Multiple Labels from the Edit Menu!)

7.4 POSERS, PROBLEMS, AND PROJECTS

- \$1. Create 1" × 3 1/2" mailing labels for the *Acme's Customer* database. If you do not have access to computer labels, Print eleven 1-inch labels on each page of plain computer paper.
- \$2. Write a memo to Acme's customers describing Acme's sales performance over the past 3 years. Copy the pie charts showing Acme's market share (see Section 5.2, Problem 2) into your memo.
- \$3. Revise the memo in Problem 2, including the data from the spreadsheet (see Section 4.6, Problem 4) instead of the pie charts. Format the data into a table that is visually attractive.
- \$4. Use the memo from either Problem 2 or Problem 3 and merge it with the *Acme's Customers* database. Print out at least five letters.
- *5. Using the database that you created in Section 6.5, Problem 2, print 3" × 5" cards for each of the parrots in Little Ben's collection. Include all the information in the database.



SHARING THE WEALTH (OF INFORMATION)

"What hath God wrought!"

—*Samuel F. B. Morse, first telegraph message on May 24, 1844*

"I never received more than one or two letters in my life . . . that were worth the postage."

—*Henry D. Thoreau*

"As cold waters to a thirsty soul, so is good news from a far country."

—*Proverbs, 25:25*

OBJECTIVES

When you've completed this chapter, you'll be able to do the following.

1. Define the terms *modem*, *host*, *e-mail*, *electronic bulletin board*, and *baud* (Sections 8.1.1 and 8.1.2)
2. List the five items needed to communicate with an information service (Section 8.1.2)
3. Define in Works the communications settings: terminal type, baud rate, data size, stop bits, parity, handshake, and phone type (Section 8.1.3)
4. Get on-line with an information service using Works and a modem (Section 8.1.4)
5. Send and capture text (Sections 8.2.1 and 8.2.2)
6. Send and receive files (Sections 8.2.1 and 8.2.2)

8.1 GETTING STARTED WITH COMMUNICATIONS

Communication between a microcomputer and another computer can greatly expand the information resources available to you. From the limited data capacity of floppy diskettes to complete libraries stored on large mainframe systems, it can aid the traveling salesperson in placing orders from hotels thousands of miles from the home office, or it can support a dialog between two microcomputer owners with similar interests. This chapter explores the communications application of Microsoft Works and how it can be used to access information on remote computers. Getting actual practice will mean locating an information service in your own locale. Suggestions and sources for locating these services are provided in Section 8.3.

8.1.1 A Brief Background in Data Communications

Data communications refers to the process by which two computers pass information between themselves over telephone lines or cables. To transmit digital data over telephone lines, they must be converted into voice frequencies. When the data are received, they must be converted back into a digital signal for the computer to understand. This translation is done by a **modem**. On the source computer, the modem MODulates the electrical signal into a voice signal and transmits it; at its destination, another modem DEModulates the voice signal back into an electrical signal that can be interpreted by the computer. Two computers can also be directly connected via a cable or dedicated telephone line that is rented from the phone company. In such cases, modems may not be necessary if the distance is short (under a few thousand feet). Otherwise, modems must be placed at both ends of the cable. Figure 8.1 shows the typical Macintosh data communications scheme.

In most data communications situations, the Macintosh will access a **host** computer, which is a mini- or mainframe computer that provides timesharing services. From a few to hundreds of microcomputer owners can access these services at the same time. Each microcomputer acts as a **terminal** polling information from the host. The range of resources available is evident from checking the offerings of one of the largest commercial services in the United States, CompuServe®.

Electronic-Mail. Electronic-mail (also known as e-mail) is a software program run on the host computer that allows you to write, edit, and send messages to others with access to the same host.

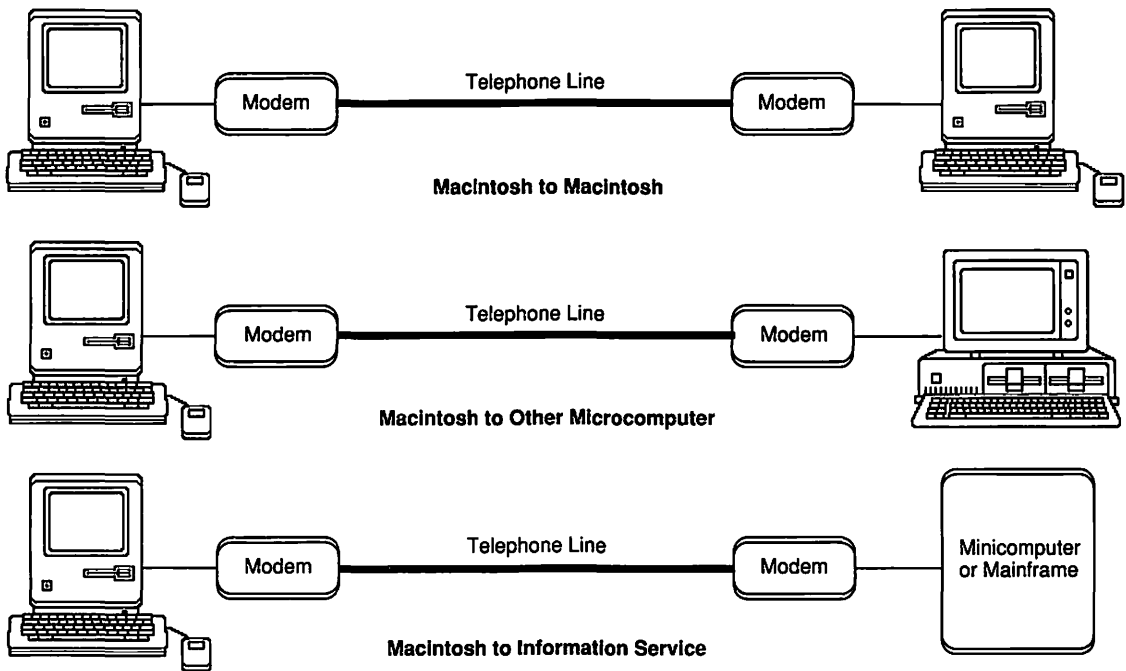


Figure 8.1. Macintosh Data Communications Diagram

Received messages can be read, printed, deleted, stored, or forwarded to other users. Messages can also be sent to multiple users by using mailing lists made up by either the user or the e-mail manager. The advantage is instantaneous delivery of your message anywhere in the world. The disadvantage is that your recipient must access the host to learn whether any mail is waiting. But once users get accustomed to checking in, e-mail saves them time that might be spent playing phone tag or trying to coordinate schedules so several people can meet to share their opinions. It has another advantage over phone conversations, too, in allowing time for more reflection prior to responding.

Bulletin Boards. An electronic bulletin board is a service via which you can post messages for anyone to read (as opposed to e-mail, in which you send a message to a specific person or group of people). The bulletin board can be general or limited to specific topics, such as Macintosh problems. Users can browse the bulletin board to pick up useful information, such as the location of the next Grateful Dead concert, or to answer someone's question about setting the tabs in Works. Many local bulletin boards are operated by computer clubs. These services are typically free and offer the beginner a good chance to practice. Check with the computer stores in your local area for information on bulletin boards.

Financial Information. One of the earliest uses of data communications was in the stock market field. From the comfort of your home or office, you can get current quotes on stocks, access financial data on a company, read current business news, manage a portfolio, and even buy and sell stocks 24 hours a day. Many banks now offer banking services for their computer-literate customers. Through them you can check your account balance, transfer funds, and even pay bills.

Reference Information. Most university libraries and many public ones now have electronic card catalogs. Patrons can search by author, title, subject, or any key word to develop their own bibliographies. CompuServe also provides electronic access to the following reference materials: *Academic American Encyclopedia*, *Consumer Reports*, *Dissertation Abstracts*, *Who's Who*, *Books in Print*, and *Book Review Digest*.

News. Several news services (Executive News Service, Associated Press Online, McGraw-Hill News Snapshot, OTC NewsAlert, and others) provide up-to-the-minute information on major news stories, sports, and weather. You can thus search news databases for specific information, eliminating the necessity of reading through several newspapers. News articles can be transferred from the host to your computer for future reference.

Recreation, Entertainment, and Travel. Users can play games with other users, exchange information with hobbyists, research and make airline, hotel, and rental car reservations, or visit an electronic shopping mall to purchase merchandise. Some well-known companies offering electronic catalogs and ordering are Sears, Spiegel, Waldenbooks, and Ford Motor Company.

Unfortunately, access to these services is not usually free. Basic hourly rates are charged, with additional surcharges for special services such as stock quotes. In addition, long-distance phone charges may apply if a toll-free telephone number is not available in your area. Despite the costs, the access to information may well be worth the investment.

8.1.2 What You Need to Communicate

It should be obvious by now that you will need a modem connected to your Macintosh. A variety of modems are available, at prices starting below \$100. The cost of the modem primarily depends on its transmission speed, or **baud** rate. The baud rate is the number of bits per second in which data are transmitted over the telephone

line. As there are 8 to 10 bits per character depending on the transmission protocol, a 1200-baud modem will transmit approximately 120 to 150 characters per second. Most common are 1200-baud modems, though 300-baud and 2400-baud modems are available for regular phone lines. Higher baud rates can be used with direct cables or leased telephone lines.

In addition to a modem, you will need a telephone line with a modular phone jack accessible to your Macintosh. This jack, known as an RJ11 jack, is the standard method of connecting telephones in the United States. You will also need communications software such as Microsoft Works and the phone number for an information service such as CompuServe, a university library, or a user group bulletin board. Many of these services give an account number and password to each authorized user. The password protects your account from unauthorized access, so you won't be charged for others' use.

8.1.3 Defining the Settings

Once you have acquired a modem, phone line, and account number, you are ready to begin—almost. Unfortunately, there are different standards for transmitting data between computers. These transmission **protocols** are like a handshake between visiting dignitaries. Your Macintosh must greet the host computer in a language and ritual that it understands. Consequently, you must define what the communications settings are for each host computer that you wish to access.

1. Start up the Macintosh using the Works Startup and Program diskettes. (Remember how? See Section 1.4.1 if you need help.)
2. If the Works window is not visible on the screen, open the Works Program disk icon (see Section 1.4.3).
3. Start Microsoft Works by selecting the Works icon (point and click) and choosing Open from the File menu.

Short Cut: Click twice on the Works icon.

4. The Works desktop should appear. Select Communications by pointing to the icon and clicking. Create a new document by pointing to and clicking on the New button.
5. The Communications Settings dialog box will appear on the screen (see Figure 8.2).

When you get an account number from the information service, you will also get a list of the handshake settings. The Communications Settings dialog box in Works allows you to define the

Communications Settings:

Type: ☒ TTY ☐ VT-100 ☐ VT-52 ☐ Auto-wrap ☐ Newline

Baud Rate: ☐ 300 ☐ 2400 ☐ 9600 ☒ 1200 ☐ 4800 ☐ 19200 **Delete Key Means:** ☐ Delete ☒ Backspace

Data Size: ☒ 8 Bits ☐ 7 Bits

Stop Bits: ☒ 1 Bit ☐ 2 Bits **Number of screens:**

Parity: ☒ None ☐ Odd ☐ Even

Handshake: ☐ None ☒ Hon/Hoff ☐ Hardware ☐ Both

Phone Type: ☒ Touch-Tone® ☐ Rotary Dial

Line Delay: **Character Delay:**

☒ Capture Text When Document Opens



Connect To: ☒  ☐ 

Figure 8.2. Communications Settings Dialog Box

appropriate settings. The most commonly used settings are described briefly below.

Type. In Works you can *emulate*, or make your Macintosh work like, three types of terminals: TTY, VT100, and VT52. The most commonly used terminal type is VT100, because it has more advanced features than the other types.

Baud Rate. Choose the appropriate data transmission rate: 300, 1200, 2400, 4800, 9600, or 19200 baud. This rate must be consistent with the modem and information service you are using. In other words, you cannot transmit at 2400 baud if you have a 1200-baud modem. Likewise, a 1200-baud information service cannot receive your 2400-baud transmission, nor can a 1200-baud modem communicate with Works if the settings are set for 2400 baud.

Data Size. This refers to the number of *data bits* transmitted per character of information. It can be either seven or eight.

Stop Bits. The **stop bits** identify the end of each character transmitted. There are either one or two stop bits.

Parity. Because data can get garbled in transmission through telephone line interference, some information services use a “parity” bit to check for transmission errors. Parity can be Even, Odd, or None.

Handshake. The handshaking protocol determines how the host computer and the user’s computer know whose turn it is to send or receive data. The handshaking can be done through hardware or software. Normally it is done with software, using the Xon/Xoff protocol.

Phone Type. Two types of dialing systems are used in the United States: rotary dial and touch tone. Check with your telephone company if you are not sure of the type used in your area.

In addition to the transmission protocol settings, several special features can be chosen from the Communications Setting dialog box. The Capture Text When Document Opens option will automatically store your communications session in a file on your hard disk or floppy diskette. This file can be used by the word processor to review or extract information at a later date. The Connect To option allows you to define where the modem is connected on your Macintosh: to the telephone port or the printer port. The Number of screens option allows you to select how many screens of data will be kept in memory during your session. These screens can be retrieved by scrolling the communications window.

Helpful Hint: The communications settings can be redefined by choosing the Settings command from the Communications menu.

8.1.4 Getting On-line

In order to get on-line to the information service, you will have to dial the appropriate phone number from the Works phone book. Here’s how to do it.

1. Make sure your modem is turned on and connected to the phone line.
2. Choose the Dial command from the Communications menu. The phone book will appear on the screen (see Figure 8.3).
3. Type the name of the information service and press the Tab key.
4. Type the appropriate phone number. Include area codes, access codes, or billing codes.

Name:		Phone Number:
Dial		
Dial		
Dial		
Dial		
Dial		
Dial		
Dial		
Dial		

Cancel OK

Figure 8.3. Communications Phone Book

5. Click the Dial button next to the information service that you want. The message Dialing . . . will be displayed on the screen and you will hear the modem dialing if it has a speaker.
6. When you are on-line, the message CONNECT will be displayed in the communications window. Type the commands necessary to gain access to the information service that you are using. This process, known as **logging on**, validates your use of the service. Follow the directions provided by the information service.

Short Cut: You can save the communications settings and the phone book so that you don't have to redefine the settings and reenter the phone number each time you want to get on-line. Do it like this.

1. Open a communications document.
2. Choose Settings from the Communications menu, define your settings, and click the OK button.
3. Choose Dial from the Communications menu, type in the phone number(s), and click the OK button.
4. Choose the Save As command in the File menu. Give the file a name appropriate to the service.

When you want to use that service, open the file, choose the Dial command, and click the appropriate Dial button.

Helpful Hint #1: If, after you log on to the information service, you see two characters on the screen instead of one (HHEELLOO, for example), choose Echo Off from the Communications menu. If you see no characters on the screen when you type, choose the Echo On command from the Communications menu.

Helpful Hint #2: Many information services use some keys that do not appear on the Macintosh keyboard. The following key sequences can be used with Works to transmit the equivalent keys.

Break	Command (⌘) + Option + 3
Delete	Command (⌘) + Option + Delete
Escape	Command (⌘) + Option + [

Whenever the information service requires a control key sequence (Control + C, for example), hold down the Command key (⌘), simultaneously pressing the other key.

Helpful Hint #3: The Keypad menu provides a VT52 or VT100 terminal keypad (see Figure 8.4). Use the mouse with this keypad to type special codes when using either of these terminal emulations.

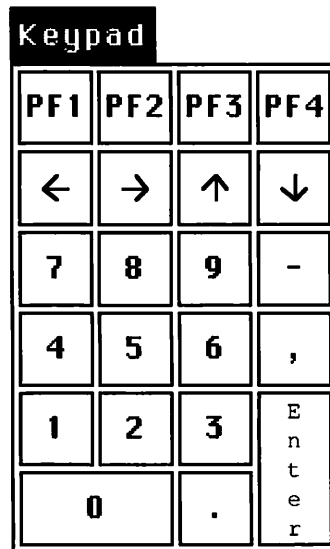


Figure 8.4. The Keypad Menu

Here is a step-by-step account of the process of accessing the CompuServe information service.

1. Turn on your modem.
2. Open a New communications document.

3. Define the settings (CompuServe uses 7 data bits, 1 stop bit, and even parity).
4. Enter the phone number listed for your area in the CompuServe directory.
5. Click the Dial button.
6. When the connection has been made, type Command (⌘) + C.
7. When the message USER ID appears in the window, type your CompuServe ID number and press the Return key.
8. When the message PASSWORD appears in the window, type your CompuServe password and press the Return key. As a security precaution, the password will not appear on the screen as you type it.

When you are finished communicating with the host computer, you must log off. For example, type OFF when quitting CompuServe. After you have logged off, choose Hang Up from the Communications menu. This will disconnect the modem from the host computer. It is important to note that hanging up alone does not log you off the host. You should log off and then hang up to properly end a session and reduce your cost.

8.2 SENDING AND RECEIVING INFORMATION

Once you become experienced in using information services, you will eventually want to send or receive large amounts of data. Perhaps you wish to write a long letter to a friend using e-mail. You can write the letter in the Works word processor and send the text rather than typing the text in an e-mail session. Not only will this allow you to edit your text easily, but it will cost less because Works can send text faster than you can type it. Or perhaps you want to share a spreadsheet or database with an associate in another city. Using Works you can send or receive a file between two Macintoshes, a Macintosh and another (non-Macintosh) microcomputer, or a Macintosh and an information service.

8.2.1 Sending Information

Two commands send information in the Works communications application: Send Text and Send Files. Both are found in the Communications menu. Use the Send Text option when you want to send text just as if you typed it on-line. Use the Send File option when you want to send a file such as a formatted word-processing document, a spreadsheet with graphs, or a database with reports.

Send Text

1. Using the word processor, enter the text and save the file. (Make sure that the diskette with the file on it is in the Macintosh disk drive when you're ready to send it.)
2. Access the receiving computer and enter any necessary commands to get to the point at which you wish to substitute text for typing.
3. Choose Send Text from the Communications menu. The Send Text dialog box will be displayed (see Figure 8.5).
4. From the list, select the file that contains the text to be sent and click the Send button. The text will be printed on the screen as it is transmitted to the receiving computer.

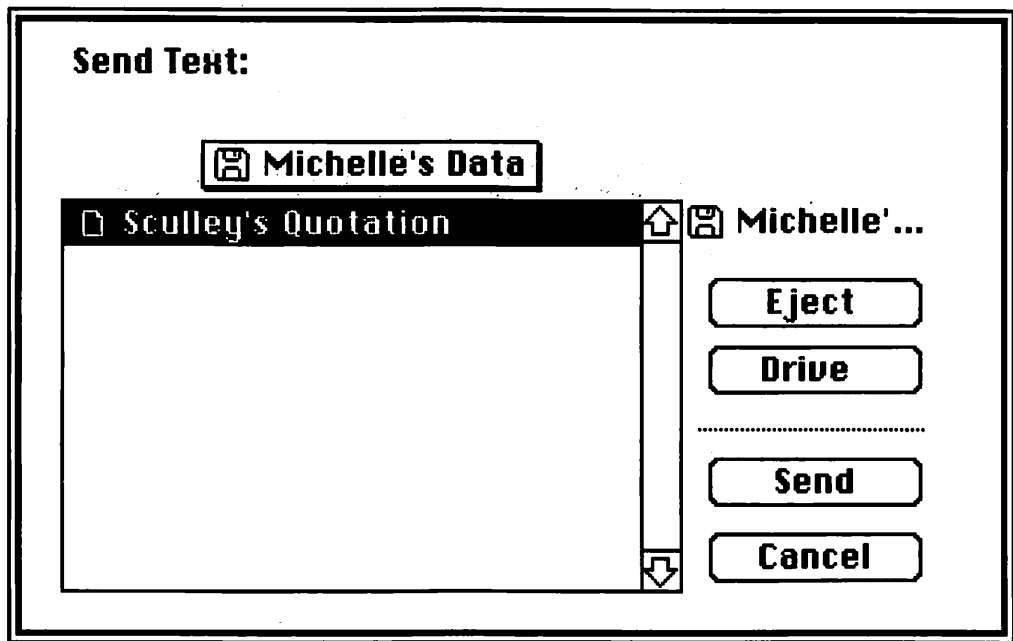


Figure 8.5. Send Text Dialog Box

Send File

1. Make sure that the diskette with the file on it is in the Macintosh disk drive when you're ready to send it.
2. Access the receiving computer and enter any necessary commands to prepare it to receive the file.
3. Choose Send File from the Communications menu. The Send File dialog box will be displayed (see Figure 8.6).
4. From the list, select the file to be sent.
5. Select a protocol option.

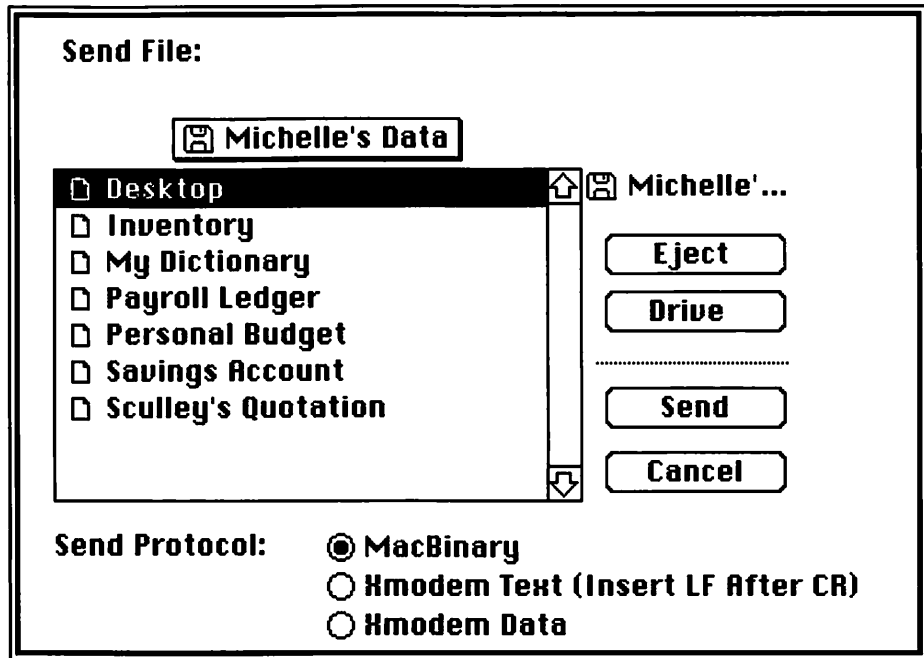


Figure 8.6. Send File Dialog Box

Helpful Hint: If you are sending a Macintosh file to another Macintosh, use the MacBinary protocol. If you are sending a file with alphanumeric characters and no formatting information (an ASCII or text-only file) from a Macintosh to another computer, select the Xmodem Text protocol. If you are sending a formatted file from a Macintosh to another computer, use the Xmodem Data protocol.

6. Click the Send button. The file will be sent to the receiving computer. Works will print a message when the transmission is complete.

8.2.2 Receiving Information

There are also two ways of receiving information in the Works communications application: Capture Text and Receive File. Both options are found in the Communications menu. Use the Capture Text option when you want to save a complete copy of your on-line session. Works will capture everything you type and everything the host computer prints on your screen. Use the Receive File option when you only want to receive a word-processing document, a spreadsheet, or a database.

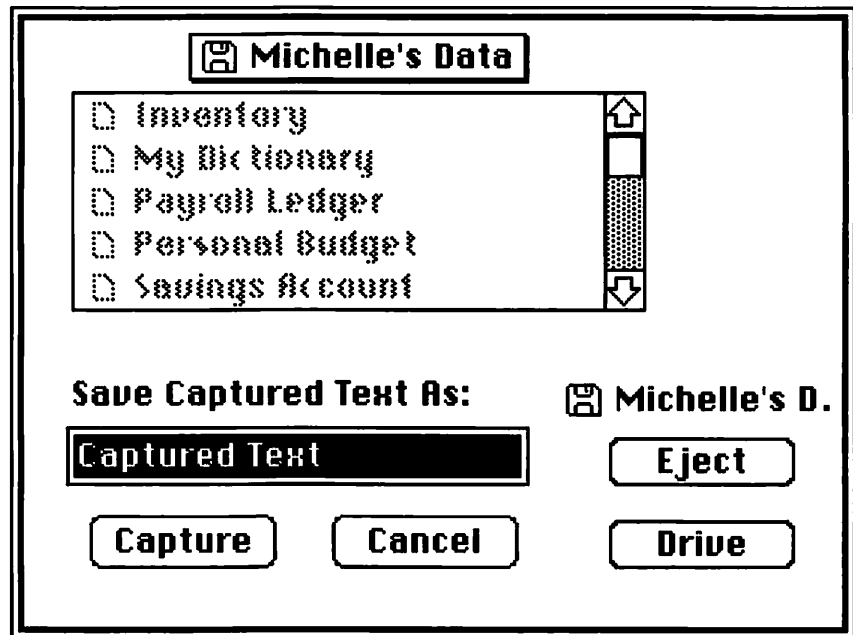


Figure 8.7. Capture Text Dialog Box

Capture Text

1. Access the sending computer and start your communications session.
2. When you wish to capture text, choose Capture Text from the Communications menu. The Capture Text dialog box will be displayed (see Figure 8.7).
3. Type the name of the file in which the text will be saved and click the Capture button.
4. When you are finished capturing text, choose the End Text Capture command from the Communications menu. No more text will be saved in the file, but your communications session will continue.

Short Cut: To automatically save your entire communications session, click the Capture Text When Document Opens box in the Settings dialog box before accessing the host computer.

Receive File

1. Make sure that the diskette with the file on it is in the Macintosh disk drive when you're ready to receive it.
2. Access the sending computer and enter any necessary commands to receive the file.

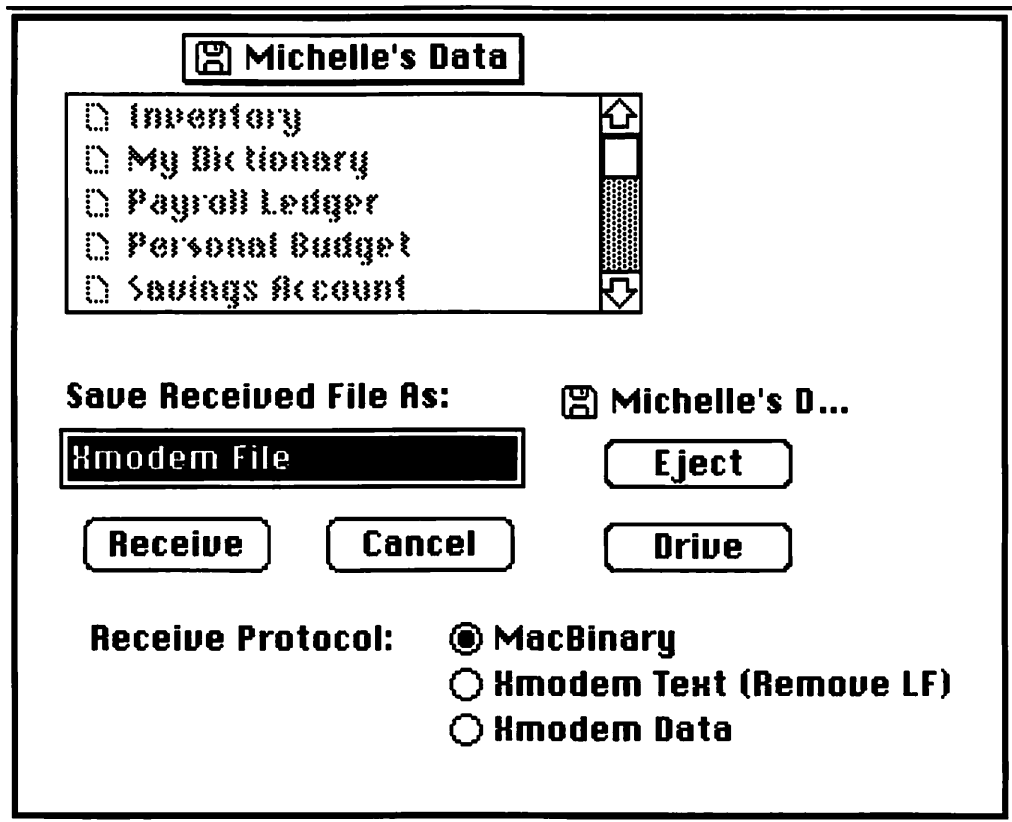


Figure 8.8. Receive File Dialog Box

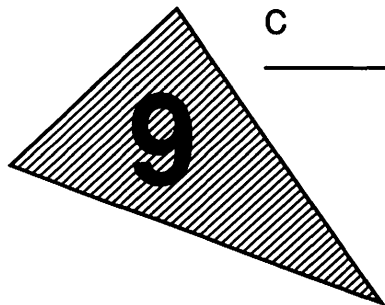
3. Choose Receive File from the Communications menu. The Receive File dialog box will be displayed (see Figure 8.8).
4. Type the name of the file to be saved on your computer.
5. Select a protocol option.

Helpful Hint: If you are receiving a Macintosh file from another Macintosh or an information service, use the MacBinary protocol. If you are receiving a file with alphanumeric characters and no formatting information (an ASCII or text-only file) from another computer, select the Xmodem Text protocol. If you are receiving a formatted file from another computer, use the Xmodem Data protocol.

6. Click the Receive button. Works will print a message when the transmission is complete.

8.3 POSERS, PROBLEMS, AND PROJECTS

- *1. Find out if your university library has an on-line card catalog system accessible by modem. Research the appropriate communications settings and phone number. Using Works, log on to the system and do a subject search on Macintosh. If your university library has an on-line card catalog but you don't have access to a modem, visit the library and learn how to use the card catalog terminals. Do the same search.
- *2. Find out the local phone number for CompuServe. Following the step-by-step instructions in Section 8.1.4, attempt to log on to CompuServe with Works and a modem. (You will not be able to log on completely without an account number and password. However, you can practice defining the settings, dialing the modem, and connecting with a host.)
3. Research the appropriate communications settings and phone number for a free local user group bulletin board. Using Works, log on to the system and browse.
4. If neither a modem nor an information service is available to you, you can simulate logging on to an on-line card catalog by "launching"—that is, opening—the file LUCI Simulation on the diskette that came with this text. This file requires HyperCard; Appendix J describes the exercise in detail.



PUBLISH OR PERISH!

“Journalism consists of producing headlines against deadlines.”

—*Anonymous*

“Some books are to be tasted, others to be swallowed, and some few to be chewed and digested: that is, some books are read only in parts, others to be read, but not curiously, and some few to be read wholly, and with diligence and attention.”

—*Francis Bacon*

OBJECTIVES

When you've completed this chapter, you'll be able to do the following.

1. Create text columns, resize them, and reposition them on the page as desired (Section 9.1.1)
2. Link two or more text columns and flow text into them (Section 9.1.2)
3. Paste text from a word processor document into text columns in another document (Section 9.1.3)
4. Add heads, borders, boxes, rules, and shading to a page layout (Section 9.2.1)
5. Add an illustration to a page layout (Section 9.2.2)
6. Use laser fonts and print a document on the Apple Laser-Writer (Sections 9.3.1 and 9.3.2)

9.1 DESKTOP PUBLISHING WITH WORKS

Desktop publishing (DTP) is the art of designing and producing camera-ready copy with the assistance of a microcomputer. This area of microcomputer applications is growing rapidly: market analysts predict that the already \$1-billion desktop publishing industry will increase fivefold over the next 2 years. The reason is quite simple: every business needs to publish.

Before desktop publishing was available, businesses wanting to publish a newsletter to be mailed to their customers embarked on a time-consuming process involving many professionals. After the articles were written, the copy was sent to a typesetting service to be formatted into columns using the desired type fonts. Headlines also had to be typeset and fit to the proper column width. Graphic artists were hired to illustrate the articles. The illustrations had to be photographically reduced or enlarged to fit the space available. Finally, a layout artist took the typeset articles and illustrations and pasted them onto a master that was photographed and printed. Throughout the process, proof copies of the articles, illustrations, and layout were sent back and forth between the typesetter, illustrator, graphic artist, and the businesses' executives for approval. This process took time, personnel, and money.

Desktop publishing allows both large and small businesses to be their own publishing company. Articles can be typed into the word processor by in-house writers; illustrations can be purchased on diskette or drawn with graphics software by employees; and pasteup can be done electronically on the computer screen. The camera-ready master can be printed on a **laser printer** for a typeset appearance and sent to the printer. Once the copy is written, the entire production process can be reduced to a few hours with an experienced staff. Some large companies have their own desktop publishing and printing departments, so the entire process is done in-house.

The Macintosh lends itself to DTP applications because of its WYSIWYG features. Several high-quality page layout packages, such as PageMaker®, QuarkXPress®, and ReadySetGo®, are available for the Macintosh. These packages are used by companies such as the one that publishes *USA Today* to design advertisements, articles, books, pamphlets, flyers, and so on. Microsoft Works contains some of the features of page layout software but is not practical for production DTP applications. This chapter will provide a simple introduction to desktop publishing by exploring the features Works does offer.

9.1.1 Entering Text in Columns

One of the primary requirements of desktop publishing is to fit multiple columns of text on a page. For example, your morning newspaper probably has as many as six columns of text wrapped around photographs and illustrations. The Works word processor creates these text columns using the Draw Tools.

1. Start up Works and create a new word-processing document. (See Section 2.2.3 if you need help.)
2. Choose the Draw On command from the Edit menu.
3. Select the Text Tool from the drawing Tool Box (see Figure 3.4). The cursor will change to an I-bar cursor (⌵).
4. Position the cursor where you want the upper left-hand corner of the text column to be.
5. Hold down the Option key and the mouse button while dragging the cursor. A rectangle with dashed lines will appear on the screen. When the mouse button is released, the text column will be defined and the heading Col 1 Link None will appear at the top (see Figure 9.1).

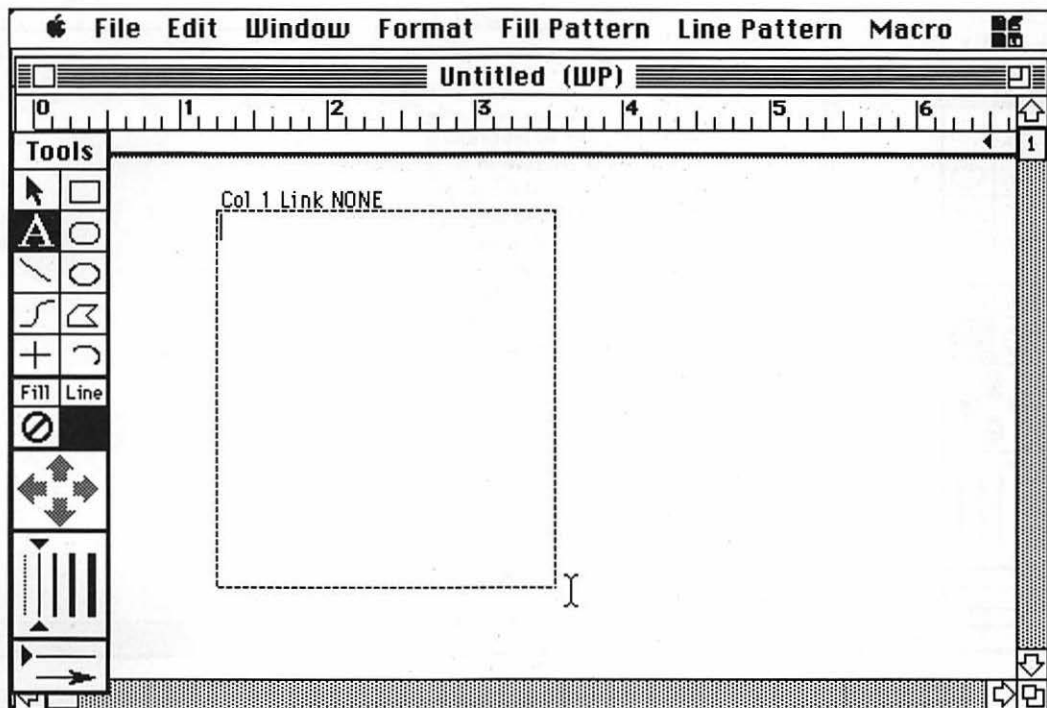


Figure 9.1. Creating a Text Column

Text can only be typed into a text column using the Text Tool with Draw On. Section 3.2 describes the way Works treats text as an object. It would be wise to review that section before continuing if you are not familiar with using the Text Tool.

Once a text column is defined, text can be typed into the column or pasted into the column from the Clipboard. The text will conform to the width of the column and take on the properties of the column: the font, size, style, and justification. If there is more text than the column can hold, the additional text will extend below the bottom of the column (see Figure 9.2). The text can be shortened by editing with the features described in Section 3.2.2, or the text column can be expanded in width or length.

1. Using the Pointer Tool (☞), select the text column. Handles will appear in the corners and along the sides of the column.

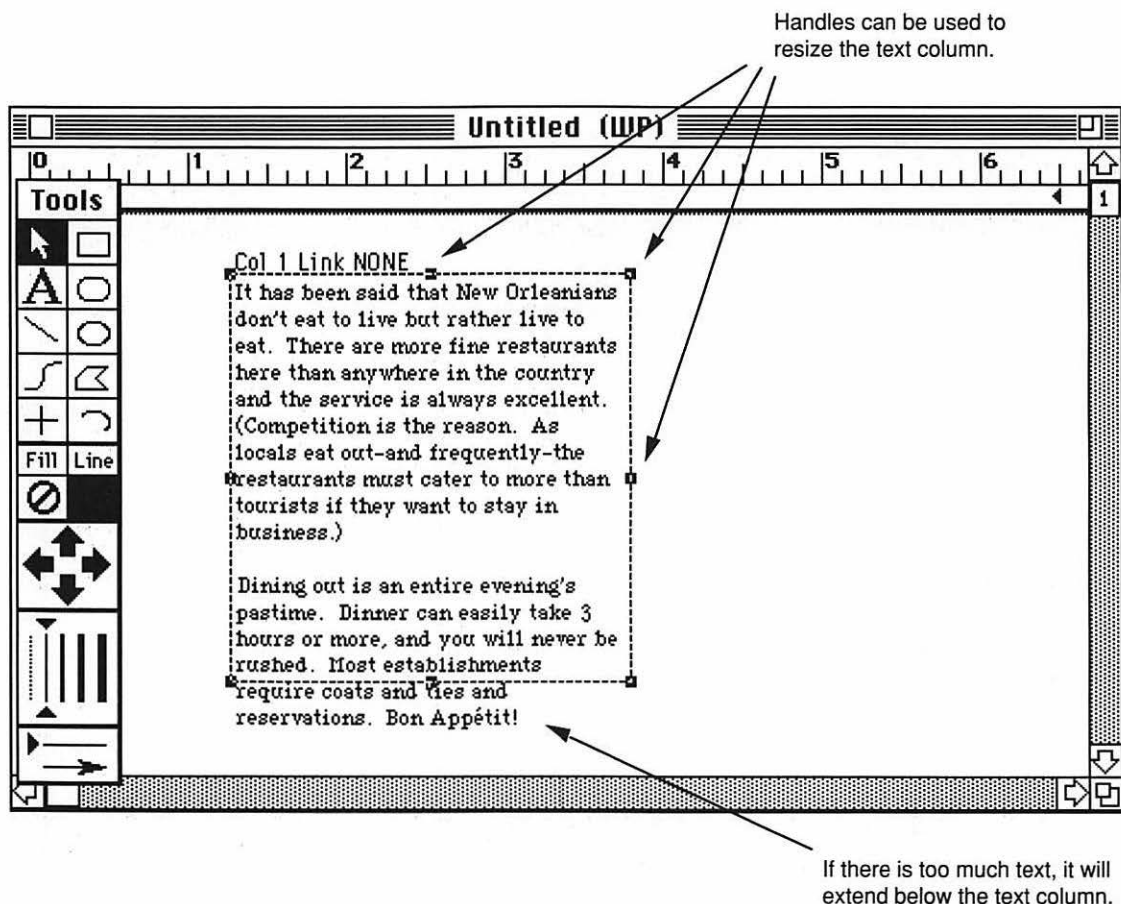


Figure 9.2. Entering Text into Text Column

2. With the Pointer Tool, click on a handle and drag to resize the text column. (See Figure 3.5 and Section 3.1.3 to review sizing an object.)
3. The text will automatically fill the resized column.

Sometimes there is no additional room on the page to resize the column and/or no text can be deleted. But if the point size of the letters is changed, more text will fit into the column.

1. Using the Pointer Tool, select the text column.
2. Choose the Size command from the Format menu. The Size submenu will appear on the screen.
3. Choose the desired text size from the submenu.

The font, style, and justification of text can also determine the amount that will fit into a column. These options can be changed in the same way as you altered the text size.

Helpful Hint: Text pasted into a text column from the Clipboard will have the same font, size, and style of the text in the source document. It will, however, take on the justification of the text column once it is pasted. To force the pasted text to conform to the text column's properties, hold down the Option key while pasting the text from the Clipboard.

9.1.2 Flowing Text: Linking Columns

Another way of dealing with more text than a column can hold is to create a second text column and flow the text from the first column to the second. Newspapers do this frequently to continue articles onto other pages. In Works you must create two or more columns and then link them. The columns do not have to be adjacent or even on the same page. However, they must be in the same document. To flow text into additional columns, follow these steps.

1. Create two or more columns using the procedure outlined in the last section.
2. Choose the Pointer Tool from the Tool Box.
3. Hold down the Option key while selecting each text column in the order that the text is to be flowed. The column headings will indicate the links. If there is sufficient text, it will flow into the columns (see Figure 9.3).

9.1.3 All the News That Fits Will Print (A Newsletter Example)

To learn the techniques of desktop publishing, in this chapter you'll design and print a newsletter describing some of the many

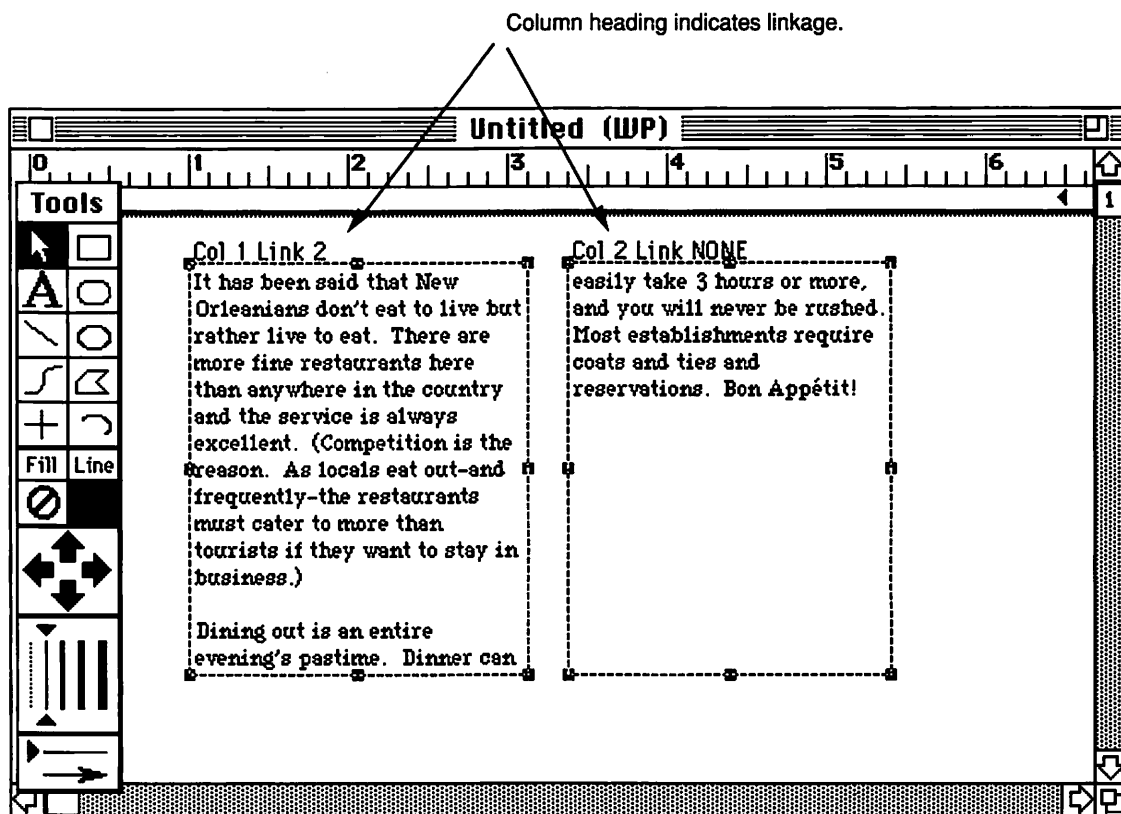


Figure 9.3. Linking Text Columns

restaurants in New Orleans. The diskette that came with this book contains two files titled *New Orleans Text* and *New Orleans Art*. They contain an article and artwork you'll use in preparing the newsletter. If you are curious about how the completed newsletter will appear, look ahead to Figure 9.10.

Helpful Hint: If you do not have handy the diskette that came with this book, the text for the article appears in Figure 9.4. Open a new word-processing document, enter the text, and save the document as *New Orleans Text*. The text must be in the New York font with a size of 9 points for your newsletter to match the figures in the remainder of this chapter.

The first task in designing your New Orleans restaurant guide is to create several text columns, link them, and paste the desired text into the columns. The remaining sections of this chapter will use the restaurant guide to demonstrate how to add borders,

It has been said that New Orleanians don't eat to live but rather live to eat. There are more fine restaurants here than anywhere in the country and the service is always excellent. (Competition is the reason. As locals eat out—and frequently—the restaurants must cater to more than tourists if they want to stay in business.)

Dining out is an entire evening's pastime. Dinner can easily take 3 hours or more, and you will never be rushed. Most establishments require coats and ties and reservations. Bon Appétit!

[About the ratings: * is poor; ***** is excellent; \$ is cheap; \$\$ is moderate; and \$\$\$ is expensive.]

***** Andrea's. If you like Northern Italian food (it always reminds me of San Francisco), Andrea's is the place for you. It has been awarded five stars by many of the world's best food critics. If you ask Roberto, the Maître d' and co-owner, for a bottle of peach champagne, he will be sure to give you a good table and great service. \$\$\$

**** Brightson's. This excellent Uptown restaurant is owned by the understudy of Paul Prudhomme. I think he's surpassed his mentor. \$\$\$

** Cafe Du Monde. This French Quarter coffeehouse is located across from Jackson Square. It is famous for beignets, New Orleans-style doughnuts. Great for late-night sobering up in the Quarter. \$

** Camellia Grill. This famous grill is right out of the 40s. No tables here, only counter service. They also serve no liquor. But the food is great . . . sandwiches, burgers, fries, onion rings, homemade pies, and chocolate freezes. This is one of many late-night spots frequented by locals. No reservations are taken: expect to wait at any time, day or night. Easily reached via the St. Charles streetcar. \$

** Central Grocery. If you like sandwiches, try the Central Grocery, home of the muffaletta. Hard to describe, the muffaletta is very Italian. Central Grocery has been operated by the same family for over 100 years and is located across from the French Market. Take-out only. \$

***** Commander's Palace. One of the most famous Creole restaurants in New Orleans, Commander's has a big local following. The food is always good, the service excellent, and the rooms crowded. Be sure to make a reservation. \$\$\$

**** Mr. B's. There are lots of French Quarter restaurants, but Mr. B's is one of my favorites. Try the duck! \$\$\$

Figure 9.4. Example Newsletter Article

drawings, and headlines and how to print out the final product on a laser printer. The detailed steps that follow will guide you through the first part.

1. Create a new word-processing document.
2. Press the Return key repeatedly until a dashed line appears, indicating the end of the page (see Figure 9.5). As our newsletter is one page long and will be designed entirely with the Draw Tools, it is necessary to fill the page with blank lines. For a four-page document, you would fill four pages with blank lines.

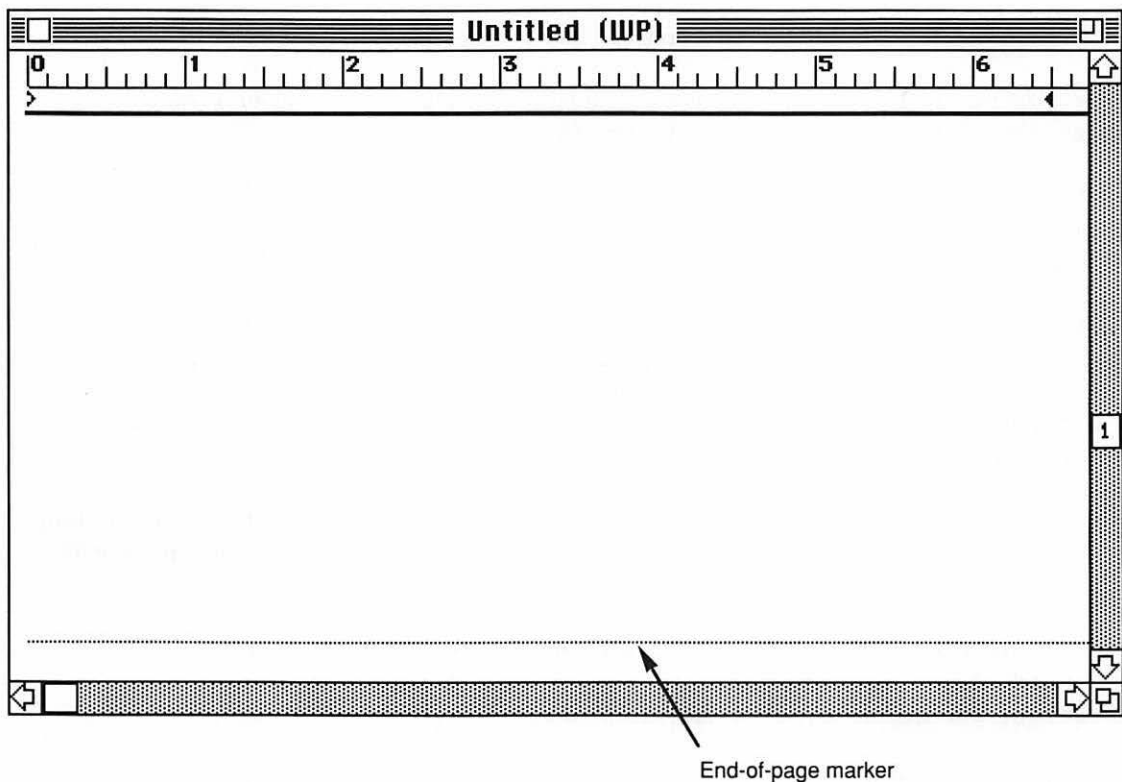


Figure 9.5. End-of-Page Marker

3. Scroll the window to the top of the page. Choose Draw On from the Edit menu. The drawing Tool Box will appear on the screen. Select the Text Tool.

4. Create a text column starting approximately 2 inches from the top and extending to the end-of-page marker by holding down the Option key while clicking and dragging the cursor. The text column should begin at the left margin (0 on the ruler) and end at the 3 1/8-inch mark on the ruler. If you do not draw the text column to the correct size on the first try, select the Pointer Tool, select the text column, and drag at its handles to get it to the correct size and location.
5. Create a second text column adjacent to the first. Column 2 should begin approximately at the 3 3/8-inch mark on the ruler and extend to the right margin (at 6 1/2 inches.) The top of Column 2 should be aligned with the top of Column 1, but it should only extend down 2 1/2 inches. This will leave room for a drawing.
6. Create a third text column about 2 inches below Column 2. It should be the same width and extend to the end-of-page marker.
7. Link all three columns. Holding down the Option key, click on Column 1, Column 2, and then Column 3. Your page should resemble Figure 9.6.
8. Choose the Open command in the File menu. Select the file titled *New Orleans Text*.
9. Choose Select All from the Edit menu. The text will be highlighted. Choose Copy from the Edit menu. Bring the restaurant guide window into view by choosing Untitled (WP) from the Window menu.
10. Select the Text Tool and click inside Column 1. A cursor should blink in the upper left-hand corner of Column 1. Choose Paste from the Edit menu. The text will appear in Column 1. Select the Pointer Tool and the text will flow into Column 2 and Column 3.
11. Using the Pointer Tool, adjust with the handles until the text in your columns looks like Figure 9.7.

If this process seems somewhat tedious, remember that Works is not a true DTP program. This process is much easier in a program such as PageMaker.

Helpful Hint: If you wish to remove from view the dashed lines around the text columns, choose Show Column Boxes from the Format menu. This will give you a better idea of what the printed page will look like.

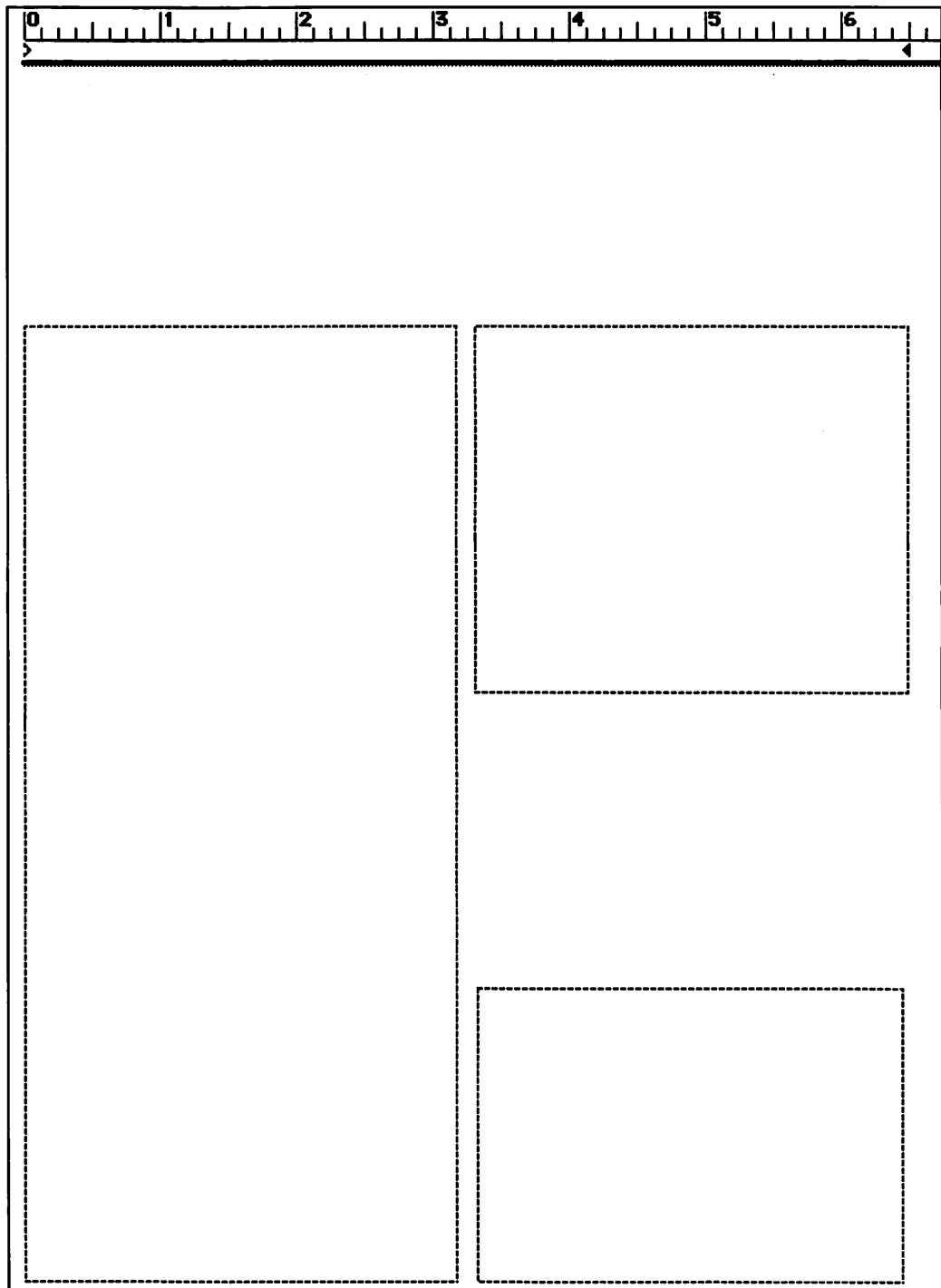


Figure 9.6. Restaurant Guide Text Columns

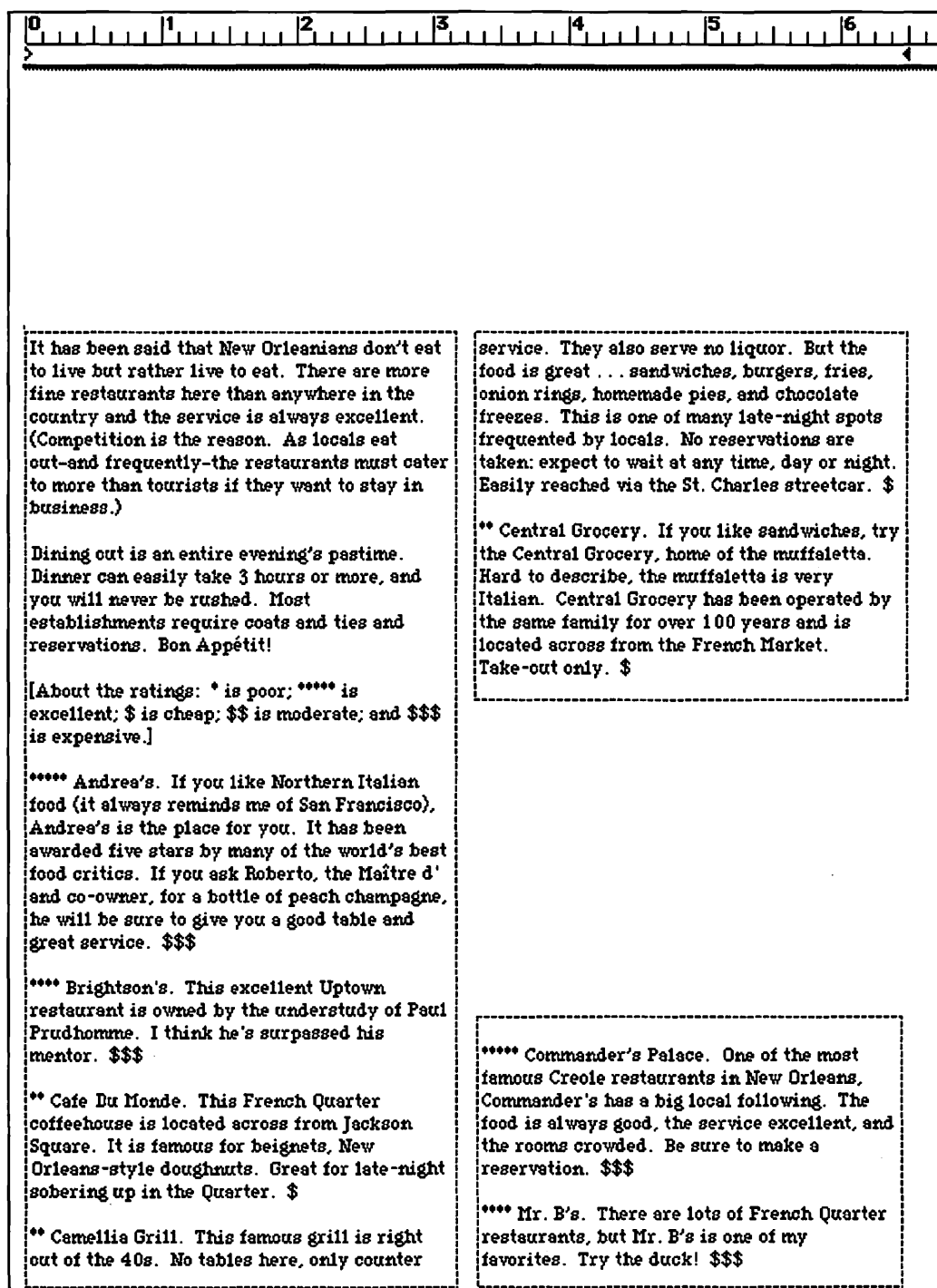


Figure 9.7. Restaurant Guide with Text Flowed into Linked Columns

9.2 ADDING GRAPHICS

One way that graphic artists make an impact with a printed page is to use large text, borders, lines, boxes, shading, pictures, and drawings. It is amazing what a single drawing or a shaded column of text will do for an otherwise plain page of text. The location of the graphics and the use of areas devoid of text or graphics, called **white space**, also contribute to the impact of the page. If you want more information on page layout and designing effective pages, many helpful books on the topic are available in the Computers section of most bookstores.

9.2.1 Heads, Borders, Boxes, Rules, and Shading

The Tool Box provides the tools necessary to create heads, borders, boxes, and rules (or lines). Chapter 3 contains detailed instructions on using each of the Draw Tools. Heads or headlines can be added to the page using the Text Tool to create text objects. Once the head is typed in, the size, font, style, and justification of the text can be set. The head can be resized, repositioned, or otherwise edited until it looks on the screen the way you want it to look on paper.

A variety of options is available to the desktop publisher. A simple box drawn around text or another object will set it off from the rest of the page. A box made up of two rules—one bolder than the other—is even more effective. Try using rounded corners or drawing a box around the entire page. Vertical rules between columns separate the text, making it easier to read.

Shading can be accomplished in two ways. Select a text column using the Pointer Tool. Choose the desired shading from the Fill Pattern menu. The text in the text column will be printed on a shaded background. A second method to shade a portion of the text in a text column (a single paragraph, for instance) uses the Rectangle Tool. Draw a rectangle around the paragraph to be shaded. Choose the desired shading from the Fill Pattern menu and the desired border from the Line Pattern menu. Finally, choose Send to Back from the Format menu to place the shaded box behind the text. For fun, try all these features of Works after creating a new document. Figure 9.8 shows some ideas for special effects using the Draw Tools.

The following instructions will add a head, several lines, and a box to the design of your restaurant guide.

1. Select the Text Tool from the Tool Box. Choose New York from the Font submenu. Choose 24 Point from the Size submenu.

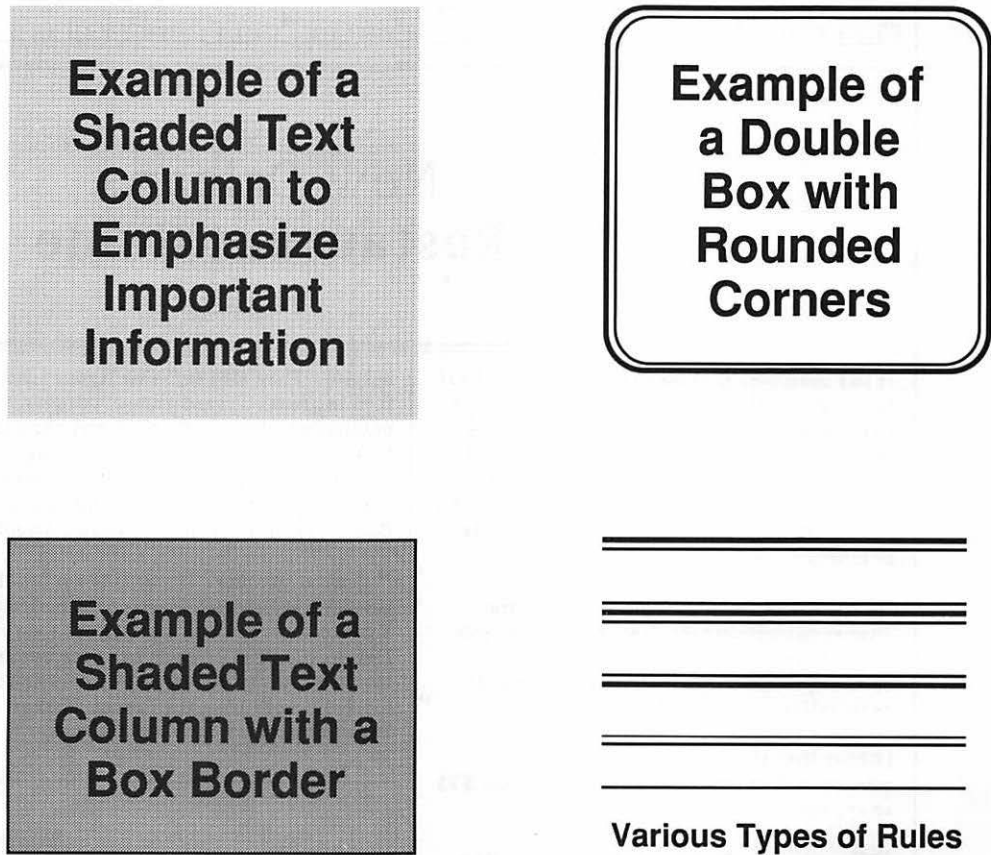


Figure 9.8. Borders, Boxes, Rules, and Shading

Choose Center from the Justification submenu. Click the Text Tool at the top center of the page. Type *New Orleans* and press the Return key. Type *Restaurant Guide*. Select the Pointer Tool and position the head to match to Figure 9.9.

2. Select the Straight Line Tool and draw a vertical rule between the left and right columns. Use the smallest line thickness and draw the line the full length of Column 1.
3. Again using the Straight Line Tool, draw a line from the left to the right margin just above Column 1 and Column 2. Above this draw a second line, slightly thicker than the first.
4. Select the Rectangle Tool and the smallest line thickness. Draw a rectangle in the empty space between Columns 2 and 3. You will place a drawing in this location later. Again, compare your page with Figure 9.9.

0	1	2	3	4	5	6
<h2 style="text-align: center;">New Orleans Restaurant Guide</h2>						
<p>It has been said that New Orleanians don't eat to live but rather live to eat. There are more fine restaurants here than anywhere in the country and the service is always excellent. (Competition is the reason. As locals eat out-and frequently-the restaurants must cater to more than tourists if they want to stay in business.)</p> <p>Dining out is an entire evening's pastime. Dinner can easily take 3 hours or more, and you will never be rushed. Most establishments require coats and ties and reservations. Bon Appétit!</p> <p>[About the ratings: * is poor; ***** is excellent; \$ is cheap; \$\$ is moderate; and \$\$\$ is expensive.]</p> <p>***** Andrea's. If you like Northern Italian food (it always reminds me of San Francisco), Andrea's is the place for you. It has been awarded five stars by many of the world's best food critics. If you ask Roberto, the Maître d' and co-owner, for a bottle of peach champagne, he will be sure to give you a good table and great service. \$\$\$</p> <p>**** Brightson's. This excellent Uptown restaurant is owned by the understudy of Paul Prudhomme. I think he's surpassed his mentor. \$\$\$</p> <p>** Cafe Du Monde. This French Quarter coffeehouse is located across from Jackson Square. It is famous for beignets, New Orleans-style doughnuts. Great for late-night sobering up in the Quarter. \$</p> <p>** Camellia Grill. This famous grill is right out of the 40s. No tables here, only counter</p> <p>service. They also serve no liquor. But the food is great . . . sandwiches, burgers, fries, onion rings, homemade pies, and chocolate freezes. This is one of many late-night spots frequented by locals. No reservations are taken: expect to wait at any time, day or night. Easily reached via the St. Charles streetcar. \$</p> <p>** Central Grocery. If you like sandwiches, try the Central Grocery, home of the muffaletta. Hard to describe, the muffaletta is very Italian. Central Grocery has been operated by the same family for over 100 years and is located across from the French Market. Take-out only. \$</p> <div style="border: 1px solid black; height: 150px; width: 100%;"></div> <p>***** Commander's Palace. One of the most famous Creole restaurants in New Orleans, Commander's has a big local following. The food is always good, the service excellent, and the rooms crowded. Be sure to make a reservation. \$\$\$</p> <p>**** Mr. B's. There are lots of French Quarter restaurants, but Mr. B's is one of my favorites. Try the duck! \$\$\$</p>						

Figure 9.9. Restaurant Guide with Head, Rules, and Box Added

9.2.2 Pictures and Drawings

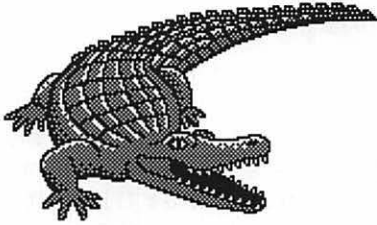
Photographs and illustrations make text interesting and improve comprehension. However, the Macintosh user is not limited to the draw features of Works to illustrate a document. The Mac has the ability to copy illustrations from a large number of draw and paint programs and paste them into Works or other DTP software packages. In addition to do-it-yourself graphics packages, ready-made commercial art is available on diskettes. These **clip art** disks contain a variety of illustrations for typical newsletter applications. To use the clip art diskettes, you will need a paint program like MacPaint or SuperPaint. The clip art is usually saved on the diskette in MacPaint files. The files can be opened and the art selected, copied to the Clipboard, and pasted into your Works word processor document.

Photographs can also be added to Works documents, using special hardware and software. An **optical scanner** is a device that converts a drawing or photograph into dots corresponding to the resolution of the Macintosh screen or laser printer. Photographs can thus be scanned and saved on diskette. Once saved, the **digitized** photograph can be added to your document in the same manner as clip art.

On the diskette that came with this book is a clip art file titled *New Orleans Art*. Two clip art drawings have previously been transferred from a MacPaint file to a Works file so that they can be used in the restaurant guide. Follow the steps below to add the illustrations.

1. Choose Open from the File menu. Select the *New Orleans Art* file.
2. Choose Draw On from the Edit menu. Select the Pointer Tool.
3. Click on the alligator drawing. Choose Copy from the Edit menu.
4. Bring the restaurant guide window into view using the Window menu.
5. Choose Paste from the Edit menu. The alligator will appear on the screen. Drag the drawing to its desired location (see Figure 9.10).
6. Repeat Steps 1 through 5, copying the saxophone drawing from the same file into your restaurant guide. Refer to Figure 9.10 for positioning.

Helpful Hint: Illustrations can easily be adjusted to fit the available space. Using the Pointer Tool, click on and drag any of the illustration's handles.



New Orleans Restaurant Guide

It has been said that New Orleanians don't eat to live but rather live to eat. There are more fine restaurants here than anywhere in the country and the service is always excellent. (Competition is the reason. As locals eat out—and frequently—the restaurants must cater to more than tourists if they want to stay in business.)

Dining out is an entire evening's pastime. Dinner can easily take 3 hours or more, and you will never be rushed. Most establishments require coats and ties and reservations. Bon Appétit!

[About the ratings: * is poor; ***** is excellent; \$ is cheap; \$\$ is moderate; and \$\$\$ is expensive.]

***** Andrea's. If you like Northern Italian food (it always reminds me of San Francisco), Andrea's is the place for you. It has been awarded five stars by many of the world's best food critics. If you ask Roberto, the Maître d' and co-owner, for a bottle of peach champagne, he will be sure to give you a good table and great service. \$\$\$

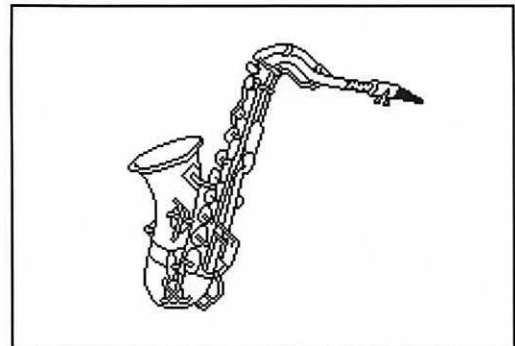
**** Brightson's. This excellent Uptown restaurant is owned by the understudy of Paul Prudhomme. I think he's surpassed his mentor. \$\$\$

** Cafe Du Monde. This French Quarter coffeehouse is located across from Jackson Square. It is famous for beignets, New Orleans-style doughnuts. Great for late-night sobering up in the Quarter. \$

** Camellia Grill. This famous grill is right out of the 40s. No tables here, only counter

service. They also serve no liquor. But the food is great . . . sandwiches, burgers, fries, onion rings, homemade pies, and chocolate freezes. This is one of many late-night spots frequented by locals. No reservations are taken: expect to wait at any time, day or night. Easily reached via the St. Charles streetcar. \$

** Central Grocery. If you like sandwiches, try the Central Grocery, home of the muffaletta. Hard to describe, the muffaletta is very Italian. Central Grocery has been operated by the same family for over 100 years and is located across from the French Market. Take-out only. \$



***** Commander's Palace. One of the most famous Creole restaurants in New Orleans, Commander's has a big local following. The food is always good, the service excellent, and the rooms crowded. Be sure to make a reservation. \$\$\$

**** Mr. B's. There are lots of French Quarter restaurants, but Mr. B's is one of my favorites. Try the duck! \$\$\$

Figure 9.10. Completed Restaurant Guide

9.3 LASER PRINTING

The Apple LaserWriter printer is commonly used in place of the ImageWriter printer for desktop publishing. The ImageWriter is a dot matrix printer that prints documents suitable for personal correspondence, internal documents, and schoolwork. The ImageWriter LQ printer is also a dot matrix printer, but it over-prints the image so that letter-quality text is produced. The LaserWriter contains a built-in Macintosh computer that controls a copy machine engine. The built-in computer converts the data sent to the printer from the user's Macintosh and creates an electrostatic image of each page on the printing drum with a laser. The drum picks up dry ink and transfers it to plain paper. The result is high-quality text and drawings resembling the output from expensive typesetting machines.

The ImageWriter and the Macintosh screen print with a resolution of 72 dots per inch. The LaserWriter prints 300 dots per inch, which is suitable for many publications. If higher quality is necessary, the Macintosh can interface with Linotronic® and Compugraphic® typesetters having resolutions of 1,240 to 2,740 dots per inch. Many typesetting services now offer high-resolution printing from a customer's Macintosh diskettes. Figure 9.11 compares the output from an ImageWriter and a LaserWriter.

This text was printed
on the Apple ImageWriter in
Geneva font.

This text was printed
on the Apple ImageWriter
in New York font.

**This text was printed
on the Apple LaserWriter
in Helvetica font.**

**This text was printed
on the Apple LaserWriter
in Times font.**

Figure 9.11. Comparison of ImageWriter and LaserWriter Printing

9.3.1 How to Use Laser Fonts

Two different types of fonts are used on the Macintosh: screen fonts and laser fonts. Thus far you have been exposed to screen fonts only. Screen fonts were designed for the 72-dots-per-inch resolution of both the Macintosh screen and ImageWriter printer. Consequently, they print with ragged edges on the higher-resolution LaserWriter. Common screen fonts are Chicago, Geneva, London, Monaco, New York, and Venice.

Laser fonts are designed to be used with Apple LaserWriter printers. The edges of these fonts print cleanly and crisply, even when they are blown up to very large sizes. They should be used when the best-quality printing is needed on the LaserWriter. Laser fonts should not be used on the ImageWriter, for the same reason that ImageWriter fonts should not be used on the LaserWriter—poor print quality.

There are two types of laser fonts: built-in and down-loaded. The built-in fonts are stored in ROM in the LaserWriter. Down-loaded fonts are stored on the Macintosh, an external hard disk, or a CD ROM (compact disc read-only memory) attached to the printer. A down-loaded font is transferred to the printer only when that font is needed. Common built-in laser fonts are Courier, Helvetica, New Century Schoolbook, Symbol, Times, and Zapf Chancery.

Laser fonts are used the same way as screen fonts. Choose the desired font from the Font submenu of the Format menu. What if there are no laser fonts in the submenu? Then the laser fonts have not been installed in the system folder of your start-up disk. You can do this by using the Font/DA Mover program found on the *Macintosh Utilities Disk 2* to copy the laser fonts into the system folder. Detailed instructions for this process can be found in the *Macintosh Utilities User's Guide* published by Apple Computer. The user's guide and utilities disk are shipped with every Macintosh.

Helpful Hint: A laser font and a screen font of the same size will have different character spacing. For this reason you should choose a laser font from the Font submenu *before* you enter the text, if you are preparing a word-processing document to be printed on a laser printer and want to see on the screen what you will get on the printer. If a laser font is not available in the Font submenu, the LaserWriter will substitute another laser font. This option is controlled by the Page Setup dialog box and will be described in the next section. If font substitution is selected, the laser font Helvetica is substituted for the screen font Geneva, Times for New York, and Courier for Monaco.

9.3.2 Printing on the Apple LaserWriter

Printing on the LaserWriter is similar to printing on the ImageWriter. The first step is to select the LaserWriter, using the Chooser desk accessory in the Apple menu. The next step is to choose Page Setup from the File menu. The LaserWriter Page Setup dialog box will appear.

At the top of the Page Setup dialog box (see Figure 9.12), you will find the Paper options. The most commonly used paper options are US Letter and US Legal. When you click on these options, the Paper Width and Paper Height will automatically be set for $8\frac{1}{2} \times 11$ inches and $8\frac{1}{2} \times 14$ inches, respectively. Tabloid is one-half the size of a standard newspaper page, or approximately 11×14 inches. A4 Letter and B5 Letter are international mail sizes that are rarely used.

The Orientation option allows you to print vertically or horizontally (this is called landscape on some computers) on the paper. The Reduce or Enlarge option allows you to enter a percentage of reduction or enlargement. At 50 percent your document prints at half its width and half its height (one-quarter of its normal size);

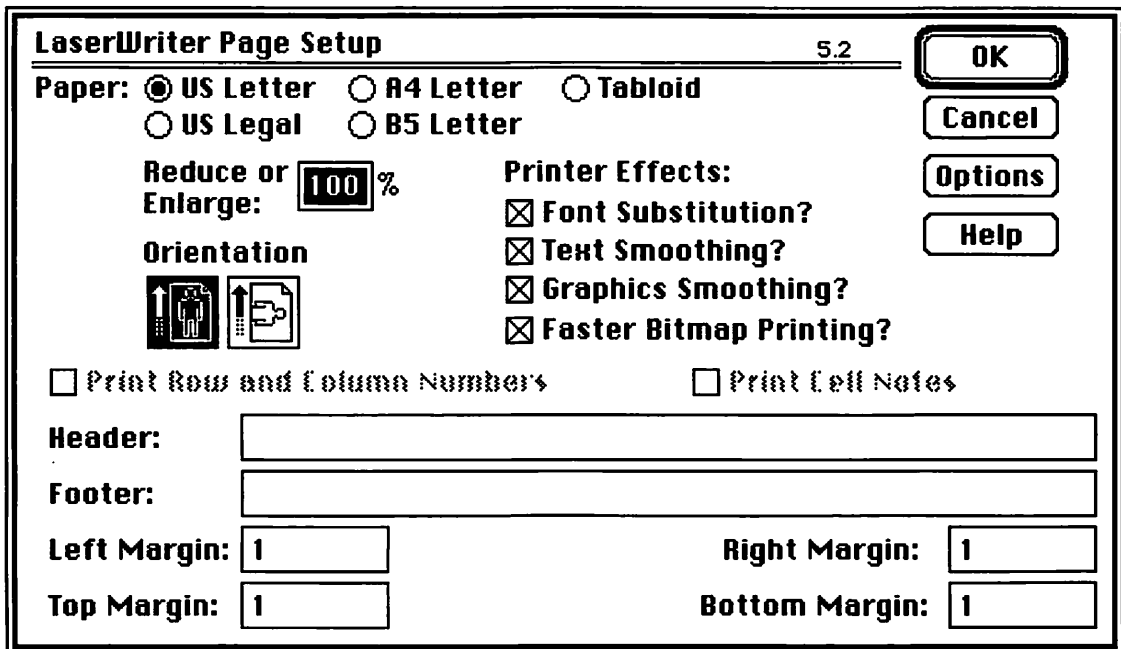


Figure 9.12. LaserWriter Page Setup Dialog Box

200 percent prints your document at twice its width and twice its height (four times its normal size). Same size is 100 percent.

The Printer Effects include Font Substitution, Text Smoothing, Graphics Smoothing, and Faster Bitmap Printing. Normally you will want to select all of these options. Clicking the Options button will display a dialog box with additional options such as Flip Horizontal, Flip Vertical, and Invert Image. The Help button will display a dialog box that explains the printer effects and the additional options.

The Header and Footer boxes are used to enter text that will be printed within the top (header) and bottom (footer) margin. These are normally used for the page number, document title, date, and so on. The text entered into the Header and Footer boxes will be printed on every page. Consequently, footers should not be used for footnotes. (Section 2.4.7 describes how to enter page numbers.)

At the bottom of the Page Setup dialog box are options for setting the printing margins. You can enter the left, right, top, and bottom margin distances in inches. Do not confuse them with the margins that you set in the ruler. These are the printer paper margins. If your left Page Setup margin is at 1 inch and your ruler left margin is at 0 inches, your text will be printed 1 inch from the left side of the paper. If your right Page Setup margin is at 1 inch, your right ruler margin should be set at 6 1/2 inches (1 inch left margin + 6 1/2 inches of text + 1 inch right margin = 8 1/2-inch paper width). The top and bottom margins will determine how many lines of text will be printed on the page.

To print a document on the LaserWriter, follow these steps.

1. Turn on the LaserWriter. After it has warmed up, a test page will be printed. You must wait until the test page is printed before continuing.
2. Select Print from the File menu. The LaserWriter printing dialog box (see Figure 9.13) should appear on the screen.

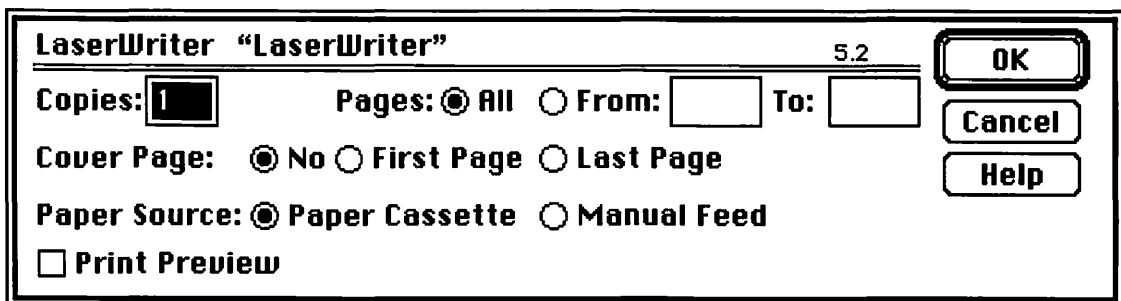


Figure 9.13. LaserWriter Print Dialog Box

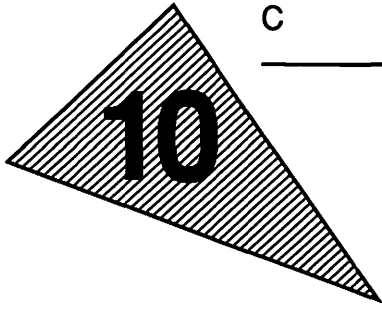
3. Enter the number of copies desired or a specific range of page numbers if you do not want to print the entire document.
4. Select either Paper Cassette or Manual Feed.
5. Point to and click on the OK button, and your document will be printed. If you wish to stop the printing, hold down the Command (⌘) key and simultaneously press the Period (.) key.

9.4 POSERS, PROBLEMS, AND PROJECTS

1. Print your New Orleans Restaurant Guide on a laser printer.
2. Art Klepp is the chief designer in Acme Paper Clip's art department. He has been asked to work with Sidney Celmour, the marketing director, to design and develop a catalog sheet that not only has a detailed drawing of Acme's new Super Clip but also describes its virtues.

Help out Art and Sidney by designing an advertisement for Acme's Super Clip. Use the Super Clip drawing that you saved in Section 3.3.1 and the Acme logo that you drew in Section 3.3.2. Write copy that convinces customers to buy the new Super Clip. Combine this material using the Works DTP features. Print the ad using a laser printer if one is available.

3. Using Works, develop a newsletter for a school, church, or community organization or for a business.



A SYSTEMS APPROACH TO MICROCOMPUTER PROBLEM SOLVING

"The trouble with not having a goal is that you can spend your life running up and down the field and never scoring."

—Bill Copeland

"It takes less time to do a thing right than to explain why you did it wrong."

—H. W. Longfellow

"Garbage in, garbage out."

—Anonymous

OBJECTIVES

When you've completed this chapter, you'll be able to do the following.

1. Identify the steps of a systems approach to the design of a microcomputer solution (Section 10.1)
2. Outline a rationale, a set of performance objectives, and a sequence of events for a microcomputer solution (Section 10.2)
3. Identify the developmental steps of the systems approach (Section 10.3)
4. Design and develop microcomputer solutions using Microsoft Works on the Macintosh and the information discussed in Chapters 1 through 9

10.1 WHAT ARE YOUR INTENTIONS?

The working knowledge of Microsoft Works and the Macintosh that you have gained in the previous chapters will take you only a small step toward using the computer as a productivity tool and actually employing microcomputer software to solve problems. In fact, problem solving using computer applications is often done by persons with no computing experience whatsoever! In these cases, the solution analysis (or design) is passed on to a computer expert (who often knows very little about the specific field) to develop a microcomputer software application. The chosen software and process are tested, refined, and eventually put to use in a real-life situation. Thus the key to the development of valid microcomputer solutions rests initially in their design.

The design-and-development process can be expedited if both designer and developer have more than a casual awareness of the other's area of expertise. In the past it was unusual for the designer and developer to be the same person, with expertise in both computers and a given application area. Very few people were highly proficient in software techniques and strategies. Likewise, few computer experts knew the intricacies of accounting, finance, banking, real estate, and so on. The wide acceptance and use of microcomputers is bringing about a gradual change, however. More and more students and workers are gaining computer literacy *in addition* to their area of expertise. This combined knowledge will increase the use of a medium for problem solving that literally is at our fingertips.

Design! If you're like most of us, you probably think you've never designed anything. But if you've ever wanted anything at all that you eventually created through your own efforts, you have in fact experienced the design process. The process is really common to most people, and it has a fringe benefit: It makes us think logically and creatively. That is, the procedure—from the identification of an objective to its attainment—breaks down into a series of steps.

10.1.1 The Systems Approach

One approach to using microcomputers for problem solving is to apply the process used in the overall development of computer software. Although this process is known by several names, and its steps may differ slightly among versions, it may be summarized in the following ten steps.

1. Statement of the rationale for use
2. Statement of the performance objectives
3. Definition of the sequence of events
4. Application software construction
5. Debugging
6. Pilot testing
7. Revision
8. Use in a real-life situation
9. Further revision
10. Evaluation

These steps comprise a process often called a systems approach to software design. But as it does involve logic, another name for it might be a commonsense approach to problem solving.

10.2 THE DESIGN PROCESS

The first three steps constitute the design stage, which will be discussed in this section. The next seven steps, the developmental stage, will be discussed in Section 10.3. Note that, though all these steps are important, the contents of each are determined solely by the specific problem requiring a microcomputer solution. In other words, the steps and general procedures for each can be outlined in this book, but the reason behind any given solution—what is done and how it is done—can only be determined by its designer. To illustrate how the systems approach can be used in problem solving, we'll develop an example using the Acme Paper Clip Company.

10.2.1 The Rationale

Assume you have a problem that you suspect might be solved by the design and development of microcomputer software. Can you explain why this problem should be solved in the first place? Can you explain why a microcomputer should be used? In other words, your rationale answers *why*: *Why* does the problem need solving, and *why* use a computer in the solution process? If either question cannot be answered, the design stage should be terminated.

10.2.2 Performance Objectives

To make sure you get to where you want to go, you must set objectives. Performance objectives should outline the prerequisites for a solution, what will comprise the solution itself, and,

specifically, what constitutes the successful completion of the solution. That is, what do you expect before, during, and after you use the microcomputer? What are the goals of the microcomputer application and how will you know when those goals are attained?

Here are some examples of performance objectives.

1. The application will merge a mailing list of up to 4,000 names with a letter. The salutation will use the first name ("Dear Mary"). The letters will be printed in ZIP code order and addressed appropriately for mailing in window envelopes.
2. The spreadsheet will compute an estimated monthly loan payment to within a .2 percent accuracy, based on the bank's mainframe computers.
3. Data will be collected from at least 98 percent of the stores and entered into the database application by 5:00 P.M. every Friday. Sales reports will be printed and distributed by 11:00 A.M. the following Monday.

10.2.3 The Sequence of Events

This design step is probably the most difficult. Obviously, the sequence of events is determined in part by the type of application (word processing, spreadsheet, database, communications, graphics, and so on) used. This in turn is determined by your rationale and objectives. Regardless of the type of application you've chosen, this step should include, at a minimum, answers to such questions as the following.

1. Is any process necessary prior to using the microcomputer? Is any material or information specifically related to the solution needed prior to using the microcomputer? If so, what is the process, who will perform it, when will it be completed, and what will it provide?
2. What data are required for the microcomputer application? Must the information be entered into the microcomputer in a specific order?
3. Will the information be reorganized once it's entered? What sorting criterion will be used?
4. Will all the information be used, or will selections be made? What selection criteria will be used?
5. What formatting options should be chosen? What font, style, size, and justification will be used? Are graphics to be included?
6. What printed reports will be generated and how will they be printed? Will a dot matrix or a laser printer be used? What type of paper will they print on?

7. How and where will the files be saved? Will the files be updated in the future? Will back-up copies be maintained?
8. What problems are anticipated? What are the contingency plans, should something go wrong?
9. Are multiple application programs needed? How will the data be integrated between the applications? In what order must the applications be executed?

Answers to these and perhaps many other questions, depending on the design, must be outlined on paper prior to translating the sequence into spreadsheet, database, or other computer applications.

Most importantly, as you design the application you must outline each sequential step necessary from the beginning to the end of the process. Think of the total sequence of events necessary to complete the process.

10.2.4 Designing a Solution for the Acme Paper Clip Company

Suppose the Acme Paper Clip Company needed to mail each stockholder notification of its quarterly dividend and wished to illustrate in the letter its percentage of the market share in 1990. Here's how the systems approach could be applied to design a solution to this problem.

Rationale. Acme Paper Clip Company, like all publicly owned companies, is required by federal law to notify stockholders of quarterly dividends. The advantage of using the computer in this process is that it can quickly print customized letters to each stockholder. With the aid of computer software, the letter can combine the required dividend notification with a pie chart showing the percentage of market share. This may encourage stockholders to purchase additional stock.

Performance Objectives. The microcomputer solution will merge a database of Acme's shareholders with a word-processing document containing the dividend notification and a pie chart showing the 1990 percentage of market share. The letters must be printed and mailed within the time limitations set by federal law.

Sequence of Events. The following sequence of events generally outlines the process necessary to solve Acme's problem. A written sequence of events can be as general as this one or more specific,

including instructions on how to accomplish each event. The level of detail will depend on the user's needs.

1. Up-to-date stockholder information, including name, street address, city, state, and ZIP code is obtained from the company's accountants.
2. A Microsoft Works database is designed and developed, using the five fields identified in Event 1.
3. The stockholder information is entered into the database and saved.
4. Data on the 1990 percentage of market share are entered into a Works spreadsheet and saved.
5. A letter is composed and typed using the Works word processor.
6. A pie chart is drawn based on the market share data in the spreadsheet.
7. The pie chart is copied from the spreadsheet application into the letter in the word processor.
8. The database is sorted into ZIP code order.
9. The name, street address, city, state, and ZIP code fields are added to the letter in the word processor using the Prepare to Merge command. These fields are aligned to show the address through a window envelope, so mailing labels needn't be generated.
10. Using the Print Merge command, the database is merged with the letter in the word processor printing a customized notification letter for each stockholder.
11. In ZIP code order, each letter is folded and inserted in envelopes so that the address shows through the window.
12. The letters are mailed.

10.3 THE DEVELOPMENTAL PROCESS

The design segment, the first three steps of the systems approach, is essentially a mental, paper-and-pencil process. Once the rationale, objectives, and sequence of events have been defined, the remaining developmental steps—the actual application of microcomputer software, debugging, testing, refinement, use, and evaluation—may be carried out.

The total process, from rationale to evaluation, for a microcomputer solution may require tens to hundreds of person hours. This would include the development of any accompanying training materials for the user's guidance. Of course, if an existing solution were used as a model and simply adapted to a user's specific needs, the time required for development would be significantly reduced.

10.3.1 Application Software Construction

Actually the next step is still a mental, paper-and-pencil process for the most part. It primarily involves translating the sequence of events into computer software such as spreadsheets, databases, and integrated documents. This is the first step in which some degree of computer expertise is required of the designer. Microcomputer software techniques and strategies must be used in transferring the design concepts from paper to microcomputer files. This may be as trivial as adapting a model spreadsheet or as involved and time-consuming as translating an original, detailed design into a comprehensive database.

10.3.2 Debugging

Even after the spreadsheet, database, or other application has been designed, the data entered, and the files saved, chances are that the solution will not work as expected. Problems, commonly called **bugs** in “computerese,” may emerge: anything from simple errors (misspelled words, syntax errors, and so on) to technical or conceptual errors (incorrect use of a formula, sorting on the wrong field, incorrect selection of criteria, and so on). **Debugging** (extermination of the errors) is then done until the software is satisfactory from the designer’s point of view.

10.3.3 Pilot Testing

Pilot testing the solution is the next step. Generally this is done with “dummy” data—or with colleagues’ and volunteers’ work, if persons other than the designer will use the software in real life. Ideally, the designer should literally look over their shoulders as others perform the process on the microcomputer, as it is a rare case in which something unanticipated does not occur. These problems may be as trivial as the user inadvertently typing a comma that the spreadsheet is not designed to handle. Alternatively, a major reworking of the conceptual and/or procedural strategy may be required. Of course, the main point of pilot testing is for the designer to get feedback about the solution.

10.3.4 Revision

The feedback provided during pilot testing frequently leads to revisions. These revisions are normally fairly minor: redefining the text format, making cosmetic improvements to the layout, and so

on. However, they could be as major as returning to the design stage for refinement of the process or, in extreme cases, discarding the application. (If the design steps are thought out carefully, this probably will not be necessary!) Note that the pilot testing and revision steps may be repeated several times prior to actually using the application.

10.3.5 Use in an Actual Situation and Further Revision

Using the microcomputer solution in a real-life situation may supplement a manual process, serve as a prerequisite to another microcomputer application, or comprise the only step left to a successful solution. Regardless of the application it is safest to anticipate continued minor revision of the materials, if for no other reason than that the number of users testing the software or seeing the output will have increased. In some applications, the software will never get to a point at which no additional revisions (however minor) are needed. Thus, use in real-life situations and revision are cyclical, continuing as long as the application is in use.

10.3.6 Evaluation

The evaluation of microcomputer solutions may be divided into two categories. The first is an analysis of objective attainment, to determine whether the defined objectives are indeed being met. This analysis varies depending on the design of the solution, but it is often based on preapplication and postapplication results. If negative results are obtained, a return to Step 1 of the systems approach may be appropriate.

The second evaluation is the analysis of the concept of using the microcomputer and the software. Did this approach prove suitable in solving the problem? This question is answered in part by the analysis of objective attainment. Further evaluation may be based on customer or employee feedback through attitudinal questionnaires, overall software performance, and the designer's own observation and intuition.

Note: In general, the success or failure of any given microcomputer solution rests heavily on the first three design steps: the importance of thoughtful design merits emphasis one last time. If the rationale, objectives, and sequence of events are very carefully defined, the likelihood of a successful solution is greatly increased. In other words, think it through, folks!

10.3.7 The Developmental Process for Acme's Stockholder Letter

To achieve a solution to Acme's need to notify stockholders, follow the developmental process of the systems approach by completing the stages outlined here. Little benefit will be gained from just reading the material that follows. Actually completing the project on the computer will help you understand the process and let you practice the skills you learned in previous chapters.

Application Software Construction. Using the sequence of events detailed in Section 10.2.4, design and develop the Acme stockholder database, the notification letter, the market share spreadsheet, and the pie chart. Sample stockholder data are provided in Figure 10.1. The text for the notification letter appears in Figure 10.2. The data

Acme's Stockholders (DB)					
Name	Street Address	City	State	Zip	
Robert Morris	8820 Edinburgh St.	Cupertino	CA	95014	
Daniel Noble	111 Veterans Blvd.	Washington	DC	20036	
Mary Pearson	6050 Curran Dr.	Boston	MA	02167	
Carrie Potter	393 Bellaire Dr.	Buffalo	NY	14208	
Tommy Rosen	6919 Colbert St.	Omaha	NE	68178	
Stacie Sanford	1901 Perdido Way	Spokane	WA	99258	
Cheryl Kitt	5004 Tartan Dr.	Baltimore	MD	21210	
Leonard Hughes	3717 Cypress Ave.	Los Angeles	CA	90045	
Curtis Green	1830 Franklin Ave.	Chicago	IL	60626	
Olga Fletcher	112 27th St.	Denver	CO	80221	
John Vincent	111 Mark Twain Dr.	Santa Clara	CA	95053	
Tiffany Duran	407 Josephine Way	Mobile	AL	36608	
Scott Davis	3618 Nashville Ave.	Philadelphia	PA	19131	
Lisa Cherry	816 Sumner Ave.	Detroit	MI	48221	
Grace Becker	2008 Kentucky Pkwy.	San Francisco	CA	94117	
Carl Waddell	217 Dodge Ct.	Scranton	PA	18510	
Brenda Stein	5510 Holly Lane	Wheeling	WV	26007	
Sidney Schwartz	2016 2nd Ave.	Cincinnati	OH	45207	
Jerry Robertson	8021 Buffalo Dr.	Jersey City	NJ	07306	
Iris Phillips	220 9th St.	Kansas City	MO	64110	

Figure 10.1. Acme's Stockholder Database

June 1, 1991

Dear Stockholder:

I am pleased to announce that the Acme Paper Clip Company is issuing a dividend of \$1.23 per share for the first quarter of 1991. This is a 230 percent increase over the dividend for the same quarter in 1990. I attribute our increase in profits to an increase in the market share. The following chart depicts Acme's percentage of market share in 1990.

I also wish to point out that we have recently introduced a new Kevlar unbreakable paper clip. If our marketing efforts are successful for this product, I am sure that we will achieve an even larger share of the market.

Yours truly,

Emily Acme
President

Figure 10.2. Text for Acme's Stockholder Letter

for the spreadsheet appear in Section 4.6, Problem 4, and help in producing the pie chart can be found in Section 5.2, Problem 2. The completed stockholder letter should resemble Figure 10.3.

Debugging. As you design and enter the letter, database, and spreadsheet, correct your errors. After the files are complete, check again for errors and make any necessary corrections.

Pilot Testing. Having completed Steps 1 through 9 in the sequence of events, you can now pilot test Step 10, the Print Merge process.

Acme Paper Clip Company

123 Main Street
Los Angeles, California 90001

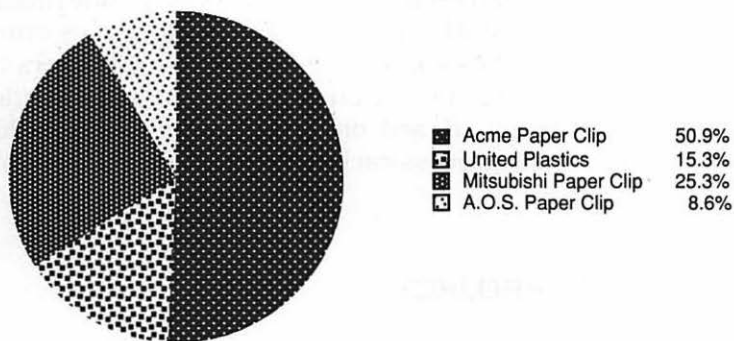
June 1, 1991

Robert Morris
8820 Edinburgh St.
Cupertino, CA 95014

Dear Stockholder:

I am pleased to announce that the Acme Paper Clip Company is issuing a dividend of \$1.23 per share for the first quarter of 1991. This is a 230 percent increase over the dividend for the same quarter in 1990. I attribute our increase in profits to an increase in the market share. The following chart depicts Acme's percentage of market share in 1990.

1990 Percentage of Market Share



I also wish to point out that we have recently introduced a new Kevlar unbreakable paper clip. If our marketing efforts are as successful for this product, I am sure that we will achieve an even larger share of the market.

Yours truly,

Emily Acme
President

Figure 10.3. Acme's Stockholder Letter

Choose the Print Preview option in the Print dialog box and review the merge operation on the screen. Test your printer by using the Print (not the Print Merge) command. A single letter will be printed rather than one for every entry in the database. Better yet, do a Record Selection just for the stockholders who live in California. Use the Print Merge command to test the process.

Revision. If any errors are discovered during pilot testing, make the necessary revision and pilot test again.

Use in a Real-life Situation. With the software construction, debugging, testing, and revision completed, use the Print Merge command and print out a letter for each of Acme's Stockholders. (For this example, you can skip Steps 11 and 12.)

Further Revision. If any other errors are noted, revise and Print Merge again.

Evaluation. Ask yourself the following questions. Were the defined objectives attained? Was the notification letter successfully generated? Was it completed on time? Did stockholders buy more stock? Did using the Macintosh and Microsoft Works prove suitable in solving the problem? As you can see, though the answers to some of these questions may be obvious, others may require additional research and testing. Based on your evaluation, should Acme continue to use this process each quarter to notify stockholders?

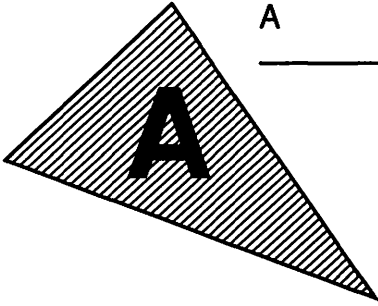
10.4 A FINAL PROJECT

As a final project, demonstrate your skills in using the Macintosh and Microsoft Works to provide a solution to a real problem. Identify a problem in an area of interest to you. It could relate to another college course, to your hobby, to your job or profession, or to your favorite charity, community group, or church. Whatever the problem, you will learn more if its solution has some practical value to you.

Design and develop an application that integrates at least three of the Works features (word processing, spreadsheet, database, communications, graphics, and desktop publishing).

- Outline on paper the rationale, performance objectives, and sequence of events.

- Follow the developmental steps: construct the software, debug it, pilot test it, revise it, use it in an actual situation, and revise it further.
- Evaluate on paper the success of applying Works and the Macintosh to the solution of your problem.



SUMMARY OF WORD PROCESSOR COMMANDS

A.1 THE FILE MENU

File	
New...	
Open...	⌘O
<hr/>	
Close	⌘W
Close All...	
Save	⌘S
Save As...	
Delete...	
<hr/>	
Make Works Desktop...	
<hr/>	
Page Setup...	
Print...	⌘P
Print Window	
Eject Page	
Print Merge...	
<hr/>	
Quit	⌘Q

New...

Creates a New file of any Works application type. A dialog box lets you select word-processing, database, spreadsheet, or communications files.

Open...

Opens an existing word-processing file to be edited or added to. A dialog box lets you select files and disks.

Close

Closes the active file window. If the file has been changed but not saved, a warning and an option for saving the file will appear in a dialog box.

Close All...

Closes all the file windows. For each file that has been changed but not saved, a warning and an option for saving the file will appear in a dialog box.

Save

Saves the active file window. If the file is untitled, a dialog box requires that a file name be entered and provides options for changing disks. If the file has been named previously, the edited file will be saved over the original file with the same file name.

Save As...

Saves an edited file with a new file name. The original file is kept intact. A dialog box allows you to enter the new file name and change disks.

Delete...

Deletes a file. A dialog box lets you select files and disks. This function is identical to dragging the file icon into the trash and emptying the trash from the Macintosh desktop.

Make Works Desktop...

Creates a Works desktop file that contains a list of all files currently open on the desktop. When this desktop file is opened, all the Works files will be opened automatically. A dialog box lets you enter a file name and change disks.

Page Setup...

Lets you define the page setup parameters, including paper type, paper orientation, header, footer, and margins. Options vary depending on the printer selected from the Chooser desk accessory.

Print...

Prints the document in the active window on the printer selected from the Chooser desk accessory. A dialog box provides options, including number of copies, range of page numbers, manual feed, and print preview.

Print Window

Prints the visible contents of the active window on the printer selected from the Chooser desk accessory.

Eject Page

Issues a form feed command to the printer, ejecting a page.

Print Merge...

Merges fields from a Works database with a Works word-processing file. The fields to be merged must be defined using the Prepare to Merge command in the Edit menu. A document will be printed for every record selected in the database. This is used to print form letters, mailing labels, and other reports.

Quit

Stops Works, closes all files, and returns to the Macintosh desktop. For each file that has been changed but not saved, a warning and an option for saving the file will appear in a dialog box.

A.2 THE EDIT MENU

Edit	
Undo	⌘Z
<hr/>	
Cut	⌘H
Copy	⌘C
Paste	⌘V
Clear	
Select All	
<hr/>	
Draw On	⌘J
<hr/>	
Prepare to Merge...	⌘M
Show Field Names	
Multiple Labels	

Undo

Undoes the action of the previous command. It is used to reverse mistakes but can only undo one command. Multiple commands or mouse movements cannot be undone.

Cut

Removes the highlighted text or drawing from the document and places it on the Clipboard. The text or drawing can later be pasted into another location in the same document or into another document.

Copy

Copies the highlighted text or drawing from the document and places it on the Clipboard. The original text or drawing remains in the document. The text or drawing on the Clipboard can later be pasted into another location in the same document or into another document.

Paste

Copies the text or drawing on the Clipboard into the document at the location of the cursor. The text or drawing on the Clipboard is not erased and can be pasted again.

Clear

Erases the highlighted text or drawing from the document. The text or drawing is *not* copied to the Clipboard.

Select All

Highlights the entire document providing a shortcut for changing the font or other characteristics.

Draw On—Draw Off

Turns on the draw mode, with which you can add lines, boxes, shading, and other graphics to the document. Draw On displays the Draw Tool box. Draw Off turns off the draw mode and returns to text mode (see Appendix B for details).

Prepare to Merge...

Defines database fields to be merged with the word-processing document. A dialog box lists the databases available on the desktop and the fields that can be merged. A database field selected in the dialog box will be inserted at the location of the cursor. The Print Merge command in the File menu will merge the database information into the document for printing.

Show Field Names—Show Field Data

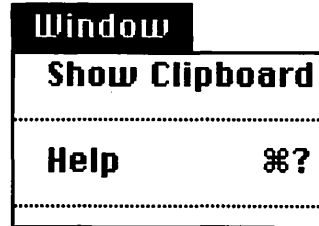
Displays the database field names of the merged fields in the word-processing window. Show Field Data displays the actual data contained in the database fields.

Multiple Labels

Allows data from more than one record in a database to be merged

on a single page of a word-processing document. This is useful in printing mailing labels and lists of information.

A.3 THE WINDOW MENU



Show Clipboard—Hide Clipboard

Displays the current contents of the Clipboard in a window on the screen. Hide Clipboard will close the Clipboard window.

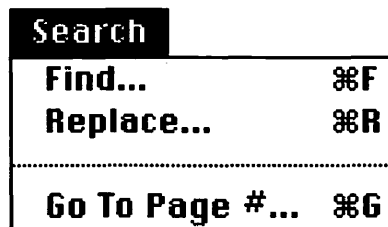
Help

Opens the Help window, which can be scrolled to get information on the various Works commands. The cursor will change to a question mark (?). Selecting a menu command with this cursor will scroll the Help window to information on that command.

Open File Windows

Shows a list of every open file below the Help command. Choosing a file window from this list will make that window active and bring it to the front.

A.4 THE SEARCH MENU



Find...

Locates text anywhere in the document. A dialog box lets you enter a search string and choose among search options.

Replace...

Locates selected text anywhere in the document and replaces it with new text. A dialog box lets you enter search strings and

replacement strings and choose replacement options. One option replaces all occurrences of the text string automatically, in the entire file. Another option replaces the text only when it is confirmed manually.

Go to Page #...

Scrolls the active window automatically to the page number specified in the associated dialog box.

A.5 THE FORMAT MENU

Format	
Hide Ruler	
<hr/>	
Font	▶
Size	▶
Style	▶
Color	▶
<hr/>	
Copy Format	⌘K
Paste Format	⌘Y
<hr/>	
Justification	▶
Spacing	▶
<hr/>	
Insert Page Break	
Title Page	
Set Page # ...	

Hide Ruler—Show Ruler

Hides the ruler at the top of the word processor window from view. Show Ruler returns the ruler to view. The ruler settings are not affected.

Font

Displays a submenu listing the fonts (typefaces) available. Choosing a font from the submenu will select that font for the text. Additional fonts can be added using the Font/DA Mover program on the Macintosh Utilities Disk.

9 Point
10 Point
12 Point
14 Point
18 Point
20 Point
24 Point
Other...

Size

Displays a submenu listing the font sizes available. Choosing a size from the submenu will select that size for the text. Sizes appearing in outline (12) will print best on the screen and the ImageWriter printer. Sizes are listed in points (72 points = 1 inch). The Other option provides for sizes other than those listed in the submenu.

Normal
Bold
Italic
Underline
Outline
Shadow

Style

Displays a submenu listing the font styles available: Normal, Bold, Italic, Underline, Outline, Shadow, Superscript, and Subscript. Choosing a style from the submenu will select that style for the text.

Black
White
Red
Green
Blue
Cyan
Magenta
Yellow

Color

Displays a submenu listing the colors available. Choosing a color from the submenu will select that color for the text on the screen.

Copy Format

Copies the format (ruler settings) to a special format clipboard. The format copied will be the format for the line on which the cursor is located. This action will not affect the contents of the regular Clipboard.

Paste Format

Pastes the format (ruler settings) from the format clipboard to the line on which the cursor is located. This action changes the existing format to the one on the format clipboard. A format can be changed on several adjacent lines simultaneously by highlighting the text with the mouse and then pasting the format.

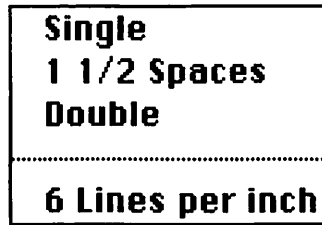
Left
Center
Right
Justified

Justification

Displays a submenu listing the justification options. Choosing a justification from the submenu will select that justification for the text. Left aligns the text on the left margin. Center centers the text within the margins. Right aligns the text on the right margin. Justified fills the text between the margins, aligning both left and right margins.

Spacing

Displays a submenu listing the spacing options. Choosing a spacing from the submenu will select that spacing for the text. Spacing options include single spacing, 1 1/2 spacing, double spacing, and 6-lines-per-inch spacing. The latter is used with data-processing forms and continuous feed labels.

**Insert Page Break—Remove Page Break**

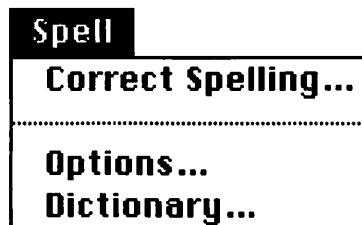
Inserts a page break (top of page or form feed) command above the line on which the cursor is located. It is used to force the line the cursor is on to begin a new page. Remove Page Break removes a page break above the line on which the cursor is located.

Title Page

Specifies the first page of the document as a title page. No header or footer information (including page numbering) will print on this page. However, the title page will be counted in the numbering.

Set Page #...

Sets the starting page number for the first page of the document. The starting page number is entered in the associated dialog box. This is useful in consecutively numbering two or more documents.

A.6 THE SPELL MENU**Correct Spelling...**

Compares each word in the entire document or highlighted text with a dictionary. Text not found in the dictionary is assumed to be misspelled and is displayed in a dialog box along with the program's

best guess about the correct spelling. Options are available to replace the misspelled word, to scan the dictionary for the correctly spelled word, to skip the word, to add the word to the dictionary, and to correct the spelling manually. A dictionary of skipped words can be saved at the end of the Correct Spelling process.

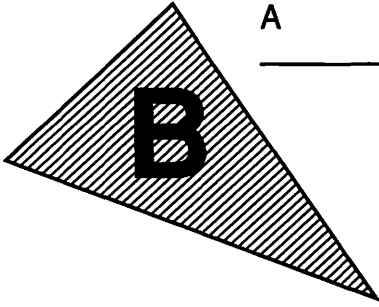
Options...

Displays the Spell Options dialog box that defines the correct spelling rules.

Dictionary...

Selects a dictionary of skipped words saved previously. Words from this dictionary will be skipped in the document to speed the process. A dialog box lets you select dictionary files and disks.

The Macro menu is described in Appendix K.



SUMMARY OF DRAW COMMANDS

B.1 THE DRAW TOOLS

Tools		
Pointer Tool		Rectangle Tool
Text Tool		Rounded Rectangle Tool
Line Tool		Oval Tool
Freehand Tool		Polygon Tool
Straight Line Tool		Arc Tool
	Fill Line	
Default Fill Pattern		Default Line Pattern
Nudge Tool		
Line Thickness Tool		
Line Type Tool		

Pointer Tool

Selects objects by pointing and clicking with the mouse.

Text Tool

Enters text and creates columns. Place the text cursor at the location where text is to be inserted, click the mouse button, and type the text.

Line Tool

Draws straight lines between any two points. Point to the starting point, click, and drag the mouse to the ending point while holding down the mouse button.

Freehand Tool

Draws freehand lines. Point to the starting point, click, and drag the mouse to the ending point while holding down the mouse button.

Straight Line Tool

Draws straight lines horizontally or vertically. Point to the starting point, click, and drag the mouse to the ending point while holding down the mouse button.

Rectangle Tool

Draws rectangles and squares. Pointing to the upper left-hand corner, click and drag the mouse to the lower right-hand corner while holding down the mouse button. To draw squares, hold down the shift key while drawing.

Rounded Rectangle Tool

Draws rectangles and squares with rounded corners. Pointing to the upper left-hand corner, click and drag the mouse to the lower right-hand corner while holding down the mouse button. To draw squares, hold down the shift key while drawing.

Oval Tool

Draws ovals and circles. Pointing to the upper left-hand corner, click and drag the mouse to the lower right-hand corner while holding down the mouse button. To draw circles, hold down the shift key while drawing.

Polygon Tool

Draws polygons. Point to the starting point of the first side of the polygon and click the mouse button. Point to each of the corners of the polygon and click the mouse button. Close the polygon by pointing to the starting point and clicking the mouse button again.

Arc Tool

Draws 90° arcs. Pointing to the starting point of the arc, click and drag the mouse to the ending point while holding down the mouse button. To draw arcs from circles, hold down the shift key while drawing.

Default Fill Pattern

Displays the default pattern, selected from the Fill Pattern menu, that will be used to fill objects.

Default Line Pattern

Displays the default pattern, selected from the Fill Line menu, that will be used to draw lines.

Nudge Tool

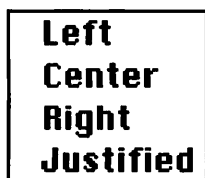
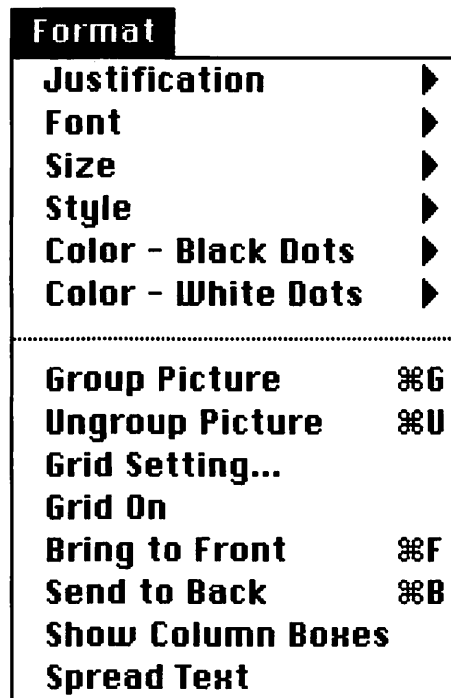
Moves (nudges) a selected object up, down, left, or right one pixel at a time on the screen.

Line Thickness Tool

Shows the current thickness of the line. Pointing to and clicking on another thickness will change the current thickness.

Line Type Tool

Shows whether the current line type has arrows or not. Point to and click on the desired line type.

B.2 THE DRAW FORMAT MENU
**Justification**

Displays a submenu listing the justification options. Choosing a justification from the submenu will select that justification for the text. Left aligns the text on the left margin. Center centers the text

within the margins. Right aligns the text on the right margin. Justified fills the text between the margins, aligning both left and right margins.

Chicago
Geneva
Monaco
New York

Font

Displays a submenu listing the fonts (typefaces) available. Choosing a font from the submenu will select that font for the text. Additional fonts can be added using the Font/DA Mover program on the Macintosh Utilities Disk.

9 Point
10 Point
12 Point
14 Point
18 Point
20 Point
24 Point
Other...

Size

Displays a submenu listing the font sizes available. Choosing a size from the submenu will select that size for the text. Sizes appearing in outline (12) will print best on the screen and the ImageWriter printer. Sizes are listed in points (72 points = 1 inch). The Other option provides for sizes other than those listed in the submenu.

Normal
Bold
Italic
Underline
Outline
Shadow

Style

Displays a submenu listing the font styles available: Normal, Bold, Italic, Underline, Outline, Shadow, Superscript, and Subscript. Choosing a style from the submenu will select that style for the text.

Black
White
Red
Green
Blue
Cyan
Magenta
Yellow

Color—Black Dots

Displays a submenu listing the colors available. Choosing a color from the submenu will select that color for the black dots on the screen.

Color—White Dots

Displays a submenu listing the colors available. Choosing a color from the submenu will select that color for the white dots on the screen.

Group Picture

Combines several objects selected into a group. Once the objects have been selected by pointing and clicking while holding down the Shift key, choose the Group Picture command. Grouped objects are treated as a single object by Works.

Ungroup Picture

Undoes the group feature for a selected object. Once ungrouped, the original objects can be moved or otherwise modified.

Grid Setting...

Sets the spacing for the transparent grid that controls the alignment of objects both horizontally and vertically. The Grid On command must be chosen for the grid to be in effect. A dialog box lets you change the Grid Setting from the default value of 1/8 inch.

Grid On

Turns on the grid feature that helps align objects horizontally and vertically. A check mark (✓) indicates that the option is in effect. To toggle the grid off, choose the Grid On command again.

Bring to Front

Moves the selected object to the foreground of the drawing layer.

Send to Back

Moves the selected object to the background of the drawing layer.


Show Column Boxes

Displays dotted lines around columns on screen. A check mark (✓) indicates that the option is in effect.

Spread Text

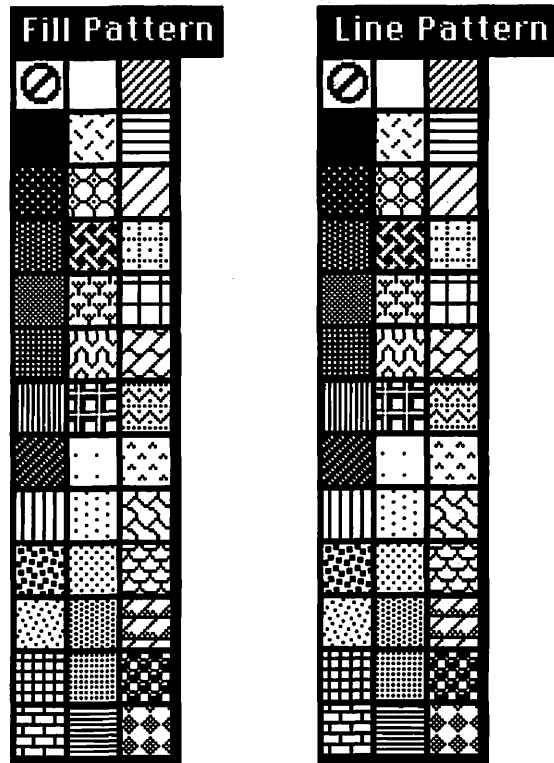
Aligns text along a line or around an arc. Copy the selected text to the Clipboard, draw the line or arc or select the desired line or arc, and choose Spread Text.

B.3 THE FILL PATTERN MENU

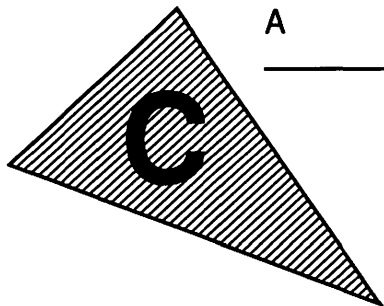
The Fill Pattern menu (see p. 246) provides 39 patterns for filling objects. To fill an object, select it and then choose a pattern from the Fill Pattern menu. If you do not select an object, the Default Fill Pattern will be changed to your new choice and all subsequent objects drawn will be filled with the new default fill pattern. An object will be transparent if the transparent () pattern is chosen.

B.4 THE LINE PATTERN MENU

The Line Pattern menu (see p. 246) provides 39 patterns for drawing lines. To change the line pattern of an object, select it and then



choose a pattern from the Line Pattern menu. If you do not select an object, the Default Line Pattern will be changed to your new choice and all subsequent objects will be drawn with lines using the new default line pattern. An object will be drawn without a line pattern if the transparent (⊘) pattern is chosen.



SUMMARY OF SPREADSHEET COMMANDS

C.1 THE FILE MENU

File	
New...	
Open...	⌘O
<hr/>	
Close	⌘W
Close All...	
Save	⌘S
Save As...	
Delete...	
<hr/>	
Make Works Desktop...	
<hr/>	
Page Setup...	
Print...	⌘P
Print Window	
Eject Page	
Print Merge...	
<hr/>	
Quit	⌘Q

New...

Creates a New file of any Works application type. A dialog box lets you select word-processing, database, spreadsheet, or communications files.

Open...

Opens an existing spreadsheet file to be edited or added to. A dialog box lets you select files and disks.

Close

Closes the active file window. If the file has been changed but not saved, a warning and an option for saving the file will appear in a dialog box.

Close All...

Closes all the file windows. For each file that has been changed but not saved, a warning and an option for saving the file will appear in a dialog box.

Save

Saves the active file window. If the file is untitled, a dialog box requires that a file name be entered and provides options for changing disks. If the file has been named previously, the edited file will be saved over the original file with the same file name.

Save As...

Saves an edited file with a new file name. The original file is kept intact. A dialog box allows you to enter the new file name and change disks.

Delete...

Deletes a file. A dialog box lets you select files and disks. This function is identical to dragging the file icon into the trash and emptying the trash from the Macintosh desktop.

Make Works Desktop...

Creates a Works desktop file that contains a list of all files currently open on the desktop. When this desktop file is opened, all the Works files will be opened automatically. A dialog box lets you enter a file name and change disks.

Page Setup...

Lets you define the page setup parameters, including paper type, paper orientation, header, footer, and margins. Options vary depending on the printer selected from the Chooser desk accessory.

Print...

Prints the document in the active window on the printer selected from the Chooser desk accessory. A dialog box provides options, including number of copies, range of page numbers, manual feed, and print preview.

Print Window

Prints the visible contents of the active window on the printer selected from the Chooser desk accessory.

Eject Page

Issues a form feed command to the printer, ejecting a page.

Print Merge...

The Print Merge feature is not available in the spreadsheet.

Quit

Stops Works, closes all files, and returns to the Macintosh desktop. For each file that has been changed but not saved, a warning and an option for saving the file will appear in a dialog box.

C.2 THE EDIT MENU

Edit	
Undo	⌘Z
.....	
Cut	⌘H
Copy	⌘C
Paste	⌘V
Clear	
Select All	
Paste with Options...	
.....	
Draw On	⌘J
Move...	
Insert	⌘I
Paste Function...	
Absolute Cell Ref	⌘A
Fill Right	⌘R
Fill Down	⌘D
Open Cell Note...	
.....	
Sort...	

Undo

Undoes the action of the previous command. It is used to reverse mistakes but can only undo one command. Multiple commands or mouse movements cannot be undone.

Cut

Removes the highlighted cell or drawing from the document and places it on the Clipboard. The cell or drawing can later be pasted into another location in the same spreadsheet, into another spreadsheet, or into another type of document.

Copy

Copies the highlighted cell or drawing from the spreadsheet and places it on the Clipboard. The original cell or drawing remains in the spreadsheet. The cell or drawing on the Clipboard can later be pasted into another location in the same spreadsheet, into another spreadsheet, or into another type of document.

Paste

Copies the cell or drawing on the Clipboard into the spreadsheet at the location of the cursor. The cell or drawing on the Clipboard is not erased and can be pasted again.

Clear

Erases the contents of the highlighted cell or erases a selected drawing from the spreadsheet. The cell content or drawing is not copied to the Clipboard.

Select All

Highlights all the cells in the spreadsheet, providing a shortcut for changing their font or other characteristics.

Paste with Options...

Copies the cells on the Clipboard into the spreadsheet at the location of the cursor, using special options. A dialog box provides the options, which include pasting the values only, pasting the formulas only, or transposing rows to columns or columns to rows.

Draw On—Draw Off

Turns on the draw mode, with which you can add lines, boxes, shading, and other graphics to the spreadsheet. Draw On displays the Draw Tool box. Draw Off turns off the draw mode and returns to the spreadsheet mode (see Appendix B for details).

Move...

Moves the contents of the cells selected with the mouse to a new

location in the same spreadsheet. Both relative and absolute cell references remain unchanged. Cut and Paste should be used when moving cells from one spreadsheet to another.

Insert

Inserts a new row of cells above a row selected by clicking on the row heading (row number). Insert can also insert a new column to the left of a column selected by clicking on the column heading (column letter).

Paste Function...

Pastes a built-in function at the location of the cursor when you enter a formula in the cell contents box. You select the built-in function from a scrolling list of available functions when the option is chosen.

Absolute Cell Ref

Converts a relative cell reference (for example, G5) to an absolute cell reference (for example, \$G\$5) when you're entering a formula into a cell.

Fill Right

Copies the contents (including formulas) from the leftmost cell in a series of highlighted cells into the cells to its right. If a formula is copied, relative cell references (such as K8) are revised appropriately; absolute cell references (such as \$K\$8) are not changed.

Fill Down

Copies the contents (including formulas) from the topmost cell in a series of highlighted cells into the cells beneath it. If a formula is copied, relative cell references (such as K8) are revised appropriately; absolute cell references (such as \$K\$8) are not changed.

Open Cell Note...

Opens a scrolling window in which a note can be typed documenting the contents of the cell. Once a cell note has been created, a small box appears in the right-hand corner of the cell. An existing cell note can be reopened, using the Open Cell Note command, and read or edited.

Sort...

Sorts the contents of the cells selected with the mouse into row order as specified in the Sort dialog box. The dialog box allows up to three sort keys (columns) to be specified. Each sort can be done in ascending or descending order. The Sort command handles both alphabetic and numeric data. Note: Adjacent cells containing

data that relate to the Sort key column must also be selected with the mouse; otherwise the contents of the adjacent columns will not be sorted along with the Sort key column.

C.3 THE WINDOW MENU

Window	
Show Clipboard	
<hr/>	
Help	⌘?
<hr/>	

Show Clipboard—Hide Clipboard

Displays the current contents of the Clipboard in a window on the screen. Hide Clipboard will close the Clipboard window.

Help

Opens the Help window, which can be scrolled to get information on the various Works commands. The cursor will change to a question mark (?). Selecting a menu command with this cursor will scroll the Help window to information on that command.

Open File Windows

Shows a list of every open file below the Help command. Choosing a file window from this list will make that window active and bring it to the front.

C.4 THE SELECT MENU

Select	
All Cells	
Last Cell	
<hr/>	
Find Cell...	⌘F
Go To Cell...	⌘G
<hr/>	
Show Active Cell	

All Cells

Selects all cells in the spreadsheet from A1 to the last cell in which data are entered. It's similar to Select All in the word-processing application.

Last Cell

Selects the last cell in which data were entered.

Find Cell...

Locates and selects a cell either by its row and column reference (for example, D6) or by matching its contents. A dialog box lets you enter the cell or the cell's contents to be matched.

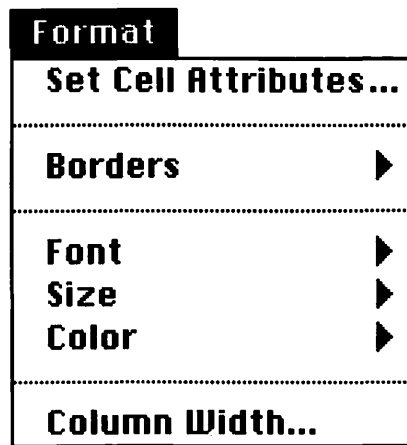
Go To Cell...

Locates a cell specified in the dialog box. The cell is located by its row and column reference (for instance, J2), and the cell is not selected.

Show Active Cell

Scrolls the spreadsheet to show the active cell within the window.

C.5 THE FORMAT MENU

**Set Cell Attributes...**

Specifies the way in which information is displayed in a cell. A dialog box lets you select the display type (general, fixed, dollar, percent, scientific, date, or time), the alignment (left, center, or right), and the style (bold, underline, or commas).

Outline
Left
Right
Top
Bottom
None

Borders

Displays a submenu listing the available border options. Outline draws a line around each edge of the selected cells. A border can also be drawn only on the left, right, top, bottom, or any combination of edges.

Chicago
Geneva
Monaco
New York

Font

Displays a submenu listing the fonts (typefaces) available. Choosing a font from the submenu will select that font for the text. Additional fonts can be added using the Font/DA Mover program on the Macintosh Utilities Disk.

9 Point
10 Point
12 Point
14 Point
18 Point
20 Point
24 Point
Other...

Size

Displays a submenu listing the font sizes available. Choosing a size from the submenu will select that size for the text. Sizes appearing in outline (12) will print best on the screen and the ImageWriter printer. Sizes are listed in points (72 points = 1 inch). The Other option provides for sizes other than those listed in the submenu.

Black
White
Red
Green
Blue
Cyan
Magenta
Yellow

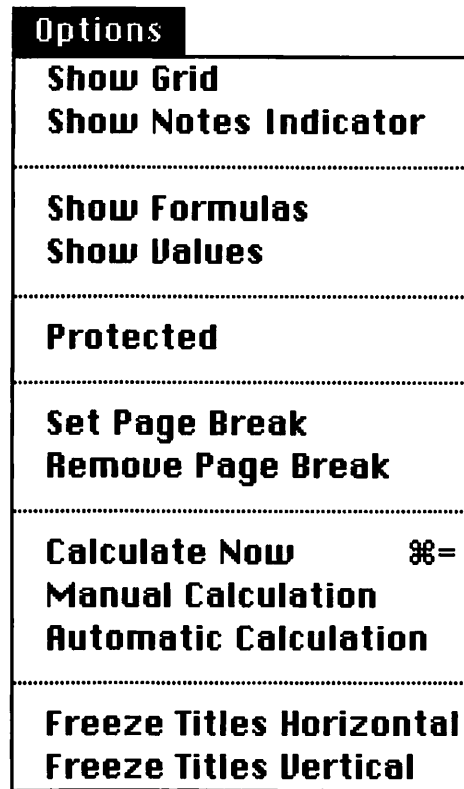
Color

Displays a submenu listing the colors available. Choosing a color from the submenu will select that color for the text on the screen.

Column Width...

Sets the width of the selected column to a specified amount. A dialog box lets you enter a column width from 1 to 40 spaces.

C.6 THE OPTIONS MENU



Show Grid

Displays and prints the row and column grid lines. Show Grid is the default option when a new spreadsheet is opened. A check mark (✓) indicates that the option is in effect.

Show Notes Indicator

Displays and prints a small box in the right-hand corner of any cell that has a cell note associated with it. Show Notes Indicator is the default option when a new spreadsheet is opened. A check mark (✓) indicates that the option is in effect.

Show Formulas

Displays and prints the unformatted cell contents or cell formula rather than the formatted value or value resulting from the calculation of the formula. If Show Formulas is in effect when you Copy or Cut a cell, the formula will be placed on the Clipboard. A check mark (✓) indicates that the option is in effect.

Show Values

Displays and prints the formatted value or calculated value in each cell. If Show Values is in effect when you Copy or Cut a cell, the values will be placed on the Clipboard. Show Values is the default option when a new spreadsheet is opened. A check mark (✓) indicates that the option is in effect.

Protected

Protects the selected cell from accidental entry of new data. If an attempt is made to enter data in a protected cell, access is denied and a warning is printed on the screen. A check mark (✓) indicates that the option is in effect. Choosing the Protected command will eliminate existing protection and allow you to modify the cell contents.

Set Page Break

Sets a page break above and to the left of the active cell. This is used to force the active cell to begin the top left corner of a new page.

Remove Page Break

Removes an existing horizontal page break above or a vertical page break to the left of the active cell. A vertical and horizontal page break can be removed simultaneously by selecting the cell in the upper left-hand corner of the page and choosing Remove Page Break.

Calculate Now

Recalculates all the formulas in the spreadsheet. This command is used when you're working in the Manual Calculation mode.

Manual Calculation

Sets the calculation mode to manual. Formulas will not be recalculated unless the Calculate Now command is chosen. You'll use this for spreadsheets with a large number of formulas that are revised frequently, to speed data entry. A check mark (✓) indicates that the option is in effect.

Automatic Calculation

Sets the calculation mode to automatic. Each time data are entered or the contents of a cell are edited, all the formulas in the spreadsheet are recalculated. Automatic Calculation is the default option when a new spreadsheet is opened. A check mark (✓) indicates that the option is in effect.

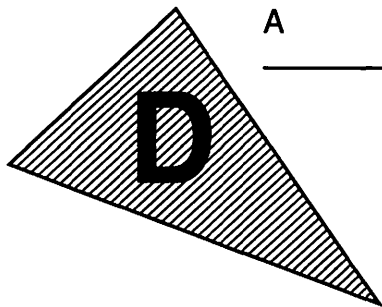
Freeze Titles Horizontal

Prevents column titles from scrolling. After the window is split using the horizontal split bar (see Section 4.5), choose Freeze Titles Horizontal to freeze the column titles above the split bar.

Freeze Titles Vertical

Prevents row titles from scrolling. After the window is split using the vertical split bar (see Section 4.5), choose Freeze Titles Vertical to freeze the row titles to the left of the split bar.

The Chart menu is described in Appendix E, the Macro menu in Appendix K.



SUMMARY OF DATABASE COMMANDS

D.1 THE FILE MENU

File	
New...	
Open...	⌘O
<hr/>	
Close	⌘W
Close All...	
Save	⌘S
Save As...	
Delete...	
<hr/>	
Make Works Desktop...	
<hr/>	
Page Setup...	
Print...	⌘P
Print Window	
Eject Page	
Print Merge...	
<hr/>	
Quit	⌘Q

New...

Creates a New file of any Works application type. A dialog box lets you select word-processing, database, spreadsheet, or communications files.

Open...

Opens an existing database file to be edited or added to. A dialog box lets you select files and disks.

Close

Closes the active file window. If the file has been changed but not saved, a warning and an option for saving the file will appear in a dialog box.

Close All...

Closes all the file windows. For each file that has been changed but not saved, a warning and an option for saving the file will appear in a dialog box.

Save

Saves the active file window. If the file is untitled, a dialog box requires that a file name be entered and provides options for changing disks. If the file has been named previously, the edited file will be saved over the original file with the same file name.

Save As...

Saves an edited file with a new file name. The original file is kept intact. A dialog box allows you to enter the new file name and change disks.

Delete...

Deletes a file. A dialog box lets you select files and disks. This function is identical to dragging the file icon into the trash and emptying the trash from the Macintosh desktop.

Make Works Desktop...

Creates a Works desktop file that contains a list of all files currently open on the desktop. When this desktop file is opened, all the Works files will be opened automatically. A dialog box lets you enter a file name and change disks.

Page Setup...

Lets you define the page setup parameters, including paper type, paper orientation, header, footer, and margins. Options vary depending on the printer selected from the Chooser desk accessory. The Page Setup command is only available after a report has been selected from the Report menu.

Print...

Prints the document in the active window on the printer selected from the Chooser desk accessory. A dialog box provides options, including number of copies, range of page numbers, manual feed,

and print preview. The Print command is only available after a report has been selected from the Report menu.

Print Window

Prints the visible contents of the active window on the printer selected from the Chooser desk accessory. The Print Window command is not available after a report has been selected from the Report menu.

Eject Page

Issues a form feed command to the printer, ejecting a page.

Print Merge...

The Print Merge feature is not available in the database.

Quit

Stops Works, closes all files, and returns to the Macintosh desktop. For each file that has been changed but not saved, a warning and an option for saving the file will appear in a dialog box.

D.2 THE EDIT MENU

Edit	
Undo	⌘Z
<hr/>	
Cut	⌘H
Copy	⌘C
Paste	⌘V
Clear	
Select All	
<hr/>	
Draw On	⌘J
<hr/>	
Paste Function	
<hr/>	
Insert Record	⌘I
<hr/>	
Change Field Name...	
Add New Field...	
Delete Field	

Undo

Undoes the action of the previous command. It is used to reverse mistakes but can only undo one command. Multiple commands or mouse movements cannot be undone.

Cut

Removes the highlighted text from the document and places it on the Clipboard. The text can later be pasted into another location in the same database, into another database, or into another type of document.

Copy

Copies the highlighted text from the database and places it on the Clipboard. The original text remains in the database. The text on the Clipboard can later be pasted into another location in the same database, into another database, or into another type of document.

Copy Totals

Copies the subtotals and grand total from the report selected to the Clipboard. This lets you copy report totals to a spreadsheet. The Copy Totals command is only available after a report has been selected from the Report menu.

Paste

Copies the text on the Clipboard into the database at the location of the cursor. The text on the Clipboard is not erased and can be pasted again.

Clear

Erases the contents of the selected (highlighted) field. The field contents are not copied to the Clipboard.

Select All

Selects all the fields in the database, providing a shortcut for changing their font or other characteristics. Select All is available only when the Show List option is in effect.

Draw On

The Draw feature is not available in the database.

Paste Function...

Pastes a built-in function at the location of the cursor in the entry bar when you enter a formula for a computed field. You select the built-in function from a scrolling list of available functions when the option is chosen.

Insert Record

Inserts a blank record immediately above the selected record in the list window or immediately before the currently displayed record in the form window.

Change Field Name...

Changes the name of the selected field. A dialog box lets you modify the field name.

Add New Field...

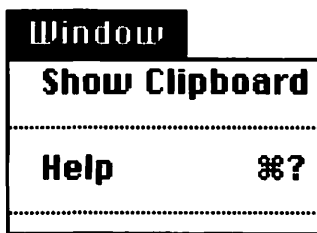
Adds a new field to the database for every record. The contents of the new field will be blank. A dialog box lets you enter the name of the new field.

Delete Field

Deletes the selected field and its contents from every record in the database. If the Delete Field command is accidentally chosen, the field can be restored by immediately choosing Undo from the Edit menu.

Change Report Title...

Changes the title of the selected report. A dialog box lets you modify the titles of the current report. The Change Report Title command is only available after a report has been selected from the Report menu.

D.3 THE WINDOW MENU**Show Clipboard—Hide Clipboard**

Displays the current contents of the Clipboard in a window on the screen. Hide Clipboard will close the Clipboard window.

Help

Opens the Help window, which can be scrolled to get information on the various Works commands. The cursor will change to a question mark (?). Selecting a menu command with this cursor will scroll the Help window to information on that command.

Open File Windows

Shows a list of every open file below the Help command. Choosing a file window from this list will make that window active and bring it to the front.

D.4 THE ORGANIZE MENU

Organize	
Find Field...	⌘F
Match Records...	⌘M
Record Selection...	
Show All Records	
Sort...	⌘A

Find Field...

Finds every field, one at a time, that contains specific text. A dialog box allows the matching text to be entered and offers an option to search only text fields, which speeds up the searching process.

Match Records...

Locates and displays all records that contain specific text in any field. If Match Records is chosen from the list window, only the matching records appear in the window. If Match Records is chosen from the form window, only the matching records can be scrolled through.

Record Selection...

Selects records based on up to six selection rules. These rules are defined in the Record Selection dialog box and let you select records by matching text in one or more specific fields. See Section 6.3.4 for details on selection rules. If Record Selection is chosen from the list window, only the selected records appear in the window. If Record Selection is chosen from the form window, only the selected records can be scrolled through.

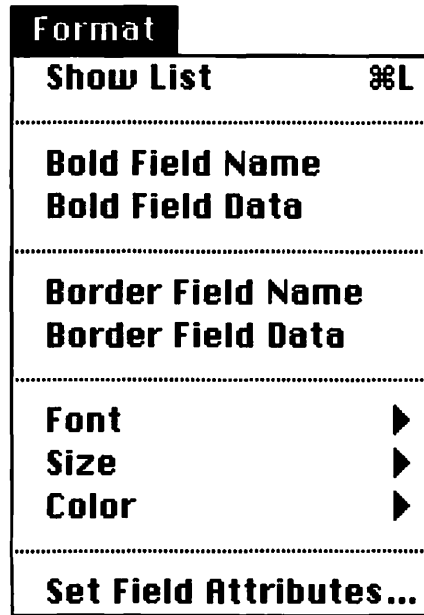
Show All Records

Reverses the effect of the Record Selection or Match Records commands displaying all records in the list window and allowing all records to be scrolled through in the form window.

Sort...

Sorts all the records in the database in alphabetical or numerical order based on the data in the selected field. The database can be arranged in A-to-Z, Z-to-A, 0-to-9, 9-to-0, chronological, or reverse chronological order as specified in the dialog box.

D.5 THE FORMAT MENU

**Show List—Show Form**

Specifies the format for displaying the database. Show List displays multiple records, one line per record, in a scrolling list window. Show Form displays one record on the screen in the form window.

Show Grid

Displays and prints gridlines between each field and each record when a report has been selected. Show Grid is the default option when a new report is defined. A check mark (✓) indicates that the option is in effect.

Bold Field Name

Makes the field name of the selected field in the form window bold.

Bold Field Data

Makes the contents of the selected field in the form window bold.

Border Field Name

Displays a border around the field name of the selected field in the form window.

Border Field Data

Displays a border around the contents of the selected field in the form window.

Chicago
Geneva
Monaco
New York

Font

Displays a submenu listing the fonts (typefaces) available. Choosing a font from the submenu will select that font for the text. Additional fonts can be added using the Font/DA Mover program on the Macintosh Utilities Disk.

9 Point
10 Point
12 Point
14 Point
18 Point
20 Point
24 Point
Other...

Size

Displays a submenu listing the font sizes available. Choosing a size from the submenu will select that size for the text. Sizes appearing in outline (12) will print best on the screen and the ImageWriter printer. Sizes are listed in points (72 points = 1 inch). The Other option provides for sizes other than those listed in the submenu.

Black
White
Red
Green
Blue
Cyan
Magenta
Yellow

Color

Displays a submenu listing the colors available. Choosing a color from the submenu will select that color for the text on the screen.

Set Field Attributes...

Specifies the way in which information is displayed in a field. A dialog box lets you select the type of data (text, numeric, date, or time), display type (general, fixed, dollar, percent, scientific, or computed), alignment (left, center, or right), and style (bold, underline, or commas).

D.6 THE REPORT MENU

Report

Select Report...
New Report...
Duplicate Report...
Erase Report...

Select Report...

Selects a previously defined report from a list of available report definitions.

New Report...

Creates a new report definition. Up to eight reports can be defined for a database.

Duplicate Report...

Duplicates a previously defined report specified from a list of available report definitions. This is useful for modifying an existing report without permanently changing the original.

Erase Report...

Erases a previously defined report specified from a list of available report definitions.

D.7 THE TOTALSPAGE MENU

TotalsPage
Sum This Field
Take a Sub-Total on Field Change
Take a Sub-Total on 1st Char
New Page After Total

The TotalsPage menu is displayed when a report has been selected from the Report menu.

Sum This Field

Computes a sum for the selected field and prints its total at the end of the report. A check mark (✓) indicates that the option is in effect for the selected field.

Take a Sub-Total on Field Change

Computes and prints subtotals for each summed field every time there is a change in the data in the selected field. The data in the selected field (criterion field) should be sorted into a specific order before you define the report. The fields to be summed must also be selected and the Sum This Field command chosen. A check mark (✓) indicates that the option is in effect for the selected field.

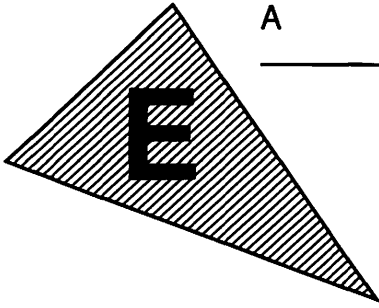
Take a Sub-Total on 1st Char

Computes and prints subtotals for each summed field every time there is a change in the first character of the data in the selected field. The data in the selected field (criterion field) should be sorted into a specific order before you define the report. The fields to be summed must also be selected and the Sum This Field command chosen. A check mark (✓) indicates that the option is in effect for the selected field.

New Page After Total

Prints the next record following a subtotal on the top of a new page. A check mark (✓) indicates that the option is in effect.

The Macro menu is described in Appendix K.



SUMMARY OF BUSINESS GRAPHICS (CHART) COMMANDS

This appendix describes the charting commands in the Works spreadsheet. When a command from the Chart menu is chosen, the Menu Bar and the menu commands change as indicated below.

E.1 THE FILE MENU

File	
New...	
Open...	⌘O
<hr/>	
Close	⌘W
Close All...	
Save	⌘S
Save As...	
Delete...	
<hr/>	
Make Works Desktop...	
<hr/>	
Page Setup...	
Print...	⌘P
Print Window	
Eject Page	
Print Merge...	
<hr/>	
Quit	⌘Q

New...

Creates a New file of any Works application type. A dialog box lets you select word-processing, database, spreadsheet, or communications files.

Open...

Opens an existing spreadsheet file and its associated charts. A dialog box lets you select files and disks.

Close

Closes the active file window. If the file has been changed but not saved, a warning and an option for saving the file will appear in a dialog box.

Close All...

Closes all the file windows. For each file that has been changed but not saved, a warning and an option for saving the file will appear in a dialog box.

Save

The Save command is not available when a Chart window is active. Charts are automatically saved with the associated spreadsheet.

Save As...

The Save As command is not available when a Chart window is active.

Delete...

Deletes a file. A dialog box lets you select files and disks. This function is identical to dragging the file icon into the trash and emptying the trash from the Macintosh desktop.

Make Works Desktop...

Creates a Works desktop file that contains a list of all files currently open on the desktop. When this desktop file is opened, all the Works files will be opened automatically. A dialog box lets you enter a file name and change disks.

Page Setup...

The Page Setup command is not available when a Chart window is active.

Print...

The Print command is not available when a Chart window is active. Use the Print Window command to print a chart or copy and paste the chart into a word-processing document for printing.

Print Window

Prints the visible contents of the active window on the printer selected from the Chooser desk accessory.

Eject Page

Issues a form feed command to the printer, ejecting a page.

Print Merge...

The Print Merge command is not available when a Chart window is active.

Quit

Stops Works, closes all files, and returns to the Macintosh desktop. For each file that has been changed but not saved, a warning and an option for saving the file will appear in a dialog box.

E.2 THE EDIT MENU

Edit	
Undo	⌘Z
<hr/>	
Cut	⌘H
Copy	⌘C
Paste	⌘V
Clear	
<hr/>	
Change Chart Name...	

Undo

The Undo command is not available when a Chart window is active.

Cut

The Cut command is not available when a Chart window is active.

Copy

Copies the chart from the active chart window and places it on the Clipboard. The chart on the Clipboard can later be pasted into a spreadsheet or word-processing document.

Paste

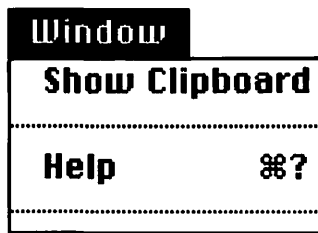
The Paste command is not available when a Chart window is active.

Clear

The Clear command is not available when a Chart window is active.

Change Chart Name...

Changes the name of the selected chart. A dialog box lets you modify the name of the current chart. The Change Chart Name command is only available when a chart definition has been selected from the Chart menu.

E.3 THE WINDOW MENU**Show Clipboard—Hide Clipboard**

Displays the current contents of the Clipboard in a window on the screen. Hide Clipboard will close the Clipboard window.

Help

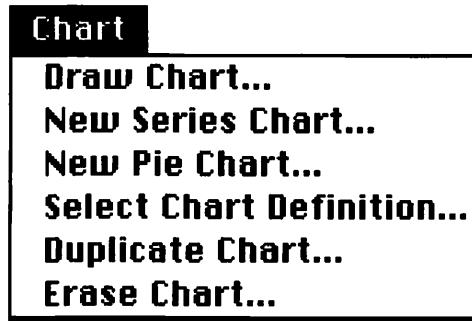
Opens the Help window, which can be scrolled to get information on the various Works commands. The cursor will change to a question mark (?). Selecting a menu command with this cursor will scroll the Help window to information on that command.

Open File Windows

Shows a list of every open file below the Help command. Choosing a file window from this list will make that window active and bring it to the front.

E.4 THE CHART MENU**Draw Chart...**

Draws a previously defined chart. A dialog box lets you choose from existing charts associated with the active spreadsheet.

**New Series Chart...**

Opens the Series Chart dialog box, which defines the chart and then draws it. Options include line, bar, stacked bar, and combination line and bar charts. You can also define the location of the data in the spreadsheet, titles, legends, and other chart features. See Section 5.1.2 for details on drawing series charts.

New Pie Chart...

Opens the Pie Chart dialog box, which defines the pie chart and then draws it. You can define the location of the data in the spreadsheet, titles, legends, and other chart features. See Section 5.1.1 for details on drawing pie charts.

Select Chart Definition...

Opens a previously defined chart's dialog box. A list of existing chart definitions associated with the active spreadsheet is displayed. Use this command to select a chart definition when you want to modify and redraw a chart.

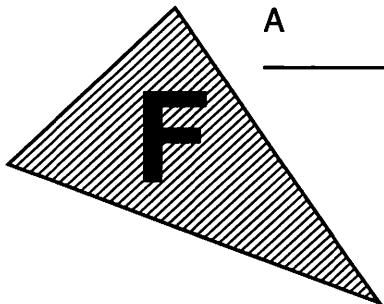
Duplicate Chart...

Duplicates an existing chart definition. A list of existing chart definitions associated with the active spreadsheet is displayed. Use this command to modify a chart definition without affecting the original chart definition.

Erase Chart...

Erases a previously defined chart. A dialog box lets you choose from the existing charts associated with the active spreadsheet. A maximum of eight charts may be associated with a spreadsheet.

The Macro menu is described in Appendix K.



SUMMARY OF COMMUNICATIONS COMMANDS

F.1 THE FILE MENU

File	
New...	
Open...	⌘O
<hr/>	
Close	⌘W
Close All...	
Save	⌘S
Save As...	
Delete...	
<hr/>	
Make Works Desktop...	
<hr/>	
Page Setup...	
Print...	⌘P
Print Window	
Eject Page	
Print Merge...	
<hr/>	
Quit	⌘Q

New...

Creates a New file of any Works application type. A dialog box lets you select word-processing, database, spreadsheet, or communications files.

Open...

Opens an existing communications file and its associated settings. A dialog box lets you select files and disks.

Close

Closes the active file window. If the file has been changed but not saved, a warning and an option for saving the file will appear in a dialog box.

Close All...

Closes all the file windows. For each file that has been changed but not saved, a warning and an option for saving the file will appear in a dialog box.

Save

Saves the active file window. If the file is untitled, a dialog box requires that a file name be entered and provides options for changing disks. If the file has been named previously, the edited file will be saved over the original file with the same file name.

Save As...

Saves an edited file with a new file name. The original file is kept intact. A dialog box allows you to enter the new file name and change disks.

Delete...

Deletes a file. A dialog box lets you select files and disks. This function is identical to dragging the file icon into the trash and emptying the trash from the Macintosh desktop.

Make Works Desktop...

Creates a Works desktop file that contains a list of all files currently open on the desktop. When this desktop file is opened, all the Works files will be opened automatically. A dialog box lets you enter a file name and change disks.

Page Setup...

The Page Setup command is not available in the communications application.

Print...

The Print command is not available in the communications application. Use the Print Window command to print the text in the communications window. If the Capture Text option is active, the text file can later be opened in the word-processing application and printed.

Print Window

Prints the visible contents of the active window on the printer selected from the Chooser desk accessory.

Eject Page

Issues a form feed command to the printer, ejecting a page.

Print Merge...

The Print Merge command is not available in the communications application.

Quit

Stops Works, closes all files, and returns to the Macintosh desktop. For each file that has been changed but not saved, a warning and an option for saving the file will appear in a dialog box.

F.2 THE EDIT MENU

Edit	
Undo	⌘Z
<hr/>	
Cut	⌘H
Copy	⌘C
Paste	⌘V
Clear	
Select All	

Undo

Undoes the action of the previous command. It is used to reverse mistakes but can only undo one command. Multiple commands or mouse movements cannot be undone.

Cut

Removes the highlighted text from the document and places it on the Clipboard. The text can later be pasted as if typed from the keyboard in the communications application or pasted into another type of document.

Copy

Copies the highlighted text and places it on the Clipboard. The original text remains in the communications window. The text can later be pasted as if typed from the keyboard in the communications application or pasted into another type of document.

Paste

Copies the text on the Clipboard into the communications window at the location of the cursor. The text on the Clipboard is not erased and can be pasted again.

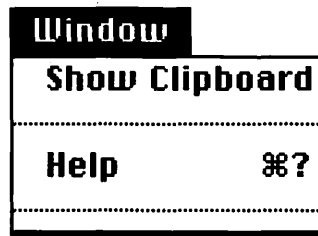
Clear

Erases the contents of the selected (highlighted) text. The text is not copied to the Clipboard.

Select All

Selects all the text in the communications window.

F.3 THE WINDOW MENU



Show Clipboard — Hide Clipboard

Displays the current contents of the Clipboard in a window on the screen. Hide Clipboard will close the Clipboard window.

Help

Opens the Help window, which can be scrolled to get information on the various Works commands. The cursor will change to a question mark (?). Selecting a menu command with this cursor will scroll the Help window to information on that command.

Open File Windows

Shows a list of every open file below the Help command. Choosing a file window from this list will make that window active and bring it to the front.

F.4 THE COMMUNICATIONS MENU

Echo On

Allows characters to “echo” in the communications window. Some host computers send the characters they receive back to the sending terminal; others do not. If characters do not appear in the communications window when they are typed, choose Echo On. A check mark (✓) indicates that the option is in effect.

Echo Off

Prevents characters from echoing in the communications window. Some host computers send the characters they receive back to the sending terminal; others do not. If duplicate characters appear in the communications window when they are typed, choose Echo Off. A check mark (✓) indicates that the option is in effect.

Dial...

Displays a dialog box in which to record names and telephone numbers of host computers. The Dial button in the dialog box will dial the host computer from the Macintosh’s modem.



Hang Up

Disconnects the Macintosh's modem from the host's telephone line, ending the communications session.

Answer Phone

Instructs Works to answer incoming telephone calls to the Macintosh's modem, making the Macintosh act as a host computer. A check mark (✓) indicates that the option is in effect.

Capture Text...—End Capture Text

Saves everything sent to and received from the host computer in a file specified in the dialog box. End Capture Text stops saving text to the file.

Send Text...

Sends the text from a word-processing file to the host computer. A dialog box lets you choose the appropriate file. This command sends text only; to send graphics and other types of data, use the Send File command.

Receive File...

Receives a file from a host computer. A dialog box lets you name the file, identify where it is to be saved, and specify the transmission protocol.

Send File...

Sends a file from the Macintosh to the host computer. A dialog box lets you specify the file and the transmission protocol.

Settings...

Sets the communication parameters in the Settings dialog box. The settings must match those of the host computer; otherwise, a proper connection will not be made. See Section 8.1.3 for a detailed discussion of the communications settings.

F.5 THE KEYPAD MENU

Keypad			
PF1	PF2	PF3	PF4
←	→	↑	↓
7	8	9	-
4	5	6	,
1	2	3	E n t e r
0	.		

The Keypad menu is used with the VT52 and VT100 terminal modes to emulate the standard VT52 and VT100 keypad. They are used with Macintosh keyboards that do not have numeric keypads.

PF1, PF2, PF3, PF4

Serve as function keys having variable codes depending on the software of the host computer.

Arrow Keys

Move the cursor left or right one space or up or down one line.

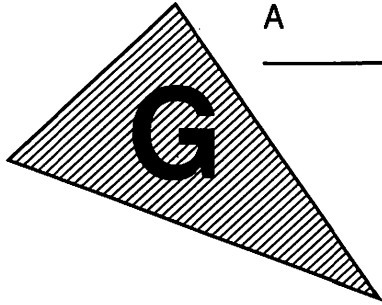
Numeric Keys

Type the appropriate number or punctuation at the location of the cursor in the communications window.

Enter Key

Signals the end of data to be transmitted to the host computer. On some host computers the Enter key is identical to the Return key. On others, the Enter key and the Return key have different functions.

The Macro menu is described in Appendix K.



CONTENTS OF SUPPLEMENTAL DISKETTE WITH ANSWERS TO SELECTED POSERS, PROBLEMS, AND PROJECTS

The Supplemental Diskette is designed to give you completed examples from the text, the files necessary to complete the more advanced examples, answers to selected problems from each chapter, an interactive reference guide to Works commands, and a simulation of the Works communications application.

G.1 EXAMPLES FOLDER

This folder contains files used for the main examples in the text. Files for Chapters 2 through 6 are provided for reference purposes. If you are having difficulty, open the appropriate file and review the correct document, spreadsheet, or database. Files for Chapters 7, 9, and 10 are provided to help you complete the examples in the text. Although you can work the examples without recourse to these files, they will eliminate considerable data entry time.

File Name	Type	Chapter	Description of Example
Sculley's Quotation	WP	2	Word-processing
Letter to Sidney Celmour	WP	2	Business letter
Savings Account	SS	4	Built-in function
Payroll Ledger	SS	4	Table lookup
Personal Budget	SS	4	Budget spreadsheet
Personal Budget		5	Pie and bar chart

File Name	Type	Chapter	Description of Example
My Dictionary	DB	6	Basic database
Inventory	DB	6	Database report
Super Clip Letter	WP	7	Merging fields
Acme's Customers	DB	7	Database for merging fields
New Orleans Guide	WP	9	Desktop publishing (DTP)
New Orleans Art	WP	9	Art for DTP
New Orleans Text	WP	9	Text for DTP
Acme's Stockholders	DB	10	Database for application integration

G.2 SELECTED ANSWERS FOLDER

This folder contains answers to selected problems from the Posers, Problems, and Projects section that ends each chapter. The files show the completed answers to the problems and should be used only when you are stumped: no cheating!

File Name	Type	Chapter	Description of Problem
Ch. 3, Problem 1	WP	3	Drawing
Ch. 4, Problem 4	SS	4	Spreadsheet
Ch. 5, Problems 2, 3, 4	SS	5	Pie chart Bar chart Bar chart
Ch. 6, Problem 2	DB	6	Database
Ch. 7, Problem 1	WP	7	Mailing labels

G.3 WORKS COMMAND REFERENCE

The Works Command Reference file is a HyperCard stack giving you the information in Appendices A, B, C, D, E, F, K, and M in interactive form. To run the Works Command Reference you will need the HyperCard application that came with the Macintosh you're using.

If you have two floppy disk drives on your Macintosh, start up the Mac with the HyperCard start-up diskette. Insert the Supplemental Diskette in the empty disk drive. Launch the Works Command Reference by double clicking on the icon. If you have a hard disk drive and HyperCard is not already on the disk, drag the HyperCard application icon from the HyperCard diskette onto the hard disk. Drag the Works Command Reference icon from the

Supplemental Diskette onto the hard disk. Launch the Works Command Reference by double clicking on the icon.

Once the Works Command Reference has been launched, you can pull down any Works menu from any Works application. The menu will remain on the screen while you scroll through brief descriptions of the available commands in the text window (see Figure G.1). If you choose a menu item with the mouse, the corresponding dialog box or submenu is displayed.

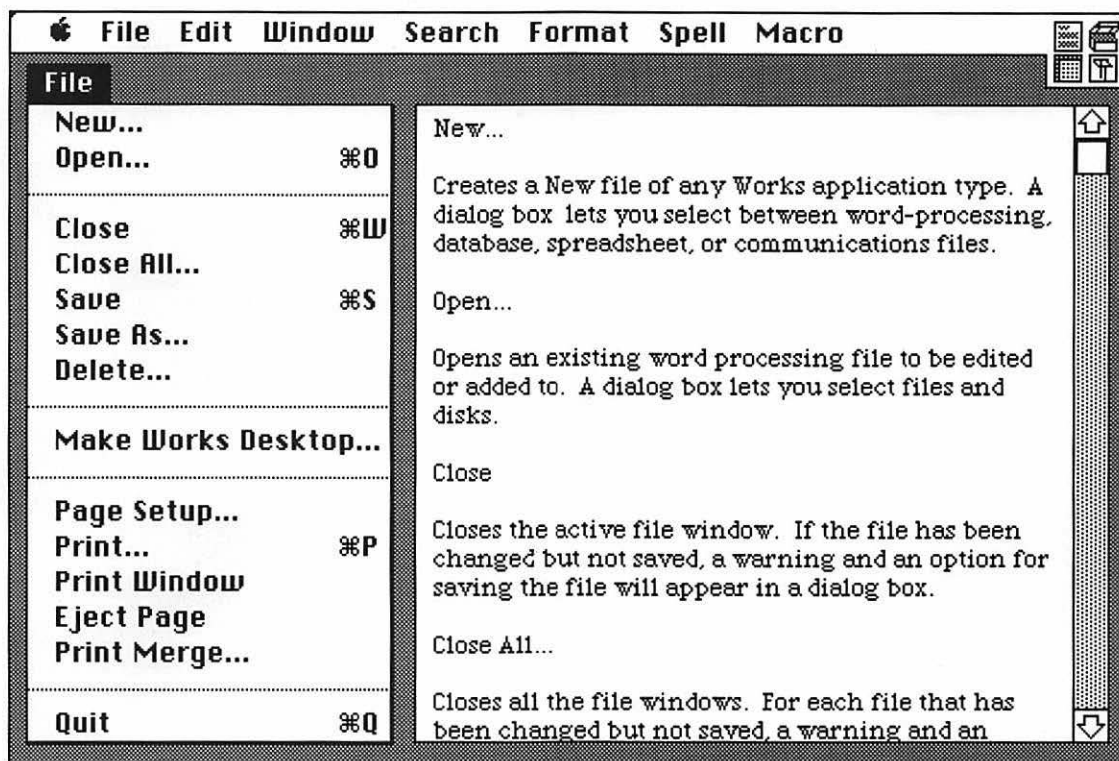
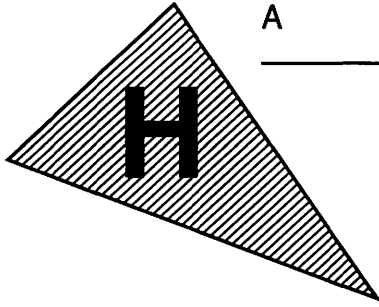


Figure G.1. HyperCard Works Command Reference Stack

G.4 COMMUNICATIONS SIMULATION

The Communications Simulation file is also a HyperCard stack. This stack is a simulated Works communications session for those of you who lack access to a modem or an information service. It simulates logging on to the Loyola University Library's on-line catalog system. You can complete the simulation (Problem 5 in Chapter 8) by following the directions in Appendix J.



GLOSSARY

- absolute cell reference:** A reference to a specific cell in a formula in the spreadsheet. The cell reference will not be affected by copying, moving, or filling.
- active cell:** In the spreadsheet, the most recently selected cell, designated by a highlighted box.
- active window:** The most recently selected window, appearing in the foreground in front of any other open window.
- baud:** The speed at which data are transmitted between two computers. Baud is measured in bits per second.
- bit:** A BInary digiT. The smallest memory component that stores a 1 or 0. Eight bits combine to form a byte.
- boolean operators:** Operators, including AND and OR, that are used to test the truth of logical expressions on a computer.
- booting:** Starting up a computer ("She booted her Macintosh").
- bug:** An error in a computer program.
- byte:** The amount of memory necessary to store one alphabetic, numeric, or punctuation character. A byte comprises eight bits.
- cell:** The functional component of a spreadsheet, in which values, labels, or formulas are stored.
- center justification:** An alignment of text centered between the margins.
- central processing unit (CPU):** The main hardware component of a computer system, processing instructions provided by software.
- chip:** A slang term for integrated circuit, or IC.
- clip art:** Professional drawings, borders, and other art available on diskette that can be used to enhance newsletters, flyers, and other documents.
- Clipboard:** A temporary storage area used when cutting or copying text and graphics.

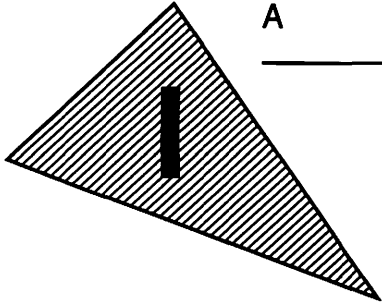
- close box:** The small box in the upper left-hand corner of a window. Pointing to and clicking in this box with the mouse will close the window.
- copying:** Copying selected text or graphics from a document to the Clipboard. The contents of the Clipboard can later be pasted into a different location or document without deleting the text or graphics from the original.
- cursor:** The indicator on the screen that is controlled by the mouse. The cursor will take different shapes (an arrow, hand, I-bar, pencil, and so on), depending on the software and current function.
- cutting:** Removing selected text or graphics from a document and placing in the Clipboard. The contents of the Clipboard can later be pasted into a different location or document.
- data bits:** The number of bits used to transmit data between two computers (either seven or eight, depending on the host computer).
- debugging:** Locating and correcting bugs (errors) in computer software.
- desktop publishing:** The use of microcomputers and laser printers to produce camera-ready copy for in-house publications. The result is a professional-looking publication in less time, at less cost.
- digitizing:** Converting a drawing or photograph to binary data capable of being stored and displayed on a computer.
- double clicking:** Pressing the mouse button twice. Double clicking on an icon opens the file or launches the application.
- dragging:** Moving an object on the computer's screen by pointing to the object, clicking and holding down the mouse button, and rolling the mouse.
- emulating:** Duplicating the function of another computer device with software. For example, the Works communications application emulates a VT100 terminal.
- field:** The smallest data component of a database. A database is composed of records containing data fields.
- file:** A document stored on a computer disk. The document may contain word-processing, spreadsheet, database, graphics, or other types of data.
- filling down:** Copying the contents (values, labels, or formulas) from a spreadsheet cell or cells to directly below.
- filling right:** Copying the contents (values, labels, or formulas) of a spreadsheet cell or cells to those immediately to its right.
- finding:** Locating specific text in a document, usually to locate and then replace text (Find and Replace).
- flat file database:** A nonrelational database file that contains the same number of fields for each record in the database and is not linked with any other file.

- font:** A typeface, or style of type, such as Geneva or Times.
- formatting:** Initially preparing a blank diskette to be used on a computer (also known as initializing).
- function:** A built-in calculation that can be used in a formula in the spreadsheet or a computed field in the database. Many functions are available that perform mathematical, trigonometric, statistical, logical, date-and-time, and financial calculations.
- handles:** Small squares that appear on a draw object when it's selected. The handles can be dragged on to change the size of the object.
- host:** A computer that responds to the inquiries of a terminal device (a microcomputer plus modem). Usually the host computer is a mainframe or minicomputer that makes information available to a large number of users.
- icon:** A graphic representation of a document, application, or function. For example, the trash can icon represents the function of deleting (throwing away) a file.
- inputting:** Providing data from peripheral devices to the central processing unit (opposite of outputting).
- integrated circuit (IC):** A very small electronic circuit that provides the equivalent of hundreds to millions of transistors.
- integrated program:** A computer program having features of several different applications and allowing them to work as one program and easily share information.
- justification:** An alignment of text spaced equally between the margins so that it aligns both left and right. It is used to create columns of text, as in newspapers.
- laser printer:** A printer that uses laser technology to print high-quality text and graphics on plain paper.
- left justification:** An alignment of text along the left margin.
- logging on:** Accessing a host computer by dialing the modem and entering an account number and password.
- mainframe:** A large-scale computer system that can process and store a large amount of data very rapidly.
- menu bar:** A bar at the top of the screen that contains a list of the major commands available in the software.
- microcomputer:** A small desktop computer system used as a tool for personal productivity.
- minicomputer:** A medium-sized computer system used for applications requiring more processing power than a microcomputer but less than a mainframe.
- modem:** A peripheral device that MOdulates (converts) computer data into voice signals that can be transmitted over standard tele-

- phone lines to another computer. The receiving modem then DEModulates the voice signals back into computer data.
- moving:** Cutting and pasting data from one location in a document to another location in the same document.
- object oriented:** A feature of some graphics programs that stores the graphic data (drawings) as objects rather than as individual dots (pixels).
- on-line:** Connected to a host computer ("He is on-line to CompuServe").
- opening:** Making an existing file accessible for editing or revision.
- optical scanner:** A peripheral device that digitizes text and graphics for storage and display on a computer.
- outputting:** Moving data from the central processing unit to peripheral devices (opposite of inputting).
- pasting:** Copying the contents (text or graphics) of the Clipboard to a document. The contents will be pasted at the location of the cursor. The contents of the Clipboard are not erased and can be pasted again.
- pixels:** The smallest unit on the computer's screen: individual dots that make up the text and graphics.
- pointing and clicking:** Rolling the mouse to move the cursor to a location, icon, or object on the screen and then pressing the mouse button.
- point:** A measurement of the size of text. There are 72 points per inch.
- presentation graphics:** Charts and graphs prepared with the aid of a computer and used primarily for business presentations.
- programming:** Designing a spreadsheet to perform a specific function ("She programmed the spreadsheet to calculate her income tax").
- protocol:** The rules each computer follows when transmitting information to another. The protocol establishes the way data will be transmitted.
- RAM:** Random Access Memory: a memory chip used as primary storage in a microcomputer system. This memory can be written to and read from and only functions when the computer is turned on.
- record:** The component of a database that is made up of a collection of fields. For example, each record in a customer database would represent a customer, and the fields would contain information about that customer.
- relational database:** A database that contains fields having linkages or relationships to fields in another database (opposite of a flat file database).
- relative cell reference:** A reference to a relative cell location in a formula in the spreadsheet. The relative cell reference will be adjusted as appropriate by copying, moving, or filling.

- replacing:** Exchanging new text for old text once the old has been located in a document using the Find feature.
- right justification:** An alignment of text along the right margin.
- ROM:** Read Only Memory: a memory chip on which program instructions have been stored by the manufacturer. These instructions cannot be erased.
- saving:** Recording data stored in temporary memory onto a permanent file on disk.
- Scrapbook:** A permanent storage area used to collect data when cutting or copying text and graphics. It is used in conjunction with the Clipboard when copying multiple items.
- scrolling:** Moving the contents of a window either up and down or left and right to view all the contents. The scroll bars and scroll box perform this function.
- scroll bar:** The bar at the bottom right area of a window that controls the scrolling of the data in the window. Clicking on the appropriate arrow in the scroll bar will move the data up, down, left, or right within the window.
- scroll box:** The box inside the scroll bar that indicates the position of the data in the window relative to the entire contents of the document or file. Dragging on the scroll box will also scroll the data in the window.
- size box:** The small box in the lower right-hand corner of a window. Dragging on this box with the mouse will change the vertical and horizontal size of the window.
- sorting:** Arranging data in alphabetical, numerical, or chronological order.
- stop bits:** The number of bits used to separate the data bits in a transmission between two computers. Either one or two stop bits are used, depending on the host computer.
- system folder:** The folder located on a start-up disk that contains the operating system files.
- terminal:** A device used to communicate with a host computer.
- timeshare:** A type of mainframe and minicomputer operating system that allows multiple users to gain access to the computer and share processing time on it.
- title bar:** A bar at the top of a window that contains the name of the document, file, or window. The title bar can be dragged on with the mouse to relocate the window on the screen.
- undoing:** Erasing the immediately preceding action. The Undo command in the Edit menu offers this option to reverse your mistakes.
- user:** A person using a computer.

- white space:** Blank space in a publication or other printed matter used to provide an artistic effect.
- window:** A rectangle on the computer screen used to display the active contents of a file or document. The size and location of the window can be changed and its contents scrolled. Multiple windows can be open on the screen at the same time.
- word wrap:** A feature that automatically moves a word to the beginning of a new line of text when it's too long to fit within the margins.
- WYSIWYG:** What You See Is What You Get: the feature that allows you to see on the screen exactly what will be printed on the printer.
- zoom box:** The small box in the upper right-hand corner of a window. Pointing to and clicking in this box with the mouse will expand (zoom) the window to fit the Macintosh screen. Once you've zoomed the material, clicking again will reduce the window to its previous size and location.



SPECIAL KEYS

There are four Macintosh keyboards: the Macintosh Plus keyboard, the Apple standard keyboard, the Apple extended keyboard, and the Macintosh Classic keyboard. In addition to normal typewriter keys, a number of special keys appear on the Macintosh keyboards (see Figures I.1, I.2, I.3, and I.4). This appendix describes the functions of those special keys.

For more information about special keys, see the *Macintosh System Software User's Guide* that came with the Macintosh you're using.

I.1 SPECIAL KEYS COMMON TO ALL KEYBOARDS

Tab

Moves the cursor horizontally to the next tab stop in the word processor, the next cell in the spreadsheet, or the next field in the database. The Tab key also moves the cursor to the next data entry field in a dialog box.

Caps Lock

Locks the keyboard into the uppercase mode for letters only. Numbers and punctuation symbols are not affected by the Caps Lock key.

Shift

Produces, in combination with a letter or number key, the uppercase letter or the upper character printed on the key. For example, holding down the Shift key and pressing the 4 key will produce a dollar sign (\$).

Option

Produces, in combination with other keys on the keyboard, special characters or special functions. Most fonts have a variety of

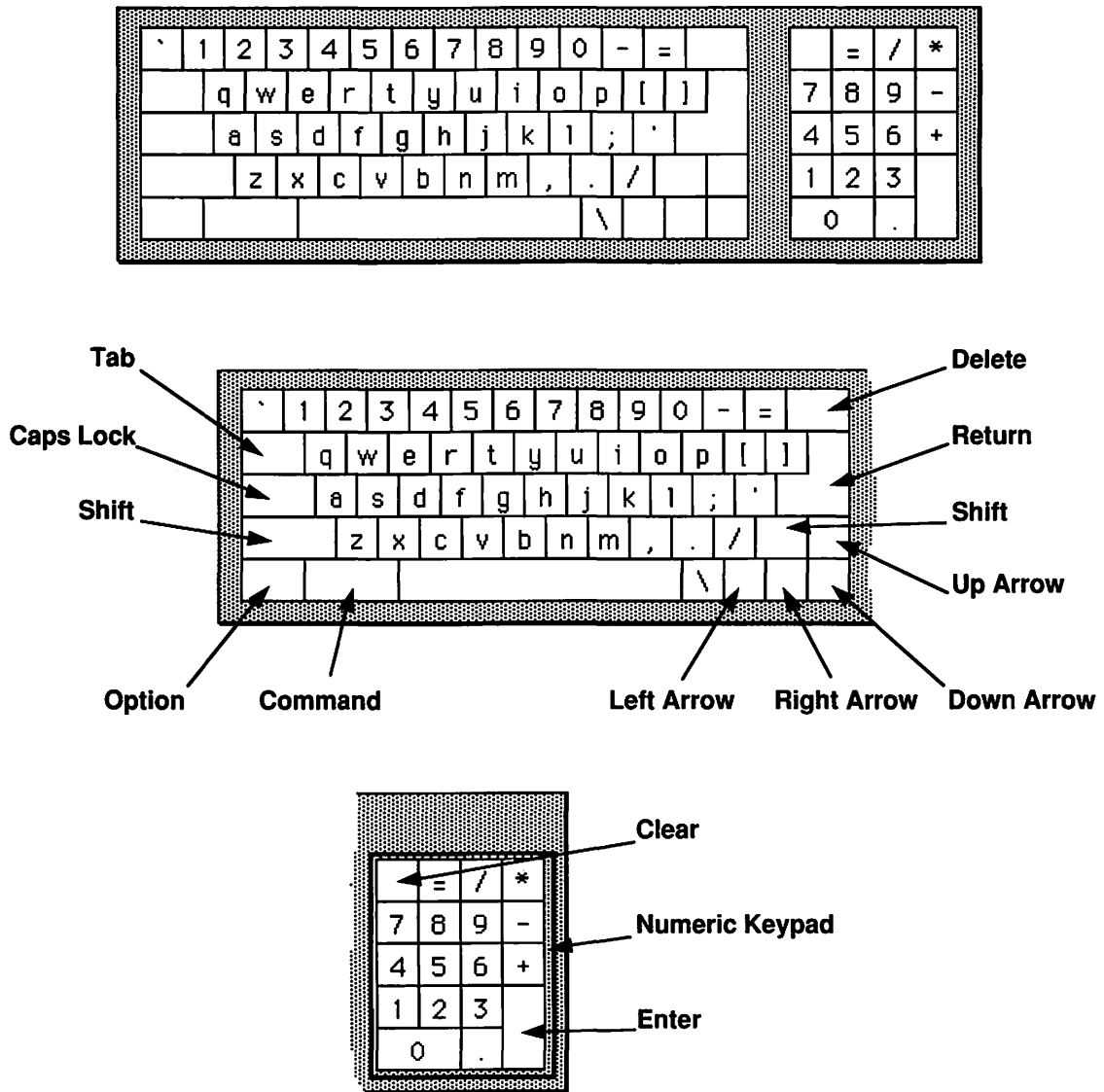


Figure I.1. Macintosh Plus Keyboard's Special Keys

symbols that can be typed by holding down the Option key while pressing a letter or number key. For example, the Option key and the R key produces the registered trademark symbol (®) in many fonts.

Command ⌘

Offers, when used in combination with another key, a shortcut to choosing a menu command or dialog box function. For example,

holding down the Command key and pressing the S key duplicates the function of the Save command in the File menu and will save the current document.

Delete/Backspace

Deletes the character to the left of the cursor. The Delete key can also be used to delete selected (highlighted) text and draw objects. The Backspace key on the Macintosh Plus keyboard serves the same function.

Return

Sends the cursor to the beginning of the next line and signals the beginning of a new paragraph in the word processor. In the spreadsheet and database, the Return key signals the end of text in a cell or field. In a dialog box, the Return key performs the same function as clicking on the outlined (default) button.

Arrow Keys

Move the cursor up, down, left, or right as an alternative to using the mouse.

Numeric Key Pad

The arrangement of the keys on the numeric keypad matches that of a desk calculator. They can be used in place of the number and arithmetic operator keys on the main keyboard to speed data entry when typing numbers and formulas.

Clear

Clears the calculator desk accessory under the Apple menu. In Works, the Clear key functions as the PF1 key when you're emulating a VT100 in the communications application. In other applications, the Clear key may or may not serve a function.

Enter

Performs the same function as the Return key. However, the cursor is not advanced to the next cell in the spreadsheet application. In the communications application, the Enter key has special functions in interaction with some host computers.

I.2 SPECIAL KEYS COMMON TO THE APPLE STANDARD, APPLE EXTENDED, AND MACINTOSH CLASSIC KEYBOARDS

Power

Turns on the computer (on the Macintosh II only). Choose Shut Down from the Special menu to turn off the computer.

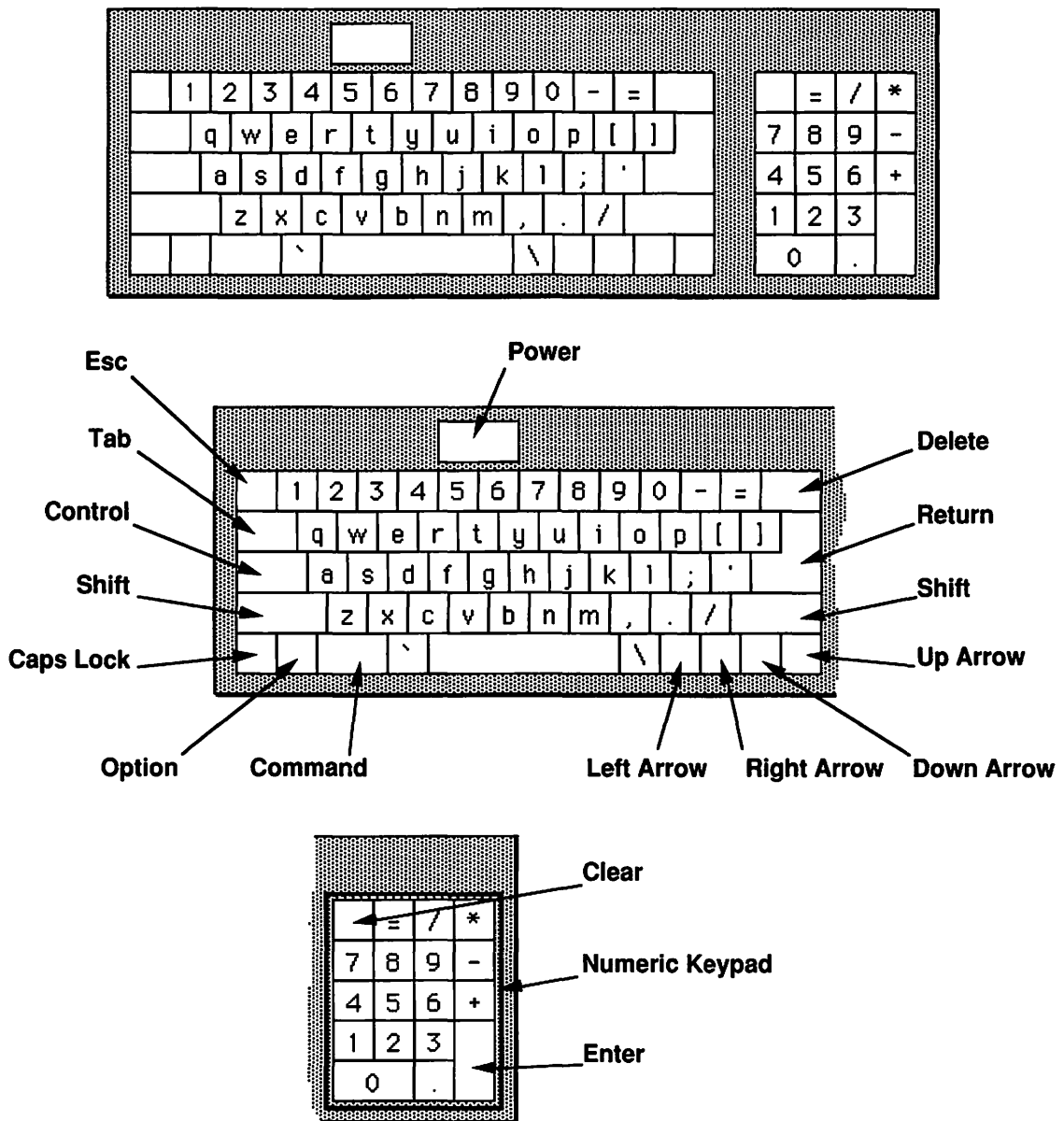


Figure I.2. Apple Standard Keyboard's Special Keys

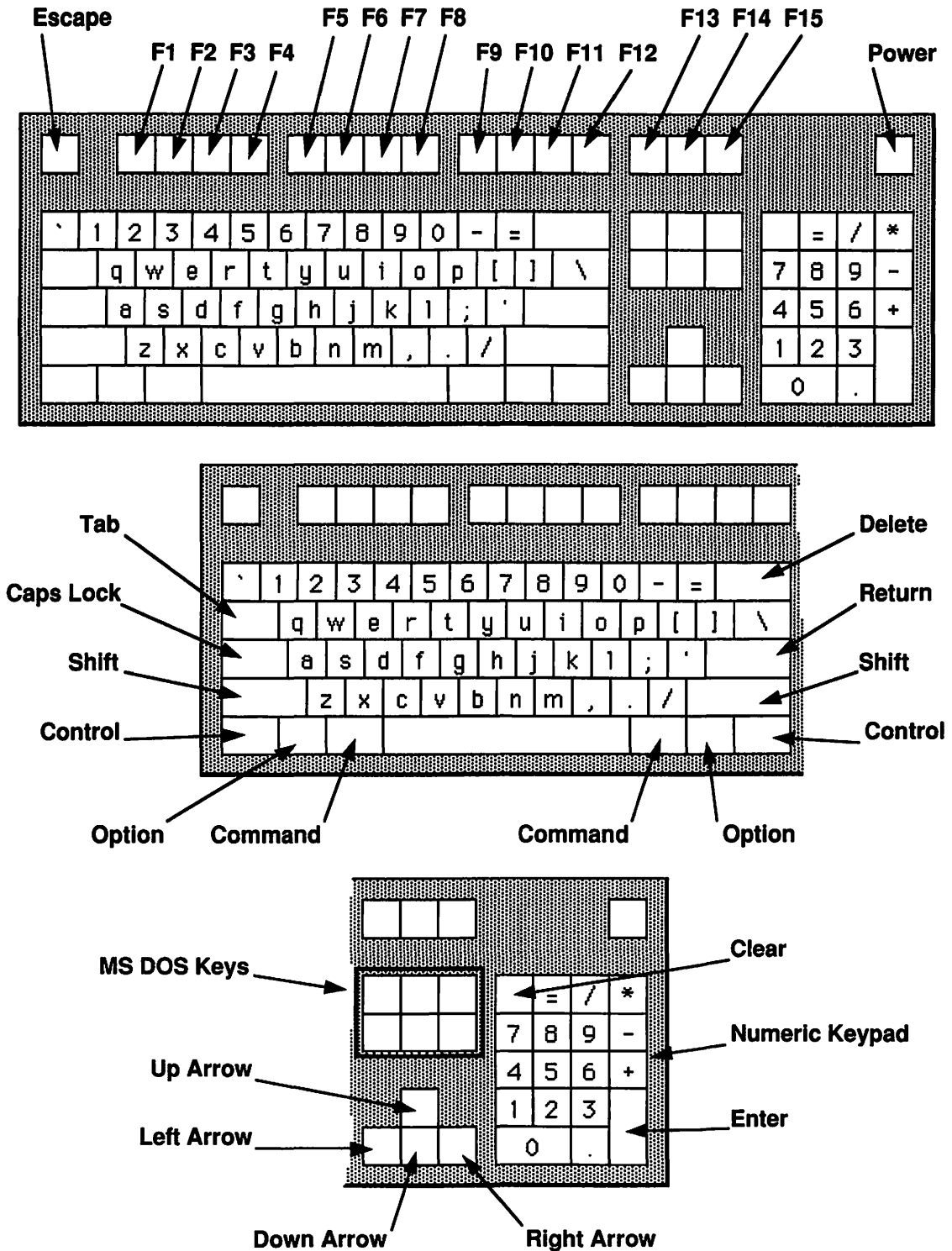


Figure I.3. Apple Extended Keyboard's Special Keys

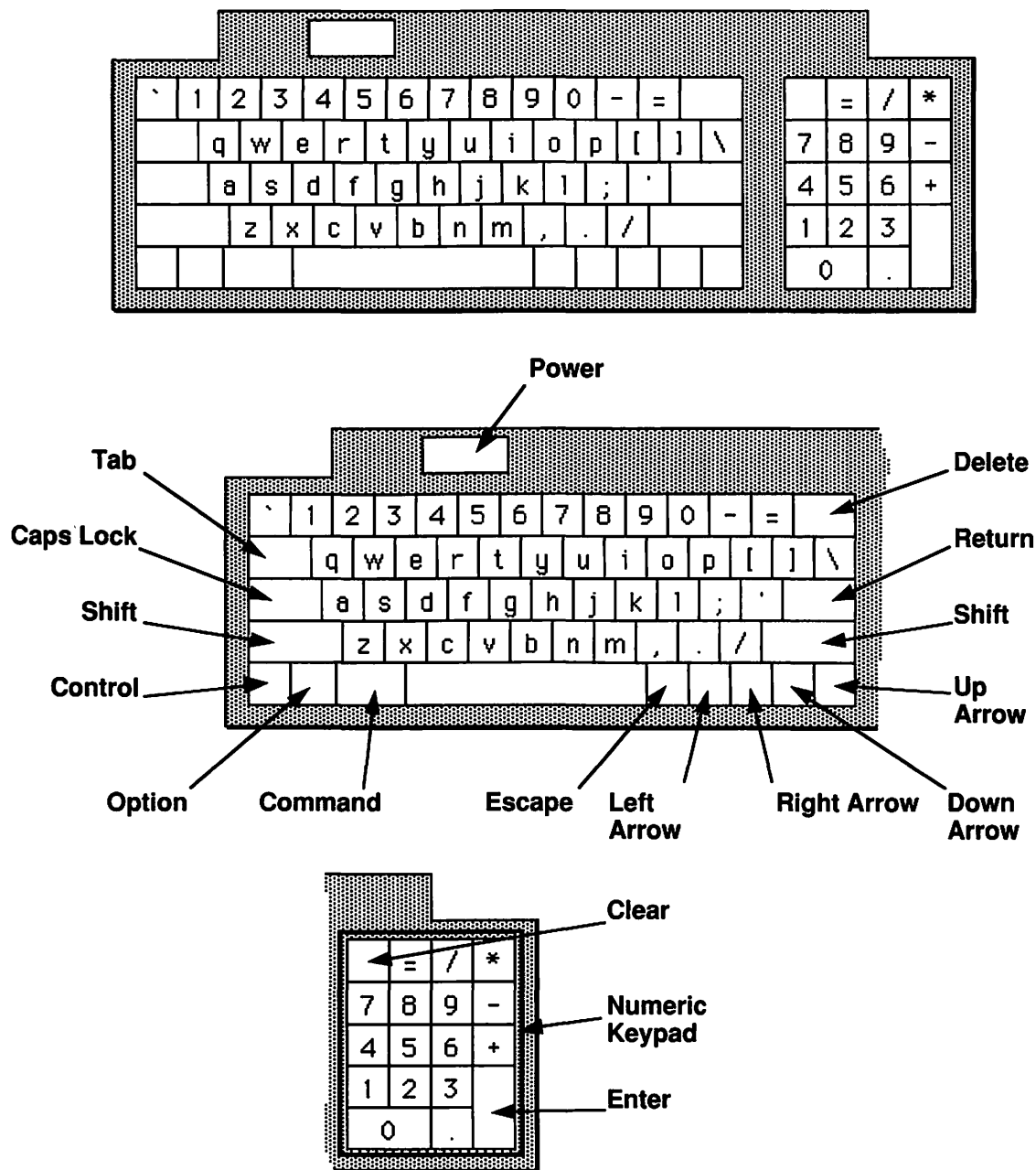


Figure I.4. Macintosh Classic Keyboard's Special Keys

Esc

Esc stands for Escape. This key has a variety of functions, but only with certain software. In the Works communications application the Esc key has special functions, depending on the host computer.

Control

Works in combination with other keys to provide shortcuts, as does the Command key. In the communications application the Control key is used in combination with other keys for various special functions, depending on the host computer.

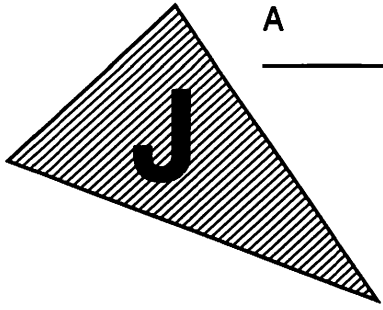
I.3 SPECIAL KEYS UNIQUE TO THE APPLE EXTENDED KEYBOARD

Function Keys (F1 through F15)

The 15 function keys are used in the communications application to work with host computers running UNIX or IBM operating systems. These keys are also used with special Macintosh programs that emulate the MS-DOS operating system used on IBM personal computers. They can also be used with the Macro menu to define Works macros.

MS DOS Keys

These special keys are used only with alternative operating systems like MS DOS. Their function varies according to the application. They have no function in Works.



HYPERCARD COMMUNICATIONS SIMULATION

The Communications Simulation file is a HyperCard stack located on the Supplemental Diskette (see Appendix G). To run the simulation you will need the HyperCard application that came with the Macintosh you're using. This stack is a simulated Works communications session for those of you who lack access to a modem or an information service. It simulates logging on to the Loyola University Library's on-line catalog system. You can complete the simulation (Problem 5 in Chapter 8) by following the directions here.

The steps you're about to take are identical to the real-life process of using Works communications application. However, if you make a mistake the simulation will print a warning on the screen telling you what it was. You must correct the mistake before continuing. Only general directions are provided here; you should review Chapter 8 to determine which settings to change and to review the process for logging on.

Directions

If you have two floppy disk drives, start up the Macintosh with the HyperCard start-up diskette. Insert the Supplemental Diskette in the empty disk drive. Launch the Communications Simulation by double clicking on the icon. If you have a hard disk drive and HyperCard is not already on the disk, drag the HyperCard application icon from the HyperCard diskette onto the hard disk. Drag the Communications Simulation icon from the Supplemental Diskette onto the hard disk. Launch the Communications Simulation by double clicking on the icon.

1. Open a new communications file. The Settings dialog box will appear.
2. The Loyola University Library on-line catalog (LUCI) requires the following communications protocol:

Terminal Type	VT100
Baud Rate	1200
Data Bits	7
Stop Bits	1
Parity	Odd

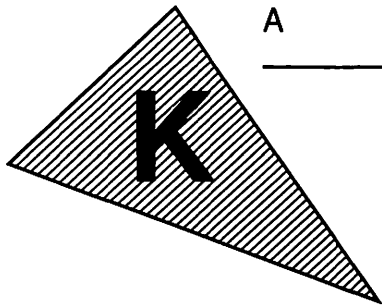
In our example, we do not want to capture the text when the document opens; adjust the settings in the dialog box appropriately.

3. Choose Echo Off from the Communications window.
4. Choose Dial from the Communications window. Enter Loyola in the Name field and 865-3990 in the Phone Number field. Click the appropriate Dial button.
5. Listen for the modem. When the connection is complete, the following text will appear in the Communications window:

```
CONNECT 1200
GANDALF PACX 2000
SERVICE?
```

Type *LUCI* and press the Return key.

6. The LUCI welcome menu will appear. Read the directions on the screen carefully. Do a subject search by typing the number 1. Enter *Macintosh* as the subject to be searched. Press the Enter key to initiate the search.
7. The next screen indicates that there are 36 references found for Macintosh. Type the number 1 to see a list of the references. Review the references by pressing the N key (for Next screen) or the P key (for Previous) until you find a book titled *Personal Publishing with the Macintosh*. Review the full citation for this book by typing the number 8. Check to see whether it is on the library's shelf by pressing the C key.
8. Press the S key to return to the main LUCI menu.
9. Do an author search by typing the number 2. Enter *Nickles, Herbert* as the author to be searched. Press the Enter key to initiate the search. The full entry for *The Practical Apple* will appear on the screen.
10. To end the communications session, choose Hang Up from the Communications menu and then Quit from the File menu.



USING THE MACRO MENU

A macro is a recorded set of mouse and keyboard actions stored in a macro file on disk. A macro can be played back at any time to recreate the original mouse and keyboard commands. This Works feature lets you safeguard against errors in repetitive tasks, create shortcuts for frequently performed functions, and perform complex Works commands even if you are new to the system.

One key on the keyboard is associated with each macro. Playing back the macro is as simple as holding down the Option key and pressing the appropriate companion key. Perhaps you always end your correspondence with *Sincerely Yours*, followed by your name and title. Instead of typing this hundreds of times a year, you can record the keyboard actions in a macro and associate the C key with it. To end your future correspondence, you just press the C key while holding down the Option key. Works will type in the exact text and spacing for you.

Mouse commands are also recorded in sequence along with keyboard actions in a macro. You can change fonts or styles, or perform any other feature accessible from the Menu Bar with the mouse. You can even cue Draw On and quickly add boxes, shading, or other graphics to a document. In the spreadsheet, you can record a macro to automatically draw a chart; in the database you can sort, select records, and print a report with a macro. As you can imagine, the macro feature can become a very powerful productivity tool once you've mastered it.

K.1 RECORDING A MACRO

A few simple steps must be followed in recording a macro.

1. Choose Macro On from the Macro menu, if it is not already checked.
2. Choose Start Recording from the Macro menu.
3. Type the key you want to associate with the macro.

Helpful Hint: You can use any key, including the function keys (F1 through F15) on the Macintosh extended keyboard, with the following exceptions: accent keys (é, î, ñ, ü, and è), Shift, Option, Command, Caps Lock, Delete, Backspace, ', =, -, +, and _.

4. Press the Tab key and enter a short description of the macro.
5. Click on the Record button.
6. Perform the function you wish to record, using the mouse and the keyboard in the normal way.

Helpful Hint: Certain mouse actions should not be used when recording a macro because they may not play back properly. These include drawing with the Freehand tool in the draw mode and using scroll bars, scroll boxes, and scroll arrows.

7. When the function has been completed, choose Stop Recording from the Macro menu. When the Stop Recording dialog box is displayed, click on the Stop button.

K.2 PLAYING BACK A MACRO

Once a macro has been recorded it can be played back at any time, in any window, and at any location in the window. There are three ways to play back a macro.

1. Check Macros On in the Macro menu, if it is not already checked.
2. Choose Playback And from the Macro menu.
3. The Playback dialog box will display a list of available macros. Select the desired macro with the mouse or type the associated key.
4. Click on the Play button. Works will execute the macro exactly as you recorded it.

OR

1. Check Macros On in the Macro menu, if it is not already checked.
2. Choose Playback And from the Macro menu.
3. The Playback dialog box will display a list of available macros.
4. Double click on the desired macro. Works will execute the macro exactly as you recorded it.

OR

1. Check Macros On in the Macro menu, if it is not already checked.

2. In your document, hold down the Option key and press the key associated with the desired macro. Works will execute the macro exactly as you recorded it.

K.3 HANDLING MACRO FILES

When the **Macros On** command is chosen from the Macro menu, Works automatically opens the default macro file, *Microsoft Works(keys)*. If this file is not on the same disk as the Works program, a new *Microsoft Works(keys)* file is created. When a macro is recorded, the **Stop Recording** command saves the macro to the *Microsoft Works(keys)* macro file. Consequently, macros are not associated with a particular spreadsheet, word-processing, or database file. Rather, they are associated with the user, who can build a macro file for customized functions in several applications.

If you wish to store macros in a macro file other than *Microsoft Works(keys)*, use the **Open Macro File**, **Save Macro File**, and **Save Macro File As** commands in the Macro menu. These commands resemble the normal **Open**, **Save**, and **Save As** commands in the File menu, but they work only with the current macro file.

K.4 SUMMARY OF MACRO MENU COMMANDS

Macros On

Turns on the macro feature in Works and opens the default macro file, *Microsoft Works(keys)*. If the *Microsoft Works(keys)* file is not on the Works disk, a new *Microsoft Works(keys)* file is opened. A check mark (✓) indicates that the option is in effect.

Macros Off

Turns off the macro feature. Choosing this command does not save the current macro file. A check mark (✓) indicates that the option is in effect.

Playback And...

Plays back previously recorded macros. The Playback dialog box lets you select the desired macro and play it back using the Play button. The dialog box also lets you maintain macro files. Macro files can be opened, saved, and renamed (**Save As**); individual macros can be deleted from or added to any macro file.

Start Recording...

Starts the recording of mouse and keyboard commands. A dialog box lets you describe the new macro and assign a key to it. When you want to play back the macro, hold down the assigned key



simultaneously with the Option key to initiate it. The following keys cannot be associated with a macro: accent keys (é, î, ñ, ü, and è), Shift, Option, Command, Caps Lock, Delete, Backspace, ', =, -, +, and _.

Stop Recording...

Stops the recording of mouse and keyboard commands and saves the recorded macro to the macro file. Dialog box options let you go back and record previous delays, record future delays, and/or continue recording.

Record Pauses

Records all pauses and delays along with the mouse and keyboard commands. Works plays back a macro as fast as possible, making it difficult to see what is happening on the screen. Recording pauses in the macro will slow down the playback to the speed at which it was recorded. A check mark (✓) indicates that the option is in effect.

Open Macro File...

Opens a new or existing macro file and its associated macros. A dialog box lets you select files and disks.

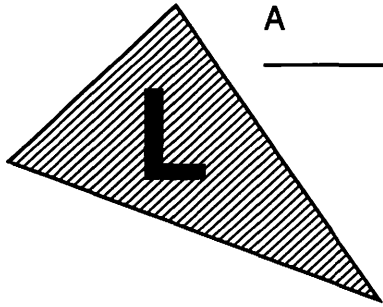
Save Macro File

Saves the open macro file to the disk. If the file has not been saved previously, a dialog box requires that a file name be entered and

provides options for changing disks. If the file has been named previously, the current file will be saved over the original file with the same file name.

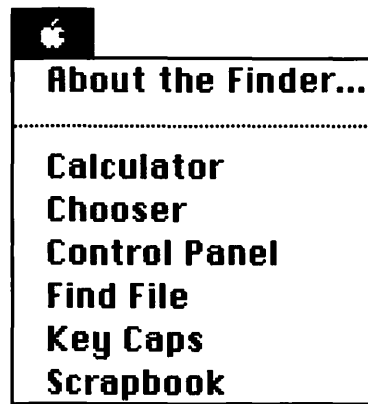
Save Macro File As...

Saves the open macro file with a new file name. The original file is kept intact. A dialog box lets you enter the new file name and change disks.



USING THE DESK ACCESSORIES

The Macintosh desk accessories are utilities that can be chosen in the Apple menu, located at the far left of the Menu Bar. This menu is available from all Macintosh applications. For example, the calculator can be used from the Works word processor, MacWrite, MacDraw, or any other Macintosh program.

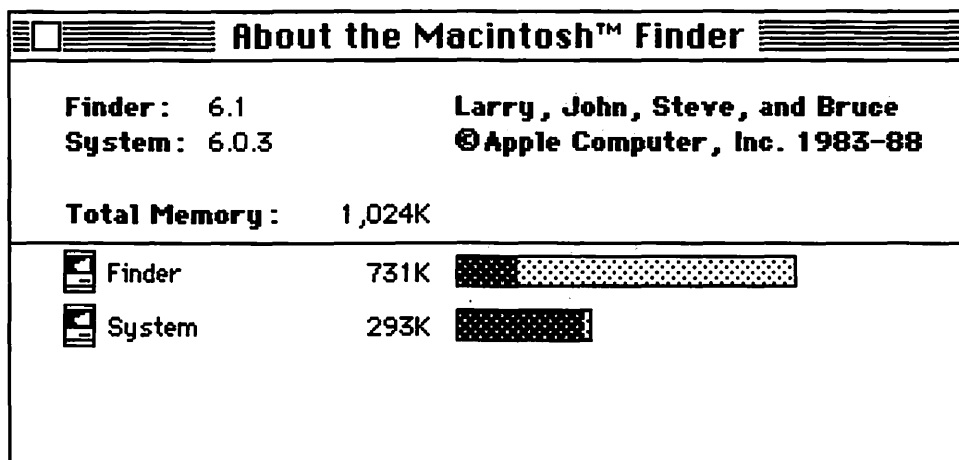


The Desk Accessories reside in the Macintosh system file on the start-up disk. You can add or remove desk accessories from the system file using the Font/DA Mover (see Appendix M).

For more information about individual desk accessories, see the *Macintosh System Software User's Guide* that came with the Macintosh computer you're using.

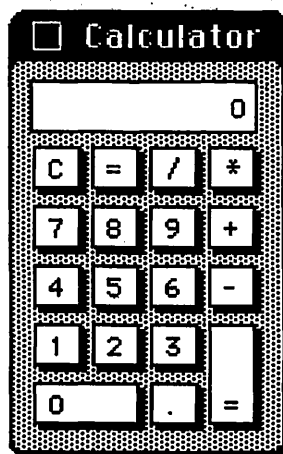
L.1 ABOUT THE FINDER...

When you choose this command, you'll see a window containing information about the Finder. The version of the Finder and the



system files, the total memory available, and the amount of memory used by the Finder and the System are displayed. Use the close box to close the About the Finder window.

L.2 CALCULATOR



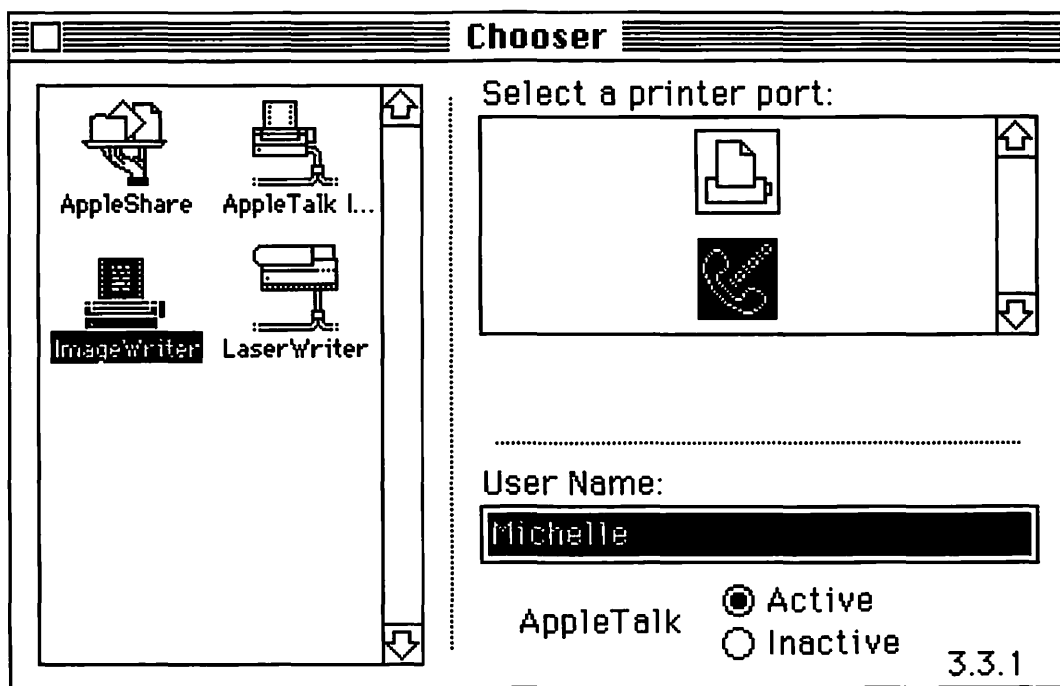
A standard calculator appears on the screen when you choose the Calculator from the Apple menu. This desk accessory is used like a normal hand-held calculator. Use the mouse to point to and click on the calculator keys or use the corresponding keys on the keyboard. The C key clears the Calculator's display and the =

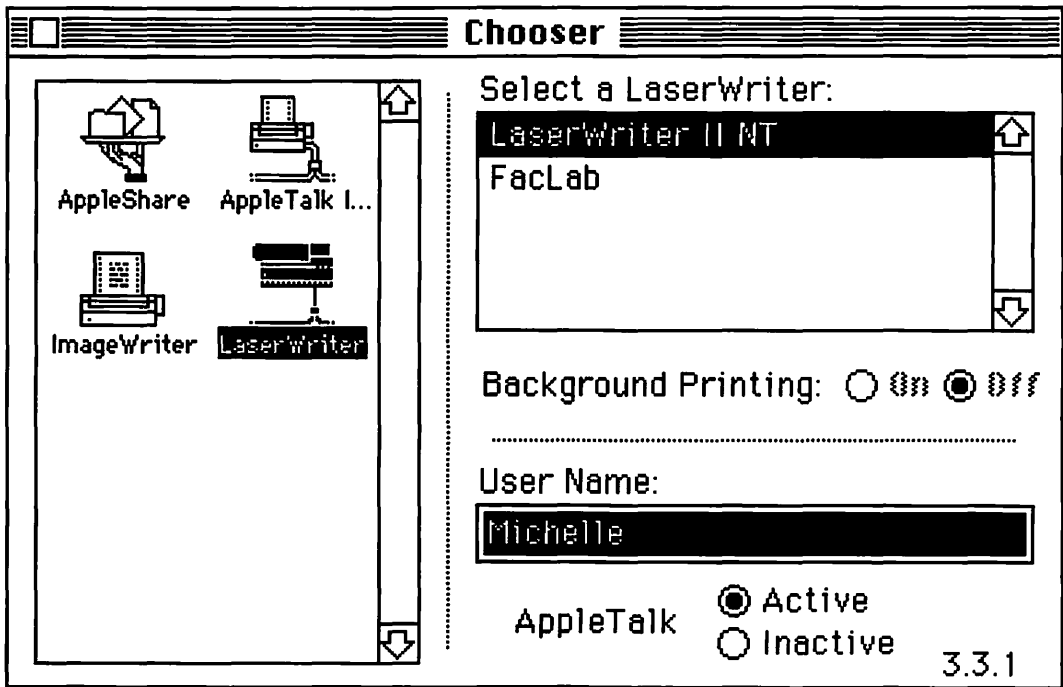
(equals) key displays the result of the calculation. For example, to add the numbers 9 and 4 press the C key followed by the 9 key, the + key, the 4 key, and the = key.

L.3 CHOOSER

The Chooser lets you select among available peripheral and network devices such as printers, file servers, and modems. Accessible from the Apple menu, the Chooser's dialog box displays icons representing all available devices attached to the Macintosh—or to the network, if your Macintosh is connected to an AppleTalk network. Select the device you want by pointing to and clicking on its icon with the mouse. If more than one device of that type is available, you can select the appropriate one from the displayed list. The Chooser can also be used to connect the Mac with or disconnect it from an AppleTalk network. Chooser selections go into effect when the Chooser window is closed.

In the first screen that follows, the ImageWriter printer icon was selected. The user also had to specify whether the printer were attached to the printer port or the telephone modem port.



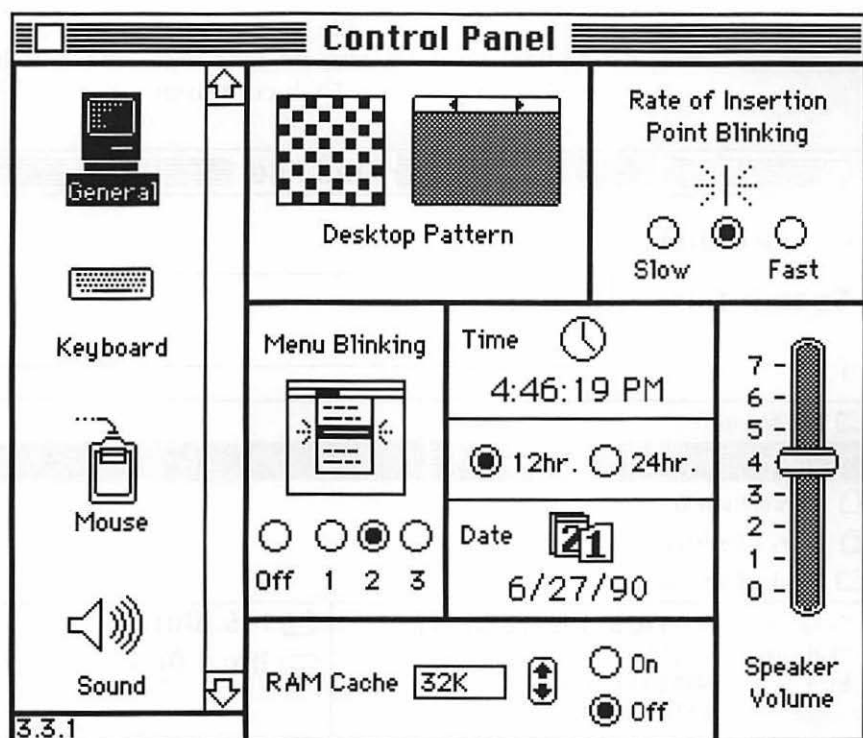


In the second screen, the user wished to print on a LaserWriter printer attached to an AppleTalk network. The LaserWriter icon was selected and the LaserWriter II NT printer selected from the LaserWriter printers available on the network. AppleTalk must be Active to print on a network printer.

L.4 CONTROL PANEL

The Control Panel lets you control aspects of many Macintosh features, such as the keyboard, mouse, monitor, desktop, and speaker. The Control Panel window displays a scrolling field of icons representing those features. When an icon is selected with the mouse, its settings are displayed on the Control Panel. The General icon lets you change the desktop pattern, the cursor's and menus' blinking rate, the time and date, and the speaker volume. You change the current settings by pointing and clicking with the mouse on the buttons provided.

You can customize the Control Panel by modifying the system folder on the start-up diskette. For further information, see the



Macintosh System Software User's Guide that came with the Mac you're using.

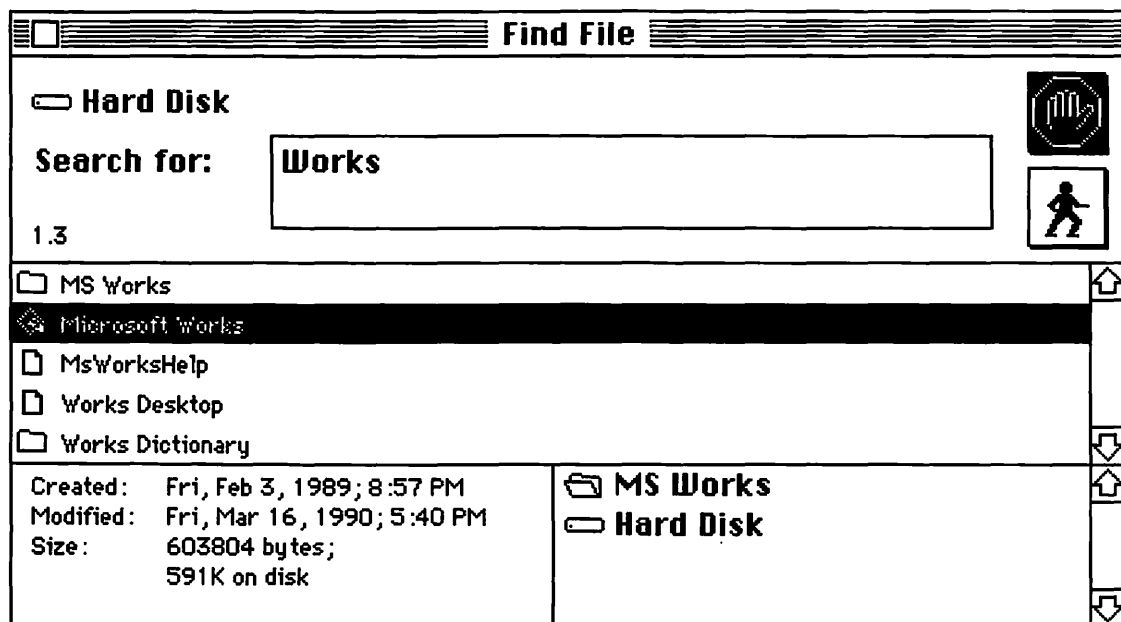
L.5 FIND FILE

The Find File command searches through the file names on a particular disk and lists all names containing the elicited text. The dialog box allows you to change disks by clicking on the disk name, to enter the target text in the Search for box, and to begin the search by clicking on the Search icon:



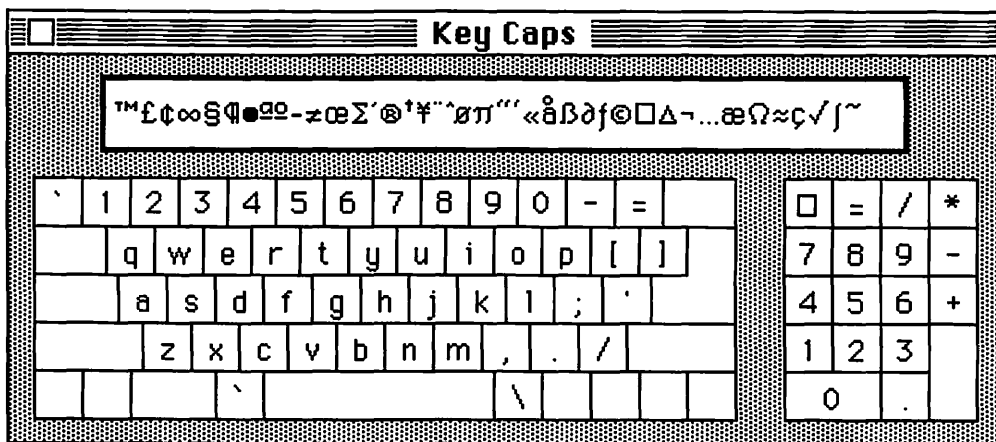
Each file name containing the target text is printed in the Find File window. When one of these files is selected with the mouse, information pertaining to it is printed at the bottom of the window:

the folder that the file is located in, the file's creation date, its modification date, and its byte size. In the following example, all the files on the Hard Disk containing the word *Works* were found.



L.6 KEY CAPS

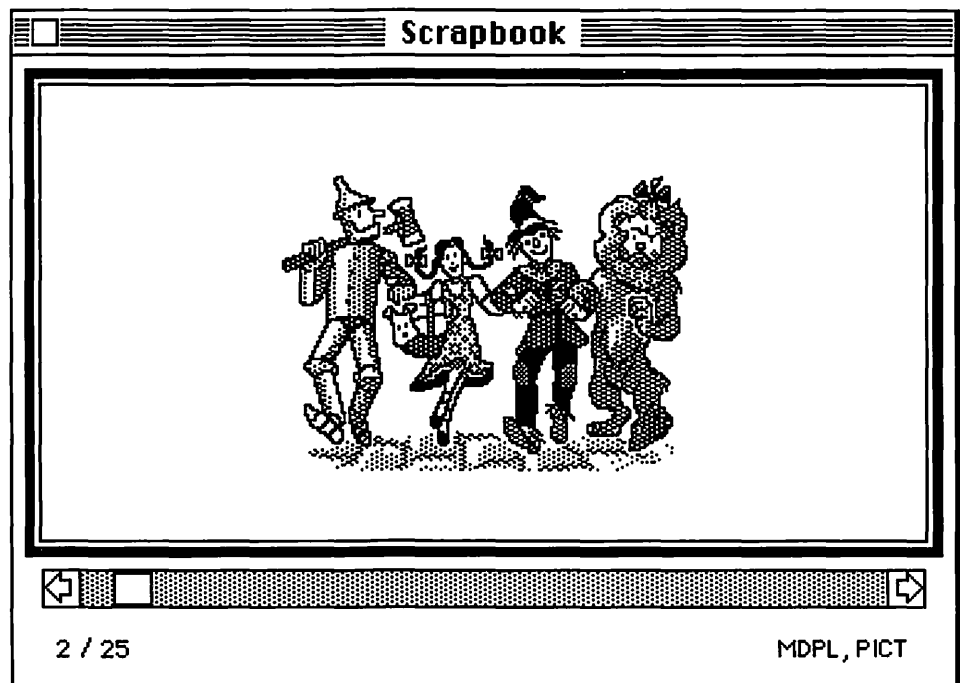
The Key Caps command portrays the Macintosh keyboard. When a key is selected by the mouse or by typing a key on the keyboard, the corresponding letter, number, or symbol is typed in the Key Caps window. This lets you easily identify which keys print special characters.

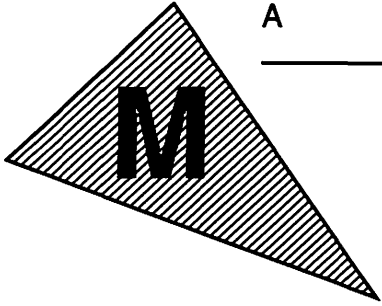


Most Macintosh fonts contain several special characters. For example, the following characters can be printed using the Helvetica font and holding down the Option key in conjunction with the 4, 5, 7, R, and G keys, respectively: ¢ ∞ ¶ ® © (see the Key Caps screen on the previous page). Holding down the Shift or Option key will display the special characters on the Key Caps simulated keyboard. Special characters in different fonts can be compared by choosing the desired font from the Key Caps menu in the Menu Bar.

L.7 SCRAPBOOK

The Scrapbook stores data from the Clipboard for use at a later time. Unlike the Clipboard, which can store only one item at a time, the Scrapbook stores multiple items—text, graphics, charts, and so on—until you remove them. The Edit menu commands Cut, Copy, and Paste are used to move items in and out of the Scrapbook. Cut deletes an item from the Scrapbook and places it on the Clipboard; Copy duplicates an item on the Clipboard; and Paste copies an item from the Clipboard into the Scrapbook. A scroll bar at the bottom of the Scrapbook window controls which Scrapbook item is being selected. The following example shows a clip art graphic stored in the Scrapbook. See Section 7.2.3 for more details on using the Scrapbook.





USING THE FONT/DA MOVER

The Font/DA Mover is a utility program used to add or remove fonts and desk accessories (DA's). Fonts reside in the system file located in the system folder on a Macintosh start-up disk. Because so many fonts are available, a utility program, the Font/DA Mover, was designed to move fonts into the System file from a font file. Desk accessories are other utilities accessible from all Macintosh applications (see Appendix L); they are handled by the Macintosh just as fonts are. Consequently, the Font/DA Mover must also be used to move a desk accessory into the system file. The Font/DA Mover is found on the Utilities 2 diskette that came with the Macintosh you're using.

M.1 STARTING THE FONT/DA MOVER

The Macintosh should be started up using the start-up diskette on which you want the font or desk accessory installed. For example, to add a font for use with Microsoft Works you should start up the Macintosh with the Works start-up diskette. If you wanted to use that font with other application programs, such as MacDraw or MacPaint, you would also have to install that font on their start-up diskettes. If you have a hard disk Macintosh, the font or desk accessory need only be installed on the hard disk.

The Font/DA Mover is an application program, just like Microsoft Works. It is launched (started up) much as you launched Microsoft Works.

1. Start up the Macintosh using the Works start-up diskette.

Helpful Hint: If you have a hard disk drive, just turn on the Macintosh and skip to Step 2.

2. Insert the Utilities 2 diskette into an empty floppy disk drive.

3. If the Utilities 2 window in Figure M.1 is not visible on the screen, open the Utilities 2 disk icon.
4. Start the Font/DA Mover by double clicking on the Font/DA Mover icon (see Figure M.1).
5. The Font/DA Mover dialog box should appear (see Figure M.2).

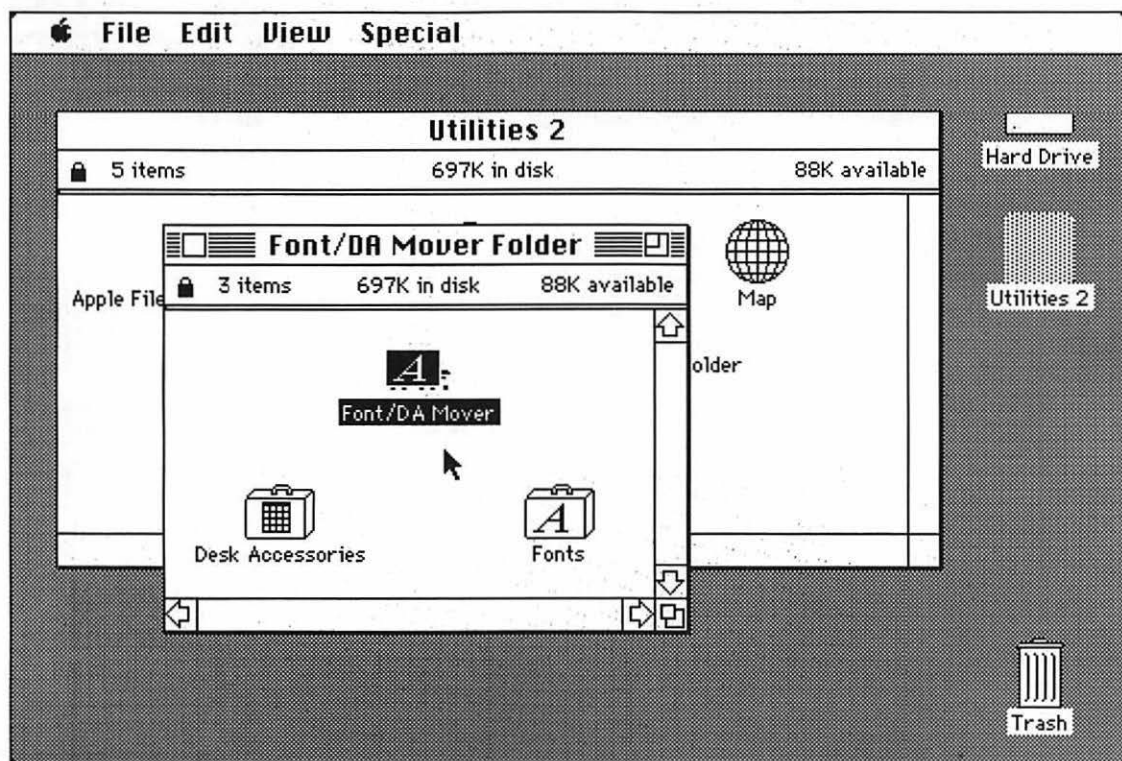


Figure M.1. Launching the Font/DA Mover from the System Utilities Disk

M.2 INSTALLING A FONT IN THE SYSTEM FILE

When the Font/DA Mover is launched, a list of the fonts in the system file of the start-up diskette is displayed on the left side of the window (see Figure M.2). This list can be scrolled to review the fonts currently in the system. To add a font, you must open the font file containing the desired font. A font file is simply a file that contains fonts. This file could be a system file on another start-up diskette, a commercially purchased font file, or a font file you've created as back-up storage.

Click the Open button on the right side of the window. A dialog box will allow you to select the desired font file. In the example in Figure M.3, the file named Fonts on the Utilities 2 disk is used.

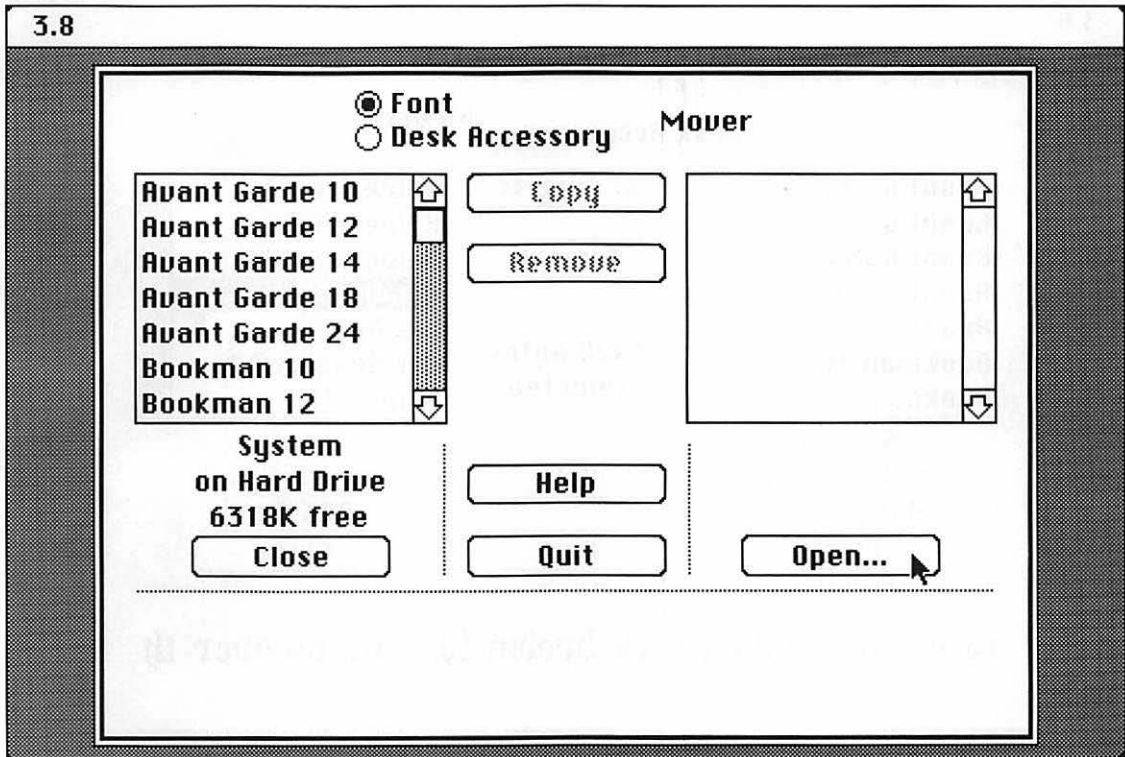


Figure M.2. The Font/DA Mover Dialog Box

This file contains the standard Macintosh fonts provided by Apple Computer. When the font file has been opened, its contents are displayed in the scrolling field on the right side of the window.

To copy a font from the font file into the system file, select the one you want from the font file (the list on the right in Figure M.3). A sample of the font will be printed at the bottom of the window and the amount of disk space needed will be printed between the two lists. (In the Figure M.3 example, the font chosen, London 18, needs 3,420 bytes.) The size of the font is important, because each font you add will increase the size of the system file. In some cases there may not be enough room on the diskette to install another font. The amount of free space available is indicated beneath the disk's name.

You may also have noticed that several sizes of each font are available. The numbers after the font name indicate the point size of that font. Helvetica 14 is the Helvetica font in 14 points. For superior printing, you want as many sizes of a particular font as possible in your system file. However, some trade-offs must be made between maintaining a large selection of fonts and leaving

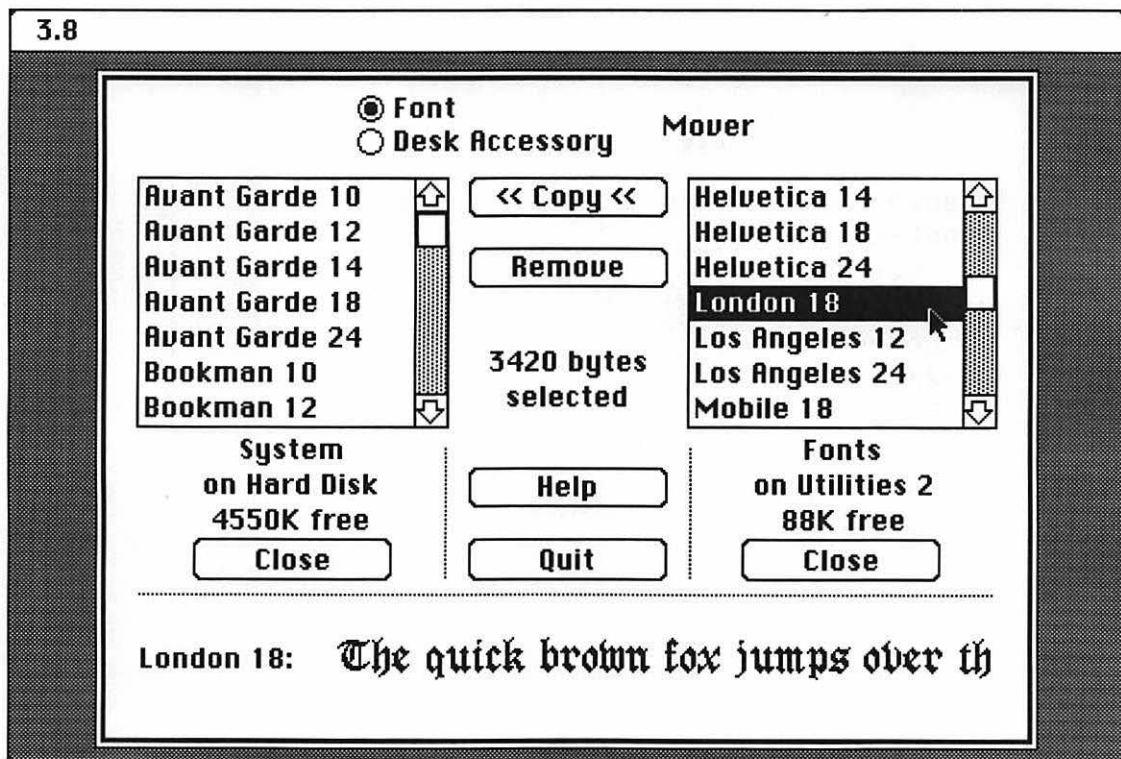


Figure M.3. Copying a Font from a Font File into the System File

enough space available on the start-up disk. If you require a large number of fonts and font sizes, you should use a hard disk Macintosh.

Once you've chosen the font you want from the font file, click the Copy button to install it in the system file. Multiple fonts can be copied by holding down the Shift key while selecting the fonts: when the Copy button is clicked, every font selected will be copied. Additional fonts from other font files can be copied to the system by closing the font file and opening another. Click the Quit button to quit the Font/DA Mover.

M.3 REMOVING A FONT FROM THE SYSTEM FILE

To remove a font from the system file, select the desired font and click on the Remove button (see Figure M.4).

Caution: Removing a font from the system folder deletes it permanently. Unless you have stored the font in another font file, you will not be

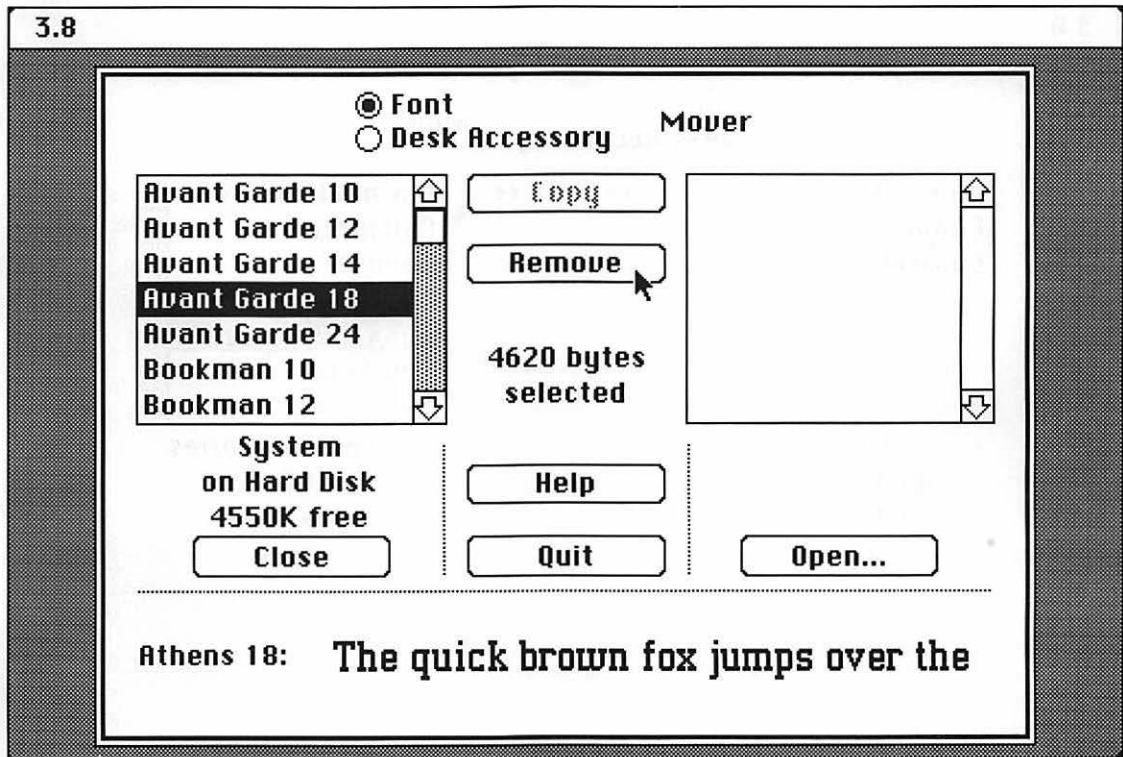


Figure M.4. Removing a Font from the System File

able to add it back into the system. To create a back-up font file, click the Open button, create a New font file, Copy the desired font to the new file, and then Remove the font from the system file.

M.4 INSTALLING A DESK ACCESSORY IN THE SYSTEM FILE

Installing a desk accessory is similar to installing a font. When the Font/DA Mover is launched, the Font button is automatically selected at the top of the window (see Figure M.2). Click the Desk Accessory button instead, and a list of the desk accessories currently installed in the system file will appear. To add a desk accessory (DA), open the file containing the DA you want. A DA file is simply a file that contains desk accessories. It could be a system file on another start-up diskette, a commercially purchased DA file, or a DA file you have created as back-up storage.

Click the Open button on the right side of the window. A dialog box will allow you to select the desired DA file. In the example in

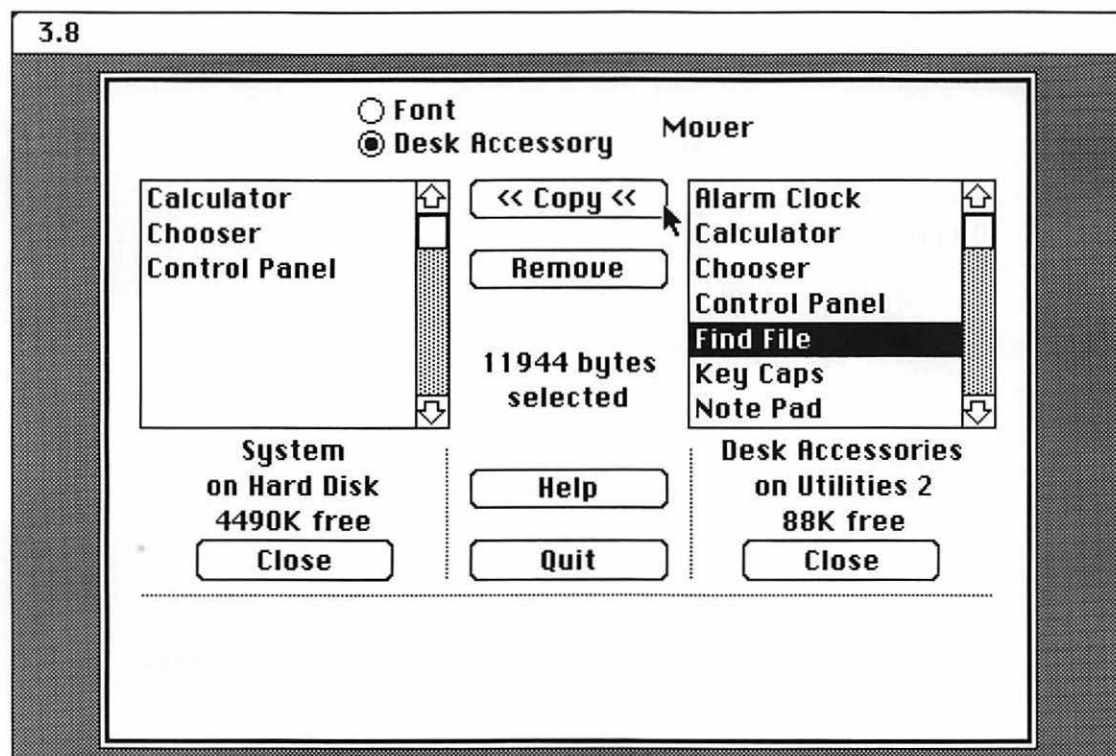


Figure M.5. Copying a Desk Accessory into the System File

Figure M.5, the Desk Accessories file on the Utilities 2 disk is used. This file contains the standard Macintosh DA's provided by Apple Computer. When the DA file has been opened, its contents are displayed in the scrolling field on the right side of the window.

To copy a DA from the DA file into the system file, select the DA you want from the DA file (the list on the right in Figure M.5). The amount of disk space needed will be printed between the two lists. (In the Figure M.5 example, the DA chosen, Find File, needs 11,944 bytes.) The size of the DA is important, because each one you add will increase the size of the system file.

Once you've chosen a DA from the DA file, click the Copy button to install the DA in the system file. Additional fonts from the same DA file or from other DA files can be copied to the system. Click on the Quit button to quit the Font/DA Mover.

M.5 REMOVING A DESK ACCESSORY FROM THE SYSTEM FILE

To remove a desk accessory from the system file, select the desired DA and click on the Remove button.

Caution: Removing a DA from the system folder deletes it permanently. Unless you stored the DA in another DA file, you will not be able to add it back into the system. To create a back-up DA file, click the Open button, create a New DA file, Copy the desired DA to the new file, and then Remove the DA from the System file.

For more information on the use of the Font/DA Mover, see the *Macintosh Utilities User's Guide*, published by Apple Computer and included with each Macintosh computer.

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