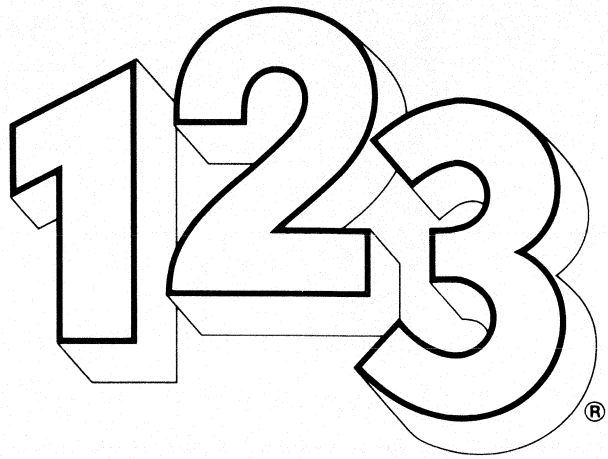

Tutorial

Release 2

Lotus®

Photographs by Jonathan Rawle
Illustrations by Bruce Sanders

Second printing

Preface

Before You Begin

Before you start the lessons in this *Tutorial*, read *Getting Started* and perform the disk installation procedure described there. Then you should go through *A View of 1-2-3*.

Who Should Read This Book

The *Tutorial* is designed for people who are unfamiliar with computers or 1-2-3. Through a series of lessons, you create and print worksheets and graphs, sort a database, and write macros. In the process, you learn to use 1-2-3 productively.

The lessons in this *Tutorial* do not teach you everything about 1-2-3; they are meant, instead, to give you a working knowledge of the program. The *Reference Manual* contains detailed information about all the features of 1-2-3. Refer to it when you want more information about a particular command or procedure described in this book.

Organization of the *Tutorial*

The *Tutorial* is meant to be read sequentially. The most basic steps are taught first and lead to more complex procedures.

Chapter 1—Learning the most basic 1-2-3 functions such as moving around the worksheet and using the Help facility.

Chapters 2 and 3—Creating basic and intermediate level worksheets and graphs.

Chapter 4—Printing the worksheets and graphs from Chapters 2 and 3. Also, writing memos in a worksheet.

Chapter 5—Sorting and extracting information from a 1-2-3 database.

Chapter 6—Using 1-2-3's macro capability. Includes branching, looping, data entry, and self-starting macros.

Summaries at the end of each lesson remind you of the commands and procedures you are learning.

Typographical Conventions

In the *Tutorial* the names of keys appear in special type: for example ESCAPE or RETURN. To find out which keys on your computer keyboard are equivalent to the keys named in this *Tutorial*, refer to the Keyboard Guide included in the 1-2-3 package. Be sure the Keyboard Guide is the correct one for your computer.

Instructions that you follow as you read the text appear in **boldface**. Words and numbers that you type as you follow the instructions appear in a different type style: for example, INCOME PROJECTION 1986 and 9+5.

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Chapter 1
BEGINNING 1-2-3®

1-2-3 is a powerful tool. You can use 1-2-3 worksheets to organize and analyze your data in many useful ways. Before you can begin to take advantage of the power of 1-2-3, you must learn a few basic concepts and master a few basic skills.

The fundamental structure for storing and organizing information in 1-2-3 is the worksheet. In this chapter you will learn how to start 1-2-3, how to identify the parts of a 1-2-3 worksheet and move around in it, and how to use menus. Specific skills you will learn include erasing a cell, canceling an error, using 1-2-3's on-line Help facility, and changing the startup directory. Finally, you will learn how to leave the 1-2-3 worksheet and return to the computer's operating system.

Keys to Locate: This is a list of 1-2-3 keys you use in this chapter. Refer to the Keyboard Guide inside your 1-2-3 package and locate these keys on your keyboard. As new keys are introduced in future lessons, a small list similar to this one will appear in the margin.

RETURN	BIG RIGHT
RIGHT	BIG LEFT
LEFT	GOTO
UP	HOME
DOWN	END
PAGE UP	/ (slash)
PAGE DOWN	

Before You Begin

Be sure you have read *Getting Started*, have installed the 1-2-3 System and PrintGraph Disks, and have used *A View of 1-2-3*, before you begin the lessons in this *Tutorial*.

Before you start 1-2-3, you must first turn the computer on and have the operating system prompt visible on the screen. To accomplish this:

One and Two-Disk Systems

Place the operating system disk in drive A and turn the power switch on

After a short wait, the computer beeps and the operating system prompts you to type in the date and time, unless you have an internal clock to supply this information. For example, if the date is July 11, 1986, type 07-11-86; if the time is 1:45 p.m., type 13:45. You must press RETURN after each entry.

Type the date and time, if necessary

After you enter the date and time, the computer displays the operating system prompt.

Remove the operating system disk from the disk drive and replace it with the 1-2-3 System Disk

Now turn to the section, Starting 1-2-3.

Hard-Disk System

Turn the power switch on with the disk drive door open

After a short wait, the computer beeps and the operating system prompts you to type in the date and time, unless you have an internal clock to supply this information. For example, if the date is July 11, 1986, type 07-11-86; if the time is 1:45 p.m., type 13:45. You must press RETURN after each entry.

Type the date and time, if necessary

After you enter the date and time, the computer displays the operating system prompt. Be sure you are in the directory with your 1-2-3 files.

Place the 1-2-3 System Disk in the disk drive

Starting 1-2-3

At the operating system prompt, you have a choice of starting 1-2-3 directly or through the Access System. If you start 1-2-3 directly from the operating system prompt, you can save time and a small amount of your computer's memory. If you start 1-2-3 through the Access System you can use the Access System menu to select the various programs. Both methods are described here. For the purposes of this chapter, you should start 1-2-3 through the Access System. In later chapters, choose either method.

To start 1-2-3 directly:

Type 123 **at the operating system prompt**

Press RETURN

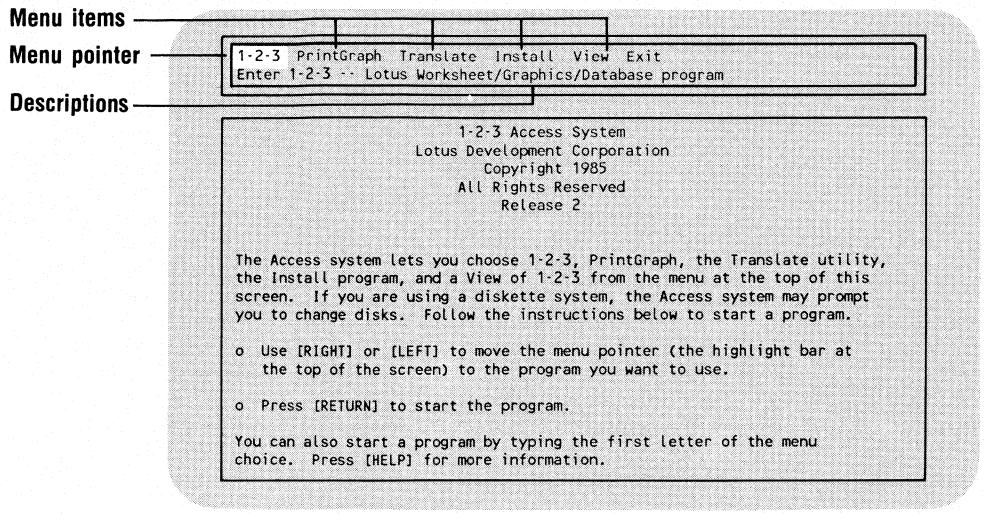
The Access System provides a menu from which you can select the various programs.

To start 1-2-3 through the Access System:

Type lotus **at the operating system prompt**

Press RETURN

It does not matter how you type "lotus"; the computer accepts uppercase or lowercase letters in any combination. RETURN tells the computer to execute the command. The disk drive light turns on and the Access System screen appears.



Access System

A list of choices, called a menu, appears on the second line of the screen; a menu pointer highlights 1-2-3. Below this choice is the description, Enter 1-2-3 — Lotus Worksheet/ Graphics/Database program. You can move the menu pointer to the other menu items by pressing RIGHT or LEFT.

Press RIGHT

The menu pointer moves to PrintGraph, and the description, Enter Lotus Graphics Printing program, appears below it. Move the menu pointer to the other menu items and read the descriptions on the line below. When you reach the final item, Exit, press RIGHT again and the menu pointer returns to 1-2-3. To select a menu item, highlight it with the menu pointer and press RETURN.

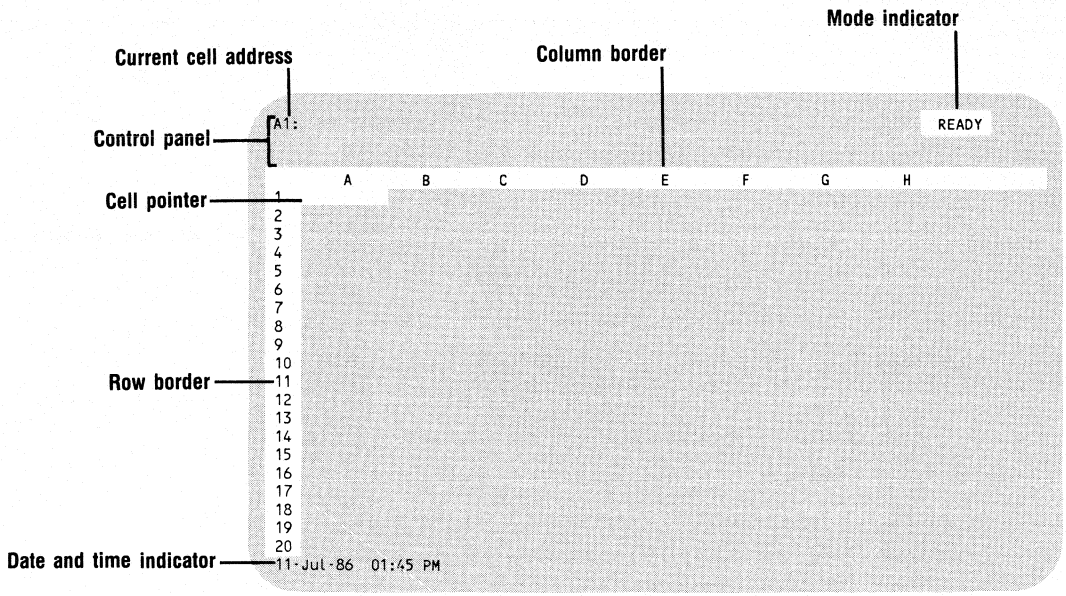
Highlight 1-2-3 and press RETURN

Once you start 1-2-3, either through the Access System, or directly from the operating system prompt, the disk drive light turns on, and soon the screen displays a copyright notice.

Press RETURN to begin

Looking at the Worksheet

Soon your screen displays the blank 1-2-3 worksheet.



Columns and Rows

The most visible parts of the worksheet are the highlighted vertical and horizontal borders. The letters along the top border designate columns and the numbers along the left border designate rows. You can see only a small portion of the worksheet's columns and rows on the screen at one time. Altogether, there are 256 columns, labeled A through IV, and 8,192 rows, numbered 1 through 8192.

Cells

The intersection of a column and a row forms a cell. This is the smallest unit of the worksheet into which you can enter and store data. A column letter followed by a row number make up a cell's location, or cell address. For example, A1 is the cell address of the upper left cell.

The Cell Pointer

The cell pointer is the highlighted bar currently in cell A1. It marks the location in the worksheet where you can enter data or begin commands. There is a short line called a cursor in the cell pointer.

The Control Panel

The space above the horizontal border is the control panel. The three lines of the control panel display information, command choices, and prompts.

Presently, there are only two items visible on the control panel. In the upper left corner, A1: indicates the current cell address of the cell pointer. If the cell pointer moves, these characters change to reflect its current address. The cell containing the cell pointer is called the current cell.

The highlighted area in the upper right corner of the control panel is the mode indicator. It tells you 1-2-3's current mode of operation. The indicator now displays READY, indicating that 1-2-3 is ready for you to execute a command or to enter data. Other 1-2-3 modes are described in future lessons.

Date and Time Indicator

The Date and Time indicator is located in the lower left corner of the screen. This displays the current date and time based on either what you entered at the operating system prompt, or what the computer's internal clock supplied. It is possible for you to turn off this indicator. The worksheet illustrations that appear later in the *Tutorial* do not show the date and time.

Moving the Cell Pointer

You use specially defined keys to move the cell pointer around the worksheet. The Keyboard Guide inside your 1-2-3 package will help you locate these pointer-movement keys as you need them.

Press DOWN

The cell pointer moves down one cell. The characters in the upper left corner of the control panel change to A2, indicating that A2 is now the current cell. Note that pointer-movement keys repeat when you hold them down. If you do this accidentally, simply move the cell pointer back with the opposite pointer-movement key.

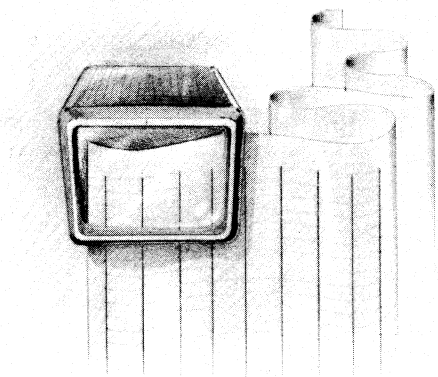
Press RIGHT

The cell pointer moves to cell B2.

Press LEFT twice

Worksheet Boundaries

The computer beeps the second time you press LEFT, and the cell pointer does not move any farther than the left border. 1-2-3 always beeps when you try to move the cell pointer beyond the border of the worksheet in any direction.



Watch the row border and press PAGE DOWN

The location of the cell pointer does not seem to change, but it is now in cell A22 instead of cell A2. 1-2-3 automatically adjusts, or scrolls, the screen to keep the cell pointer visible at all times.

Press PAGE UP

The row numbers change again to show that the cell pointer is back in row 2. PAGE UP and PAGE DOWN move the cell pointer the length of the screen.

Try moving in a different direction.

Watch the column border and press BIG RIGHT

Once again, the cell pointer does not seem to change its location on the screen. The column border, however, indicates that it moved from cell A2 to cell I2.

Press BIG LEFT

The cell pointer returns to column A. BIG RIGHT and BIG LEFT move the cell pointer the width of the screen.

1-2-3 adjusts the screen each time you attempt to move the cell pointer beyond the border of the current screen. The cell pointer never disappears; instead, the column and row headings change to follow its movement.

The GOTO key moves the cell pointer to any cell address you choose. Using this key is a two-step process.

First, press GOTO

The prompt, Enter address to go to: A2, appears on the control panel. 1-2-3 suggests the current cell as the address to go to. Change this by typing the address of the cell where you want the cell pointer to go.

Second, type H20 **and press RETURN**

The cell pointer moves to cell H20.

Continue to press pointer-movement keys and move the cell pointer to various locations in the worksheet. Notice that each time the cell pointer moves, the current cell address in the upper left corner changes to reflect the new location.

When you finish moving around the worksheet with the pointer-movement keys:

Press HOME

Pressing HOME returns the cell pointer to A1 from anywhere in the worksheet. Using this key is a useful way to reorient yourself if you become lost in a large worksheet.

Exploring the Worksheet

Try an experiment to see how large the worksheet is.

Type 123 **and press RETURN**

As you type 123, the cursor in the cell pointer moves up to the second line of the control panel to mark where you enter each character. When you press RETURN, the numbers appear in cell A1 and also on the first line of the control panel.

Press END and press DOWN

The cell pointer moves to cell A8192. This is the last row in the 1-2-3 worksheet. The END key used with a pointer-movement key moves the cell pointer to the end of a blank worksheet in the direction of the pointer-movement key.

Type 123 **and press RETURN**

The number 123 appears in cell A8192.

Press END and press RIGHT

The cell pointer moves to column IV. This is cell address IV8192, and it is the cell farthest from A1. Again:

Type 123 **and press RETURN**

The number 123 appears in cell IV8192. Continue moving the cell pointer to the upper right corner of the worksheet.

Press END and press UP

The cell pointer moves to cell IV1.

Type 123 **and press RETURN**

Finally, return to cell A1.

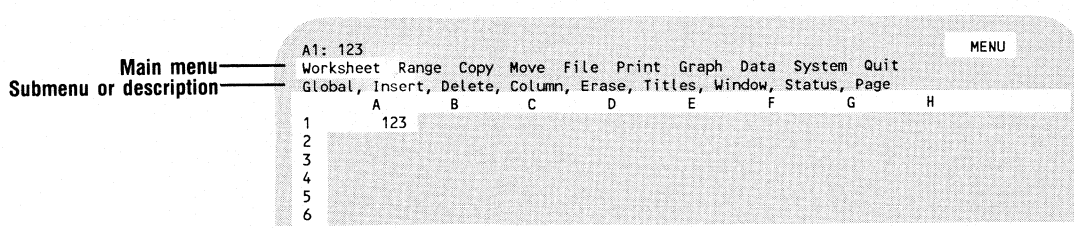
Press HOME

You just went to the four corners of the full 1-2-3 worksheet and made entries in each. This should give you an idea of the large size of the worksheet available to you. Of course, placing entries in such widely separated cells makes your data somewhat hard to read. Showing you how to build concise, easy to understand worksheets is one of the goals of this *Tutorial*.

Using Menus

In order to accomplish a task in 1-2-3, you select commands from menus. These menus appear on the control panel. To see the Main menu:

Press /



Main Menu and Submenus

The Main menu appears on the second line of the control panel. The mode indicator changes from READY to MENU. The /Worksheet command is currently highlighted by a menu pointer, and a list of /Worksheet commands appears below it. You can move the menu pointer with RIGHT and LEFT. As you do this, a submenu or a description of that command appears on the line below it.

To select a command, highlight it, then press RETURN. If you should select an item by mistake, you can cancel the selection by pressing ESCAPE. To see how this works:

Move the menu pointer to Worksheet (if necessary) and press RETURN

A submenu of /Worksheet commands replaces the Main menu. The first item in this menu, Global, is highlighted.

Press RETURN to select Global

A second submenu appears. These are the /Worksheet Global commands. In this menu, Format is highlighted.

Press RETURN to select Format

A submenu of /Worksheet Global Format commands appears. These commands let you change the format or the display of numbers in the worksheet in a variety of ways.

As you can see, the 1-2-3 menus are structured to let you choose a very specific procedure by selecting items in successive submenus.

To return to READY mode:

Press ESCAPE

This returns you to the previous submenu, Worksheet Global.

Press ESCAPE again

The Worksheet submenu returns.

Press ESCAPE twice

The worksheet returns to READY mode. ESCAPE lets you back out of any menu selection, one menu level at a time, until you return to READY mode.

Erasing a Cell

You have an entry in cell A1. Suppose you want to erase it.

In cell A1 press /

Move the menu pointer to Range

Press RETURN

The /Range commands appear on the second line of the control panel.

Move the menu pointer to Erase and press RETURN

A prompt, Enter range to erase: A1..A1, appears on the control panel. The suggested range to erase is the current cell, A1. To accept the suggestion:

Press RETURN

This erases the contents of cell A1. Whenever you want to erase a cell, move the cell pointer to that cell and select the /Range Erase command. 1-2-3 always suggests the current cell as the range to erase. You can accept that suggestion by pressing RETURN.

As you might guess, the /Range commands can do more than just erase a cell. You will learn more about how to use the /Range commands in future lessons.

Getting Help

If you should make an error while working with the program, 1-2-3 beeps and displays an error message. This does not cause any harm to the program or to your data. In fact, 1-2-3 can help you correct an error with its on-line Help facility. To see how, create an intentional error while moving the cell pointer.

Press GOTO

Instead of supplying 1-2-3 with a complete cell address at the prompt, type in only a row number.

Type 20 and press RETURN

The incorrect cell address causes 1-2-3 to beep and the mode indicator to display ERROR. An error message, Invalid cell or range address, appears in place of the Date and Time indicator in the bottom left corner of the screen. Error messages describe the nature of an error. For a more complete description and instructions on how to correct the error, you can consult 1-2-3's on-line Help facility.

Press HELP

The worksheet disappears and a message describing the two possible causes of invalid cell addresses appears. The first cause, typing an incorrect cell address, applies to your situation.

The Help facility is like a reference manual that is always open to the right page. You can press HELP at any time to receive information about the specific error, command, or area of the program with which you are working.

From a Help screen, you have a choice of selecting more information about related topics. You can also select an index of Help screens.

Move the menu pointer to Help Index and press RETURN

The Help Index lets you access all the Help screens in 1-2-3. You can move the menu pointer with any pointer-movement key to highlight a topic that interests you, and select it by pressing RETURN. You can even read about using the Help facility. Spend some time now becoming familiar with using the Help screens. When you have explored enough:

Press ESCAPE

Canceling Errors

Pressing ESCAPE returns you to the worksheet as you left it, with the mode indicator displaying ERROR. To cancel the Invalid Cell Address error:

Press ESCAPE again

1-2-3 returns to READY mode. If you do not want to read a Help screen when an error occurs, you can cancel the error and return to READY mode by pressing ESCAPE.

Changing the Startup Directory

Before you can save worksheet files, you must tell 1-2-3 the directory in which to save them. This directory is called the startup directory. When you first open the 1-2-3 package, the program assumes that your computer has one disk drive. If you have a one-disk system, you do not need to do anything further. Turn to the section, Leaving 1-2-3, in this chapter.

If you have a two-disk system or a hard-disk system, you need to change the 1-2-3 startup directory. Once you specify the correct startup directory for your computer, you should not have to change it again.

Press /

In the Main menu, the menu pointer highlights Worksheet.

Press RETURN

In the Worksheet menu, the menu pointer highlights Global.

Press RETURN

In the Worksheet Global menu:

Move the menu pointer to Default and press RETURN

In the Worksheet Global Default menu:

Move the menu pointer to Directory and press RETURN

On the second line of the control panel, 1-2-3 displays the current directory at startup, A:\. To change this,

Press ESCAPE

This erases the current directory designation. Next, follow the directions that are appropriate for your system.

Two-Disk System

You want 1-2-3 to store your work in the second, or B, drive. Be sure you have a formatted disk in that drive.

Type B:\ **and press RETURN**

The Worksheet Global Default Directory submenu returns. To save the new directory designation:

Move the menu pointer to Update and press RETURN

After a short while, the submenu returns. To return to READY mode:

Move the menu pointer to Quit and press RETURN

This completes changing the startup directory for a two-disk system. Now turn to the section, Leaving 1-2-3, in this chapter.

Hard-Disk System

Type the letter that designates your hard-disk drive, followed by a colon and a backslash (:\). You can also type the path of a subdirectory where you want 1-2-3 to store your data.

For example, if your hard-disk drive is C, and you want 1-2-3 to store data in a subdirectory called data:

Type C:\data

If your hard-disk drive is C, and you do not have any subdirectories:

Type C:\

To complete the directory designation:

Press RETURN

The Worksheet Global Default Directory submenu returns. To save the new directory designation:

Move the menu pointer to Update and press RETURN

After a short while, the submenu returns. To return to READY mode:

Move the menu pointer to Quit and press RETURN

Leaving 1-2-3

The last thing you need to learn in this chapter is how to leave 1-2-3.

Press /

The Main menu appears.

Move the menu pointer to Quit and press RETURN

The control panel now displays a Yes or No choice. You must confirm your decision to leave 1-2-3 by selecting Yes. If you select No, 1-2-3 returns to READY mode.

Move the menu pointer to Yes and press RETURN

If you started 1-2-3 directly, the operating system prompt appears.

If you started 1-2-3 through the Access System, the Access System screen appears.

Move the menu pointer to Exit and press RETURN

If a message appears on your screen telling you to insert COMMAND.COM in drive A, insert your operating system disk in drive A and press any key when ready. After a short wait, the operating system prompt appears.

Summary

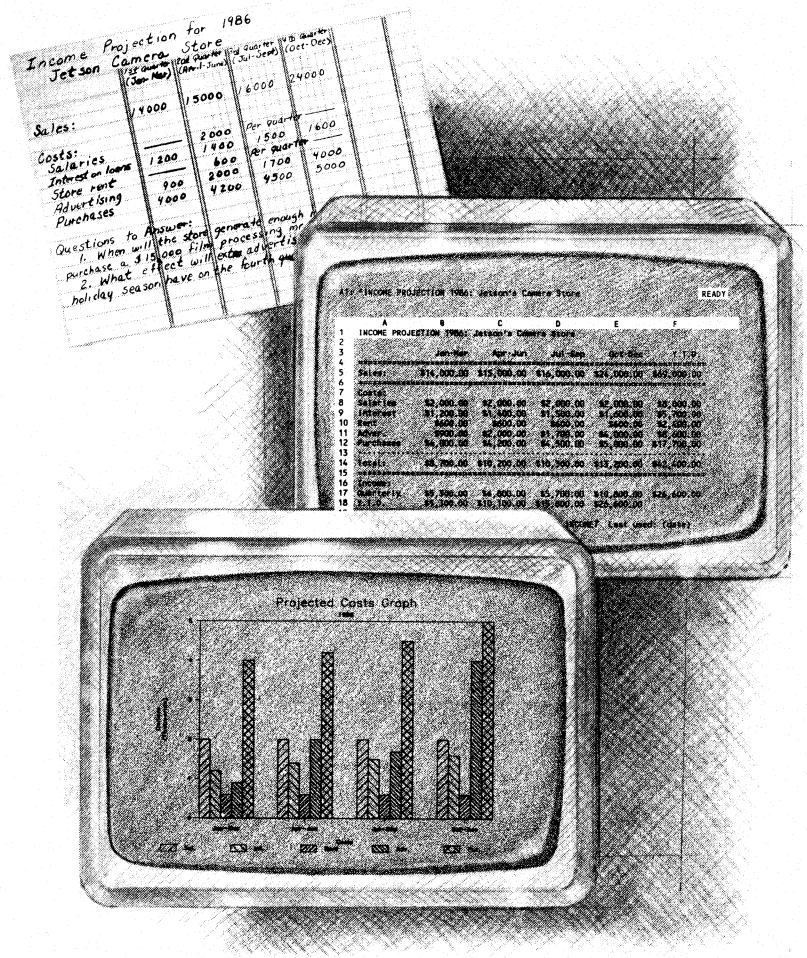
In this chapter you learned how to start and end 1-2-3, move around the 1-2-3 worksheet, enter data, and use menus to execute commands. Remember:

- Start 1-2-3 by selecting 1-2-3 from the Access System menu, or by typing 1-2-3 at the operating system prompt and pressing RETURN.
- The worksheet consists of columns identified by letters and rows identified by numbers. A cell is the intersection of a column and a row.
- Move around the worksheet by using the pointer-movement keys, or by pressing GOTO, typing a cell address, and pressing RETURN.
- Enter the 1-2-3 Main menu by pressing slash (/).
- Select a command by using RIGHT or LEFT to move the menu pointer to it, and pressing RETURN.
- Cancel a menu selection by pressing ESCAPE.
- Erase a cell by using the /Range Erase command.
- Get on-line Help by pressing HELP.
- Leave 1-2-3 by pressing /, selecting Quit, and selecting Yes.
- Leave the Access System by selecting Exit.

Chapter 2
BUILDING A 1-2-3 WORKSHEET

This chapter explores what an electronic worksheet can do. Each lesson in Chapter 2 focuses on specific tasks that you perform as you build a sample worksheet. While you are building this worksheet, you learn how to enter text and numbers, write formulas, and change the worksheet's appearance. Finally, you create graphs to visually represent the data in the worksheet. Step by step, you learn about 1-2-3 as you perform specific tasks.

The worksheet you build is an income projection for a small business, Jetson's Camera Store. You organize information about the projected sales figures and expenses of the store, and answer questions about the store's finances by using the worksheet to predict possible income for the year. As a result, you learn something about using 1-2-3 as a tool for projecting future results.



The illustration above describes the process you will go through in this chapter. You begin with a handwritten page of information and questions the owners have about their finances and organize this information in a 1-2-3 worksheet. Then you use the worksheet to calculate the store's projected income. Finally, you create two graphs illustrating the information in your worksheet.

Lesson 1 Beginning the Income Worksheet

New Keys to Locate:
CAP LOCK
BACKSPACE

When you begin a worksheet, you must consider how you want to arrange the information that will appear in it. You can use labels to organize the numbers that appear in the columns and rows of the worksheet. In a sense, these labels represent the structure for the numbers and are a logical place to begin.

In this lesson, you will learn how to enter labels in a worksheet, correct typing errors, save a worksheet, and erase a worksheet.

Start 1-2-3 so that you have a blank worksheet on the screen

Entering Text

Begin by giving your worksheet a title in the upper left corner. Note that you can press CAPS LOCK once to type uppercase letters and a second time to return to lowercase.

Move to cell A1

Type the first letter in the worksheet title, I

Notice two things that happen. First, the letter I appears on the second line of the control panel at the cursor. Second, the mode indicator changes from READY to LABEL.

Mode Indicator

When you make an entry, the mode indicator changes in response to the first character you type. A letter changes 1-2-3 from READY mode to LABEL mode, indicating that you are entering text. A number changes 1-2-3 to a mode called VALUE, indicating that you are entering numbers or formulas. You will learn more about LABEL and VALUE, as well as other modes, in later lessons.

Finish typing: INCOME PROJECTION 1986: Jetson's Camera Store
but do not press RETURN

Correcting Mistakes

Check the second line of the control panel to make sure that you have not made a mistake. If you have, correct it before you press RETURN by pressing BACKSPACE, retyping the deleted portion, then pressing RETURN. BACKSPACE erases characters to the left of the cursor one at a time. If you notice an error after you press RETURN, correct it by typing a new entry in that cell and entering it to replace the old one.

Press RETURN

Long Labels

Notice that even though you made your entry in cell A1, it extends through F1. 1-2-3 displays a label that is too long to fit into one cell if the cells to the right are blank. This is useful when you need to use long titles, or you want to write memos in a worksheet, a topic covered in Chapter 4.

The long label in cell A1 illustrates two points. First, a cell can contain more information than can fit within the width of the column. In fact, a cell can hold a maximum of 240 characters. Second, there is a difference between the way label entries and value entries appear in a worksheet. Label entries can extend beyond the column width, but value entries cannot, as you will see later in this chapter.

Your next task is to label the Sales and Costs figures you will enter in Lesson 2.

Press DOWN four times to move to cell A5

You will begin to list the sales figures in cell A5.

Type Sales: **and press RETURN**

The word "Sales:" appears in A5 as a label for row 5.

Press DOWN twice to move to cell A7

In cell A7 you will begin to list the costs for the business.

Type Costs:

Do not press RETURN to complete the entry; instead:

Press DOWN

"Costs:" appears as a label in row 7, and the cell pointer moves down one cell. The entry is complete and 1-2-3 is ready for you to enter data into cell A8.

Ways to Enter Data

1-2-3 lets you complete cell entries and move the cell pointer at the same time by using pointer-movement keys. Using these keys saves you time entering information. Whenever possible, plan to enter consecutive labels or numbers. To take advantage of this method for entering data, use the following table as a guide for entering the new labels in the Costs section of your worksheet.

In Cell:	Type:	Press:
A8	Salaries	DOWN
A9	Interest	DOWN
A10	Rent	DOWN
A11	Adver.	DOWN
A12	Purchases	DOWN (twice)
A14	Total:	RETURN

Now enter the column labels for the quarterly figures by moving the cell pointer from A14 to B3.

Press GOTO

At the prompt, Enter the address to go to, 1-2-3 suggests the current cell, A14. This suggestion is called a default because 1-2-3 will use cell A14 unless you specify otherwise. Because you do not want to remain in the same place, you must specify another cell to move the cell pointer to.

Type B3

The cell address B3 replaces A14 at the prompt. You can type a cell address in either uppercase or lowercase letters; 1-2-3 automatically converts it to uppercase letters.

Press RETURN

The cell pointer moves to cell B3.

Using GOTO is the most efficient way to move the cell pointer to distant cells. For example, if you tried to move from A14 to B3 using RIGHT and UP, you would have to press RIGHT once and UP 11 times.

With the cell pointer in B3, follow the table below to enter the column labels for the quarterly breakdown of sales and costs.

In Cell:	Type:	Press:
B3	Jan-Mar	RIGHT
C3	Apr-Jun	RIGHT
D3	Jul-Sep	RIGHT
E3	Oct-Dec	RIGHT
F3	Y.T.D.	HOME

After completing these entries, refer to the worksheet illustration at the beginning of this chapter to see that your labels are entered correctly. The cell pointer should be in cell A1.

There are many ways to enter information into a 1-2-3 worksheet. Preplanning where the data should go, and even how you are going to enter it, increases the clarity of a worksheet and the speed at which you can work. When there are different ways to perform the same task, these lessons will suggest the best method to use.

Until you save your work, it exists only in the computer's random access memory (RAM). This memory is temporary. When you turn the computer off, or if there is a power failure, everything in this temporary memory is erased. The save procedure (copying data from the computer's random access memory onto a data disk) prevents you from losing your work. These lessons remind you to develop the routine of saving your work frequently. Then, if there is an accidental power failure, you only lose entries that you made since the last time you saved the worksheet.

To save the worksheet:

Press /

Pressing / displays the Main menu on the second line of the control panel. The mode indicator changes to MENU.

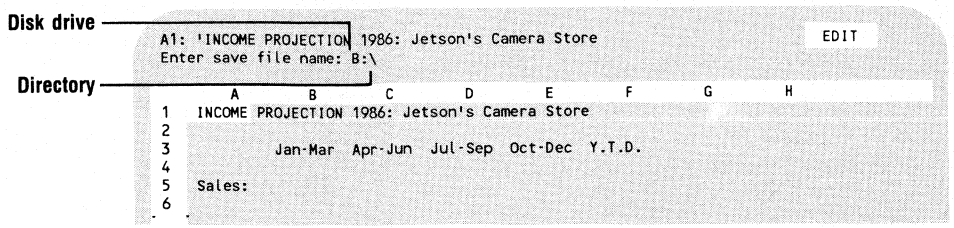
In Chapter 1 you selected a command by moving the menu pointer to it and pressing RETURN. 1-2-3 also lets you select a command by typing the first letter or number of that command. You do not have to press RETURN.

From this point on, whenever you select a command, either type the first letter of that command or move the menu pointer to it, and press RETURN. For example, to select File from the Main menu on the control panel, either type F, or press RIGHT four times and press RETURN.

Select File by typing F

A submenu of /File commands appears. Information is stored in files on a data disk. The commands in the File submenu let you save and retrieve these files.

Select Save by typing S



File Names

1-2-3 prompts you to enter the name of the file you want to save. You must give each file a unique name so that you can find the information again. The characters that appear on the screen after the prompt indicate the disk drive and the directory path in which 1-2-3 will store your data. In Chapter 1 you specified the disk drive in your computer that you use to store data, and if necessary, you selected which directory path you use. If you have a one- or two-disk system, be sure that this disk drive has a formatted disk in it before you continue.

1-2-3 uses file names to distinguish files on the disk. The name you choose is limited to a combination of only eight letters or numbers, so try to use a descriptive name for your file that will remind you of what it contains. Now name your file:

Type INCOME1 **and press RETURN**

The mode indicator changes to WAIT. When it changes back to READY, the file is saved. Your screen looks the same as it did before the save procedure. The only change is that a duplicate of your work is now in a file named INCOME1 on the data disk.

Erasing a Worksheet

To see how saving a file works, erase the worksheet you have on the screen. This clears the information you entered during Lesson 1 from the screen, and from the computer's memory. When you begin Lesson 2, you will retrieve the file INCOME1 from the data disk and confirm that your information is still there. The /Worksheet Erase command removes data from the computer's memory, but not from a file on a data disk.

Press / then select Worksheet

Select Erase then select Yes

You now have a blank worksheet. Notice how quickly you can select these commands if you type only the first letter of each menu item. Should you choose the wrong menu item, remember that you can press ESCAPE to go back to the previous menu.

At this point either leave 1-2-3 or continue to Lesson 2. To leave 1-2-3:

Press /

Select Quit

Select Yes

You will return either to the Access System or to the operating system prompt. If you started from the Access System:

Select Exit

If a message appears on your screen telling you to insert COMMAND.COM in drive A, insert your operating system disk in drive A and press any key when ready.

Summary

In this lesson, you entered labels into a blank worksheet. These labels set up a structure for the numbers that you will enter in the next lesson. Remember the following:

- When you begin a cell entry with a letter, the mode indicator changes from READY to LABEL.
- To correct mistakes while making a cell entry, use BACKSPACE to erase the mistakes.
- To correct mistakes after you complete an entry, type a new entry and press RETURN to replace it.
- Press RETURN to complete a cell entry and keep the cell pointer in that cell.
- Press any pointer-movement key to complete a cell entry and move the cell pointer to another cell.
- 1-2-3 extends the display of long label entries into adjacent cells to the right, if these cells are blank.
- Use the /File Save command to save a worksheet.
- Use the /Worksheet Erase command to erase a worksheet.

Lesson 2 Entering Numbers in the Worksheet

New Key to Locate:
\ (backslash)

The labels you entered in Lesson 1 set up a structure for the numbers that will go into the income worksheet. In this lesson, you enter the numbers for the projected sales and costs of Jetson's Camera Store.

Also in this lesson, you learn how to retrieve a file, create lines to separate the numbers and labels, and save an updated version of the worksheet.

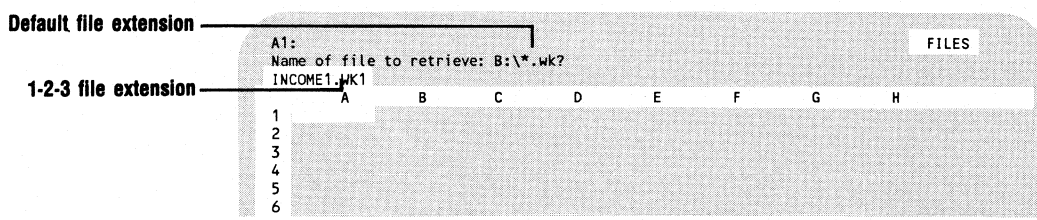
Retrieving a File

First, you must retrieve the file you saved in Lesson 1. Make sure that 1-2-3's blank worksheet is on your screen. If you have a one- or two-disk system, be sure that you have a data disk in the disk drive.

Press /

Select File from the Main menu

Select Retrieve from the submenu



INCOME1, the name you gave the file at the end of Lesson 1, appears on the third line of the control panel with the characters .WK1 added to it. These characters are an extension that 1-2-3 automatically gives worksheet files when it saves them. This extension identifies the worksheet as one created with 1-2-3 Release 2, rather than a worksheet created with an earlier version of 1-2-3 or Symphony®.

If there is more than one worksheet file on the data disk, they are listed alphabetically on the control panel. If there are more than five files on your disk, only the first five are visible. You can press DOWN to display the next five files until you reach the end of the list. HOME returns the menu pointer to the first file name.

To retrieve your file, do one of the following:

Type INCOME1 **and press** RETURN

or

Move the menu pointer to the name of the file and press RETURN

The mode indicator displays WAIT; soon the worksheet with column and row labels you entered in Lesson 1 appears.

Entering Numbers

The column and row labels in the income worksheet indicate where you enter numbers in this lesson. Their location is important since the structure of a finished worksheet determines how easy or difficult the information is to understand.

The first number you enter is the projected sales figure for the first quarter. Start with the first digit.

Move the cell pointer to B5 and type 1

Notice that the number 1 appears on the second line of the control panel and that the mode indicator changes from READY to VALUE. This change indicates that the worksheet is receiving numeric information.

Finish typing 14000 **and press** RIGHT

The entry is complete. The number 14000 appears in cell B5 and the cell pointer moves to cell C5.

Continue entering the quarterly sales figures under the appropriate column label. Because the cells are adjacent, you can use RIGHT to complete each entry. Follow this table.

In Cell:	Type:	Press:
C5	15000	RIGHT
D5	16000	RIGHT
E5	24000	RIGHT

The next numbers you enter are the costs for the first two quarters. These are the costs for Salaries, Interest, Advertising, and Purchases. The location of these entries is determined by the appropriate row and column label. First, you must move the cell pointer to the cell location of the first-quarter salaries.

Press GOTO

Type B8 **and press** RETURN

Begin entering the numbers for Salaries, Interest, Rent, Advertising, and Purchases. Notice which keys you use to enter these numbers.

In Cell:	Type:	Press:
B8	2000	DOWN
B9	1200	DOWN
B10	600	DOWN
B11	900	DOWN
B12	4000	RIGHT
C12	4200	UP
C11	2000	UP
C10	600	UP
C9	1400	UP
C8	2000	HOME

The cell pointer should now be in A1.

Creating a Line

Although the labels entered in Lesson 1 organize and give meaning to the numbers, you can make the worksheet easier to look at by adding lines that separate the column labels and numbers.

Move the cell pointer to cell A4

Type \ then =

In 1-2-3, the backslash (\) serves as a repeating label prefix. Whatever you type after the backslash will repeat until it fills the cell.

Press RETURN

Cell A4 now contains a row of equal signs (=).

Copying a Range

You want to continue the double line across the worksheet from cell A4 to cell F4. Rather than repeat the procedures for entering the double line in cell A4, you can use 1-2-3's /Copy command.

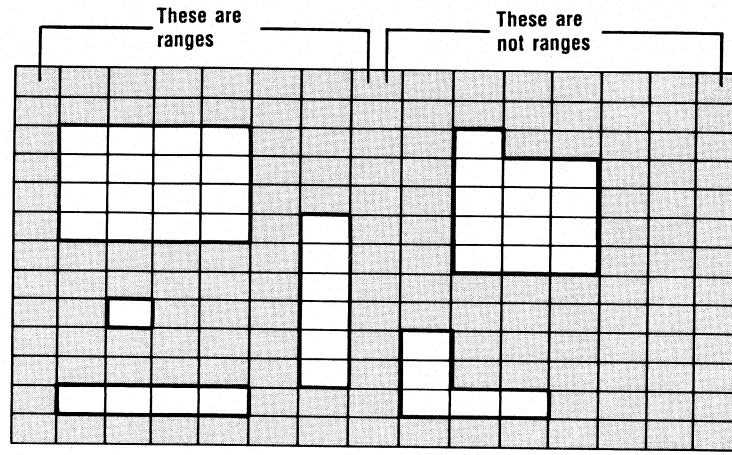
With the cell pointer in A4, press / and select Copy

The prompt, Enter the range to copy FROM: A4..A4, appears. The current cell, A4, is the cell you want to copy from, so you should accept the default.

Press RETURN

Ranges

Next, the prompt, Enter the range to copy TO: A4, appears. You want to copy the double line in cell A4 to cells B4 through F4. Rather than copy this line to each cell individually, you can copy it to a range of cells.



A range is a rectangular block of one or more cells that 1-2-3 treats as a unit. To specify the group of cells B4 through F4 as the range to copy to, you need to type the address of the two most distant cells in the range, B4 and F4, and separate them with one or more periods. B4.F4 means cell B4 through F4.

Type B4.F4

What you type replaces the default, cell A4.

Complete the copy procedure.

Press RETURN

The double line in cell A4 now extends to cell F4.

Ranges have many uses in 1-2-3. For example, you can use the /Range Erase command that you learned in Chapter 1 to erase more than one cell at a time. To do this, you can specify the range to erase in the same way you specified the range to copy in this lesson.

Now, create another line to visually separate the Sales section of your worksheet from the Costs.

Press /

Select Copy

Press RETURN

This accepts the current cell, A4, as the range to copy from.

Type A6.F6

This defines the range where you want to have the line.

Press RETURN

A double line extends from A6 to F6, completing the copy procedure.

A third line in cells A13 through F13 will separate the costs from the row that totals them. Make this a single line, using a hyphen (-) to show that the row totaling the costs is still part of the costs information and not a separate section. You can follow the same procedure you used to copy the double line.

Use \ - and the /Copy command to create a line in cells A13..F13

The /Copy command is very flexible and applies to a wide variety of situations. In the next lesson you will learn other ways to use it.

You have added new information to the worksheet since you saved your work in Lesson 1. Before you begin the next lesson, you must save these changes, so that you do not run the risk of losing them.

Press /

Select File

Select Save

1-2-3 prompts you to enter the file name to save and displays the current file name, INCOME1.WK1, as the default. You can save your new information under the current file name.

Press RETURN

Rather than executing the /Save command immediately, 1-2-3 displays two choices, Cancel and Replace. If you select Replace, 1-2-3 erases the old file named INCOME1.WK1 on the data disk and replaces it with the new one. If you select Cancel, you return to READY mode, and you can choose a new file name to save the worksheet under.

Select Cancel

It is a good idea to keep a record of your worksheet as it changes during each lesson. Repeat the save procedure choosing a new file name for your current worksheet:

Press /

Select File

Select Save

1-2-3 displays INCOME1.WK1 again. You can edit the default file name so that you save the updated worksheet as a separate file on the data disk.

Press ESCAPE to erase the file extension and the number 1

Type 2 and press RETURN

This saves the updated worksheet as INCOME2.WK1. 1-2-3 automatically adds the period and the three-character file extension. INCOME1.WK1 and INCOME2.WK1 are now separate files on your data disk.

At this point either leave 1-2-3, or continue to Lesson 3. To leave 1-2-3:

Press /

Select Quit

Select Yes

This returns you to the Access System or the operating system prompt. To leave the Access System:

Select Exit

If a message appears on your screen telling you to insert COMMAND.COM in drive A, insert your operating system disk in drive A and press any key when ready.

Summary

In this lesson, you entered numbers for the projected sales and costs. Remember:

- Use /File Retrieve to retrieve a file from a data disk.
- When you begin a cell entry with a number, the mode indicator changes from READY to VALUE.
- Use the repeating label prefix, backslash (\), to create lines separating different areas of your worksheet.

- Ranges are rectangular blocks of one or more cells that you want to treat as a unit.
- Specify a range by typing the cell addresses of two diagonally opposite corners. Separate the two cell addresses by at least one period.
- Use the /Copy command to copy one cell to a range of cells.
- Save a file with a new name by editing the old file name. Use DELETE or BACKSPACE to erase characters, then type in the new file name.

Lesson 3 Calculating in a Worksheet

Until now, you have used 1-2-3 to record labels and numbers on the screen just as you would on a piece of lined paper. With paper, however, you would have to do the arithmetic by hand or with a calculator. 1-2-3 can do it for you automatically.

In this lesson, you will learn how to write formulas and copy those formulas to other locations in the worksheet.

Retrieve the INCOME2.WK1 file if it is not already on the screen

Beginning with this lesson, whenever you see the word **Enter** in bold, it means type the material that follows and then press RETURN or an appropriate pointer-movement key. For example, **Enter** 9+5 means: **Type** 9+5 **and press RETURN**.

Before you work with the numbers you entered in Lesson 2, try a few basic calculations in a different part of the worksheet.

Press GOTO

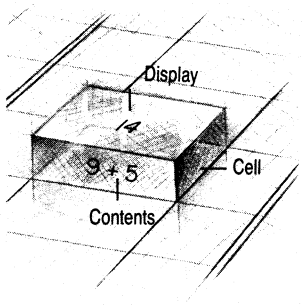
Type A21 **and press RETURN**

Writing Formulas

In 1-2-3, formulas are mathematical expressions. When you write formulas, you can use the basics of addition, subtraction, multiplication, division, and exponentiation as well as using advanced financial and statistical analysis. 1-2-3 will calculate the results automatically.

First, write a formula that adds two numbers. Be careful not to put any spaces between characters of a formula as you type them.

In cell A21, enter 9+5



What appears in cell A21 is not what you typed, but is the result of the formula: 14. The plus sign told 1-2-3 to add 9 and 5. The first line of the control panel, however, displays the formula you typed, 9+5. 1-2-3 stores what you type, and displays the formula as the cell contents on the control panel. Only the result of a calculation appears in the cell.

Move to cell B21 and enter 9/5

The result of dividing 9 by 5, 1.8, appears in cell B21. 1-2-3 automatically calculates the correct decimal position. Again, the formula appears on the control panel while the result appears in the cell.

You can write formulas as basic as the examples above or as complicated as you like. Formulas are limited only by the 240 character maximum that limits an entry into an individual cell. Even this is not really a constraint because you can join formulas together in several cells. As formulas become more complex, however, there are certain rules that apply to the way 1-2-3 calculates them. To see one of these rules in operation, enter the following formula.

Move to cell C21 and enter 9+5–9/5

Order of Precedence

You might expect the result of this formula to be the result of all the operations taken in order, 9 plus 5, minus 9, divided by 5, equaling 1. Instead, cell C21 displays 12.2. This is because 1-2-3 performs calculations in a specific order of precedence. 1-2-3 calculates exponents (for example, squares and cubes) before it divides and multiplies. In turn, 1-2-3 divides and multiplies before it adds and subtracts.

Arithmetic Operators

+	Addition
–	Subtraction
*	Multiplication
/	Division

In the formula you just wrote, 1-2-3 divided 9 by 5 first (1.8), and then subtracted that from 14 (the sum of 9+5).

You can override 1-2-3's order of precedence by using parentheses. Parentheses tell 1-2-3 to perform calculations within the parentheses first, starting from left to right. For example:

Move to cell D21 and enter (9+5–9)/5

The result is 1. The parentheses require 1-2-3 to add 9+5 and then subtract 9 before dividing this total by 5. When you write formulas, consider the order of precedence and use parentheses when you want to override that order.

Cell Addresses in Formulas

To complete your initial investigation of formulas, write the next formula two different ways.

Move to cell E21 and enter (9+5−9)/5−9

Cell E21 displays the result: −8. Note, however, the number of characters you had to type to write this formula. 1-2-3 offers an easier way to accomplish the same thing.

The first part of the formula you want in E21, (9+5−9)/5, is the same as the formula in cell D21. So, instead of typing the whole formula in cell E21, you can add the contents of cell D21 to −9, and achieve the same result that you got when you typed the formula character by character.

In cell E21, type +D21

This part of the formula is the same as the formula in cell D21.

Type −9 **and press** RETURN

E21 displays the same result as before, −8, and the control panel displays a formula with the cell address, D21, in place of (9+5−9)/5. 1-2-3 considers a cell address equivalent to the cell contents, so it is possible to write complex formulas by referring only to cell addresses.

The new formula in cell E21 begins with a plus sign (+). This tells 1-2-3 that the entry is a value. If you forget to include the plus sign (+), 1-2-3 considers an entry beginning with a letter to be a label.

Try a few formulas on your own in the blank area of the worksheet, using numbers, cell addresses, or both. Practice until you feel comfortable entering formulas and seeing how 1-2-3 calculates them.

When you finish, erase these formulas, using the /Range Erase command you learned in Chapter 1, so that these cells do not appear when you print this worksheet in Chapter 4. When all the formulas are erased:

Press HOME **to return to cell A1**

Now you can apply what you know to the numbers in your worksheet. First, write a formula to calculate the total costs in the first quarter.

Move to cell B14 and enter +B8+B9+B10+B11+B12

The sum of the business costs for the first quarter, 8700, appears in cell B14. Using cell addresses in your formula saves you time compared to having to type the numbers from each of those cells.

Using @Functions

You can save even more time when writing the same formula by using an @function and a procedure called highlighting. You will use these to total column C, the business costs for the second quarter.

Move to cell C14 and type @

The mode indicator changes to VALUE.

Type SUM

@SUM is one of 1-2-3's many @functions (pronounced, "at functions"). @Functions are formulas built into 1-2-3 to assist in performing calculations. You can use @functions to calculate mathematical, statistical, financial, and even time and logical formulas. @Functions save you typing time and extend 1-2-3's calculating ability in specialized ways.

In your formula, @SUM avoids the need to type the plus sign (+) between each cell address.

Type (

Highlighting a Range

@SUM requires you to specify a list of values, called an argument. The open parenthesis marks where the argument begins. For the @SUM argument, you will enter a range of cell addresses. Instead of typing this range as you did in Lesson 2, you will highlight it.

Press UP twice to move to cell C12

The mode indicator changes to POINT. In POINT mode, you can specify a range by highlighting. C12 appears next to @SUM(, and the contents of that cell, 4200, appear on the control panel above the cell addresses. Carefully follow what happens next.

Press . (period)

A second reference to cell C12 appears in the formula. 1-2-3 defines the current range as C12 through C12, a range of one cell. The period you press anchors cell C12 as the starting point of the range. You can now specify the range by expanding the size of the highlight with a pointer-movement key.

Press UP four times

The highlight expands from the anchor cell, C12, until it highlights the range you want to add, C12 through C8.

Type)

The close parenthesis ends the argument, and the highlight returns to cell C14.

Press RETURN

RETURN enters the formula. The sum of the costs for the second quarter, 10200, appears in cell C14, and the control panel displays the formula @SUM(C12..C8). This formula performs the same calculations as the formula you wrote in cell B14.

While both formulas are correct, you may prefer using @functions and highlighting a range to avoid repetitive typing or keeping track of cell addresses.

Copying Formulas

It is possible to establish formulas in a cell before you have numbers to calculate. In your worksheet, you need to total the expenses for the final two quarters and the year-to-date. You save time by creating these formulas now, even though you have not yet entered the numbers you want to total. Use the /Copy command to establish formulas in these columns by copying the formula in cell C14.

In cell C14 press / and select Copy

The prompt, Enter range to copy FROM: C14..C14, appears. The formula you want is in cell C14, so accept the default.

Press RETURN

The prompt, Enter range to copy TO: C14, appears. The totals for the final two quarters and the year-to-date will appear in the range of cells D14 through F14. You can either type in these cell addresses, as you did in Lesson 2, or highlight the cells. If you highlight the cells, however, you decrease the risk of typing errors, so use this method.

Press RIGHT once and press . (period)

A second reference to cell D14 appears next to the prompt, indicating that D14 is anchored. Now you must highlight the cells in which you want totals to appear.

Press RIGHT twice

1-2-3 highlights the range D14..F14. To complete the copy procedure:

Press RETURN

The cell pointer returns to cell C14. Zeros appear in cells D14 through F14. This indicates the presence of a formula with no numbers to calculate.

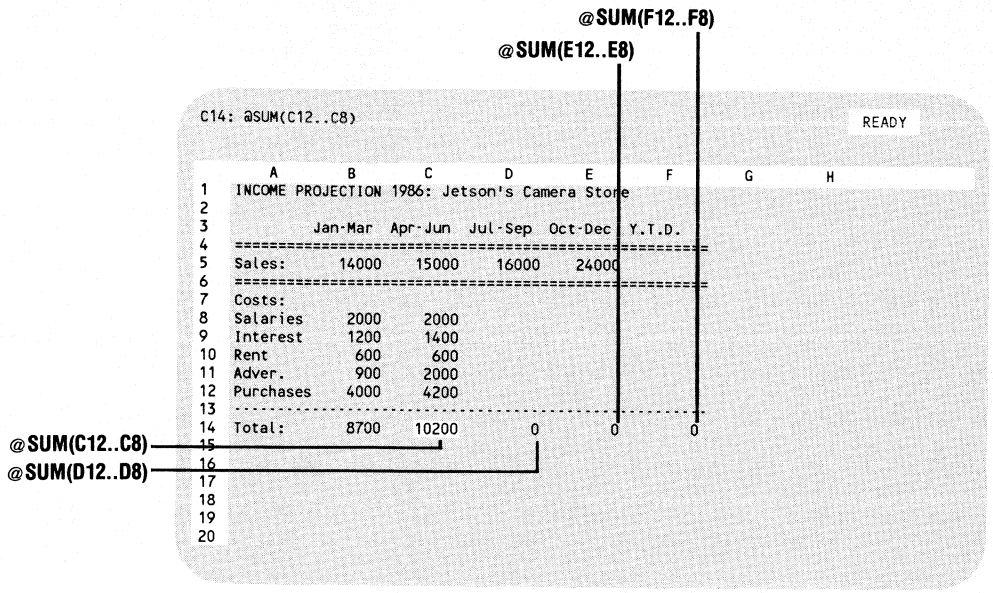
Using Relative Cell Addresses

Now compare the formulas in cells D14 through F14 to the original formula you wrote in C14. Because the cell pointer is in C14, that formula appears on the control panel as @SUM(C12..C8), while the result of the formula, 10200, appears in the cell.

Move to cell D14

The control panel displays the formula in D14, @SUM(D12..D8). Because cells D12 through D8 are blank, the result of this formula is zero.

Next, move the cell pointer to cells E14 and F14, and read the formulas there. Notice that these formulas did not copy as exact duplicates of what is in cell C14. Instead, they adjusted to the columns in which they appear.



The formulas are different because, unless you specify otherwise, cell addresses used in formulas are relative. 1-2-3 reads the formula in cell C14 as the sum of the cells two, three, four, five, and six rows above it, not as the sum of the specific cell addresses. When you copy the formula from C14, you copy the relationship of these cells and not the cell contents. Thus, when the formula reaches cell D14, it adds the contents of cells D12 through D8. In cell E14, the formula adds the contents of cells E12 through E8, and so on. This is why you can copy the formula in C14 to different locations in your worksheet and not have to rewrite it.

The next step is to total the Sales figures and the Costs in the rows of column F (year-to-date). The steps needed to write these formulas are the same ones you used in totaling the columns, so use this section to practice what you learned earlier.

Move to cell F5 and type @SUM(

This begins the formula.

Press LEFT and press . (period)

1-2-3 is in POINT mode, and cell E5 is anchored.

Press LEFT three times and type)

1-2-3 highlights the range E5..B5. The parenthesis completes the argument and returns the cell pointer to F5.

Press RETURN

RETURN enters the formula. The total sales figure for all four quarters, 69000, appears in cell F5. Now, copy the formula in cell F5 to total the expenses in rows 8 through 12.

With the cell pointer in F5, press /

Select Copy and press RETURN

This selects the /Copy command and enters cell F5 as the range to copy from.

Press DOWN three times to move to cell F8

Press . (period)

This moves the cell pointer to the range to copy to and anchors cell F8.

Press DOWN four times to move to cell F12

Press RETURN

This highlights and enters the range to copy to. The totals of the numbers you entered in Lesson 2 appear in cells F8 through F12.

Notice that cell F14, which previously displayed a zero, now has an updated total in it. If the data in any cell that is part of a formula changes, 1-2-3 automatically recalculates that formula to reflect the new data.

Although you did not enter any new numbers in this lesson, you want to save the formulas. Refer to the directions at the end of Lesson 2 if you need help saving a file with a new name. When you begin Lesson 4, retrieve this file, rather than the previous ones. Continue building an archive of files as a record of what you are learning.

Save the file as INCOME3

Summary

In this lesson, you wrote and copied formulas to add numbers in the worksheet. When you use formulas, remember the following:

- You can include numbers, cell addresses, and arithmetic operators when you write formulas.
- 1-2-3 follows an order of precedence when it calculates formulas. You can override this order by using parentheses.

- @Functions are formulas built into the program. Use them to save time and extend your ability to calculate.
- Use the /Copy command to copy formulas.
- Cell addresses are relative unless you specify otherwise. This means that when you copy a formula containing cell addresses, the cell addresses change to adjust to the new location.

Lesson 4 Changing the Worksheet's Appearance

So far, you have entered labels and numbers, and written formulas. Your worksheet is starting to take on a meaningful shape. You are ready to learn some techniques for improving the appearance of a worksheet.

In this lesson, you will change the display of numbers, adjust the column width, and change the alignment of the labels.

Retrieve the INCOME3.WK1 file if it is not already on the screen

Changing the Worksheet Format

The way a number appears in your worksheet depends on the format of the cell. In an income worksheet, the numbers represent money, so the format you need is Currency. This format includes decimal places and a currency symbol. Change the numbers in the worksheet to currency.

Press /

Select Worksheet

The menu pointer highlights Global in the submenu. A /Worksheet Global command affects the entire worksheet.

Select Global

From the menu of /Worksheet Global commands:

Select Format

```
F5: @SUM(E5..B5)                                                    MENU
Fixed  Scientific  Currency  ,  General  +/-  Percent  Date  Text  Hidden
Currency format ($x,xxx.xx)
      A        B        C        D        E        F        G        H
1  INCOME PROJECTION 1986: Jetson's Camera Store
2
3           Jan-Mar  Apr-Jun  Jul-Sep  Oct-Dec  Y.T.D.
4  ==================================================
5  Sales:      14000    15000    16000    24000    69000
6  ==================================================
```

In the menu of /Worksheet Global Format commands, each item represents a different way to display values in the worksheet.

Currency Format

Select Currency

1-2-3 prompts you to enter the number of decimal places to display. The default is 2, but the choices vary from 0 to 15. Accept the default of 2 decimal places:

Press RETURN

Long Numbers

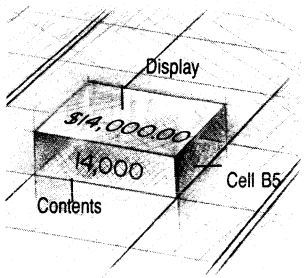
A number of things change in your worksheet. The numbers for the rent and the advertising costs in the first quarter change to the Currency format, but all the other numbers change to a series of asterisks. These asterisks indicate a VALUE entry with too many characters to fit in the cell.

To understand what happened, look at the cell contents.

Move to cell B5

```
B5: 14000                                                           READY
      A        B        C        D        E        F        G        H
1  INCOME PROJECTION 1986: Jetson's Camera Store
2
3           Jan-Mar  Apr-Jun  Jul-Sep  Oct-Dec  Y.T.D.
4  ==================================================
5  Sales:   **************************************************
6  ==================================================
7  Costs:
8  Salaries ******************                    *********
9  Interest ******************                    *********
10 Rent       $600.00  $600.00                    *********
11 Adver.     $900.00 *********                    *********
12 Purchases******************                    *********
13 --------------------------------------------------------
14 Total:    ******************   $0.00    $0.00 *********
15
16
17
18
19
20
```

Cell Display vs. Cell Contents



Even though the cell displays a series of asterisks, the first line of the control panel displays 14000 as the cell contents. This is the same number you entered in cell B5 during Lesson 2. When you selected the Currency format, however, 1-2-3 added two zeros, a decimal point, a currency sign, and a comma to the cell display. These additional characters plus the ones already in the cell take up more space than the column width. Because values, unlike labels, do not extend into adjacent cells, 1-2-3 displays asterisks instead of the cell contents.

Changing the Column Width

1-2-3's default column width is 9 spaces. By widening the column, you can display numbers with the Currency format instead of displaying asterisks.

Press /

Select Worksheet

Selecting /Worksheet displays the Worksheet menu. Column is an item in this menu, but this command affects only one column at a time. In the income worksheet, you need to change the width of all the columns.

Select Global

The Worksheet Global menu includes a Column-Width option that affects the entire worksheet.

Select Column-Width

1-2-3 prompts you to enter the global column width and displays 9 as the current width. You can choose from 1 space to 240 spaces.

To change the column width, you can type a new number of spaces, for example 12, and press RETURN. If you do not know how wide to make the column, use RIGHT and LEFT to visually test different widths before you choose one.

Watch the worksheet and press RIGHT

The entire worksheet appears to move to the left as the columns grow wider. As each column widens, the asterisks change and display the cell contents in the Currency format.

At a column width of 10, the numbers in the Costs section appear. The cells containing the sales figures and two of the totals still display asterisks.

Press RIGHT again

At a column width of 11, all the figures in the worksheet display correctly. The sales figures in row 5, however, appear too close together. You can improve their appearance by increasing the column width one more space.

Press RIGHT a third time

Pressing RETURN enters a new column width. Until you press RETURN, however, you may continue to press RIGHT and LEFT to change the width of the columns. Experiment by shrinking the size of the worksheet columns down to one space with LEFT. Notice what happens to the values and what happens to the labels. Next, expand the worksheet columns with RIGHT until the information in column F is no longer visible.

When you finish, return the column width to 12 spaces and press RETURN

Aligning Labels

With the columns 12 spaces wide, the column labels in cells B3 through F3 no longer line up with the numbers in the columns. The labels are left-aligned while the columns of numbers below them are right-aligned.

Label Prefixes:

'	Left Align
"	Right Align
^	Center
\	Repeating

1-2-3 automatically aligns label entries with the left margin of a cell, and automatically aligns value entries with the right margin of a cell. You can override the default left label prefix (') by typing an alternative label prefix when you enter a label. You can also change the alignment of a range of label entries by using the /Range Label command.

Test different alignments in cells B3 through F3 to find an alignment that looks best. First, move the cell pointer to the column heading for the first quarter (Jan-Mar).

Move to cell B3 and press /

Choose the Range menu. /Range commands affect single cells and groups of cells.

Select Range

The submenu of /Range commands appears.

Select Label

Three choices, Left, Right, and Center, appear on the control panel.

Select Center

1-2-3 prompts you to enter the range of labels to center, and automatically anchors the range in the current cell, B3. The mode indicator displays POINT.

Highlight the range B3..F3 and press RETURN

The column labels move to the center of each column. On the control panel, the label prefix changes from left-aligned (') to centered (^).

This realignment improves the way your worksheet looks. Nevertheless, the column labels still do not line up with the numbers in the columns. Try a right alignment. Follow the same procedure you used to center the labels.

Press / and select Range

Select Label and select Right

Highlight the range B3..F3 and press RETURN

All the column labels move to the right margin of each cell and match the alignment of the numbers in the columns.

The change in the way numbers and labels appear in the income worksheet makes the information in it easier to understand. Later chapters will explore other methods that change the way a worksheet looks. Commands that change the appearance of the worksheet do not change your data, only the way it displays; therefore, experimentation is the best way to discover what these commands do.

Save the file as INCOME4

Summary

You have used various techniques to improve the appearance of your worksheet. These techniques include the following:

- Use the /Range Label command to align all labels in a range.
- Use the /Worksheet Global Format command to control how numbers throughout the worksheet are displayed. Changing the format does not affect the actual contents of the cells.
- Adjust column widths to permit 1-2-3 to display numbers according to the format you establish. 1-2-3 never extends the display of numbers beyond a cell border; instead, it displays asterisks.

- Use the /Worksheet Column command to change the width of a single column.
- Use the /Worksheet Global Column-Width command to change the width of all columns at once.

Lesson 5 The Finished Worksheet

New Key to Locate:
CALC

In the previous lessons you entered labels and values, and wrote formulas. You used various techniques to improve the worksheet's appearance. The skills you have used building the income worksheet are the basic skills you need to work with 1-2-3.

The purpose of a worksheet is not only to record data and perform calculations, but also to provide information that helps you make decisions. In the illustration at the beginning of the chapter, you saw a handwritten page containing projected costs and revenues, and two questions: "When will the store generate enough income to purchase a $15,000 film processing machine?" and "What effect will extra advertising during the holiday season have on the fourth quarter's income?"

In this lesson, you will finish the worksheet by supplying the remainder of the information on costs and adding a section on cumulative income. Then you will be able to answer both of these questions.

Completing Data Entry

Retrieve the INCOME4.WK1 file if it is not already on the screen

First, supply the numbers that are missing. Enter the salaries for the third quarter.

Move to cell D8 and enter 2000

The entry appears as $2,000.00 in cell D8 and also appears in cell D14, which contains a formula that adds all the data in cells D8 through D12. By entering 2000 in to cell D8, you caused the formula in cell D14 to calculate a new total.

Interdependent Formulas

Cells F8 and F14 also increase by $2,000.00. Cell F8 contains a formula that totals the salaries; cell F14 contains a formula that totals all of the costs. When F8 increases by

$2,000.00, F14 increases by the same amount. These cells change as a result of entering only one number because the formulas in your worksheet depend on the results of other formulas. Complete the following entries in column D as listed below:

In Cell:	Enter:
D9	1500
D10	600
D11	1700
D12	4500

Notice how 1-2-3 recalculates the worksheet with each new entry, and how all the dependent formulas calculate new totals.

Automatic Recalculation

1-2-3 automatically recalculates formulas each time you change data in a worksheet. Usually this feature is a convenience. If you have a large worksheet with many formulas, however, Automatic recalculation can cause 1-2-3 to pause several seconds after each entry. Because you cannot make another entry until 1-2-3 finishes, Automatic recalculation might slow you down. In this case, it is quicker to recalculate only at specific times.

Manual Recalculation

1-2-3 has a second method of recalculation, called Manual. When you choose /Worksheet Global Recalculation Manual, 1-2-3 recalculates formulas only when you press CALC. You can then enter numbers into many cells before pausing to recalculate.

Notice how Manual recalculation works as you enter the fourth-quarter costs into column E.

Press / and select Worksheet

Select Global then select Recalculation

The Worksheet Global Recalculation menu appears. These commands control the method, the order, and the number of times 1-2-3 recalculates a formula.

Select Manual

1-2-3 returns to READY mode. Notice the change from automatic to manual recalculation while entering the numbers in the following table.

In Cell:	Enter:
E8	2000
E9	1600
E10	600
E11	4000
E12	5000

E14 still displays $0.00, although you entered numbers that affect the formula in that cell. The year-to-date totals in column F did not change either. Instead, a CALC indicator appears in the lower right corner of the screen, indicating that you made changes to the worksheet that 1-2-3 must recalculate.

The CALC Key

Watch cells E14 and F14 and press CALC

1-2-3 recalculates all the formulas in the worksheet. The CALC indicator disappears, and new totals appear in cells E14 and F14.

Before you continue to the next part of this lesson, restore Automatic recalculation.

Press /

Select Worksheet then select Global

Select Recalculation then select Automatic

Writing Formulas to Answer Questions

Next, add a section for the income accumulated by Jetson's Camera Store. From this section, you will answer the hypothetical questions asked at the beginning of the chapter about equipment purchase and increasing advertising costs.

First, separate the cost totals from the cumulative income with a double line in row 15.

Move to cell A6 and press /

Select Copy and press RETURN

This selects the double line in cell A6 to copy from.

Move to cell A15

Press . (period) to anchor the range

Highlight the range A15..F15 and press RETURN

The double line appears in cells A15 through F15.

Enter the following labels for the cumulative income section.

In Cell:	Enter:
A16	Income:
A17	Quarterly
A18	Y.T.D.

Formula for Quarterly Income

To obtain the income per quarter, you must subtract the costs from the sales in that quarter.

Move the cell pointer to B17 and enter +B5–B14

The result, $5,300.00, appears in cell B17. To copy this formula to the other cells that calculate quarterly income, C17 through F17, follow the instructions below. Remember that the formula in B17 contains relative cell addresses. These addresses adjust to the appropriate column when you copy the formula.

Press /

Select Copy and press RETURN

This selects the formula in cell B17 as the range to copy.

Press RIGHT

Press . (period)

Highlight the range C17.. F17 and press RETURN

Cells C17 through F17 calculate the income for each quarter.

Formula for Year-To-Date Income

To calculate the year-to-date totals in row 18, you need to write a formula that adds the income for the current quarter and the year-to-date total for the previous quarter. For the first quarter, the year-to-date total and the quarterly income are the same. You can write the formula in cell B18 either by typing or highlighting the cell address.

Move to cell B18

Type +B17 **and press RETURN**

or

Move to cell B18

Type +

Highlight cell B17 and press RETURN

The year-to-date total in column C requires a formula that adds the second-quarter income and the first-quarter year-to-date total.

Move to cell C18 and type +

Highlight cell C17

Type +

Highlight cell B18 and press RETURN

This establishes the formula, +C17+B18, in cell C18. You can copy this formula to cells D18 and E18 by using the same procedure you used to copy the formula in B17 to cells C17 through F17.

Copy C18 to cells D18..E18

Now that you have finished entering all the numbers and formulas in the worksheet, you can analyze the data. The year-to-date totals in row 18 answer the questions about income. Each total tells you exactly how much income the camera store has accumulated to that date. The point at which the store accumulates enough income to buy a $15,000 film processing machine occurs in the third quarter, when the total income to date reaches $15,800.00. The impact of increasing advertising costs on the fourth-quarter income will be more than offset if the sales goals for the holiday season are met.

Because this worksheet is projecting income, it is possible that the numbers in it will be different from what you anticipate. Although the sales figures might be greater than projected, or certain costs might be less, the changes do not create a problem. You can update figures in the worksheet at any time, and the formulas will calculate new totals automatically.

For example, if sales for the first quarter are greater than projected, Jetson's Camera Store might be able to buy the film processing machine earlier than anticipated. If sales are less than expected, the owners might want to reduce an expense, such as advertising, to remain profitable.

With the income worksheet, the owners of Jetson's Camera Store can see if their actual results match their projections. They can even speculate about future results by changing one or more of the numbers to see how these changes affect

the other numbers in the worksheet. Thus, the owners can make decisions about buying more equipment or hiring new employees on the basis of how these changes affect all aspects of the business, particularly profitability.

Adding Notation

Before you finish the worksheet, it is a good idea to include information about how the worksheet was produced. Such information might include your name, the date, the file name with which you save the worksheet, and any instructions that others who use it later might need to know. If you want to add such notation:

Move to cell A20

Enter: Created by (your name) (date) File name: INCOME5 Last used: (date)

Save the file as INCOME5.

Using Worksheet Principles

The income worksheet is now in its final form. You can apply all the new skills you learned while creating this worksheet to any future worksheets. Beyond specific skills, however, there are several underlying principles for constructing a worksheet that you should now consider.

Always start with a plan for your worksheet. Before you turn the computer on, write down the data you have and the questions you need to answer. From this information, develop a list of goals for your worksheet.

Try to duplicate worksheet models that are familiar to you. If you use a particular format in your account books or budget, use the same format in your 1-2-3 worksheet.

Arrange your data in either columns or rows. In the income worksheet, you placed quarterly data in columns and individual categories of sales and costs in rows. A visually consistent worksheet is easier to read and reduces the possibility of mistakes.

Check a new worksheet carefully; make sure the formulas do what you intend. In a complex worksheet it may be difficult to find a formula that does not calculate the value you expect it to. 1-2-3 does not make mistakes calculating, but it cannot tell if the formulas it is calculating are correct.

In the next two lessons you will learn how to make graphs from the income worksheet. These graphs will give you different ways to analyze your data.

Summary

In this lesson you completed the income worksheet and used it to help you answer hypothetical business questions. You also learned the difference between Automatic and Manual calculation. Remember the following:

- 1-2-3 automatically recalculates formulas whenever you enter new data into the worksheet unless you use the /Worksheet Global Recalculation command to establish Manual recalculation.
- With Manual recalculation, 1-2-3 recalculates formulas only when you press CALC.
- List information pertinent to the creation of a worksheet in the worksheet.

Lesson 6 The Sales Graph

New Key to Locate:
GRAPH

You have used the worksheet's columns and rows to arrange your data clearly and logically. 1-2-3 can also visually represent your data with graphs. Graphs let you see your data in new ways. Graphs can also make your data more accessible to people who are not familiar with the worksheet format.

In this lesson, you will create a bar graph to represent the projected sales figures for Jetson's Camera Store, document this graph with titles and labels, and save the graph with the worksheet.

Graph Appearance

Depending on your computer, you will produce either black and white (monochrome), or color graphs. This *Tutorial* illustrates all graphs in black and white, distinguishing data categories with different crosshatching patterns. If you have a color monitor, 1-2-3 can use contrasting colors to do the same thing.

Some monitors cannot display graphs. Even if this is true of your computer, you can still print your graphs when you reach Chapter 4.

Retrieve the INCOME5.WK1 file if it is not already on the screen

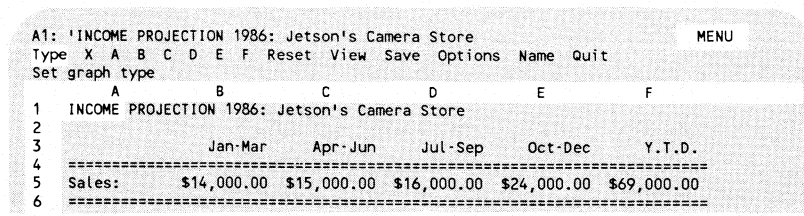
Defining Graph Settings

The first graph you make from your worksheet compares the sales figures. These numbers, in cells B5 through E5, represent a single unit of data, or a range. A graph that uses only one data range is the most basic kind of graph 1-2-3 can display.

The Graph Menu

Begin by selecting the Graph menu.

Press / and select Graph



Creating a graph requires several steps. You must select a graph type and define at least one data range. You can also add titles and legends. To speed up the procedure, the Graph menu returns each time you select a /Graph command, unless you are selecting items in the Graph Options menu.

Graph Type

You can select a graph type from the five choices listed in the Graph Type menu: Line, Bar, X-Y, Stacked-Bar, and Pie. Each displays data in a different way. A bar graph is well suited for showing a single data range such as the sales figures, so start with it.

Select Type then select Bar

Graph Data Range

The Graph menu reappears so that you can identify the data range for the bar graph. 1-2-3 permits up to 6 data ranges (A through F) in a single graph. This graph, however, needs only one range for the projected sales figures for 1986.

Select A

When 1-2-3 prompts you to enter the first data range, you must specify the quarterly sales figures in cells B5 through E5. As with all ranges in 1-2-3, you can type in the cell addresses or highlight them. So, either:

Type B5.E5 **and press RETURN**

or

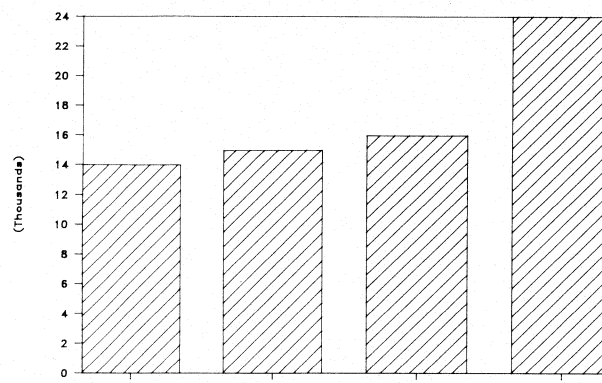
Move to cell B5

Press . (period) to anchor the range

Highlight the range B5..E5 and press RETURN

The graph menu returns. 1-2-3 now has enough information to draw a graph. To look at that graph:

Select View



X Axis and Y Axis

When 1-2-3 draws the graph, each shaded bar represents one of the quarterly sales figures. The vertical border, called the Y axis, automatically adjusts to the correct scale for the numbers. The horizontal border, or X axis, evenly separates the bars.

If you change the data ranges in a graph, or if you modify your data, the View option in the Graph menu shows you the latest update. If you are in READY mode, GRAPH performs the same function.

Press ESCAPE to return to the Graph menu

Adding Graph Labels and Titles

Titles and labels explain the sales graph. Follow the steps below to add them. If you wish, select View to observe your progress at the end of each step.

First, label the bars that represent the sales figures.

From the Graph menu, select X

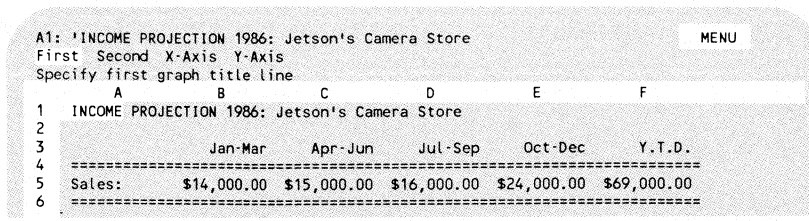
The prompt, Enter X-Axis range, appears. You want to enter a range of cells that includes the column labels in cells B3 through E3. Enter this range the same way you entered the range of sales figures.

Type or highlight the range B3..E3 and press RETURN

Next, add titles to identify your graph. If you want to view the graph while you do this, return to the Graph menu by selecting Quit.

From the Graph menu, select Options

Select Titles



The four options in the Titles menu place words or numbers in a different position on the graph. The option, First, is the primary title. Primary titles appear at the top of a graph and should describe the nature of the graph.

Select First

1-2-3 prompts you to enter the top line of the graph title.

Type Projected Sales Graph **and press RETURN**

You can also choose a secondary title. Secondary titles appear beneath primary titles and should provide additional information.

Select Titles then select Second

1-2-3 prompts you to enter the second line of the graph title.

Type 1986 **and press RETURN**

Finally, choose titles for the X (horizontal) axis and the Y (vertical) axis.

Select Titles

Select X-Axis

Type Sales **and press RETURN**

Follow the same procedure for the Y axis:

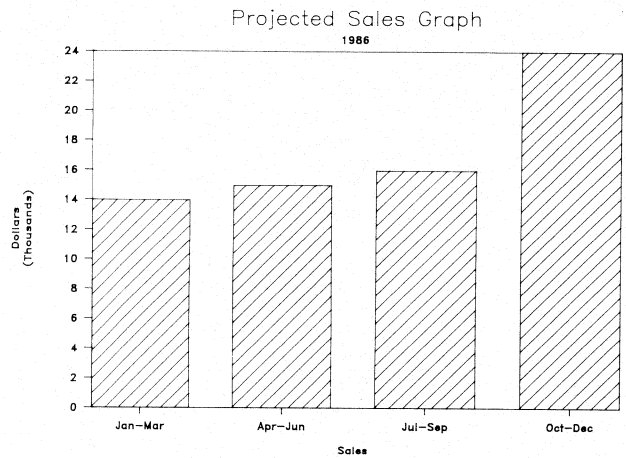
Select Titles

Select Y-Axis

Type Dollars **and press** RETURN

After you select a graph type, define a data range, and add labels, your Sales graph is complete.

Select Quit then select View



Press ESCAPE **to return to the Graph menu**

Select Quit to return to READY mode

Saving the Graph Settings

Now save your graph settings. To save the graph settings, you must save the current worksheet. Although the worksheet looks the same as it did at the end of Lesson 5, it now has an underlying graph attached to it.

Save the file as INCOME6

Summary

In this lesson, you created a bar graph comparing the projected sales figures in your worksheet. When you create a graph, remember the following:

- Use the /Graph commands to create a graph.
- Select a graph type and at least one data range.
- Use /Graph View to view a graph, or press GRAPH from READY mode.
- If you change data ranges in a graph, or modify the data, the graph will reflect the changes the next time you view it.

Lesson 7 The Business Costs Graph

New Key to Locate:
INSERT

The graph in Lesson 6 used only one data range, the sales figures from the income worksheet. 1-2-3 can display up to six different data ranges in one graph.

Your worksheet contains five categories of costs: Salaries, Interest, Rent, Advertising, and Purchases. In this lesson, you will create a bar graph that compares these five items.

Retrieve the INCOME6.WK1 file if it is not already on the screen

Press GRAPH to draw the graph you made in Lesson 6

The bar graph of the sales figures in your worksheet should appear. 1-2-3 always keeps the most recent graph settings current. You can draw the current graph at any time by pressing GRAPH if you are in READY mode, or by selecting View from the Graph menu. If the graph does not appear on your screen, review Lesson 6 and recreate it.

Press ESCAPE to return to READY mode

Naming Graph Settings

You will create a second bar graph in this lesson, but you do not want to lose the current graph. To save more than one graph with a worksheet, you must give each graph a name. This way 1-2-3 can keep the settings separate.

Be aware that the /Graph Name command is different from the /Graph Save command. /Graph Save creates a separate file of the current graph on your data disk so that you can print it with 1-2-3's PrintGraph program. You will do this in Chapter 4. The /Graph Name command attaches the current graph settings to the worksheet file. A named graph can change to reflect changes in the worksheet data.

To name the current graph:

Press /

Select Graph

Select Name

The Graph Name menu is a list of options that let you name, use, or delete a graph setting.

Select Create

1-2-3 prompts you to enter the graph name.

Type SALES **and press RETURN**

The Graph menu returns. You have attached the settings of the current graph to the worksheet with the name SALES and now are ready to define the settings for the second graph.

Defining New Graph Settings

The named settings for the Sales graph remain current, and 1-2-3 presents them as defaults when you select new settings for the Costs graph. This means that you can reuse any of the old graph settings that apply to your new graph. For example, because the previous graph type is Bar, you do not have to select Bar again. You need to select and change only settings that are different from those of the current graph.

Multiple Data Ranges

You must specify data ranges for the business costs: Salaries, Interest, Rent, Advertising, and Purchases. You should use the ranges A through E on the Graph menu.

Select A

1-2-3 highlights the salary figures in cells B5 through E5. This is the old setting for the A data range of the Sales graph, and it is the current default. To cancel the default range setting:

Press ESCAPE

The highlight returns to B5. To specify a new A data range for the graph:

Move to cell B8 and anchor the range

Highlight the range B8..E8 and press RETURN

The next data ranges to define are Interest, Rent, Advertising, and Purchases. Remember, you can view your progress at any time by returning to the Graph menu, selecting Quit, then selecting View.

Enter the following data ranges as graph settings.

Data Range:	Range Address:
B	B9..E9
C	B10..E10
D	B11..E11
E	B12..E12

If you view the graph after you enter each data range, you see that additional bars appear with different crosshatching patterns. 1-2-3 automatically adjusts the graph display to accommodate up to six data ranges.

Titles

The first title of the graph is no longer appropriate. You can edit the old title to fit the new data.

Select Options

Select Titles

Select First

1-2-3 presents the old title, Projected Sales Graph. The mode indicator displays EDIT.

Move the cursor with LEFT to the S in Sales

Press INSERT

The INSERT key lets you write over characters while in EDIT mode, instead of erasing them. When you press INSERT, OVR appears in the lower right corner of the screen to indicate that you can overstrike.

Type Costs **to replace Sales and press RETURN**

The new title is Projected Costs Graph.

You also need to change the X axis title. The previous graph was about sales; the new graph compares costs.

Select Titles

Select X-Axis

1-2-3 presents the previous X axis title, Sales, as the default.

Press ESCAPE to erase the default setting

Type Costs **and press RETURN**

To view the new graph:

Select Quit to return to the Graph menu

Select View

The five data ranges in the graph, Salaries, Interest, Rent, Advertising, and Purchases, are visible as separate bars, each with a different crosshatching pattern. With five data ranges instead of one, however, the X axis title, Costs, is no longer specific enough. By adding brief descriptions, or legends, you can explain the individual bars in the graph.

Press ESCAPE to return to the Graph menu

Select Options

Legends

The menu pointer highlights Legend. This command lets you add brief descriptions to remind you which crosshatching pattern (or color) represents which data range. Keep legends as short as possible because their display is limited. With five legends, for example, the maximum total number of characters you can use is 21.

Select Legend

The Legend menu contains six options, A through F, corresponding to the data ranges in the graph.

Select A

1-2-3 prompts you to enter the legend for the A range.

Type Sal. **and press RETURN**

The Options menu appears.

Select Legend

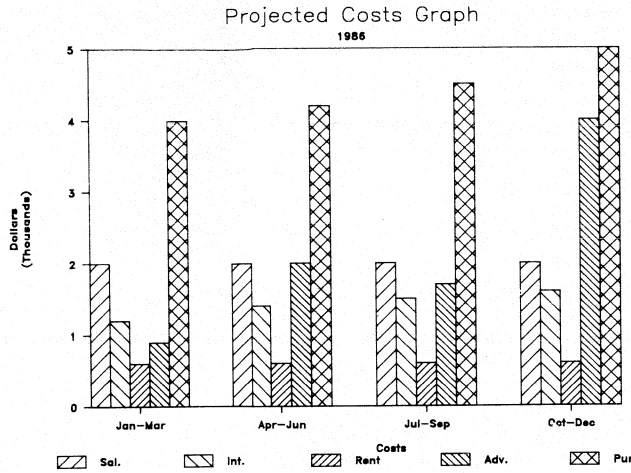
Enter legends for the B, C, D, and E data ranges listed in the table below.

Range:	Enter:
B	Int.
C	Rent
D	Adv.
E	Pur.

To view the graph with the legends:

Select Quit to return to the Graph menu

Select View



Looking at Graphs

A bar graph such as the one you just created is an excellent tool for comparing different categories of data. The graph shows the relationship of the costs in a much different way than the rows and columns of numbers in the worksheet do. The relative size of the bar representing Salaries compared to the bar representing Purchases shows you quickly that Jetson's Camera Store is spending about twice as much on its merchandise as on its payroll.

Making a Graph Current

Save the costs graph settings separately from the sales graph settings.

Press ESCAPE to return to the Graph menu

Select Name then select Create

Below the prompt, Enter the graph name, the menu pointer highlights SALES. Enter a name that distinguishes your new graph from the old one.

Type COSTS **and press RETURN**

The Graph menu returns. You now have two graphs attached to your worksheet, one illustrating sales and one comparing costs. You can create and name as many graphs with a 1-2-3

worksheet as you like. When there is more than one graph attached to a worksheet, the current graph is the one that appears when you press GRAPH or select View.

Select Name and then select Use

1-2-3 prompts you to enter the name of the graph you want to make current, and displays COSTS and SALES as the choices. COSTS is highlighted.

Move the menu pointer to SALES and press RETURN

1-2-3 draws the graph: SALES. When you return to the worksheet, that graph remains current, even when you save and retrieve the worksheet file.

Remember, you can view the current graph from READY mode at any time by pressing GRAPH.

Press ESCAPE to return to the Graph menu

Select Quit to return to READY mode

Saving the worksheet saves the settings of the costs graph. As in Lesson 6, the new worksheet does not look different. However, you now have a second named graph attached to the worksheet.

Save the worksheet as INCOME7

Summary

In this lesson, you created a second bar graph that compares all the business costs listed in the income worksheet. When you create graphs for a worksheet, remember:

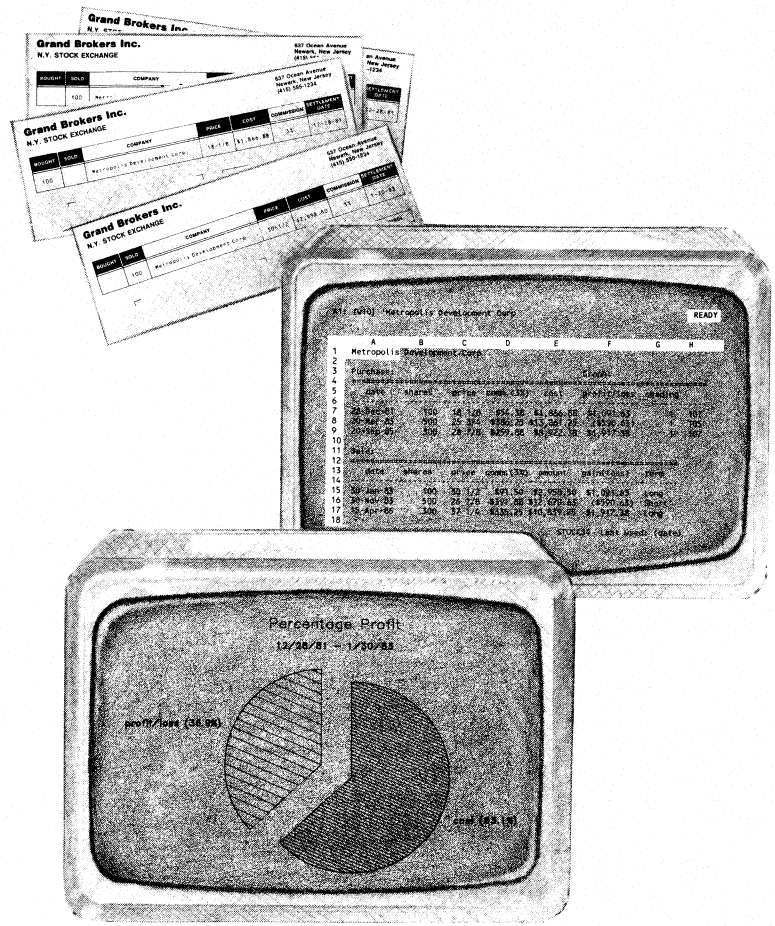
- Use the /Graph Name Create command to save more than one graph with a worksheet.
- Use the /Graph Name Use command to make a graph current. A graph must be current before you can view it or change its settings.
- Use the /Graph Options Legend command to create legends for graph data ranges.
- Press ESCAPE then RETURN to cancel any graph setting.

Chapter 3
ADDING WORKSHEET SKILLS

This chapter continues to explore what an electronic worksheet can do. You will build a stock market worksheet that records stock purchases and sales, and calculates the gain or loss from each transaction.

In the first lesson, you will create the section that records information pertaining to stock purchases. In the next two lessons, you will create additional sections that record stock sales and calculate gains. In the final lesson, you will use pie charts to illustrate the percentage of profit or loss for each transaction.

As you proceed through the chapter, you will learn more about writing formulas, and master other useful skills such as moving ranges and inserting or deleting rows and columns.



The illustration above represents the process you will go through in this chapter. You begin with stock purchase and sale records as they are supplied from a broker. You then organize the information into a worksheet and create a pie chart representing the percentage gain or loss.

Beginning in this chapter, instructions are abbreviated. For example, **Select /Worksheet Global Label-Prefix** means type /, select Worksheet, select Global, and select Label-Prefix.

Remember that the quickest way to proceed through the menus is by typing the first letter of each command. Remember also that **enter** means to type the text or numbers that follow and press RETURN or a pointer-movement key.

Lesson 1 The Stock Purchase Section

In this lesson, you will construct a worksheet that records your purchases of Metropolis Development Corporation stock. You will include information such as purchase date, number of shares purchased, and purchase price. In addition, you will write formulas to calculate the broker's commission (based on a standard percentage) and the total cost of your stock.

Entering Labels

Begin with a blank worksheet

In the first part of this lesson, you enter numbers and labels. Review Lessons 1 and 2 of Chapter 2 if you want detailed instructions.

Begin by giving your worksheet a title, the name of the company whose stock you wish to purchase.

Move to cell A1 and enter Metropolis Development Corp

This is a long label that extends into the adjacent blank cells.

Next, enter labels in the following cells to identify the types of data you will enter. Use pointer-movement keys to speed up the process.

In Cell:	Enter:
A3	Purchase:
A5	date
B5	shares
C5	price
D5	comm.(3%)
E5	cost

You need to center the range of column labels, A5 through E5. To do this:

Move to cell A5 and select /Range Label Center

Highlight the range E5..A5 and press RETURN

Next, create a double line that separates the column labels from the section heading.

Move to cell A4 and enter \=

Then copy the double line to cells B4 through E4.

Select /Copy and press RETURN

Highlight the range B4..E4 and press RETURN

Now you need a single line to separate the column labels from the numbers you will enter below them. Use the same procedures you used to create the double line.

Move to cell A6 and enter \–

Select /Copy

Press RETURN

Highlight the range A6..E6 and press RETURN

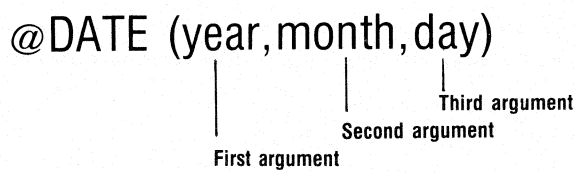
This creates a single line in cells A6 through E6.

Entering Data

The first information you want to enter in the worksheet is the stock purchase date, December 28, 1981. Ordinarily, you might want to enter this date as a label and not use it in any calculations. In the stock market worksheet, however, you

want to determine how many days elapse between a purchase and a sale. There is a way to enter a date so that 1-2-3 can convert it to a value and perform such calculations.

@DATE The 1-2-3 @function, @DATE, converts a date to a value by calculating the number of days between that date and January 1, 1900. For example, @DATE converts January 31, 1900, to the number 31.



There are three arguments, or pieces of information you must provide @DATE, each separated by a comma. The first argument is a number representing the year. Use the last two digits of the years between 1900 and 1999 and the numbers 100 to 199 for the years between 2000 and 2099. @DATE can convert dates only between the years 1900 and 2099.

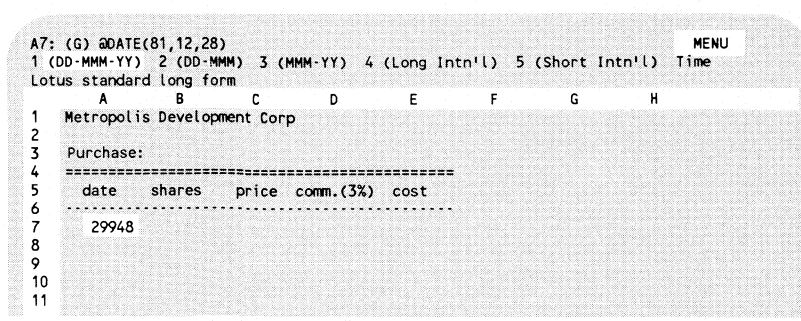
The second @DATE argument is the month of the year. The third argument is the day of the month.

Move to cell A7 and enter @DATE(81,12,28)

The number 29948 appears in cell A7. This is the number of days between January 1, 1900 and December 28, 1981.

Date Format Once @DATE converts a date to a number, 1-2-3 can display it in one of several different formats. To see the menu of options available:

Select /Range Format Date



Option 1 (DD-MMM-YY) is the Lotus standard long form. Move the menu pointer to read the descriptions of the five other items in this menu. If you enter all the dates in a worksheet with the @DATE function, you can use the /Range Format Date command to display them in different formats.

Press RETURN to select the Lotus standard long form

The prompt to enter a range to format appears. Highlight all the cells into which you will eventually enter dates:

Press DOWN twice then press RETURN

Long Numbers

Asterisks appear in cell A7, indicating that the long form for displaying dates is too long for the standard column width of 9. To correct this problem:

Select /Worksheet Column Set-Width

Since you do not know what column width is necessary to display the long date form, use pointer-movement keys to discover the proper width.

Press RIGHT

At a column width of 10 spaces, cell A7 displays 28-Dec-81.

Press RETURN to enter 10 as the new column width

Cell A7 displays the date in the long date format and the control panel displays the @DATE formula. Preceding the formula is the format indicator (D1), and the column-width indicator [W10].

The next entry in the Purchase section is the number of shares purchased.

Move to cell B7

Type 100 and press RIGHT

The stock purchase price goes in column C. Newspapers list most stock prices with fractions. Electronic information services such as CompuServe®, and Dow Jones News/Retrieval®, list prices with decimals. 1-2-3 can use either decimals or fractions.

Enter a stock price as a value if you want to display it with a decimal; that is, type the number with the correct decimal and press RETURN. If you want to display the stock price with a fraction, such as 18 1/8, enter the price as a label with a label prefix. Use the right label prefix to align it with the other numbers in the worksheet.

In cell C7 type "18 1/8 **and press** RIGHT

@VALUE

@VALUE converts fractions entered as labels to decimals. This means that you can display stock prices in whichever form you are familiar with and not worry about creating errors in converting fractions to decimals.

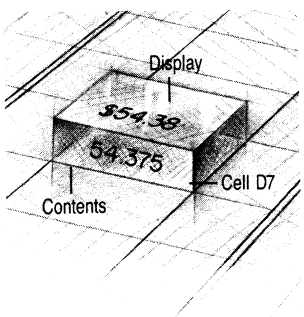
Calculating Percentages

In column D, you need to write a formula that calculates a 3% broker's commission on the stock purchase. The formula has to multiply the percentage of the commission by the number of shares and the price per share. In this formula, @VALUE will convert the price per share of 18 1/8 to the value 18.125.

In cell D7 type +B7*@VALUE(C7)*3% **and press** RETURN

Cell D7 displays 54.375, and the formula appears on the first line of the control panel. Notice that 1-2-3 displays 3% as 0.03 in the formula.

Change the format of this number to currency.



Select /Range Format Currency and press RETURN

This accepts the default number of decimal places, 2. A prompt, Enter range to format, appears.

You want both columns D and E to display numbers with a currency format. At the prompt:

Highlight the range D7.. E9 and press RETURN

This formats cells that you will use later for currency figures.

Cell D7 displays $54.38. The currency format rounds 54.375 up to a two-place decimal for display purposes only. When you use the contents of cell D7 in a formula, 1-2-3 calculates with 54.375, not 54.38.

You want cell E7 to calculate the total cost of the stock purchase. The formula must add the broker's commission to the number of shares multiplied by the price per share.

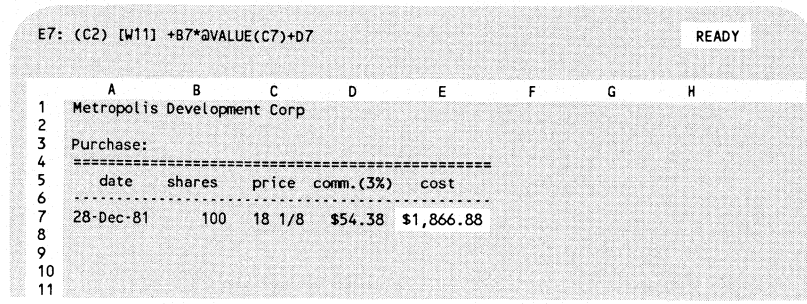
Move to cell E7 and enter +B7*@VALUE(C7)+D7

Asterisks appear in cell E7, indicating that there are too many characters to fit in the cell. You can increase the column width of E to 11 spaces. Although the number in cell E7 displays correctly at only 10 spaces, you want column E to accommodate larger figures than this.

Select /Worksheet Column Set-Width

Press RIGHT twice then press RETURN

Cell E7 displays $1,866.88. The worksheet should now look like the following illustration:



After entering data, formatting it, and calculating percentages, the Purchase section of the stock market worksheet is complete. In the next lesson, you add the Sale section.

Save the worksheet as STOCKS1

Summary

In this lesson, you created a worksheet that records stock purchases, calculates commissions, and calculates total costs. As you created this worksheet you learned to:

- Use @DATE to enter a date as a number. @DATE requires three arguments: year, month, and day.
- Use the /Range Format Date command to display a date that you enter with @DATE.
- Use @VALUE to convert a fraction you enter as a label into a decimal value.

Lesson 2 The Stock Sale Section

In this lesson, you construct a new section of the stock market worksheet that records your sales of Metropolis Development Corporation stock. Because the Sale section will be similar to the Purchase section, you can use the /Copy command to save time and effort creating it. In addition, you learn a new way to specify ranges and use 1-2-3's /Move command.

Retrieve the STOCKS1.WK1 file if it is not already on the screen

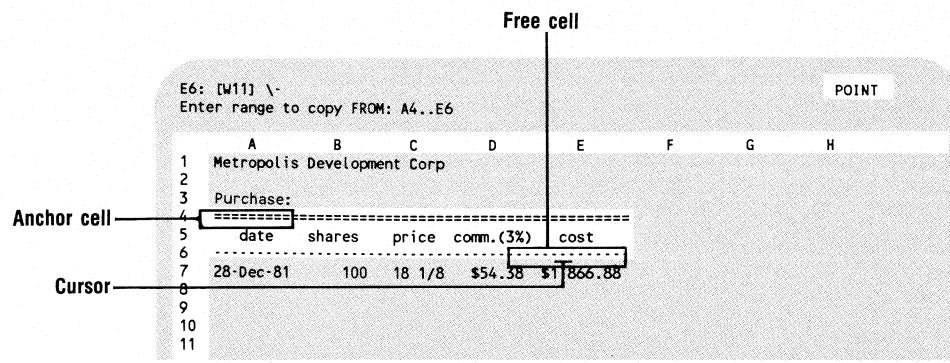
Copying a Range

You can take advantage of the fact that the columns of the Sale section record data similar to the Purchase section by copying the Purchase section's column labels and lines.

Move to cell A4 and select /Copy

You want this range to include all the column labels in rows 4, 5, and 6.

Highlight the range A4..E6



The Anchor Cell and Free Cell

Your screen should look like the worksheet illustration above. The cell addresses, A4 and E6, displayed on the control panel are the two diagonally opposite cells in the range. 1-2-3 displays these addresses because they are the anchor cell and the free cell of the range.

The first cell address, A4, is the anchor cell. It is the fixed, or stationary, cell from which you expand the highlight. The second address, E6, is the free cell. It is the cell diagonally opposite the anchor cell. Notice that the cursor is always in the free cell.

Until you press RETURN, you can move the free cell with pointer-movement keys to change the size and shape of the range. Try an experiment to demonstrate this relationship.

Press UP twice

The range shrinks to row 4. The free cell address on the control panel changes to reflect its new location.

Press UP twice

The range expands again, this time to include rows 2 and 3. Now, move the cell pointer toward the row border.

Press LEFT twice and DOWN twice

This shrinks the range to only three cells, A4 through C4. The free cell is now C4.

Finally, move the free cell back to E6.

Press DOWN twice and RIGHT twice

Notice how the range is tied to the position of the anchor cell. The free cell can expand the range away from the anchor cell or shrink the range toward it, but the range must always include the anchor cell.

To finish selecting the range to copy from:

Press RETURN

The highlight returns to the size of one cell, A4, and 1-2-3 prompts you to enter the range to copy to.

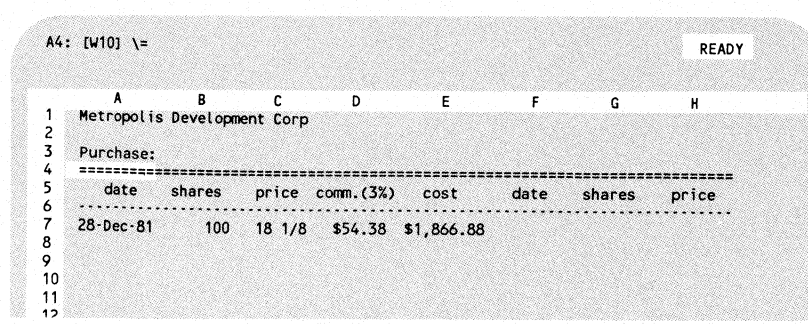
Select a location to the right of the stock purchase data for the Sale section.

Move to cell F4

Anchor the range in cell F4

Highlight the range F4..J6 and press RETURN

This copies the column labels of the Stock purchase section to the location of the Sale section. The cell pointer returns to cell A4. Notice that the labels in the Sale section retain the center label prefix (^).



The labels in columns F, G, and H (date, shares, and price) are visible, but the other labels you copied are off the screen to the right. The active area of your worksheet is now larger than the screen's display. You must move the cell pointer to see the rest of the worksheet.

Using the END Key

Press END then RIGHT

Pressing END then RIGHT moves the cell pointer to cell J4. This is the last cell in that direction that has an entry. The portion of the worksheet you could not see before is now visible, and columns A and B disappear from the screen.

As you discovered in Chapter 1, END provides a way to move quickly around a worksheet. When you use END with a pointer-movement key, the cell pointer moves in the direction of that key until it detects a change in cell contents. If the cell pointer starts in a filled cell, it stops in the last filled cell before a blank cell. If the cell pointer starts in a blank cell, it stops in the first filled cell in that direction.

For example, when you pressed END RIGHT while the cell pointer was in cell A4, the cell pointer stopped in cell J4. This is because cell J4 is at the end of the group of filled cells in that direction. If you press END RIGHT again, the cell pointer will move all the way to cell IV4, the right worksheet border.

Entering Labels and Data

Next, add a heading to the Sale section, and change the label in column J from "cost" to "amount."

Move to cell F3 and enter Sale:

Move to cell J5 and enter ^amount

Begin entering the stock sales data. The first sale date, January 30, 1983, goes in column F.

Move to cell F7 and enter @DATE(83,1,30)

The number 30346 appears in cell F7 as the number of days from January 1, 1900 to the date of the sale. To display numbers in column F as dates:

Select /Range Format Date

Press RETURN

This selects the long date format. At the prompt, enter the range of cells in column F that will contain dates.

Highlight the range F7..F9 and press RETURN

The long date format causes asterisks to appear in the cell. To allow the date to display correctly in cell F7, you must increase the column width to 10 spaces.

Select /Worksheet Column Set-Width

Press RIGHT then press RETURN

The date displays correctly, and 1-2-3 returns to READY mode. (D1) and [W10] appear on the control panel to indicate the date format you selected and the new column width.

Enter the number of shares sold in column G.

Move to cell G7

Type 100 **and press RIGHT**

Enter the price per share in column H.

Type "30 1/2 **and press RIGHT**

Since you entered 30½ as a label, be sure to use the right label prefix (") to align the label with the numbers at the right margin.

Copying a Formula

In cell I7, you need a formula to calculate the broker's commission on the stock sale. This is the same formula you used in cell D7 to calculate the commission for the stock purchase. Rather than rewrite this formula, you can copy it.

Move to cell D7

Select /Copy and press RETURN

Move back to cell I7 and press RETURN

The amount $91.50 appears in cell I7, and the cell pointer returns to cell D7. To see how 1-2-3 copied this formula:

Move the cell pointer to I7

The characters (C2) and the formula +G7*@VALUE(H7)*0.03 appear on the control panel. Notice how the relative cell addresses in the original formula from D7 adjusted to the formula's new location in I7. Notice, too, that the Currency format moved with the formula.

Finally, you must write a formula in cell J7 to calculate the amount that you receive from the stock sale. This amount equals the sale price multiplied by the number of shares, minus the broker's commission.

Move to cell J7 and enter +G7*@VALUE(H7)-I7

The number 2958.5 appears in cell J7. To change the display format to Currency:

Select /Range Format Currency

Press RETURN twice

Asterisks appear in cell J7, indicating that the number 2958.5 along with the extra characters needed for the Currency format will not fit in the 9 spaces of the default column width. Widen column J to accommodate a five-figure currency amount.

Select /Worksheet Column Set-Width

Press RIGHT twice then press RETURN

Column J is now 11 spaces wide, and $2,958.50 appears in cell J7.

Moving a Range

You completed the Sale section of the worksheet quickly and efficiently by copying elements of the Purchase section. You need more than one screen, however, to view the active area of your worksheet. In spite of preplanning, you will sometimes want to change the design of your worksheet after you create it. 1-2-3 has many ways to make this worksheet easier to look at.

By moving a range with the /Move command, you can transfer a range of cells from one part of the worksheet to another. To make your current worksheet visible on only one screen, move the Sale section below the Purchase section. Do this by first specifying the range you want to move.

Range Names

1-2-3 lets you give a range a name. Then, each time you are prompted to enter that range, you can type the range name instead of highlighting it. This will save time when you move the Sale section.

Move to cell F3

Select /Range Name Create

1-2-3 prompts you to enter a name. The range you want to name is the Sale section, so you should use a name that describes it.

Type SALE **and press RETURN**

1-2-3 accepts any range name up to 14 characters or spaces, as long as the characters do not constitute a cell address.

Anchor cell F3

Highlight the range F3..J7 and press RETURN

After naming the range, you are ready to move it.

Select /Move

Type SALE **at the prompt and press RETURN**

When you type SALE at the prompt, 1-2-3 remembers the cell addresses of that range.

1-2-3 prompts you to enter the range to move to. You need to move the cell pointer to the location of the anchor cell in the new range.

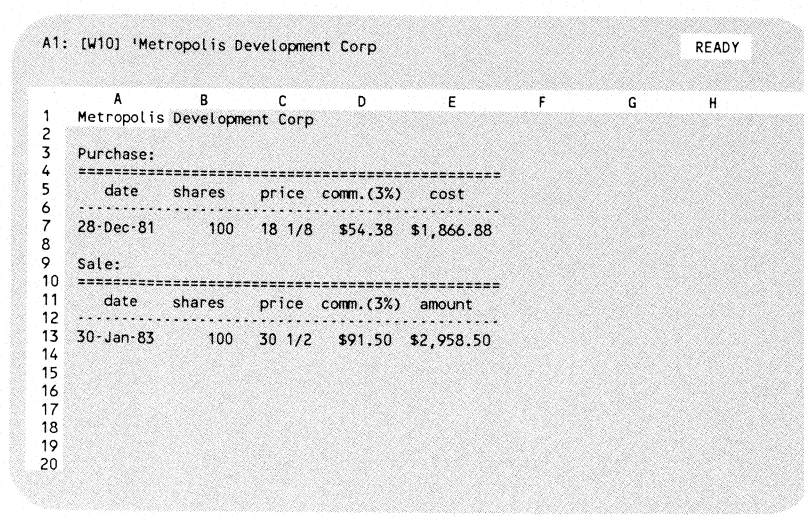
Move to cell A9

You do not have to enter more than the upper left cell address of the new location since the size and shape of the range is already defined. To move the range:

Press RETURN

To see all the data in the worksheet:

Press HOME



1-2-3 places the upper left cell of the range, SALE, in A9. The rest of the range aligns itself in relation to cell A9 in the same way that it arranged itself around cell F3.

Move the cell pointer to cells D13 and E13

Read the formulas in each of these cells as they appear on the control panel. Because the formulas in the Sale section refer to cells that you moved, the cell addresses in these formulas adjusted. If the formulas in the Sale section referred to cells that you did not move, then the cell addresses in the formulas would not adjust.

After copying the labels and lines of the Purchase section and adding data and formulas, the Sale section of the worksheet is complete. Keep an archive of files for Chapter 3, just as you did in Chapter 2.

Save the worksheet as STOCKS2

Summary

In this lesson you used the /Copy and /Move commands to help you create a section of the stock market worksheet to record stock sales. Remember the following:

- Use the /Copy command to copy one range of cell entries to another range. When you copy the contents of a cell, you also copy the format of that cell.
- Use the pointer-movement keys to highlight a range. A range expands and shrinks around the anchor cell in the direction of the free cell. The anchor and free cells are always diagonally opposite.
- Use the /Range Name Create command to give a range a name. Then you can enter that range in a command by typing the name and pressing RETURN.
- Use the /Move command to move a range of cells to a new location. /Move automatically maintains the correct relationship among all the cells in a worksheet.

Lesson 3 The Stock Gains Section

New Key to Locate:
EDIT

So far, you have created two sections of the stock market worksheet. One records purchases; the other records sales. In this lesson, you will add a final section to the worksheet. This section calculates the gain or loss from each completed transaction and determines whether the gain is long or short term.

While creating this section of the worksheet, you will learn more about formulas and @functions, and you will edit some existing formulas.

Retrieve the STOCKS2.WK1 file if it is not already on the screen

Entering Labels and Formatting Cells

Begin the stock gains section in columns F and G by entering these column labels.

In Cell:	Enter:
F11	^gain(loss)
G11	^term

Next, extend the double and single lines in rows 10 and 12 into columns F and G. Use the following data to copy the ranges. Refer to Lesson 2 for instructions on using the /Copy command.

Range to copy FROM:	Range to copy TO:
E10..E10	F10..G10
E12..E12	F12..G12

Column F will display the gains and losses of the stock transaction in amounts up to five figures. To display the amounts correctly in the Currency format, you must change the display format of cell F13 and widen column E.

Move the cell pointer to F13

Select /Range Format Currency

Press RETURN twice

This establishes the standard Currency format in cell F13. The control panel displays (C2).

Select /Worksheet Column Set-Width

Press RIGHT then press RETURN

The width of column F increases from 10 to 11 spaces. The control panel displays [W11].

Writing Formulas

In cell F13 you need a formula that calculates the result (gain or loss) from the stock sale. The result is the difference between the stock sale amount in cell E13 and the purchase cost in cell E7.

Type +E13–E7 **and press RETURN**

The gain from the sale, $1,091.63, appears in cell F13.

Now you want a formula that determines the term, or time period, between the purchase and the sale. This formula is useful for calculating taxes, since many tax codes take into account how long property is held before it is sold. A long term gain is often taxed at a lower rate than a short term gain. For example, in the United States during the years 1978 through June, 1984, the minimum holding period for a long term gain was one year.

The @IF Function

In this worksheet, you want a formula to determine if your gain is long term or short term. The formula must compare the time between the purchase and sale to the minimum time period for a long term gain. The 1-2-3 @function @IF allows you to compare these two time periods and display a certain result depending on the length of time between the purchase and sale.

Logical Operators:

=	Equal
<	Less than
>	Greater than
<=	Less than or Equal
>=	Greater than or Equal
<>	Not Equal

@IF compares two values with a special character called a logical operator. The logical operators you can use include equal (=), greater than (>), and less than (<). You want your formula to determine if the number of days between the purchase and the sale is greater than the minimum required holding period for long term gains. In the United States, for example, if the number of days is greater than one year, the formula should display "Long". If the number of days is not greater than one year, the formula should display "Short".

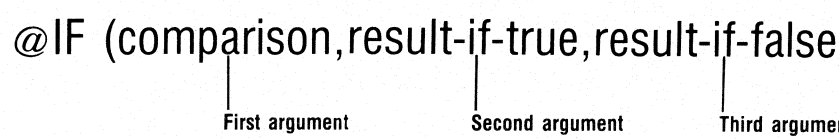
To begin the @IF formula:

Move to cell G13 and type @IF(A13–A7>365,

@IF requires three arguments. You just wrote the first argument, the comparison of the number of days between the purchase and the sale (A13–A7) and the number of days in a

year (365). The logical operator you used for the comparison is greater than (>), because you want @IF to determine if the number of days you held the stock is greater than a year.

The second and third arguments are the results you want the formula to display. They follow the first argument in the manner illustrated:



The second argument is the result of the @IF formula if the comparison is TRUE. In your formula, this means that if the result of subtracting cell A7 from cell A13 is greater than 365, the formula will display what is in the second argument. This can be a value, text, or a formula. You want your formula to display the word "Long" if the holding period is longer than a year, so for the second argument:

Type " Long", **next to the first argument on the control panel**

Notice that the second argument is enclosed with quotation marks and that there are two spaces between the first quotation mark and the word. The quotation marks are necessary if an argument uses text. The two spaces are needed to align "Long" with the right margin in column G.

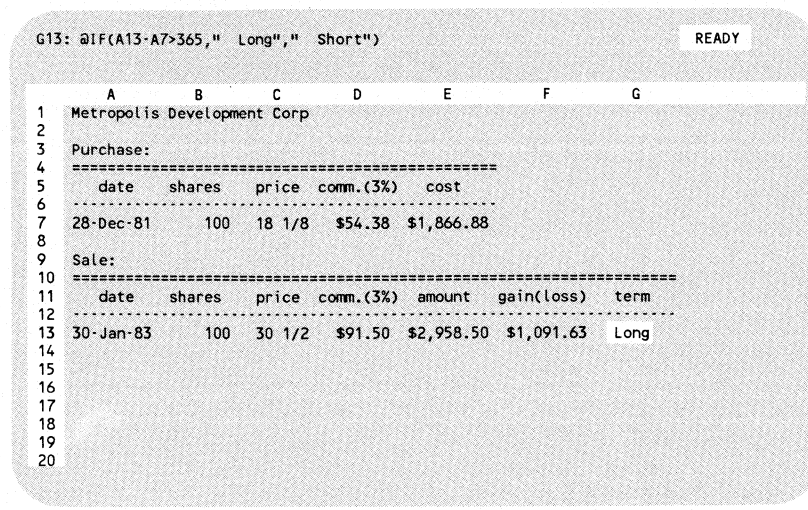
The third argument is the result the formula displays if the comparison is FALSE. If the number of days between the stock purchase and sale is not greater than 365, then @IF will display what is in the third argument. For this:

Type " Short")

The entire formula now reads:
@IF(A13–A7>365," Long", " Short"). Be sure that the three arguments are enclosed in parentheses and separated by commas and that there are no spaces outside the double quotation marks. If the formula is correct:

Press RETURN

"Long" appears as the result of the formula. @IF determined that the number of days between December 28, 1981 and January 30, 1983 is greater than one year. Thus, the comparison in the first argument is TRUE and the second argument appears in cell G13.



Entering Additional Data

Now that you have written the formulas for the worksheet, enter data for two more purchases and sales of Metropolis Development Corporation stock. Each transaction demonstrates a different ability of the stock market worksheet.

/Insert

Before you can add more data, you must make room for it. The /Worksheet Insert command allows you to add the blank rows you need. To use this command:

Move to cell A8 and select /Worksheet Insert

1-2-3 gives you the option to insert either columns or rows.

Select Row

The prompt, Enter the row insert range, appears. You need two blank rows at the bottom of the Purchase section of the worksheet. The /Worksheet Insert command adds only entire rows, so you do not need to highlight more than one cell for each row that you want to insert.

Highlight cells A8..A9 and press RETURN

The Sale portion of the worksheet moves down two rows and opens up rows 8 and 9 for new data. Like the /Move command, /Worksheet Insert and its companion command, /Worksheet Delete, maintain the correct relationship among all the cell references in a worksheet.

Enter the new purchase and sale data as follows:

In Cell:	Enter:
A8	@DATE(83,3,20)
B8	500
C8	"25 3/4
A16	@DATE(83,11,30)
B16	500
C16	"26 1/8

Cells A8 and A16 display the numbers 30395 and 30650, not dates. The /Worksheet Insert command creates rows and columns that have a General format. Even though you formatted cells A8 and A9 to display a date in Lesson 1, the /Worksheet Insert command moved that format two rows down. In Lesson 2, the /Move command did not include the additional cells that you formatted. For these reasons, you must change the format in cells A8 through A9 and A16 through A17 to the Lotus standard long date format.

Move to cell A8

Select /Range Format Date

Press RETURN

1-2-3 prompts you to enter the range to format.

Highlight the range A8..A9 and press RETURN

The correct date appears in cell A8.

Follow the same instructions to format cells A16..A17

Copying Formulas

After entering and formatting the new data, you need to enter the formulas that calculate costs, sales amounts, and gains in the same way that you calculated this information for the first transaction. It is quicker to copy these formulas from the cells above than to retype them. Use this table to copy the formulas and refer to earlier copy procedures if you need specific instructions.

Range to copy FROM:	Range to copy TO:
D7..E7	D8..E8
D15..G15	D16..G16

Notice that cell F16 displays a loss of $590.63. When 1-2-3 calculates a negative number in a Currency format, it encloses that number in parentheses. Also notice that the term in cell G16 is "Short", meaning that the holding period of the transaction is not greater than 365 days.

Finally, enter the third purchase and sale data in the same way you entered the previous ones.

In Cell:	Enter:
A9	@DATE(85,9,20)
B9	300
C9	"28 7/8
A17	@DATE(86,4,15)
B17	300
C17	"37 1/4

Next, copy the formulas to calculate this data. Use the following table to copy the ranges.

Range to copy FROM:	Range to copy TO:
D8..E8	D9..E9
D16..G16	D17..G17

Editing Formulas

"Short" appears in cell G17. The gain of $1,917.38 in cell F17 is listed as a short term gain because 1-2-3 calculated that the time between the purchase and the sale was less than a year. Suppose that the tax law defining long and short term gains changes. In June of 1984, for example, the United States Internal Revenue Service reduced the minimum holding period for long term capital gains to six months. Your last purchase and sale occurs between 1985 and 1986, making it possible that your gain is now long term under the new law. You can edit your formula to reflect the new minimum holding period and recalculate it to see if the term will change from "Short" to "Long."

To edit a formula, first move the cell pointer to the cell with the formula.

Move to cell G17

The first line of the control panel displays the formula as it is currently written.

Press EDIT

The current cell contents appear on the second line of the control panel as well as on the first. You can make changes in the formula on the second line, starting from the cursor location.

Press LEFT until the cursor is under the 3 in 365

In EDIT mode, you can use RIGHT and LEFT to change the position of the cursor one character at a time. HOME moves the cursor to the first character of the entry, and END moves it one space beyond the last character.

Press DELETE three times

To make a change, use either DELETE to erase the characters directly above the cursor, or BACKSPACE to erase the characters to the left. You can then type in characters to replace the ones you erase. Pressing ESCAPE erases the entire entry so that you can type another.

Type 180 **and press RETURN**

This enters 180, the accepted number of days in six months, into the formula in place of 365. When you press RETURN, the new version of the formula replaces the old one on the first line of the control panel, and 1-2-3 recalculates and displays "Long" in cell G17. Your worksheet should now look like the worksheet illustration at the beginning of the chapter.

Using EDIT to change a cell entry is easier than typing a new entry when you have only a few changes to make. If the changes are substantial, it may be easier to type a new cell entry.

Adding Notation

Before you finish the worksheet, you might want to annotate it as you did the income worksheet.

After adding a section to calculate long and short term gains and entering new data, the stock market worksheet is complete. In the next lesson you will create a graph from this worksheet that shows the percentage of profit or loss from a transaction.

Save the file as STOCKS3

Summary

You completed the stock market worksheet so that it calculates stock gains and losses. You used @IF and a logical formula to determine whether each gain is long or short term. Remember the following:

- @IF uses a logical formula to generate a value. @IF requires three arguments: the logical formula, the resulting value if the formula is TRUE, and the resulting value if the formula is FALSE.
- Use the logical operators equal (=), greater than (>), and less than (<) to set up logical formulas.
- Use the /Worksheet Insert command to add rows or columns to a worksheet.
- Press EDIT from READY mode when you want to change cell entries. Use the pointer-movement keys to move the cursor to the characters you want to change. Use DELETE and BACKSPACE to erase characters. Type in new characters at the cursor. Press RETURN to enter the revised entry.

Lesson 4 The Profit/Loss Graph

The stock market worksheet calculates gains and losses when you buy and sell Metropolis Development Corporation stock. In this lesson, you will create a graph to visually represent the percentage of gain or loss in a completed stock transaction. At the end of Chapter 2, you created two bar graphs. Bar graphs are appropriate when you want to compare values to each other. Now you will learn how to create a pie chart that is useful when you want to represent values as parts of a whole.

Retrieve the STOCKS3.WK1 file if it is not already on the screen

Creating a Pie Chart

1-2-3's pie charts calculate and display slices that make up a circle. Each slice corresponds to a percentage part of the whole. When you sell some stock, for example, you might want to know what percentage of the sale amount represents profit and what percentage is the original amount you invested. 1-2-3 can draw a circle that represents the sales amount and divide it into proportional profit and cost slices.

The Data Range

Since the pie chart compares parts to the whole, you can use only a single data range to draw one. The value in each cell of the range becomes one slice in the pie. If you want to graph more than one range, you need more than one pie chart.

Because a range contains only adjacent cells, you have to set up a special section in the worksheet where the cost figures and the profit figures can be side by side. This section does not add new data to the worksheet; it only places it in a convenient location for creating the graph.

To create an appropriate data range, you must duplicate the values and labels in cells F12 through F17 so that they are adjacent to the cost data in column E. In this location you can use them to draw your pie charts. You cannot use the /Copy command for this procedure since these cells contain formulas. When you copy a cell that contains a formula, the relative cell addresses adjust to the new location, and the formula calculates a new value. You want to use the current values.

/Range Value

The /Range Value command copies only the value in a cell and not the underlying formula that calculates the value. This avoids the possibility of a formula calculating a different result in the new location. To use this command:

Move to cell F12

Select /Range Value

1-2-3 prompts you to enter the range to copy values from.

Highlight F12..F17 and press RETURN

To complete the procedure:

Move to cell F4 and press RETURN

Next, give this section of graph data a heading and change the column label.

Move to cell F3 and enter Graph:

Move to cell F5 and enter ^profit/loss

The First Graph Settings

You are ready to create a pie chart using this data. To begin:

Select /Graph Type Pie

The Graph menu returns. Next, you must define the data range for the graph.

Select A

The prompt, Enter first data range, appears. Specify the stock purchase cost in cell E7 and the profit from the stock sale in cell F7.

Highlight the range E7..F7 and press RETURN

The Graph menu returns. If you view the graph now (with the /Graph View command), you will see a two-section pie. The upper left slice of the pie chart shows the percentage profit of the sale, and the rest shows the percentage cost of the purchase.

Labeling a Pie Chart

You can identify the cost and profit pie slices with labels. Pie charts use the X range values for this purpose. Since there is no horizontal axis in a pie chart, 1-2-3 places labels next to the corresponding pie slices.

Select X

Highlight the range E5..F5 and press RETURN

To add titles to identify your graph:

Select Options Titles First

Type Percentage Profit **and press RETURN**

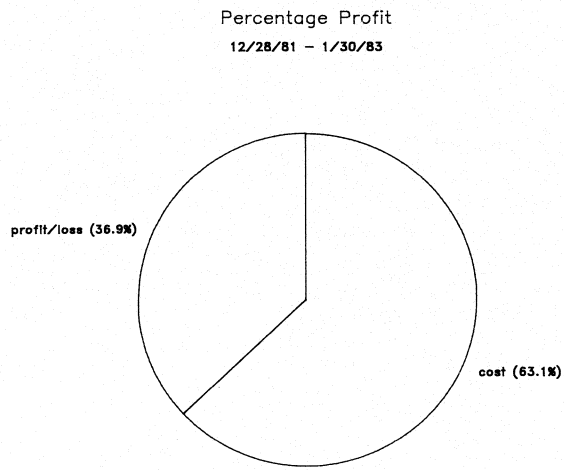
For the secondary title:

Select Titles Second

Type 12/28/81 – 1/30/83 **and press RETURN**

Confirm that the labels and titles are entered correctly.

Select Quit then select View



Press ESCAPE to return to the Graph menu

Select Quit to return to READY mode

Shading Pie Chart Slices

When 1-2-3 draws a pie chart, it draws only an outline of a circle with lines separating the slices. You can shade individual slices with a crosshatching pattern to emphasize the different data areas.

Code Numbers for Crosshatching

1-2-3 does not automatically shade the slices of a pie chart as it does the different data ranges of a bar graph. Instead, you must use code numbers to specify which slices will contain shading. Each code number, 1 through 7, fills a pie slice with a different crosshatching pattern. The number 0 specifies no pattern.

If you have a color monitor and select Color from the Graph Options menu, the numbers will indicate contrasting colors instead of patterns. The particular color each code represents depends on your computer and monitor.

To use a crosshatching code, specify the numbers of your choice as the B (second) data range in the Graph menu. This means that you must add a section to the worksheet for the code numbers so that you can highlight them as a range.

For the shading to correspond with the slices in the pie chart, the B range must have the same number of entries and be parallel to the A range. Columns G and H next to the Graph section are a convenient location for this data, so use the following to establish this range.

Range to copy FROM:	**Range to copy TO:**
F4	G4..H4
F6	G6..H6

In Cell:	**Enter:**
G5	shading

Column H is not visible on the screen. To make it visible with the rest of the worksheet, you need to reduce its width.

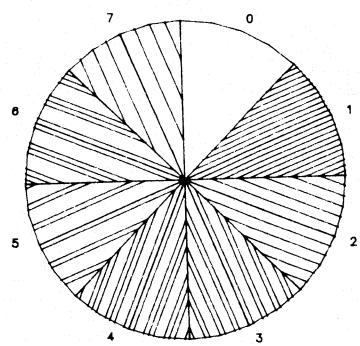
Move to cell H5

Select /Worksheet Column Set-Width

Press LEFT until column H is 6 spaces wide

Press RETURN then press HOME

The entire worksheet is now visible on the screen.



The Shading Code Range

You want to choose and enter code numbers that specify the patterns for the pie slices in your graphs. Study the different shading possibilities in the illustration of the crosshatching possibilities and choose two that contrast. For example:

Move to cell G7 and enter 1

Move to cell H7 and enter 7

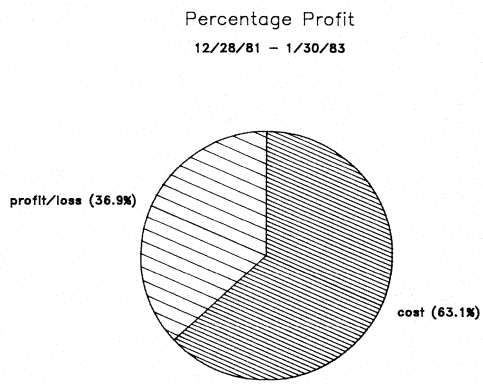
To add the shading codes to the graph settings:

Select the B range from the Graph menu

Highlight the range G7..H7 and press RETURN

In order to see how the crosshatching codes change the graph:

Select View



You can select any combination of crosshatching codes for your pie charts by changing the numbers in the cells of the B range. Because 1-2-3 stores the B range settings as cell addresses and not the actual numbers, changing the values in the cells changes the patterns. When you complete shading the pie chart according to the suggestions in this lesson, experiment with different combinations.

Press ESCAPE to return to the Graph menu

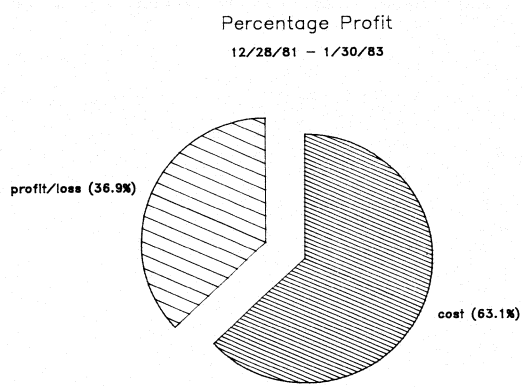
Select Quit to return to READY mode

Exploding Pie Charts

Another way to emphasize selected slices of a pie chart is to explode, or detach, the slices from the rest of the chart. To do this, add 100 to the shading code of the slice you want to explode. The crosshatching pattern remains the same, but that slice moves away from the center of the pie. If you add 100 to all of the graph shading numbers, the whole chart explodes away from the center.

Move to cell H7 and enter 107

Press GRAPH



The pie slice that illustrates the percentage of profit is detached from the rest of the graph.

Press ESCAPE to return to the Graph menu

You can create two more pie charts using the data from the second and third stock transactions. Remember that you must name each graph in order to keep the settings separate. To name the current graph:

Select /Graph Name Create

Type PROFIT/LOSS1 **and press RETURN**

Try the following suggestions to edit the current graph settings to create profit/loss pie charts from the second and third transactions:

Setting:	Transaction 2:	Transaction 3:
Range A	E16..F16	E9..F9
Range X	E13..F13	E5..F5
1st Title	Percentage Loss	Percentage Profit
2nd Title	3/20/83 - 11/3/83	9/20/85 - 4/15/86
Shading	G8 = 1;H8 = 105	G9 = 1;H9 = 107
Graph Name	PROFIT2	PROFIT3

You have created at least one pie chart showing the percentage profit or loss in a completed stock transaction in the stock market worksheet. In the next chapter you will print out some of your worksheets and a graph.

Save the file as STOCKS4

Summary

In this lesson, you used pie charts to represent the profit or loss in a completed stock transaction. Remember the following:

- Use a single data range, A, to make a pie chart.
- Use the X range to store labels for the pie slices.
- Use the B range to store crosshatching, or color codes, to distinguish individual pie slices.
- Add 100 to the crosshatching code numbers to cause a slice of a pie chart to explode.
- Use the /Range Value command to copy the current value of cells containing formulas.

Chapter 4
PRINTING YOUR WORK

Sooner or later, you will want to print the results of your work. 1-2-3 lets you produce attractively printed reports with a few simple steps.

In this chapter, you will print all or part of a worksheet with headers and footers, format and print a memo, and use the PrintGraph program to print a 1-2-3 graph.

Before you begin the lessons in this chapter, be sure you used the Install program to tell 1-2-3 what printers you are using.

Lesson 1 Printing from a Worksheet

In this lesson, you will print a worksheet that you have already created. Any worksheet will do. You can select one of the worksheet files you created in Chapter 2 or 3. Then you will print the same worksheet with headers and footers.

Before you continue with this lesson, be sure the text printer you specified with the Install program is properly connected to your computer and is turned on.

Retrieve the worksheet you want to print

Printing a Worksheet Range

Choose the Print command:

Select /Print

/Print Printer vs. /Print File

The /Print command offers two basic options: Printer and File.

If you select File, 1-2-3 prepares to store information from your worksheet in a standard text file on a disk.

If you select Printer, 1-2-3 prepares to send your printing instructions to the text printer you designated with the Install program.

Select Printer

Print Range

You must tell 1-2-3 what you want to print from the worksheet. You do this by specifying a range to print (a print range).

Select Range

If the cell pointer is not in cell A1, move it there so that your print range begins at the top of the worksheet.

Press HOME

Anchor the cell pointer

Highlight the part of the worksheet you want to print and press RETURN

Adjust the paper so that the printer will begin printing at the top of a page. You can adjust the paper manually or advance the paper one line at a time by selecting Line. When you are ready, select Align to tell 1-2-3 that the printer is ready to begin printing at the top of a page.

Adjust the paper and select Align

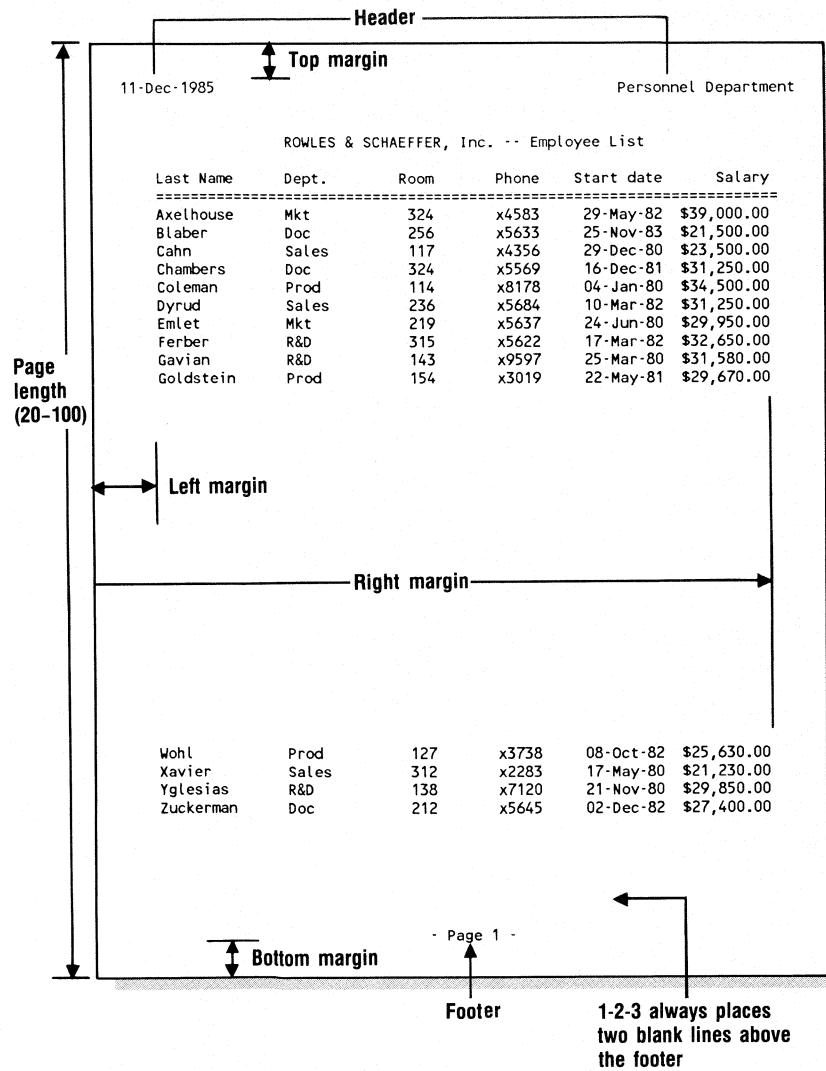
You are ready to print.

Select Go

Your printer should now be printing.

When your printer has finished, advance the paper to the top of the next page:

Select Page

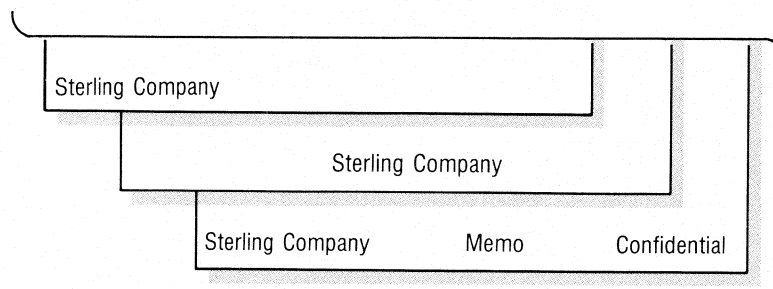


Selecting Print Options

Before you print, you can specify the page format for your printed copy. For example, you can change margins, establish headers and footers, number pages, and automatically include the current date by choosing /Print Printer Options.

Creating Headers and Footers

You can establish a header line that will appear at the top of each printed page, and a footer line to appear at the bottom of each page. Both headers and footers may contain up to three segments: a left-aligned segment, a centered segment, and a right-aligned segment. You separate these segments with a split vertical bar (¦).



If you want 1-2-3 to print today's date in the header or footer, include @ where you want the date to appear. If you want 1-2-3 to number the pages, include # where you want the page numbers to appear.

Select Header

Whatever you enter now will appear at the top of every page in the range you print.

Enter ¦Sample Printout

Select Footer

Enter Prepared @ ¦¦Page #

Select Quit to return to the main Print menu

1-2-3 remembers the last print range you specified. You do not need to reenter the print range unless you want to change it.

You are ready to print again.

Select Go

Unless the end of your print range coincides exactly with the bottom of a page, you must advance the paper to the top of the next page to get a footer on the last page.

Select Page

Select Quit to leave the Print menu

Note the header and footer. The footer includes today's date (in place of @) and the page number (in place of #). If your print range was large enough to require more than one page, each page includes the same header and footer with appropriate page numbers.

When you save a worksheet, you also save the print range and options you specified most recently. So it is a good idea to save the worksheet that you have just printed.

Since you have not changed the contents of the worksheet, you may want to save it under its old name. If you do, 1-2-3 will ask you whether to replace the old file with the new one. You can select Yes.

Save the file

Summary

You have printed a worksheet twice, the second time with headers and footers. When you want to print from a worksheet, use the following steps:

- Select /Print to begin the command.
- Select Printer to send your printing instructions directly to the printer.
- Select Range and enter a print range.
- Select any Options you want, such as headers and footers.
- Select Quit to leave the Options menu.
- Select Align to tell 1-2-3 you are at the top of the page.
- Select Go to begin printing.
- Select Page if you want to include a footer on the last page and/or advance to the next page.
- Select Quit to leave the Print menu and return to READY mode.

Lesson 2 Formatting and Printing Text

On occasion, you may want to include a written message along with a printed copy of your worksheet. Perhaps you want to attach a memo to give some background to the worksheet or to call attention to a particular trend or pattern.

You have already used labels to identify the contents of individual rows and columns. You can also use label entries to store extended text. By choosing the /Range Justify command, you can string together a series of label entries to create a neatly formatted paragraph.

In this lesson, you will write and format a brief memo, then print out both the memo and the worksheet data.

The final form of the worksheet you created in Chapter 2 is INCOME7.

Retrieve INCOME7.WK1

Composing a Memo

Suppose you want to send a printed copy of the data in this worksheet to a colleague, and you would like to accompany the data with a memo.

You need some blank space in which to write the memo, so move the cell pointer below your data.

Move to cell A25

Identify the receiver and sender:

In cell A25 enter To: Stanley Jetson

In cell A26 enter From: Joan Evenston

Both entries are long labels. That is, they are text entries that appear to extend beyond the boundaries of the cells in column A in which they are stored. If you move the cell pointer to cells B25 and B26, you can verify that they are blank by looking at the control panel.

Remember that each cell can store up to 240 characters of text, no matter what its column width.

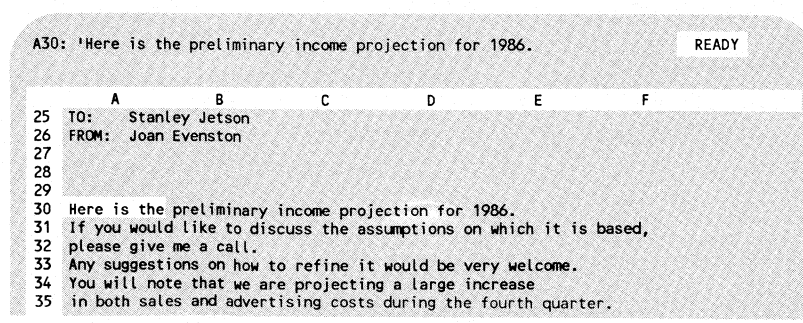
Entering Text to be Formatted Later

Move to cell A30

Enter the text of your memo as a column of long labels. It makes no difference how much or little you put in each cell.

Be sure that all your entries are in column A. You will not be able to format the text if it is not all in the same column. Also be sure that there are no blank cells between the labels. The /Range Justify command formats a single column of consecutive labels.

Enter the following labels in column A beginning in cell A30



Formatting Text with /Range Justify

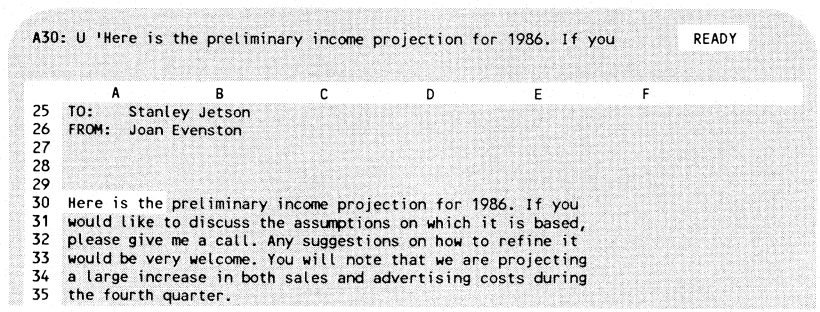
Now you are ready to use the /Range Justify command to format this column of consecutive long labels.

Move to cell A30

Select /Range Justify

1-2-3 prompts you to enter a justify range. You must specify how wide you want the text to be by expanding the highlight to the desired width.

Highlight A30..E30 and press RETURN



Note how 1-2-3 redistributes the text to conform to the paragraph width that you specified. It formats a single column of consecutive label entries, stopping when it reaches a blank or nonlabel cell.

Practicing /Range Justify

Experiment with the /Range Justify command and different widths until you have a good feel for how it works. Repeat the following steps:

Move to cell A30

Select /Range Justify

Press RIGHT to highlight the width you want

Press RETURN

When you increase the width, the text is redistributed upward and to the right. When you decrease the width, the text is redistributed downward and to the left. At the same time, anything in the column below the text is shifted upward or downward (not a consideration here, because there is nothing below the memo).

Inserting the Memo

Since you probably want to print the memo above the data in the worksheet, you can insert some rows at the top of the worksheet and move the memo there.

Press HOME

Select /Worksheet Insert Row

1-2-3 prompts you to enter the row insert range.

Highlight A1..A20 to insert 20 rows and press RETURN

Move the memo to the top of the worksheet.

Select /Move

1-2-3 prompts you for the range to move from. You want to move the cell pointer to A45 and highlight the memo, but the range is currently anchored in A1. If you move the cell pointer, you will highlight a range beginning in A1. First you must press ESCAPE to unanchor the range. Then, after you move to A45, you press period (.) to reanchor the range.

Press ESCAPE to unanchor the range

Move to A45

Press . (period) to reanchor the range

Highlight the entire memo and press RETURN

Remember that the memo is stored in column A, although it appears to extend into subsequent columns, so you need to highlight cells only in column A.

The highlight returns to cell A1, and 1-2-3 prompts you for the range to move to.

Press RETURN to accept cell A1

Editing the Memo

Now suppose you want to add some text in the middle of the memo.

Move to the cell in column A containing: You will note...

Press EDIT

The mode indicator changes from READY to EDIT, and the label appears on the second line of the control panel, ready for editing.

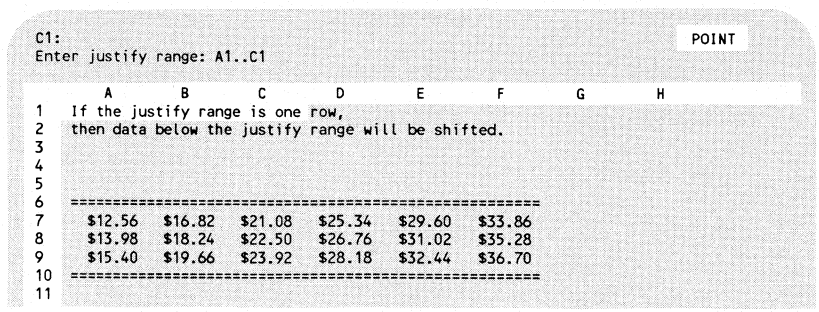
Move the cursor to the Y in You

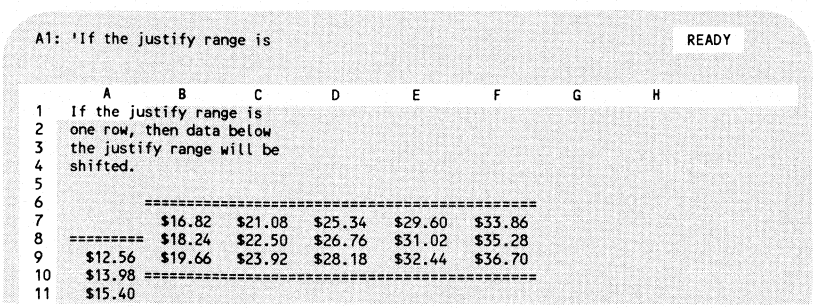
Type How about a meeting next week?

Type two spaces to separate the sentences and press RETURN

Now you can use the /Range Justify command to rejustify the paragraph.

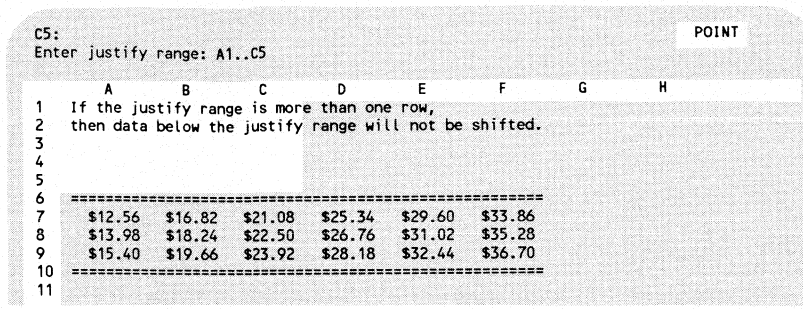
Remember that anything in column A below the justified paragraph is shifted downward or upward along with the paragraph, moving column A out of alignment with the rest of the worksheet.

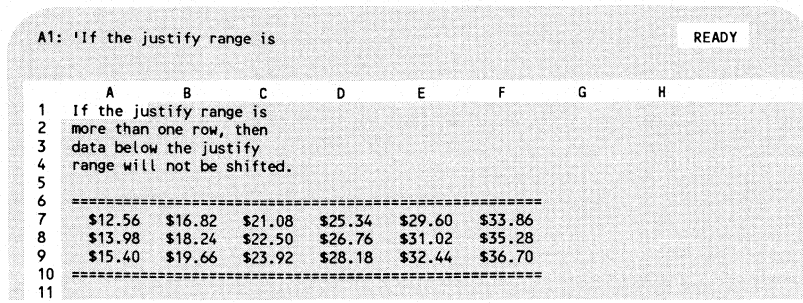




Multiple-Row Justify Ranges

You can prevent this from occurring. When you specify the range you want to justify (the justify range), expand the highlight not only to the right to specify paragraph width, but also downward to specify the maximum area you want the justified paragraph to fill.





If you specify a justify range of only one row, 1-2-3 shifts everything below the column of justified text. If you specify a justify range of more than one row, 1-2-3 does not move anything in the cells below that range.

Move to the cell containing Here is the preliminary...

Select /Range Justify

Press RIGHT to highlight the paragraph width you want

If you expand the highlight down, you are specifying the maximum area the memo can occupy.

Press DOWN until the highlight is just above the top of your worksheet data

When you are satisfied that the range is not only the right width, but also large enough to accommodate the rejustified paragraph:

Press RETURN

If the text does not fit in the justify range, 1-2-3 displays an error message. If this happens, press ESCAPE to return to READY mode. Next time you select /Range Justify, specify a wider and/or deeper range.

Saving Space

Now you can use the /Worksheet Delete Row command to get rid of some of the blank space between the memo and the worksheet data. This allows you to print both the memo and the data in one print range without a lot of blank space in between. Another solution is to print the memo in one print range and the worksheet data in a second print range, but this requires you to go through the print procedure twice.

Move the cell pointer a line or two below the bottom of the memo

Select /Worksheet Delete Row

Press DOWN to expand the highlight to just above the top of your worksheet data

Press RETURN

Printing the Memo and the Worksheet Data

Now you are ready to print the memo and the worksheet data.

Press HOME

Select /Print Printer Range

Highlight both the memo and the worksheet data

Press RETURN

You want to begin printing at the top of a new page.

Adjust the paper and select Align

You are ready to print.

Select Go then select Page

Select Quit to leave the Print menu

If you want to save the worksheet with the memo:

Save the file as CASHMEM

Summary

In this lesson, you created a memo and printed it along with your worksheet data. When you want to format text, remember the following:

- Use /Range Justify to format a paragraph of text that you have entered as a single column of consecutive labels.
- If you specify a single-row justify range, /Range Justify shifts information below the formatted column.
- If you specify a multiple-row justify range, /Range Justify does not disturb the placement of any information below the justify range.

Lesson 3 Printing Graphs with PrintGraph

A graph can be an effective tool for presenting information. An economic trend buried in columns of figures stands out in a bar graph, or the sales performance of different sectors of a company in a pie chart.

Once you have created a graph, you can store it in a file, then print it using PrintGraph, a program that comes with 1-2-3. In this lesson, you will print a graph that you created in Chapter 2. Before proceeding with this lesson, be sure you designated a graphics printer with the Install program.

Retrieve the INCOME7.WK1 file if it is not already on the screen

Saving a Graph in a File

Attached to INCOME7 are two bar graphs with titles, labels, and legends.

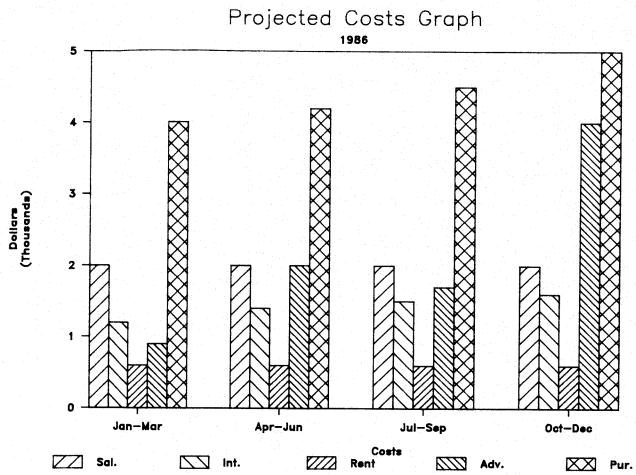
You named them COSTS and SALES with the /Graph Name Create command.

Make the COSTS graph current:

Select /Graph Name Use

Move the menu pointer to COSTS and press RETURN

If your computer can display graphs, it should now be displaying COSTS.



Press ESCAPE to return to the Graph menu

Now you want to store this graph in a separate file so that you can print it later with PrintGraph.

Select Save

1-2-3 prompts you for a file name.

Enter COSTS

1-2-3 automatically adds the .PIC file extension to distinguish graph files from other kinds of files.

/Graph Name Create and /Graph Save

In Chapter 2, you used /Graph Name Create to create a graph named COSTS. Now you have used /Graph Save to store that graph in a file (COSTS.PIC) that PrintGraph can use for printing.

You use /Graph Name Create to name a graph that you created. If you save the worksheet with /File Save, the named graph becomes part of the worksheet file. Each time you retrieve that worksheet, that graph is there. Each time you change data in the worksheet, the graph changes accordingly. You can create any number of named graphs within a worksheet and make any of them current with the /Graph Name Use command.

When your graph is in a form that you want to print, use /Graph Save to save the graph as a separate and static file, distinct from the worksheet, and in a form that PrintGraph can use to print it. This file is accessible only from PrintGraph, and it does not reflect any changes you make to the worksheet after you create it with /Graph Save. During a 1-2-3 session, you can use the /File List Graph command to see a list of the .PIC files you have created.

Select Quit to leave the Graph menu

Now, leave the 1-2-3 program and start PrintGraph.

Select /Quit Yes

Switching from 1-2-3 to PrintGraph

If you started from the Access System, you are now back in the Access menu. Otherwise, you are back at the operating system prompt.

If a message appears on your screen telling you to insert COMMAND.COM in drive A, insert your operating system disk in drive A and press any key when ready.

One and Two-Disk Systems

To start PrintGraph from the Access System:

Select PrintGraph

The Access System instructs you to put the PrintGraph Disk in drive A.

Replace the System Disk with the PrintGraph Disk and press RETURN

To start PrintGraph from the operating system prompt:

Replace the System Disk with the PrintGraph Disk

Type pgraph **and press RETURN**

Now turn to the section, PrintGraph Settings.

Hard-Disk System

If you have not yet copied the files from the PrintGraph Disk to the current directory (the 1-2-3 directory) of your hard disk, do so now.

To start PrintGraph from the Access System:

Select PrintGraph

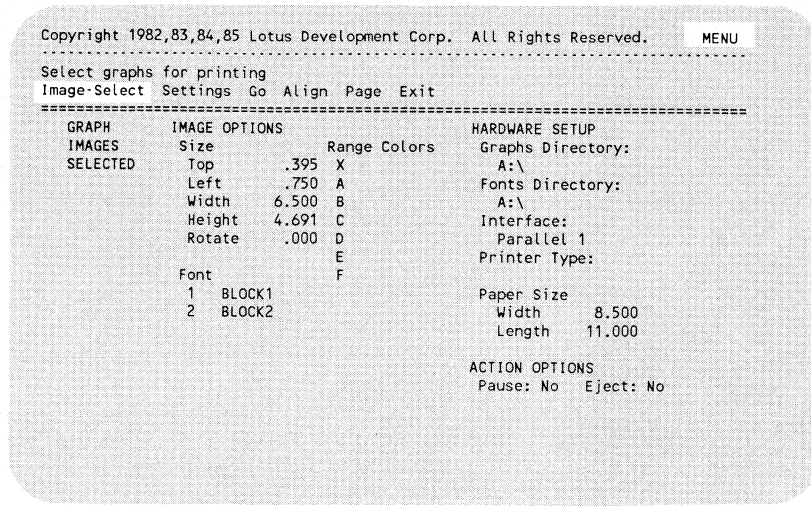
To start PrintGraph from the operating system prompt:

Type pgraph **and press RETURN**

Now turn to the section, PrintGraph Settings.

PrintGraph Settings

PrintGraph's current settings are displayed on the main part of the screen, below the main PrintGraph menu. Your screen should look as follows:



Establishing Hardware Setup

The first time you start PrintGraph, it assumes that you have a one-disk system and that your .PIC files are stored along with the fonts (typeface for the text on your graphs) on the PrintGraph Disk in drive A.

One-Disk System

You do not need to make any changes. The default settings are what you want.

Now turn to the section, Printer Type.

Two-Disk System

From the main PrintGraph menu:

Select Settings Hardware Graphs-Directory

Change the graphs directory from A:\ to B:\ (this assumes that you store your .PIC files on a data disk in drive B):

Type B:\ **and press RETURN**

Select Quit twice to return to the main PrintGraph menu

Now turn to the section, Printer Type.

Hard-Disk System

You must change both the graphs directory and fonts directory.

From the main PrintGraph menu:

Select Settings Hardware Graphs-Directory

You may be storing .PIC files on any directory of the hard-disk drive or the diskette drive. This is the directory you should designate now. If you saved the graph (COSTS.PIC) to C:\data, for example, then:

Type C:\data **and press RETURN**

PrintGraph (including print fonts) should be in the 1-2-3 directory of the hard disk.

Select Fonts-Directory

If you copied all the files from the PrintGraph Disk to C:\123, for example, then:

Type C:\123 **and press RETURN**

Select Quit twice to return to the main PrintGraph menu

Printer Type

If you specified more than one graphics printer during the Install procedure, you must tell PrintGraph which one to use. If you selected a printer that prints at more than one density, you must tell PrintGraph what density to use. At a higher density, your printed copies will show more detail, but the printing will take longer.

From the main PrintGraph menu:

Select Settings Hardware Printer

Select a combination of printer and density and press RETURN

Select Quit to return to the Settings menu

Saving New PrintGraph Settings

Any changes you make to the PrintGraph settings are effective immediately, but they are also forgotten as soon as you leave PrintGraph unless you save them with the /Settings Save command.

From the Settings menu:

Select Save

Select Quit to return to the main PrintGraph menu

Other Settings

You can also use /Settings commands to change the size and proportion of the graph, select different fonts for text, and select colors (if your printer or plotter can print colors). See the chapter on PrintGraph in the *Reference Manual* for complete details.

Specifying Which Graph to Print

Now you must specify which graph you want to print. From the main PrintGraph menu:

Select Image-Select

PrintGraph lists all .PIC files in the graphs directory in alphabetical order along with information on their size and when you created them with the /Graph Save command. You have created only one .PIC file, COSTS; it is highlighted.

Highlight COSTS and press SPACE

The # that appears in front of COSTS means that you have selected COSTS for printing.

To enter your selection and return to the main PrintGraph menu:

Press RETURN

Adjust your paper and select Align

Select Go to begin printing

When the printing is done, advance the paper to the next page:

Select Page

Summary

You have used PrintGraph to print a graph that you created in 1-2-3. Here are the steps:

- Create a graph in 1-2-3.
- Use the /Graph Save command to save an image of the graph in a .PIC file.
- Exit 1-2-3, either to the Access menu or the operating system, and start the PrintGraph program.
- Verify that the fonts directory and graphs directory are appropriate for your system. If necessary, change them. Be sure you have specified a printer type.
- (Optional) Make any other Settings choices you think are suitable. Select Quit to return to the main PrintGraph menu.
- Select Image-Select and specify the graph(s) you want to print.
- Select Go to print the graph(s).

Chapter 5
MANAGING A DATABASE

So far, you have created worksheets with data organized in appropriately labeled columns and rows. Columns and rows provide the underlying structure of a worksheet. You have taken advantage of that structure to organize your information for ease of use and for clarity.

In a well organized worksheet, each column and each row contains closely related information. This is also true of a 1-2-3 database.

A 1-2-3 database is a worksheet containing columns and rows of related information organized in a particular way. This structure and the 1-2-3 database capability can be very useful for organizing and managing large quantities of information.

Expenditures for June

A1: [W17] READY

	A	B	C	D	E	F	G
1							
2							
3		JAN	FEB	MAR	APR	MAY	JUN
4	SALARIES	$24,500	$24,500	$25,200	$25,200	$25,200	$25,200
5	COMMISSIONS	$14,200	$11,600	$12,300	$15,200	$17,000	$16,800
6	PLANT MAINTENANCE	$4,600	$4,300	$3,900	$4,000	$3,200	$3,100
7	OFFICE SUPPLIES	$160	$140	$280	$240	$300	$260
8	TRAVEL	$400	$270	$890	$320	$160	$580
9							
10							
11							

Expenditures for supplies

One row in the business worksheet above contains all expenditures for office supplies, while one of the columns contains all expenditures for June.

The worksheet below illustrates part of a database that a realtor might maintain. Each row in the database contains a collection of information about one house for sale. Each column holds a specific item of information, such as address or cost.

Cost of each house

A1: [W17] READY

	A	B	C	D	E	F	G	H
1			CURRENT LISTINGS					
2	ADDRESS	BDRMS	BATHS	LOT	HEAT	AGE	COST	ON MARKET
3	12 Bartholomew Sq	5	4	0.25	Gas	48	$290,000	01-Aug-82
4	46 Prospect Pl	5	2	0.40	Oil	22	$90,000	28-Apr-83
5	690 Rice Ave	3	2	0.60	Oil	25	$92,000	04-Oct-84
6	903 Ray Rd	2	1	0.30	Oil	45	$42,000	14-Oct-84
7	455 Daniels Rd	2	1	0.25	Elec	16	$47,500	01-Nov-84
8	12 Garden St	2	1	0.20	Elec	34	$87,500	15-Jan-85
9	203 Somerset Ave	4	2	0.60	Gas	12	$95,000	01-Feb-85
10	34 Harley Pl	7	5	1.33	Oil	40	$180,000	10-Feb-85
11	45 Lynwood Dr	3	2	0.30	Gas	45	$55,000	10-Mar-85
12	11 Pomona Rd	3	1	0.40	Oil	30	$80,000	25-Mar-85
13	315 Fremont Ave	5	2	0.60	Elec	20	$160,000	01-Apr-85
14	19 Auburn St	4	2	0.35	Elec	22	$112,500	05-Apr-85
15	122 Stuyvesant Rd	3	2	1.25	Elec	14	$180,000	12-Apr-85
16	87 Newbury St	6	2	0.60	Gas	17	$120,000	05-May-85
17	1122 Bellevue	6	3	1.00	Gas	9	$140,000	01-Jun-85
18	19 Hill Rd	4	2	0.30	Oil	26	$110,000	01-Jun-85
19	1 Pond Rd	8	5	2.00	Gas	60	$245,000	15-Jul-85
20	384 High St	7	4	1.20	Gas	7	$215,000	15-Jul-85

One house for sale

This chapter contains three lessons designed to teach you how to set up and use a database. You will work with a sample database that has already been created. Lesson 1 explains what a 1-2-3 database is, how to set one up, and how to sort information for ease of use. Lesson 2 explains how to use 1-2-3 to locate specific information in a database. Finally, Lesson 3 describes how to retrieve information from a database and place it somewhere else on the worksheet.

Lesson 1 Setting Up and Sorting a Database

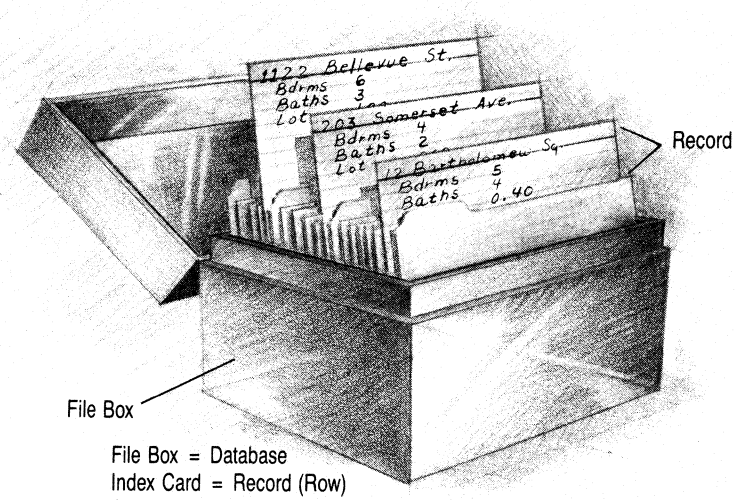
Before you can use 1-2-3's database capabilities, you must understand what a database is and how to set one up. Then you want to be able to sort the information in it, so that you can readily find the information you need.

You will find a 1-2-3 worksheet containing the sample database on the View of 1-2-3 Disk. REALTY.WK1 will help you learn about 1-2-3's database capability as quickly as possible without requiring you to type in a large number of entries. The principles that you learn with this sample database apply equally to any 1-2-3 database.

Retrieve REALTY.WK1 from the View of 1-2-3 Disk

Card Index vs. 1-2-3 Database

Compare the following card index to the 1-2-3 database that appears on your screen.



Records Each card in the card index and each row in the database contains information about a single house for sale. Each row in a 1-2-3 database is called a record.

Fields Each card in the card index contains the same categories of information: address, number of bedrooms, heating system, cost, and so on. Each row, or record, in the database contains the same categories. These categories are called fields. Each column in a 1-2-3 database is a field.

Some of the fields contain numbers; others contain text. Text entries can include numbers, as is the case for all the ADDRESS entries.

Column widths and formats have been set for each field as appropriate. When you set up a database, you can adjust column widths and set formats however you like.

Field Names

The labels at the top of each column in the 1-2-3 database, such as ADDRESS, BDRMS, and BATHS, are field names.

Setting Up a Database

Any collection of data that you can organize in fields and records can become a 1-2-3 database. Common examples include mailing lists and employee or client records. The requirements for a database are as follows:

- You must place a field name at the top of each column. Field names are labels (text) identifying the category of information that you will enter in that column. Field names make up the first row of the database. Each field name must be unique.
- Starting in the row immediately below the field names, each row of the database must contain a single record. Each record contains a collection of field entries.
- Fields can contain labels or numbers. All the entries in each field should be either labels or numbers.

Use the pointer-movement keys to move around the database. Examine the formats in each field. Column H, for example, has been formatted to display dates; each date has been entered with @DATE. Move right to view the COMMENTS field, and move down to the bottom of the database. When you are through, press HOME to return to the top of the worksheet.

Sorting Database Records

Currently the records are in the order in which they were entered in the database, that is, the order in which the houses came onto the market.

You will not always want to refer to records in the order in which they were entered in the database. Suppose, for example, that you want to look at the records in this database in order of the most expensive to least expensive house. The /Data Sort command lets you do that.

Select /Data Sort

Before you can sort the records, you must specify two things: a range you want to sort, and the field to sort by.

Data Range

The range you want to sort is called the data range. It should include all the records in the database. It should also include all fields, or the sort will jumble your records by sorting some fields and not others.

Select Data-Range

1-2-3 prompts you to enter a range. Do not include field names (in row 2 of the worksheet) since you do not want to sort the field names along with the actual records.

Remember that you can enter a range by highlighting it and pressing RETURN, or by typing in the diagonally opposite cell addresses of the range and pressing RETURN.

Enter A3..I33 as the data range

Primary Sort Key

You have told 1-2-3 what to sort. Now you must specify how you want to sort the database. 1-2-3 needs to know which field to use to determine the new order of records. This field is a sort key.

You want to sort by cost, so the COST field is the sort key. It is called the primary sort key.

Select Primary-Key

1-2-3 prompts you to enter the primary sort key address. You specify a sort key address by indicating any cell in the appropriate field. You want to sort the records by cost, so you can indicate any cell in the COST column.

Move to any cell in column G and press RETURN

1-2-3 now prompts you to enter a Sort order: A for ascending or D for descending. You want to sort in descending order, most expensive to least expensive.

Type D and press RETURN

You are ready to sort. Watch the screen carefully or you may miss the change.

Select Go

1-2-3 sorts all the records in the database in descending order by cost. Move the cell pointer around the database to verify that it was sorted.

Several of the houses cost the same amount.

Move to cell A9

Your screen should look like the following:

A9: [W17] '16 Rice St READY

	A	B	C	D	E	F	G	H
1			CURRENT LISTINGS					
2	ADDRESS	BDRMS	BATHS	LOT	HEAT	AGE	COST	ON MARKET
3	12 Bartholomew Sq	5	4	0.25	Gas	48	$290,000	01-Aug-82
4	319 Sunnyside Dr	4	3	0.50	Solar	3	$275,000	01-Aug-85
5	1 Pond Rd	8	5	2.00	Gas	60	$245,000	15-Jul-85
6	384 High St	7	4	1.20	Gas	7	$215,000	15-Jul-85
7	287 Carmel Terr	3	2	0.45	Solar	4	$194,000	05-Aug-85
8	714 Orchard St	5	3	0.50	Oil	15	$185,000	15-Aug-85
9	16 Rice St	5	3	1.00	Elec	18	$180,000	01-Aug-85
10	34 Harley Pl	7	5	1.33	Oil	40	$180,000	10-Feb-85
11	122 Stuyvesant Rd	3	2	1.25	Elec	14	$180,000	12-Apr-85

Three houses are selling for $180,000. At present, they are in no particular order. Suppose you want to sort records of houses costing the same amount in order of age, newest to oldest. In that case a primary sort key is not enough: you also need a secondary sort key.

Secondary Sort Key

The secondary sort key is optional and is used to break ties that occur when two or more records have the same entry in the primary sort key field.

Select /Data Sort

You do not need to specify the data range or the primary sort key again since 1-2-3 remembers the values you just gave them. All you need to specify is a secondary sort key.

Select Secondary-Key

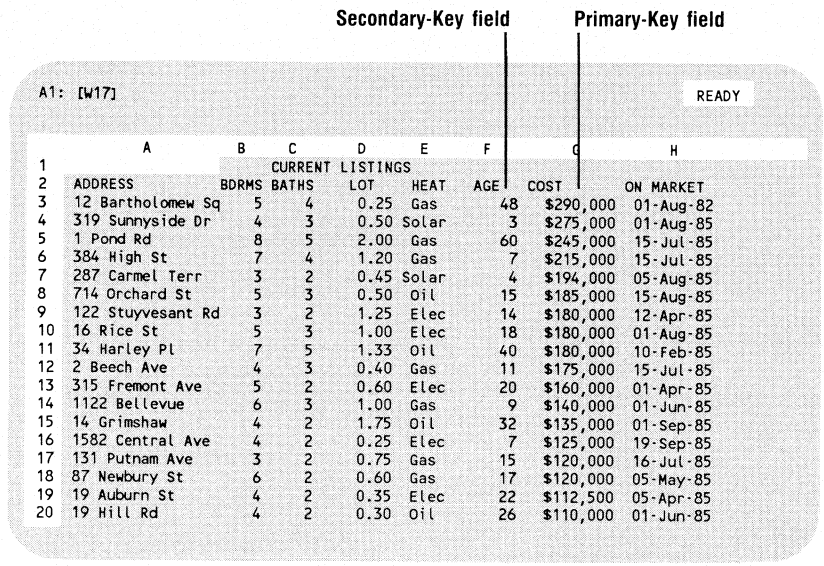
Move to any cell in column F and press RETURN

Type A **and press RETURN to select ascending order**

You are ready to sort again.

Select Go

Use the pointer-movement keys to verify that the records are still in descending order by cost, and that in the case of ties, 1-2-3 has placed them in ascending order by age. The database should look like the following:



	A	B	C	D	E	F	G	H
1			CURRENT LISTINGS					
2	ADDRESS	BDRMS	BATHS	LOT	HEAT	AGE	COST	ON MARKET
3	12 Bartholomew Sq	5	4	0.25	Gas	48	$290,000	01-Aug-82
4	319 Sunnyside Dr	4	3	0.50	Solar	3	$275,000	01-Aug-85
5	1 Pond Rd	8	5	2.00	Gas	60	$245,000	15-Jul-85
6	384 High St	7	4	1.20	Gas	7	$215,000	15-Jul-85
7	287 Carmel Terr	3	2	0.45	Solar	4	$194,000	05-Aug-85
8	714 Orchard St	5	3	0.50	Oil	15	$185,000	15-Aug-85
9	122 Stuyvesant Rd	3	2	1.25	Elec	14	$180,000	12-Apr-85
10	16 Rice St	5	3	1.00	Elec	18	$180,000	01-Aug-85
11	34 Harley Pl	7	5	1.33	Oil	40	$180,000	10-Feb-85
12	2 Beech Ave	4	3	0.40	Gas	11	$175,000	15-Jul-85
13	315 Fremont Ave	5	2	0.60	Elec	20	$160,000	01-Apr-85
14	1122 Bellevue	6	3	1.00	Gas	9	$140,000	01-Jun-85
15	14 Grimshaw	4	2	1.75	Oil	32	$135,000	01-Sep-85
16	1582 Central Ave	4	2	0.25	Elec	7	$125,000	19-Sep-85
17	131 Putnam Ave	3	2	0.75	Gas	15	$120,000	16-Jul-85
18	87 Newbury St	6	2	0.60	Gas	17	$120,000	05-May-85
19	19 Auburn St	4	2	0.35	Elec	22	$112,500	05-Apr-85
20	19 Hill Rd	4	2	0.30	Oil	26	$110,000	01-Jun-85

When you save the database, you also save the data range and the keys that you specified.

Save the file as REALTY1

You are going to use REALTY1 in Lesson 2.

Summary

A 1-2-3 database is a worksheet organized in columns and rows of closely related information. In this lesson, you have learned the significance of columns and rows in a database. You also learned to sort a database. Here are the essential points:

- A 1-2-3 database consists of a series of records, one record in each row.
- Each record contains the same categories of information called fields, one field in each column.

- Field names, which are labels at the top of each column, identify what is in that field.
- Each field contains either numbers or text. You can set an appropriate column width and format for each field.
- The /Data Sort command lets you sort records in a data range according to the primary sort key and optional secondary sort key you designate. The sort order for each key can be ascending or descending.

Lesson 2 Searching a Database

In Lesson 1, you learned how to sort the records in a database.

In this lesson, you will go one step further toward making the database a tool for organizing information. You will learn how to find specific records that meet the criteria you establish, using the /Data Query Find command.

Retrieve the REALTY1.WK1 file if it is not already on the screen

Suppose you want to find the records of all the homes in the database that have 3 bedrooms and at least 2 bathrooms, that do not have electric heat, and that cost less than $150,000.

Fortunately, you do not have to check each record to determine whether it meets these criteria. 1-2-3 does the work for you much faster than you could.

Before 1-2-3 can find the records you want, you must specify the range to search and the criteria to use.

Establishing an Input Range

The range that 1-2-3 searches is called the input range.

The input range contains the field names, as well as all the records you are searching. The first row of the input range must contain field names, and all subsequent rows must contain records. There cannot be any blank row or rows containing a border between the field names and the first record.

Move to cell A2 and select /Data Query

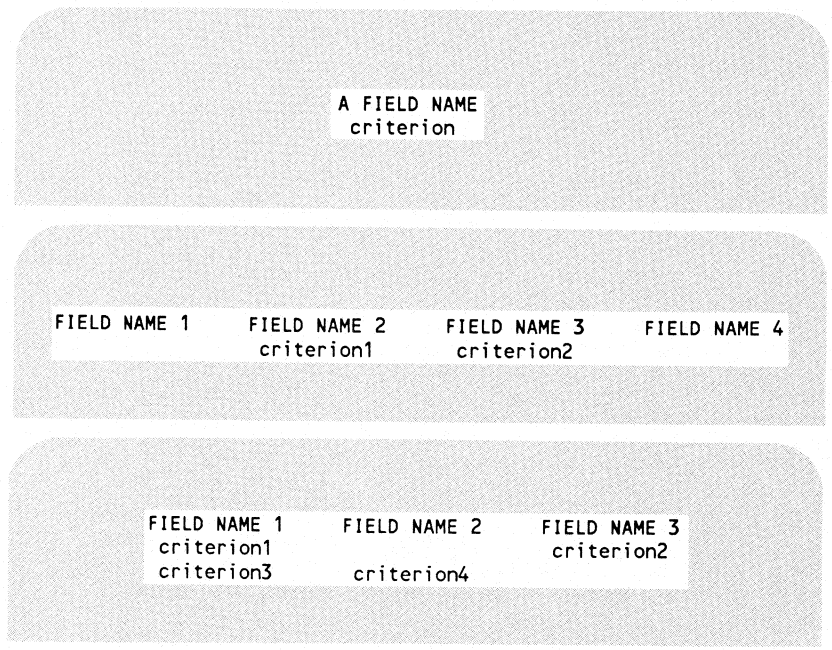
You want to establish the input range.

Select Input

Enter A2..I33 as the input range

Setting Up the Criterion Range

Next, you must establish the criteria that 1-2-3 uses in its search. You do this by specifying a criterion range. The first row of the criterion range must contain one, some, or all of the field names. You place the criteria in one or more subsequent rows directly beneath the appropriate field names. The following illustration gives you an idea of what criterion ranges can look like.



To set up the criterion range, you must first do the following:

- Copy the field names to a blank area of the worksheet
- Enter the criteria directly below the relevant field names

Select Quit to leave the Data menu

It is a good idea to copy all the field names, even though you may use only some of them. This makes it easier to change criteria later, using any fields.

Copy the field names from cells A2..I2 to cell A51

Move to cell B52

Entering Criteria

Under BDRMS, you want to enter a criterion that tells 1-2-3 to look for all houses with 3 bedrooms, so the appropriate criterion is 3.

In cell B52 enter 3

Now you can establish the criterion range. The only criterion is in cell B52, so the range could be cells B51 through B52 (field name and criterion).

Since you are going to add criteria later, begin by defining a criterion range that includes all the field names and the row of cells directly below, A51 through I52.

Do not include any blank rows in the criterion range. 1-2-3 interprets blank cells in a criterion range to mean that any entry in that field is acceptable, so a row of blank cells means that all records meet your criteria.

Select /Data Query Criterion

Enter A51..I52 as the criterion range

Now you are ready to start the /Data Query Find command.

Select Find

The mode indicator changes to FIND, and 1-2-3 highlights the first record in the input range that meets the criterion in the criterion range. Your screen should look like the following:

A7: [W17] '287 Carmel Terr FIND

	A	B	C	D	E	F	G	H
1			CURRENT LISTINGS					
2	ADDRESS	BDRMS	BATHS	LOT	HEAT	AGE	COST	ON MARKET
3	12 Bartholomew Sq	5	4	0.25	Gas	48	$290,000	01-Aug-82
4	319 Sunnyside Dr	4	3	0.50	Solar	3	$275,000	01-Aug-85
5	1 Pond Rd	8	5	2.00	Gas	60	$245,000	15-Jul-85
6	384 High St	7	4	1.20	Gas	7	$215,000	15-Jul-85
7	287 Carmel Terr	3	2	0.45	Solar	4	$194,000	05-Aug-85
8	714 Orchard St	5	3	0.50	Oil	15	$185,000	15-Aug-85
9	122 Stuyvesant Rd	3	2	1.25	Elec	14	$180,000	12-Apr-85
10	16 Rice St	5	3	1.00	Elec	18	$180,000	01-Aug-85
11	34 Harley Pl	7	5	1.33	Oil	40	$180,000	10-Feb-85

Press DOWN to move to the next record that meets the criterion

Note the cursor in the middle of the ADDRESS field. You can move the cursor to any field. This lets you view a field that is not currently visible on the screen.

Press RIGHT and LEFT to move the cursor through the fields in the record

Each time you press DOWN, 1-2-3 highlights the next record that meets your criterion. If you try to move beyond the last record that meets the criterion, 1-2-3 beeps.

Press DOWN until 1-2-3 beeps

You can also move up through the database.

Press UP until 1-2-3 beeps

All this time, the mode indicator displays FIND, indicating that you are still in the /Data Query Find command.

Press RETURN to end /Data Query Find

The mode indicator displays MENU, and you are back in the Data Query menu.

Select Quit to return to READY mode

Consider the other criteria you want to include in the criterion range:

BATHS	at least 2
HEAT	not electric
COST	less than $150,000

Logical Formulas

The first of these criteria is "at least 2 baths." You express "at least 2" as a logical formula. A logical formula is one that evaluates whether a condition is TRUE or FALSE. A given house either has at least 2 bathrooms, or it does not.

It is a rule that any formula in the criterion range must test the appropriate field of the first record in the input range. So in this case, the formula must test the contents of cell C3, the BATHS entry of the first record.

At the beginning of /Data Query Find, 1-2-3 actually moves down through the input range, testing the BATHS entry of all the records.

You can write the formula as +C3>=2 (the contents of cell C3 are greater than or equal to 2). But since "at least 2" in this case means "more than 1," a simpler formula is +C3>1.

Logical Operators:

=	Equal
<	Less than
>	Greater than
<=	Less than or Equal
>=	Greater than or Equal
<>	Not Equal

Move to cell C52 and enter +C3>1

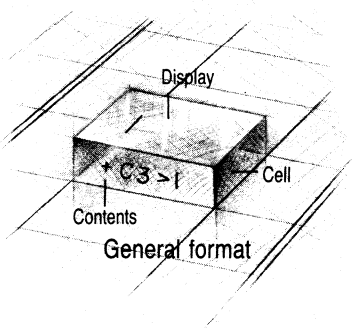
1-2-3 displays +C3>1 on the first line of the control panel and 1 in cell C52.

Cell C52 displays 1 because the formula evaluates to TRUE. 1-2-3 represents TRUE as 1 and FALSE as 0. C3, the cell that the formula tests, contains 4, which is greater than 1. The first record (in row 3) happens to meet the criterion.

If you want the criterion range to display formulas rather than 0's and 1's, use Text format.

Select /Range Format Text

Enter A52..I52 as the range to format



Formulas appear in cells with Text format, which is useful in a case like this where you are more interested in the formula than the value it generates.

The next criterion is that the heating system be nonelectric. Putting a tilde (~) in front of a label entry in the criterion range tells 1-2-3 to look for records containing anything in that field except the label following the tilde.

The database entry for electric heat is Elec, so if you put ~Elec in the criterion range under HEAT, you are telling 1-2-3 that you want to find all records with any entry in the HEAT column other than Elec.

Move to cell E52 and enter ~Elec

Matching Criteria

When you entered 3 in cell B52, you specified an exact match: 3 bedrooms, no more, no less. When you entered +C3>1 in cell C52, you specified a criterion that would allow a variety of entries: 2 bathrooms, 3 bathrooms, and so on. Both of these criteria pertain to numeric entries.

You can also enter criteria in fields with labels that allow exact matches or a variety of matches. If you enter "Oil" in G52, you are specifying an exact match. Only the records of houses with oil heat meet that criterion. But sometimes you want to allow a variety of different labels to match a single criterion. 1-2-3 uses three special characters to do just that:

? matches any single character, so "h?t" matches "hat", "hot", and "hut", but not "huts" or "hitch".

* matches all characters to the end of the label, so "cat*" matches "cat", "catsum", and "catches", but not "caught" or "crate".

~ matches all labels except the one that follows, so "~Elec" matches all labels except "Elec".

The final criterion concerns cost. You want to find the records for all the houses that meet the other criteria and cost less than $150,000.

Once again you need a logical formula. This one must test the first COST entry of the database to see if it is less than $150,000. The first entry under COST is cell G3, so the appropriate formula is +G3<150000.

Move to cell G52 and enter +G3<150000

Now you are ready to view the records that meet all the criteria you have set. The criterion range is still A51..I52.

Select /Data Query Find

Use DOWN and UP to look at the records that meet the criteria

You should find only three records that meet your criteria. They are the records for the houses at:

- 131 Putnam Ave
- 690 Rice Ave
- 45 Lynwood Dr

Editing Records during /Data Query Find

During /Data Query Find, you can edit the records you find. You move to the record you want to edit and move the cursor to the field you want to edit. For example:

Move to the record for the house at 131 Putnam Ave

Press RIGHT until the cursor reaches the COMMENTS field in column I

Enter Show to the Dolloffs

Press RETURN again to return to the Data Query menu

Select Quit to return to READY mode

More on Criteria

When you place several criteria in the same row, you are connecting them with an implicit *and*. The current criteria are summarized: 3 bedrooms *and* more than 1 bathroom *and* not electric heat *and* costing less than $150,000.

You can connect criteria with an implicit *or* by placing them in separate rows. You can also construct complex criteria in a single field. See the section on /Data commands in the *Reference Manual* for the complete details on criteria.

Save the file as REALTY2

You are going to use REALTY2 in Lesson 3.

Summary

In this lesson, you learned how to use /Data Query Find to find records that meet the criteria that you establish. Remember the following:

- /Data Query Input establishes an input range. The input range must include field names and all the records you want to search.
- /Data Query Criterion establishes a criterion range. The criterion range must include an exact copy of all or some of the field names and one or more rows of criteria.
- Criteria can consist of text entries that you want to match exactly or partially (? and *), or not at all (~).

- Criteria can also consist of value entries that you want to match exactly or that form part of a logical expression that you want to match. In formulas, you compare the appropriate field of the first record in the input range to some value, using a logical operator (=, <, <=, >, >=, <>).
- Use /Data Query Find to find the records in the input range that meet the criteria in the criterion range.
- When you are using /Data Query Find, the mode indicator displays FIND. Use UP and DOWN to move among the records. Use RIGHT and LEFT to move to different fields within each record.
- You can edit any record you find. Move the cursor to the field you want to edit, and edit the entry or type in a new entry.
- Press RETURN to end the /Data Query Find command.
- Select Quit to leave the Data Query menu.

Lesson 3 Retrieving Information from a Database

In the last lesson, you used /Data Query Find to find records that met the criteria you specified. Sometimes you may want to include these records in a report or print them.

In this lesson, you will learn how to copy records meeting the specified criteria to a separate area on the worksheet.

Retrieve the REALTY2.WK1 file if it is not already on the screen

Extracting Records

The /Data Query Find command lets you find and edit selected records.

The /Data Query Extract command, on the other hand, lets you copy selected records to a range outside the database where you can work with them all at once. This range is called the output range.

You must specify the following before you can execute /Data Query Extract:

- Input range
- Criterion range
- Output range

The following illustration depicts the relationship between the three ranges.

Input range

ADDRESS	BDRMS	BATHS	LOT	HEAT	AGE	COST	ON MARKET
12 Bartholomew Sq	5	4	0.25	Gas	48	$290,000	01-Aug-82
46 Prospect Pl	5	2	0.40	Oil	22	$90,000	28-Apr-83
690 Rice Ave	3	2	0.60	Oil	25	$92,000	04-Oct-84
903 Ray Rd	2	1	0.30	Oil	45	$42,000	14-Oct-84
455 Daniels Rd	2	1	0.25	Elec	16	$47,500	01-Nov-84
12 Garden St	2	1	0.20	Elec	34	$87,500	15-Jan-85
203 Somerset Ave	4	2	0.60	Gas	12	$95,000	01-Feb-85
34 Harley Pl	7	5	1.33	Oil	40	$180,000	10-Feb-85
45 Lynwood Dr	3	2	0.30	Gas	45	$55,000	10-Mar-85
[illegible] Rd	3	1	0.40	Oil	30	$80,000	25-[illegible]
[illegible]	5	2	0.60	Elec	20	$14[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	0.35	Elec	[illegible]	[illegible]	[illegible]

Criterion range

ADDRESS	BDRMS	BATHS	LOT	HEAT	AGE	COST	ON MARKET
	3	+C3>1		~Elec		+G3<150000	

Output range

ADDRESS	BDRMS	BATHS	LOT	HEAT	AGE	COST	ON MARKET
690 Rice Ave	3	2	0.60	Oil	25	$92,000	04-Oct-84
45 Lynwood Dr	3	2	0.30	Gas	45	$55,000	10-Mar-85
131 Putnam Ave	3	2	0.75	Gas	15	$120,000	16-Jul-85

Input Range

Remember that the input range includes field names and all the records. Confirm that the input range you established in Lesson 2 still exists.

Select /Data Query Input

1-2-3 should highlight the range A2..I33.

Press RETURN to reenter A2..I33

Criterion Range

You also set up a criterion range in the last lesson. To confirm that it still exists:

Select Criterion

1-2-3 should highlight the range A51..I52.

Look at the criteria you established at the end of Lesson 2. The houses must have 3 bedrooms and at least 2 baths, must not have electric heat, and must cost less than $150,000.

Press RETURN to reenter A51..I52

Output Range

Now you can create an output range, the place on the worksheet where you want 1-2-3 to place all the records that meet the criteria in the criterion range.

The first row of the output range must contain the field names of the database fields you want to copy. These must be identical to the corresponding field names in the input and criterion ranges, but may appear in any order.

You need to make a copy of the field names on an unused portion of the worksheet, for example, the range beginning at A75.

Select Quit to leave the Data Query menu

Copy the field names from A2..I2 to A75

Move to A75

Single-row Output Ranges

If you specify an output range that contains only the row of field names, 1-2-3 reserves the entire portion of the worksheet below the field names for output records. In other words, 1-2-3 erases everything in the worksheet below the field names before it puts anything in the output range.

Do not specify a single-row output range if there is anything below the output field names that you want to keep. Specify a multiple-row output range instead.

In this worksheet, the area below A75..I75 is blank, so you can safely use a single-row output range.

Select /Data Query Output

Enter A75..I75 as the output range

Multiple-row Output Ranges

If you specify an output range of more than one row (row of field names plus rows for the output records), 1-2-3 does not disturb anything below the range when you execute /Data Query Extract. In the current situation, A75 through I90 is a possible multiple-row output range with room for up to 14 records. Be sure the output range is large enough to contain all the records that meet the criteria. Otherwise, 1-2-3 beeps when you select /Data Query Extract and displays an error message. When this happens, press ESCAPE to return to READY mode and specify an output range with more rows.

/Data Query Extract

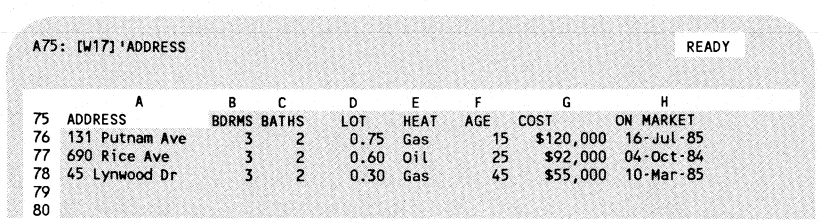
Now you are ready to execute the /Data Query Extract command.

Select Extract

The CALC indicator appears in the lower right corner of the screen. 1-2-3 places a copy of all the records that meet the criteria in the output range. These records are ready to print or to incorporate into a report.

Select Quit to return to READY mode

The CALC indicator disappears. The output range should resemble the following:



	A	B	C	D	E	F	G	H
75	ADDRESS	BDRMS	BATHS	LOT	HEAT	AGE	COST	ON MARKET
76	131 Putnam Ave	3	2	0.75	Gas	15	$120,000	16-Jul-85
77	690 Rice Ave	3	2	0.60	Oil	25	$92,000	04-Oct-84
78	45 Lynwood Dr	3	2	0.30	Gas	45	$55,000	10-Mar-85
79								
80								

Database Statistical Functions

1-2-3 has a number of @functions designed to let you extract statistical information from a database. With @DAVG, for example, you can calculate the average cost of all houses in your database between 15 and 25 years old. For details on all the database statistical functions, see the chapter on @functions in the *Reference Manual.*

If you want to save this version of the database:

Save the file as REALTY3

Summary

In this lesson you used /Data Query Extract to copy records that meet the specified criteria to an output range. When you use /Data Query Extract, remember the following:

- The /Data Query Extract command requires an output range in addition to an input range and a criterion range.
- The output range must begin with field names, as must the input and criterion ranges. Include field names for all fields that you want to copy to the output range.
- If the output range includes only one row (the field names), 1-2-3 erases the area below those field names to the bottom of the worksheet before it places anything in the output range.
- If you specify an output range of more than one row, 1-2-3 does not disturb the contents of the worksheet below the output range.
- If a multiple-row output range is not large enough to contain all the records that meet the criteria, 1-2-3 displays an error message when you select /Data Query Extract. Press ESCAPE to return to READY mode, and specify an output range with more rows.

Chapter 6
AUTOMATING 1-2-3 WITH MACROS

Part of the usefulness of 1-2-3 is its ability to perform complex or repetitive tasks with great speed and accuracy. Sometimes you may discover, however, that you are performing a procedure in 1-2-3 over and over again.

When this happens, consider creating and using a macro. Any action that you perform manually in 1-2-3 can be performed by a macro. Macros are based on the principle that all procedures in 1-2-3 consist of a sequence of keystrokes. A macro is a collection of the keystrokes that make up the procedure you want to automate.

The lessons in this chapter explain how to construct and use very basic macros as well as some more advanced ones. The basic ones are often the most useful, so you can expect to put the knowledge you will acquire in the very first lesson to immediate use.

Lesson 1 Saving Keystrokes with Macros

New Key to Locate:
MACRO

Whenever you discover that you are typing the same entry over and over or repeating a sequence of 1-2-3 commands, use a macro. A macro not only performs the action much faster than you could, but performs it exactly the same way each time, so it can help ensure accuracy as well as save you time.

Begin with a blank worksheet on the screen

Using Macros to Make Cell Entries

Macros let you automate any procedure that you perform in 1-2-3. Suppose, for example, you find that you are typing the same entry, "Administrative Costs", at different places on your worksheet. You can write a macro that will type this label for you automatically.

Move to cell B8 and enter Administrative Costs

This is your first version of a macro, a sequence of keystrokes that you want to be able to repeat anywhere on the worksheet.

Naming the Macro

Before you can use this entry as a macro, you must give it a name. You will use the name to invoke the macro. Macro names always contain two characters. The first is backslash (\), and the second is a single letter: \A, \B, \C,...\X,\Y,\Z. It makes no difference whether you use an uppercase or lowercase letter. 1-2-3 interprets \A and \a as exactly the same thing.

Select /Range Name Create

Enter \a **as the name**

Enter B8 as the range

It is a good idea to put a label in the worksheet to help you remember that you named this macro \A. You can put macro names in the cell to the immediate left of the macro.

Move to cell A8 and enter '\a

Remember that \ is also the label prefix that indicates a repeating label. If you do not precede \ with a label prefix (', ", or ^), the cell will display aaaaaaaaa.

Invoking the Macro

You are ready to try out the macro. Suppose you want to enter "Administrative Costs" in A1.

Move to cell A1

You invoke a macro by holding down MACRO and pressing the appropriate letter. Do not press \. Since you use the letter but not the \ to invoke the macro, you can refer to this macro as macro A.

Hold down MACRO and press A

"Administrative Costs" appears on the control panel. The macro repeated all of the keystrokes stored in B8.

Press RETURN to enter Administrative Costs **in cell A1**

If you include RETURN in the macro, then you do not have to press RETURN each time you invoke the macro.

To include RETURN in the macro, it must be part of the entry in B8; however, you cannot type a RETURN directly into B8. Pressing RETURN enters a label or value in a cell; RETURN is never part of the entry.

Although you cannot enter some keys, such as RETURN and DOWN, directly in a cell, 1-2-3 lets you include these keys in macros. For each of these keys, there is a key indicator. Simply enter the appropriate key indicator where it belongs in the macro. The indicator for RETURN is tilde (~), so the entry in B8 should be "Administrative Costs~".

Move to cell B8 and edit the label to read
Administrative Costs~

Move to cell A2 to try out the revised macro

Hold down MACRO and press A

The new macro types the label and enters it in the current cell.

See the chapter on macros in the *Reference Manual* for a complete list of key indicators.

You can also use a macro to enter numbers. The macro itself, however, must consist exclusively of label entries. A macro stops if it encounters a cell containing a value entry.

Suppose you want to use a macro to enter the value 10000 in the current cell. You must enter 10000 as a label.

Move to cell B15 and enter '10000~

Use /Range Name Create to assign the name \B to cell B15

Move to cell A15 and enter '\b

This is macro B.

Move to cell A3

Hold down MACRO and press B

1-2-3 puts the value 10000 in A3. It does not enter the label prefix.

Using a Macro to Execute a Command

You can also use a macro to execute a command or sequence of commands that you find yourself repeating. Suppose, for example, you discover that you are entering currency amounts interspersed with other types of data requiring different formats. Each time you enter a dollar amount, you must format that cell with the /Range Format command.

If you place the exact sequence of keystrokes that you use to complete the /Range Format command in a macro, then the macro will execute the command each time you invoke it.

Here is the sequence of keystrokes required to format the current cell to display currency with 0 decimal places:

- / (to display the menu)
- R(ange)
- F(ormat)
- C(urrency)
- 0 (zero decimal places)
- RETURN (to enter the 0)
- RETURN (to enter the current cell as the range to be formatted)

If you line up these keystrokes side by side, using lowercase letters and substituting ~ for RETURN, you get:

/rfc0~~

This is the format for a macro.

Move to cell B20 and enter '/rfc0~~

You must include the label prefix before you type /. Otherwise the Main menu appears, and 1-2-3 prepares to execute a command rather than enter a label in a cell.

Use /Range Name Create to assign the name \C to cell B20

Move to cell A20 and enter '\c

This is now macro C.

Move to cell A3 and invoke macro C

1-2-3 displays the value 10000 in A3 as $10,000.

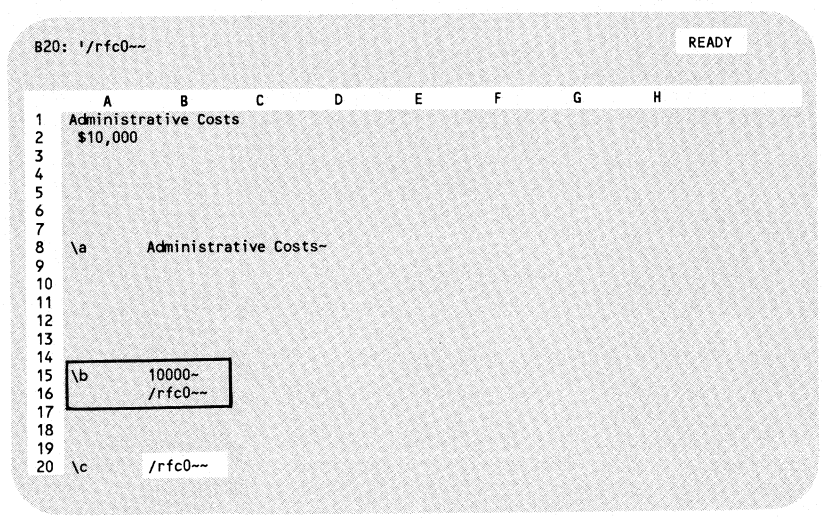
Combining Operations in a Macro

A macro executes the keystrokes in the cell that you name, and then proceeds to the cell immediately below. It continues down through consecutive cells in the same column until it reaches a blank cell or a cell containing a value entry. You can include up to 240 keystrokes in each cell, although it is a lot easier to keep track of what you are doing if you limit the entries in each cell to a single task.

If you combine macros \B and \C, the new macro will both enter a value and format a cell.

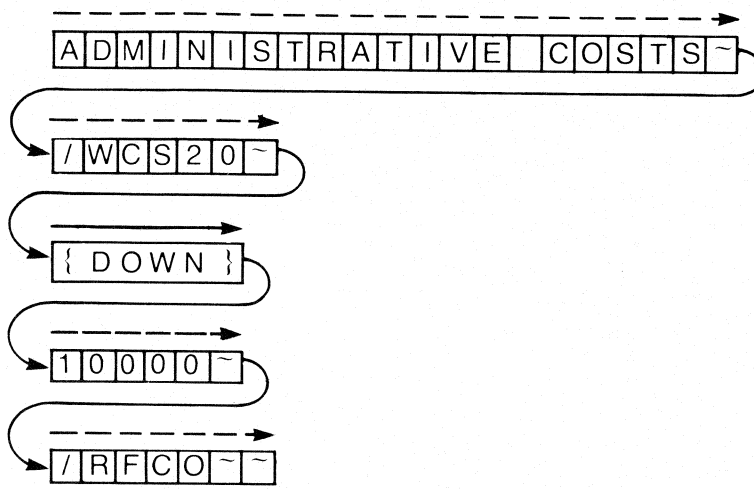
Copy macro C from cell B20 to cell B16

The new macro should look as follows:



Move to cell A4 and invoke macro B

The illustration below shows you how 1-2-3 executes a macro.



Now you can add a command to macro A that automatically sets the column width to 20 after it enters the label "Administrative Costs". Here is the sequence of keystrokes required to complete this command:

/W(orksheet)C(olumn)S(et-Width)20RETURN

Move to cell B9 and enter '/wcs20~

This entry is now part of macro A.

Move to cell F1 and invoke macro A

Finally, you can combine macros A and C so that the new macro:

- Enters the label "Administrative Costs"
- Changes the column width to 20
- Moves down a cell
- Enters 10000
- Formats the cell so that it displays $10,000

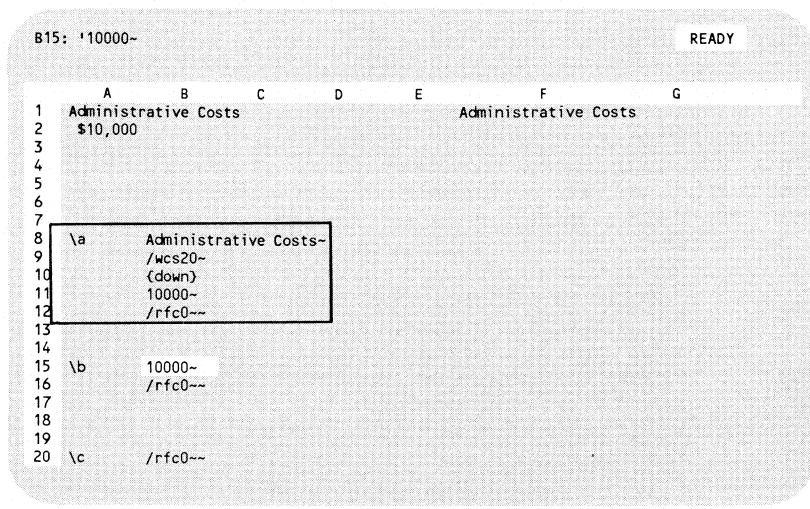
At the end of the current macro A, and before you append macro C, you want to include an instruction that will move the cell pointer down one row. All you need to do is include the key indicator for DOWN.

DOWN, like RETURN, is a keystroke that you cannot enter directly in a cell. You must use a key indicator. The key indicator for DOWN is {down}.

Move to cell B10 and enter {down}

Copy macro B from cells B15..B16 to cell B11

Macro A should look as follows:



Move to cell D1 and invoke macro A

Save the file as MACROS1

Summary

In this lesson, you used macros to enter labels and numbers and to perform 1-2-3 commands. Remember the following:

- Use a macro to automate a repetitive task in 1-2-3.
- A macro consists of a column of consecutive label entries. The macro halts when it reaches a blank cell or a cell containing a value.

- Macro entries include the keystrokes you want the macro to repeat. Record the exact sequence of keystrokes before you write the macro. Verify the sequence by going through it once manually.
- Include a label prefix before a value, or before a sequence of commands that begins with slash (/).
- Use key indicator names for the special keys that you cannot type directly into a cell.
- Use /Range Name Create to name the first cell of the macro. The name should consist of a backslash (\) and a single letter.
- Label the macro by putting its name in the cell to the immediate left of the macro. Remember to include a label prefix before the \.
- Invoke the macro by holding down MACRO and pressing the letter that identifies the macro.

Lesson 2 Making Macros Interactive

New Key to Locate:
STEP

Sometimes you find yourself repeating a task in 1-2-3 that is slightly different each time. You want a macro that lets you introduce some variations each time you invoke it.

1-2-3 includes a number of advanced macro commands that let you interact with a macro while it is executing. In this lesson, you will use one of these advanced macro commands to add flexibility to a macro from Lesson 1. But first, you will learn a method for finding mistakes in macros that do not work as you want them to.

Retrieve the MACROS1.WK1 file if it is not already on the screen

Checking a Macro One Step at a Time

On occasion, a macro may not perform as you expect. If this happens, you can step through the macro keystroke by keystroke to see exactly what it does and where it goes wrong.

Press STEP

A status indicator at the bottom of the screen displays STEP. If you invoke a macro, the status indicator changes to SST, which stands for single step. 1-2-3 pauses after it executes each keystroke in the macro. Press any key when you want

1-2-3 to execute the next keystroke in the macro. When you reach the end of the macro, the status indicator changes from SST back to STEP.

Move to cell J1 and invoke macro A

The status indicator changes to SST. It will remain SST as long as the macro is executing single steps.

Press any key and watch the control panel

The macro has executed its first keystroke.

Continue pressing any key

The macro executes one keystroke at a time.

When SST changes back to STEP, the macro is done.

If you press STEP again, the status indicator disappears. Any macros you now invoke will execute normally.

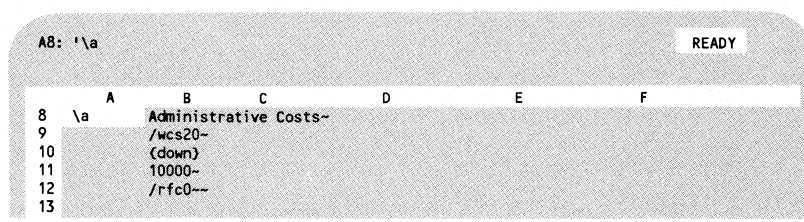
Press STEP

The STEP indicator disappears.

Making a Macro Interactive

In the previous lesson, you constructed a macro that enters a label, sets the column width to 20, moves down one cell, enters a value, and formats the cell containing the value.

The macro looks as follows:



This macro serves your purpose if you frequently enter the figure $10,000. But suppose you want to be able to enter a different value each time you invoke the macro. You can do this by using the pause command, {?}.

Whenever 1-2-3 encounters {?} during a macro, it pauses for input from the keyboard. When you finish typing your input, you press RETURN and the macro resumes executing. 1-2-3 does not execute this RETURN as part of the macro. If the procedure requires a RETURN, include a tilde (~) in the macro.

Move to cell B11 and replace 10000~ **with** {?}~

Move to cell E1 and invoke macro A

When the macro gets to {?}, the status indicator at the bottom of the screen displays CMD while the mode indicator at the top displays READY. CMD means that you are in the middle of a macro. READY means that 1-2-3 is prepared to accept an entry in the current cell.

Type 2500 **and press** RETURN

As soon as you press RETURN, the macro resumes execution. First, the ~ (RETURN) enters 2500 in cell A1. Then, /rfc0~~ formats cell E2 as currency with 0 decimal places.

Including {?} in a Command

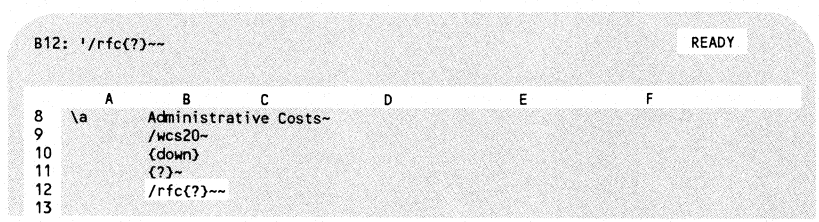
You have just used {?} to let you make a cell entry in the middle of the macro. You can also use {?} in conjunction with a menu command.

You can rewrite macro A to let you specify the number of decimal places each time you invoke the macro. All you need to do is replace the zero (0) in the /Range Format Currency command with {?}.

Move to cell B12 and press EDIT

Replace '/rfc0~~ **with** '/rfc{?}~~

The macro should look as follows:



1-2-3 will pause in the middle of the macro to let you specify a number, then format accordingly.

Move to cell G1 and invoke macro A

Type 1542 **and press** RETURN

When the macro reaches the second {?}, the status indicator displays CMD, and the mode indicator displays EDIT. CMD reminds you that you are in the middle of a macro. EDIT means that you are in EDIT mode, just as you would be at

this point if you were executing this command manually. The prompt, Enter the number of decimals places, appears.

Type 4 **and press** RETURN

The format for cell G2 is now C4 (Currency, 4 decimals places), so cell G2 displays $1,542.0000.

If you want to save the worksheet:

Save the file as MACROS2

Summary

You have learned how to test a macro keystroke by keystroke to check its operation, and you have written an interactive macro. Remember the following:

- If a macro does not work, run through it keystroke by keystroke. Press STEP to turn single step on and off.
- Use {?} in a macro to combine macro automation with manual input. When 1-2-3 encounters {?} during a macro, it pauses for input from the keyboard. Press whichever keys are appropriate. Press RETURN to resume executing the macro.
- The cells in a macro contain label entries. Be sure to include a label prefix before an entry that would otherwise be stored as a value. You must also include a label prefix before any entry beginning with slash (/).

Lesson 3 Branching Macros

New Key to Locate:
BREAK

In your macros, you have used key indicators to represent keystrokes that you cannot enter directly into a cell. So far, you have used ~ and {down}.

1-2-3 also includes a set of advanced macro commands in { } that you use only in macros. You have already used one of these, {?}, which instructs the macro to pause for input from the keyboard.

The advanced macro commands permit you to branch and loop, to call subroutines, to create your own menus, to interact in various ways with manual input, to control screen display, to manipulate data, even to transfer data between your worksheet and other files. See the chapter on macros in the *Reference Manual* for a complete description of all the advanced macro commands.

In this lesson, you will use three of the advanced macro commands to write a macro that repeats a procedure until a condition you set is fulfilled.

Begin with a blank worksheet on the screen

Setting Up a Column of Numbers

Assume that you want to list the years from 1977 to 1986 in cells A1 through A10.

/Data Fill

The easiest way to create such a column of numbers is with the /Data Fill command. The /Data Fill command puts a series of numbers in the range you specify. You must also specify start, step, and stop values. Begin the command:

Select /Data Fill

1-2-3 prompts you to enter the fill range.

Enter A1..A10

1-2-3 prompts you to specify the start value, the first number to put in the range.

Enter 1977

1-2-3 prompts you to specify the step value, how much larger each number is than its predecessor.

Enter 1

Finally, 1-2-3 prompts you for the stop value, or a limit. 1-2-3 stops when it reaches this number, or fills the entire range, whichever comes first.

Enter 1986

1-2-3 fills cells A1 through A10 with the numbers 1977 to 1986. Now you can automate this procedure with a macro. You will use this macro repeatedly as you test out different techniques to manipulate these numbers.

Use /Range Erase to erase A1..A10

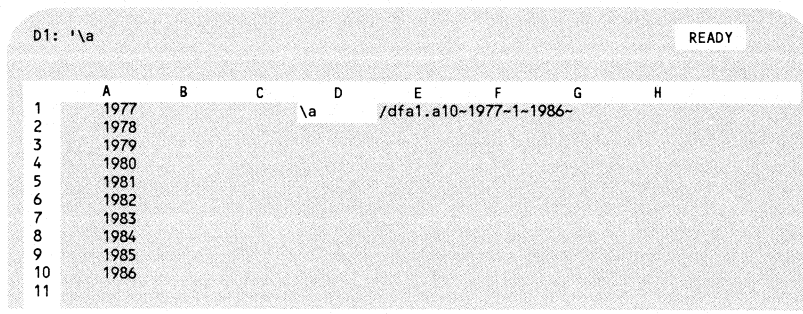
Move to cell E1 and enter '/dfa1.a10~1977~1~1986~

Use /Range Name Create to assign the name \A to cell E1

Move to cell D1 and enter '\a

Invoke macro A

Your screen should look as follows:



Turning Numbers into Labels

Now you are going to write a macro that will transform the column of numbers to left-aligned labels. In its first version, the macro will do the following:

- Change a number to a label
- Move down a cell (to the next number)
- Start over again

The numbers are right-aligned in column A. 1-2-3 always displays values right-aligned. Suppose, however, you are using these numbers to identify entries in a table, and you want to display or print them left-aligned.

You can change the alignment by inserting the label prefix (') before each number.

Remember that by adding label prefixes, you change the contents of these cells from values to labels, which means you cannot perform addition and multiplication or any other mathematical operations with them. Of course, you can always turn them into values again, if you want, by removing the label prefixes or by using @VALUE.

The sequence of keystrokes to change a value entry into a left-aligned label is:

- EDIT (puts you in EDIT mode)
- HOME (moves the cursor to the beginning of the entry)
- ' (inserts the left alignment prefix)
- RETURN (enters the revised entry)

Move to cell A1 and manually try out the sequence above

1977 is now a left-aligned label.

The key indicators for EDIT and HOME are {edit} and {home}.

You are ready to write the first part of the macro.

Move to cell E5 and enter {edit}{home}'~

Use /Range Name Create to assign the name \B to cell E5

Move to cell D5 and enter '\b

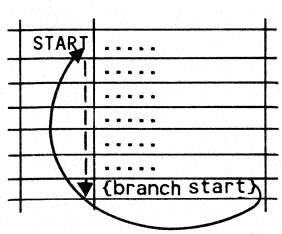
The next step is to move the cell pointer down to the next cell in the column.

Move to cell E6 and enter {down}

Branching

Now you need a command that tells 1-2-3 to go the beginning of the macro and align the next number. The advanced macro command {BRANCH} tells 1-2-3 to jump to a location you specify and continue reading keystrokes. The format for the {BRANCH} command is {BRANCH *location*}.

{BRANCH}



You want 1-2-3 to jump back to the beginning of the macro. You have already named that cell \B. So the appropriate location to branch to is \B.

Move to cell E7 and enter {branch \b}

Your screen should look as follows:

```
E7: '{branch \b}                                                   READY

        A         B         C         D         E         F         G         H
1   1977                               \a        /dfa1.a10~1977~1~1986~
2        1978
3        1979
4        1980
5        1981                          \b        {edit}{home}'~
6        1982                                    {down}
7        1983                                    {branch \b}
8        1984
9        1985
10       1986
11
```

This macro can handle any column of numbers. The only problem is that it does not know when to stop. In fact, it is an infinite loop. It will continue indefinitely, until you force it to stop by pressing BREAK.

If you do not know the key or key combination on your machine for BREAK, consult your Keyboard Guide before you invoke macro B. You can break out of a macro at any time by pressing BREAK.

Move to cell A2 and invoke macro B

After the macro formats the column of numbers, it continues downward, inserting a label prefix in blank cells. To stop the macro:

Press BREAK

The mode indicator at the upper right corner of the screen tells you that an error has occurred. The error message at the bottom left tells you the source, in this case the BREAK that you pressed. The error message lets you know that you interrupted a command.

Press ESCAPE to return to READY mode

Branching Conditionally

You can get around the inconvenience of having to stop the macro yourself by introducing a conditional branch. Each time the macro is about to insert a label prefix, have it determine whether the cell pointer has reached the bottom of the column of numbers. If the cell pointer has reached a cell that is blank or contains a label, the macro is to stop. Otherwise, it is to continue.

{IF} The advanced macro command for a conditional branch is {IF}. {IF} works in conjunction with a logical condition that is either TRUE or FALSE. The format for the {IF} command is {IF *condition*}.

- If the condition is TRUE, the macro continues with the next keystroke in the same cell
- If the condition is FALSE, the macro jumps immediately to the next cell

You want to set up your macro as follows:

	If the current cell does not contain a value, stop the macro
(Otherwise...)	Add a label prefix
	Move down to the next cell
	Branch back to the beginning

@CELLPOINTER You can use an @function, @CELLPOINTER, to determine whether the current cell contains a value.

@CELLPOINTER can tell you many things about the current cell, such as its address, width, format, and so on, depending on the argument you use with it. Right now, you are interested in cell "type" (blank, value, or label).

@CELLPOINTER("type") yields the value "b" (blank), "v" (value), or "l" (label), depending on the contents of the current cell.

Remember that you must enclose text arguments in quotation marks.

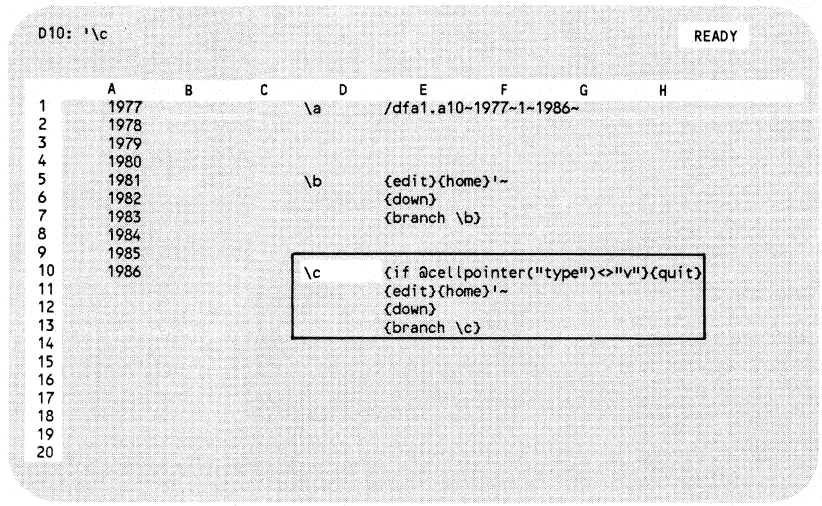
The appropriate expression to use in the conditional branch is:

	@CELLPOINTER("type")<>"v"
Which means	the type of the current cell is not equal to v(alue)
Or in other words	the current cell does not contain a value entry

If this expression is TRUE, you want the macro to stop; otherwise, you want the macro to insert a label prefix, move down a cell, and branch back to the beginning of the macro.

{QUIT} The advanced macro command to stop a macro is {QUIT}.

Invoke macro A to reenter the column of numbers



Move to cell E10

Enter the macro just as it appears in the illustration above

Use /Range Name Create to name the macro \C

Move to cell D10 and enter '\c

Move to cell A1 and invoke macro C

The macro continues looping until it reaches a cell that does not contain a value; then it stops.

If you want to save this worksheet:

Save the file as MACROS3

Summary

You used one new 1-2-3 command and three advanced macro commands to create a column of numbers and transform those numbers into labels. The 1-2-3 advanced macro commands provide a powerful set of tools for performing a wide variety of tasks. In this lesson, you learned the following:

- The /Data Fill command fills a range with a regular progression of numbers.
- {BRANCH} transfers macro control to another location.

- {IF} transfers macro control conditionally to the next cell.
- {QUIT} stops the macro.
- @CELLPOINTER can determine whether the current cell contains a value, a label, or is blank. This @function is useful when you want a macro to repeat an operation until it encounters a cell of a particular type (blank, value, or label).

Lesson 4 Customizing 1-2-3 with Macros

Using advanced macro commands, you can lead a user through a series of clearly specified procedures. This lets you set up a worksheet that not only contains useful information, but also specifies how to process that information.

In this lesson, you will create a macro to automate data entry in the database that you used in Chapter 5. The macro that you write will execute automatically when you retrieve the file that contains it, and it will include customized menus.

Retrieve REALTY.WK1 from the View of 1-2-3 Disk

A1: [W17] READY

	A	B	C	D	E	F	G	H
1			CURRENT LISTINGS					
2	ADDRESS	BDRMS	BATHS	LOT	HEAT	AGE	COST	ON MARKET
3	12 Bartholomew Sq	5	4	0.25	Gas	48	$290,000	01-Aug-82
4	46 Prospect Pl	5	2	0.40	Oil	22	$96,000	28-Apr-83
5	690 Rice Ave	3	2	0.60	Oil	25	$92,000	04-Oct-84
6	903 Ray Rd	2	1	0.30	Oil	45	$42,000	14-Oct-84
7	455 Daniels Rd	2	1	0.25	Elec	16	$47,500	01-Nov-84
8	12 Garden St	2	1	0.20	Elec	34	$87,500	15-Jan-85
9	203 Somerset Ave	4	2	0.60	Gas	12	$95,000	01-Feb-85
10	34 Harley Pl	7	5	1.33	Oil	40	$180,000	10-Feb-85
11	45 Lynwood Dr	3	2	0.30	Gas	45	$55,000	10-Mar-85

Using a Macro for Database Entry

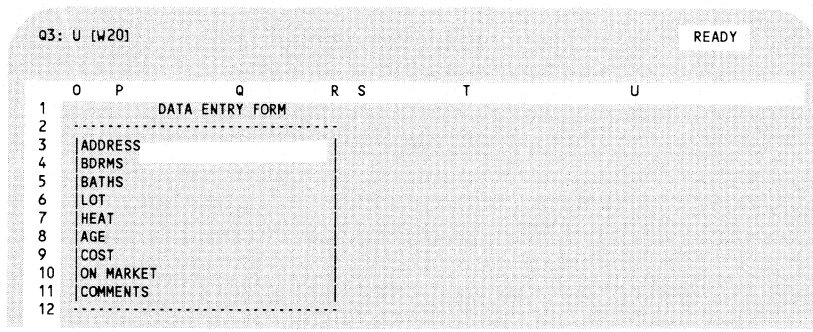
Suppose you use a database like the one in Chapter 5. You may want to arrange it so that someone else can enter new records without risk of getting lost or disturbing what is already in the database. You can accomplish this as follows:

- Set up a data entry form in a blank area of the worksheet
- Write a macro that directs the person using it through the process of adding records to the database

Setting Up a Data Entry Form

Move to cell O1

Create a data entry form as follows:



Your data entry form should meet the following specifications:

- The column width of columns O and R is 1 (Use /Worksheet Column Set-Width)
- The column width of column Q is 20
- The horizontal borders in rows 2 and 12 are repeating labels (enter \ –)
- The vertical borders in columns O and R are labels (enter '|)
- The format for Q6 is F2 (Fixed, 2 decimal places)
- The format for Q9 is C0 (Currency, 0 decimal places)
- The format for Q10 is D1 (Date 1)

/Range Input

In your macro, you want to make sure that the user enters data only on the entry form and does not accidentally change any entries already in the database. You can use the /Range Input command to restrict the user to the data entry form. /Range Input restricts access to unprotected cells in a specified range.

Before you start the /Range Input command, you must unprotect the cells in which you want to let the user enter data. These are the blank cells in the data entry form.

Use /Range Unprotect to unprotect Q3..Q11

Start the /Range Input command:

Select /Range Input

1-2-3 prompts you to enter a data input range. This must include the cells you have just unprotected and should include anything else you want to appear on the screen while /Range Input is executing. Specify the entire data entry form.

Enter the range O1..R12

1-2-3 puts the upper left cell of this range at the top left of the screen.

Press DOWN repeatedly

Press UP repeatedly

You cannot move out of the unprotected cells in the data input range. When the cell pointer reaches the last unprotected cell, it jumps up to the first cell, and vice versa.

You can make or edit entries in the unprotected cells of the data input range. The /Range Input command continues until you press RETURN or ESCAPE without first typing or editing an entry.

Press RETURN to end the /Range Input command

In addition to /Range Input, the data entry macro will use two new commands: /Range Transpose and the advanced macro command {MENUBRANCH}.

/Range Transpose

Once the user has filled in the data entry form, the macro must insert this information as a new record at the bottom of the database. /Range Transpose lets you copy a column of entries in the data entry form to a row in the database.

{MENUBRANCH}

Finally, the macro must let the user make a series of choices, chiefly whether to continue entering new records. You will use the advanced macro command {MENUBRANCH} to set up two menus.

An Overview of the Data Entry Macro

You are now ready to specify in detail what the data entry macro does.

- It uses /Range Input to let the user input a record into the data entry form.
- It uses /Range Transpose to insert the new record at the bottom of the database:

DATA ENTRY FORM

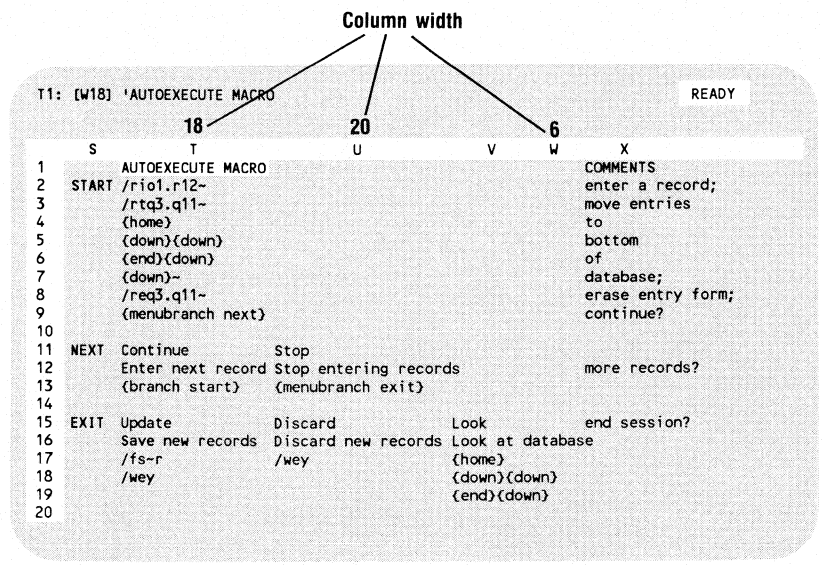
ADDRESS	43 Prospect St
BDRMS	5
BATHS	3
LOT	0.40
HEAT	Gas
AGE	14
COST	$133,000
ON MARKET	24-Oct-85
COMMENTS	

CURRENT LISTINGS

	BDRMS	BATHS	LOT	HEAT	AGE	COST	ON MARKET
12 Bartholomew Sq	5	4	0.25	Gas	48	$290,000	01-Aug-82
46 Prospect Pl	5	2	0.40	Oil	22	$90,000	28-Apr-83
690 Rice Ave	3	2	0.60	Oil	25	$92,000	04-Oct-84
903 Ray Rd	2	1	0.30	Oil	45	$42,000	14-Oct-84
455 Daniels Rd	2	1	0.25	Elec	27	$105,000	15-Aug-85
12 Garden St	3	3	0.50	Oil	15	$185,000	15-Aug-85
95 Horne Pl	4	2	0.25	Gas	14	$65,000	01-Sep-85
14 Grimshaw	4	2	1.75	Oil	32	$135,000	01-Sep-85
194 Maplewood	3	1	0.40	Oil	35	$76,000	15-Sep-85
1582 Central Ave	4	2	0.25	Elec	7	$125,000	19-Sep-85
43 Prospect St	5	3	0.40	Gas	14	$133,000	24-Oct-85

- It uses /Range Erase to clear the data entry form for the next entry.
- It uses {MENUBRANCH} to set up a menu. The menu will let the user continue with a new entry or to stop entering records.
- If the user chooses Continue, the macro branches to the beginning of the macro so the user can enter another record.
- If the user chooses Stop, the macro sets up another menu.
- The second menu presents three choices: to update the database by saving it with the new records, to discard the new records by erasing the worksheet, or to look at the database.
- If the user chooses Look, the macro moves the cell pointer to the bottom of the database and concludes.

Enter the macro just as it appears in the illustration below



Named Ranges The names in column S document the ranges the macro uses. You must name these ranges.

Use /Range Name Create to name the ranges the macro uses:

Name	Range
START	T2
NEXT	T11
EXIT	T15

Comments Note the comments in column X. It is a good idea to include comments if your macro becomes complex or if someone else may have to understand it.

Branching to a Menu

When the macro encounters {MENUBRANCH next}, it branches to the range named NEXT and displays a menu on the control panel that works just like 1-2-3's own menus.

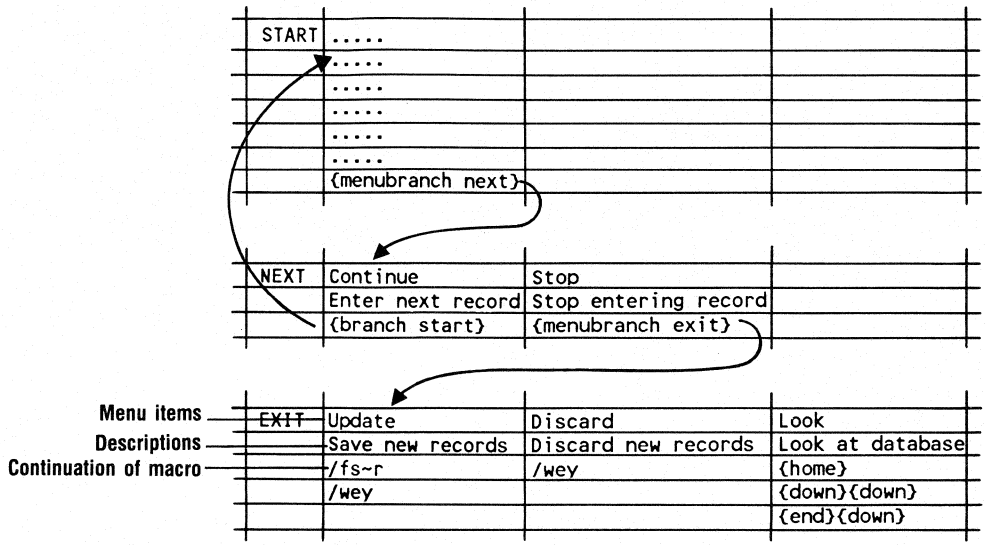
The menu items are drawn from consecutive cells in the first row of NEXT. Each item should begin with a unique character, so the user can select it by pressing that character.

The second row contains phrases that explain each menu item. Each of these phrases will appear on the control panel below the corresponding menu item.

The user makes a choice in the same way as with a regular 1-2-3 menu.

The macro resumes execution in the third row below the choice the user has made.

The following illustrates {MENUBRANCH}:



Executing Macros Automatically

You are ready to name the macro. Assume this is a macro that you want to execute automatically every time you retrieve this worksheet.

To make a macro execute automatically each time you retrieve the file, name it \0 (backslash zero). If you want to be able to execute it manually as well, you can also give it a macro letter name (\A...\Z).

Use /Range Name Create to assign the name \0 to cell T2

Now save the worksheet with its new autoexecute macro. When you retrieve the worksheet, the macro will execute automatically.

Save the file as DATAMAC

Retrieve DATAMAC.WK1

The macro automatically sets up the data entry form.

Fill in the data entry form

Remember to put a label prefix in front of the entry for ADDRESS, and be sure to use @DATE(YY,MM,DD) to enter the date in Q10. For example, type @DATE(86,5,12) to enter May-12-1986.

Press RETURN to end the /Range Input command

The macro puts the record in the database, clears the data entry form with /Range Erase, and presents you with the choice to stop or to continue.

Select Continue

Fill in the form again

Press RETURN when you are done

Select Stop

Selecting Stop causes the macro to perform {MENUBRANCH exit}. Now the macro presents the menu beginning at the range named EXIT.

Select Look

Take a look at the database to make sure that the records you inserted are still there.

Experiment by retrieving the worksheet again, making new entries, and selecting Save or Discard. Use STEP to review the macro keystroke by keystroke.

Modifying the Macro

You may want to introduce some modifications of your own into this macro. Here are some suggestions:

- After the user chooses Update or Discard, end the 1-2-3 session (/Quit Yes) instead of erasing the worksheet (/Worksheet Erase Yes).
- Allow the user to enter dates in Q10 as text, '15-Mar-86, for example, rather than @DATE(86,3,15). Then use @DATEVALUE to convert this label to a value, before you insert the new record in the database. See @DATEVALUE in the chapter on @functions in the *Reference Manual*.

Summary

You have written a macro that automates and safeguards the entry of new records into a database. Using such macros, you can tailor 1-2-3 to perform specific applications. Remember the following:

- Use the /Range Input command to limit access to the unprotected cells in the data input range.
- Use /Range Transpose to copy a range of columns to a range of rows, or visa versa.
- Use {MENUBRANCH} to set up your own menus.
- Name a macro \0 so that it executes automatically each time you retrieve the file.

Looking Ahead

Now that you have acquired the basic skills you need to use 1-2-3, experiment with the program. Set up a worksheet to balance your checkbook. Record and graph your utility payments for the past six months. Keep records of important letters, memos, and phone calls in a database.

With a little practice, you can become an expert user of 1-2-3. Remember the following resources when you need more information:

- During a 1-2-3 session, you can press HELP at any time to get a screen of information that pertains to what you are currently doing. From any Help screen, you can move to other Help screens on related topics. You can get to all of the Help screens by using the Help index. PrintGraph has a similar Help facility.
- If you are not currently in a 1-2-3 or PrintGraph session, or you need more detailed information than the Help screens give, use the *Reference Manual*.

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