Lotus 1-2-3 Release 3.1

Tutorial

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How to Use the *Tutorial*

The *Tutorial*, through a series of step-by-step lessons, teaches concepts and skills that let you use Lotus® 1-2-3® for everyday work. The *Tutorial* is divided into five chapters:

- Chapter 1 teaches you the basic skills you need to use 1-2-3. You will learn how to start 1-2-3, select commands, enter data, perform calculations with the data, format a worksheet, and print your work.
- Chapter 2 teaches you how to create several types of graphs, add explanatory text and legends to your graphs, view a graph side-by-side with the worksheet data it is based on, and print the graphs you create.
- Chapter 3 teaches you how to create and work with files that contain more than one worksheet, how to read several files into memory at the same time, and how to link files.
- Chapter 4 teaches you how to set up a database table and perform basic database operations such as sorting the information in a database table, finding and copying records that match certain requirements, and printing records that match certain requirements.
- Chapter 5 teaches you how to automate 1-2-3 tasks with macros. You will learn how to plan, create, name, document, run, and debug macros.

If you are a new 1-2-3 user, complete Chapter 1 of the *Tutorial* first to learn basic 1-2-3 concepts. Then, read whichever chapters pertain to the type of work you want to do with 1-2-3. You do not have to read the chapters in any particular order.

If you are an experienced 1-2-3 user, browse through the *Tutorial* to review 1-2-3 basics and learn how to use some of the new 1-2-3 features, such as multiple-sheet files, file linking, graph printing from within 1-2-3, enhanced database sorting, and keystroke recording to simplify creating macros.

Sample Files

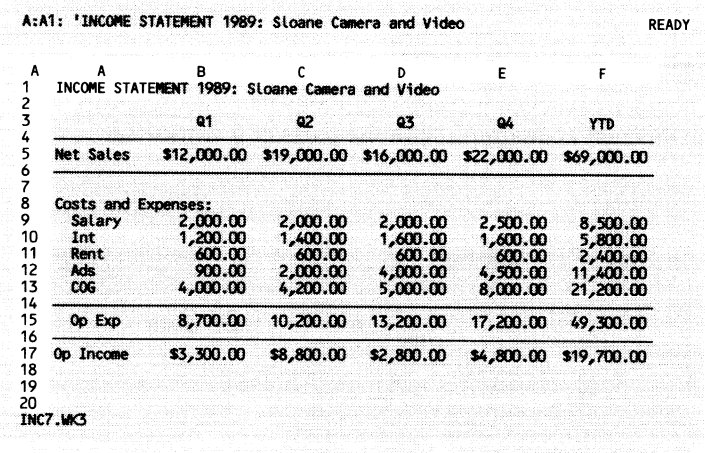
All the *Tutorial* lessons have sample worksheet files, which the Install program transfers to your 1-2-3 Release 3.1 program directory. The sample worksheets, filled in as though you had completed previous lessons, let you use the *Tutorial* without having to complete the lessons in order.

NOTE The *Tutorial* uses 123R3 as the 1-2-3 Release 3.1 program directory. 123R3 is the default program directory recommended in Install.

Chapter 1
Building a 1-2-3 Worksheet

This chapter teaches you the basic skills you need to use 1-2-3. You will learn how to start 1-2-3, select commands, enter data, perform calculations with the data, format a worksheet, and print your work. Soon you will begin building your first **worksheet**, a grid that provides a structure for entering and calculating data, and storing and organizing information.

The worksheet you are going to build is an income statement for a company called Sloane Camera and Video. Using 1-2-3, you will enter net sales and costs-and-expenses figures and calculate operating expenses and income for the store. When you have completed the chapter, the resulting worksheet will look like this:



A:A1: 'INCOME STATEMENT 1989: Sloane Camera and Video READY

	A	B	C	D	E	F
1	INCOME STATEMENT 1989: Sloane Camera and Video					
2						
3		Q1	Q2	Q3	Q4	YTD
4						
5	Net Sales	$12,000.00	$19,000.00	$16,000.00	$22,000.00	$69,000.00
6						
7						
8	Costs and Expenses:					
9	Salary	2,000.00	2,000.00	2,000.00	2,500.00	8,500.00
10	Int	1,200.00	1,400.00	1,600.00	1,600.00	5,800.00
11	Rent	600.00	600.00	600.00	600.00	2,400.00
12	Ads	900.00	2,000.00	4,000.00	4,500.00	11,400.00
13	COG	4,000.00	4,200.00	5,000.00	8,000.00	21,200.00
14						
15	Op Exp	8,700.00	10,200.00	13,200.00	17,200.00	49,300.00
16						
17	Op Income	$3,300.00	$8,800.00	$2,800.00	$4,800.00	$19,700.00
18						
19						
20						

INC7.WK3

Lesson 1 Learning About 1-2-3

To use 1-2-3 effectively, you need to master some basic worksheet concepts and skills. In this lesson you will

- Start 1-2-3
- Identify the parts of a worksheet
- Move around a worksheet
- Use the 1-2-3 Help system

Starting 1-2-3

To start 1-2-3, the operating system prompt (C >) must be on the screen and you must be in the directory where you transferred the 1-2-3 files with the Install program. Also, if the light above your **NUM LOCK** key is on, turn it off by pressing **NUM LOCK**.

The directory that contains your 1-2-3 files must be the current directory. If it is not, complete the following steps to make your 1-2-3 directory the current directory:

Type	cd\123r3 *(If 123R3 isn't the name of the directory that contains your 1-2-3 files, type the correct name in place of 123R3.)*
Press	**ENTER**

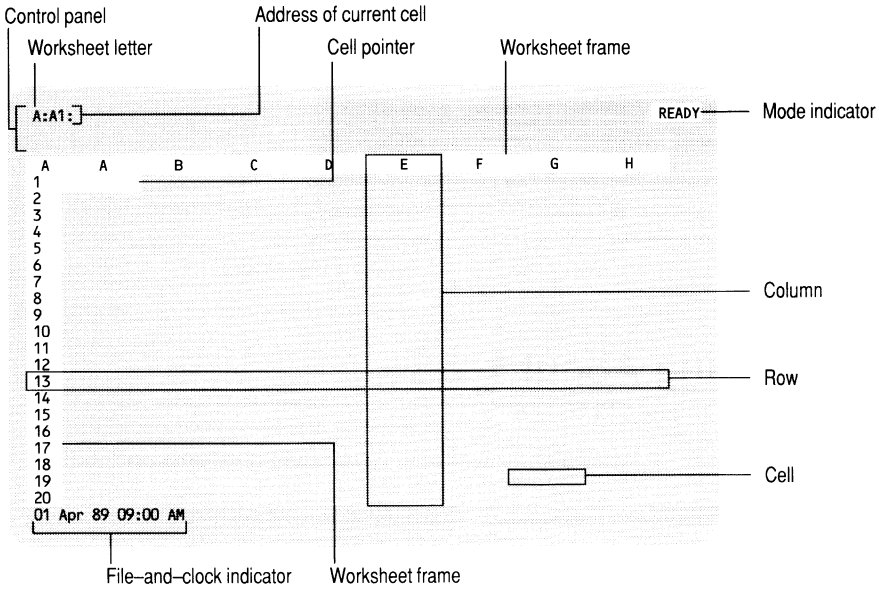
Now start 1-2-3:

Type	123
Press	**ENTER**

An introductory screen appears, followed by a blank 1-2-3 worksheet.

Identifying the Parts of a Worksheet

Each time you start 1-2-3, a blank worksheet appears that looks like the following screen. Before you go any further, get acquainted with the parts of a worksheet.



Worksheet Letter

You can use up to 256 worksheets at once (if your computer has enough memory). 1-2-3 assigns a different letter to each worksheet you are using and displays the letter in the upper left corner of the worksheet frame. Worksheets are labeled A through Z, AA through AZ, BA through BZ, and so on through IV. (You will learn about using multiple worksheets in Chapter 3.)

Columns and Rows

The letters along the worksheet frame designate **columns** and the numbers along the worksheet frame **rows**. You can see only a small portion of a worksheet's columns and rows on the screen at one time. All together, a worksheet has 256 columns and 8,192 rows. Columns are labeled A through Z, AA through AZ, BA through BZ, and so on through IV. Rows are numbered 1 through 8192.

Cells

The intersection of a column and a row forms a **cell**, the smallest unit of the worksheet in which you can enter and store data. A worksheet letter followed by a column letter and a row number make up a cell's location, or **cell address**. For example, the cell address A:A1 refers to the cell located in worksheet A at the intersection of column A and row 1.

Cell Pointer

The **cell pointer** is the highlighted rectangle currently in cell A:A1. You move the cell pointer to the cell in which you want to enter data, make a calculation, or begin a command. The cell that contains the cell pointer is called the **current cell**. The worksheet that contains the cell pointer is called the **current worksheet**.

Control Panel

The **control panel** is located at the top of the screen, above the column letters. It displays cell information, commands, descriptions of commands, and the mode in which 1-2-3 is operating.

Currently, the control panel displays two items. On the left is the address of the current cell, A:A1. When you move the cell pointer, the address changes to reflect the cell pointer's new location. On the right is the **mode indicator**, which describes the current 1-2-3 mode of operation. As you work, the mode indicator changes to show, for example, that you are entering a value or label, editing an entry, or making an error. The indicator now displays READY, showing that 1-2-3 is ready for you to select a command or enter data.

File-and-Clock Indicator

The **file-and-clock indicator** is located in the lower left corner of the screen. If you have saved the current worksheet in a file on disk, the indicator displays the file name. If, however, you have not yet saved the current worksheet in a file, the indicator displays the current date and time.

Moving Around a Worksheet

Working in 1-2-3 involves moving from cell to cell as you enter, change, and calculate data or use 1-2-3 commands. There are a number of ways to move around a worksheet quickly and efficiently. For example, you can move the cell pointer using the **pointer-movement keys**, located on the right side of your keyboard. Before you try the following exercise, check the cell address in the control panel to make sure the cell pointer is in A:A1.

NOTE Although the control panel always displays the current worksheet letter (such as A:A4 or B:J36), the Tutorial refers to cells in the current worksheet by just their column and row location (such as A4 or J36). When you work with more than one worksheet in Chapter 3, however, the *Tutorial* refers to cells by their worksheet, column, and row location.

Press HOME *to move to A1 if the cell pointer is not there*

Press → *to move to B1*

Press ↓ *to move to B2*

Notice that the cell address in the upper left corner of the control panel has changed to reflect the new location of the cell pointer.

The pointer-movement keys you just used moved the cell pointer one cell at a time. Now try some keys that move it in larger jumps. Watch the row numbers change when you do the following:

Press PGDN *to move down the length of the screen*

Several pointer-movement keys are actually key combinations. Key combinations linked with a hyphen must be pressed simultaneously; for example, BIG RIGHT (CTRL-→) means that you press and hold CTRL while you press →. Try it:

Press BIG RIGHT (CTRL-→) *to move right the width of the screen*

You can also use the END key with other pointer-movement keys to move the cell pointer. Press END first, release it, and then press a pointer-movement key. Notice as you complete the following exercise that the END indicator appears in the bottom right corner of your screen when you press END and disappears when you press the second key:

Press END ↓ *to move to the last row of the worksheet (row 8192)*

Press END → *to move to the last column of the worksheet (column IV)*

Press HOME *to move back to A1*

Press ← *(1-2-3 will beep.)*

1-2-3 beeps when you press ← because you can't move the cell pointer beyond the worksheet frame.

You have tried a small sample of the 1-2-3 pointer-movement keys. See "The 1-2-3 Screen" in Chapter 1 of *Reference* for a complete list of pointer-movement keys.

NOTE From now on in the *Tutorial*, the keystroke instructions simply tell you to "Move" the cell pointer to a specific cell. You can use any of the pointer-movement keys to move the cell pointer, as well as special keys you will learn about in later lessons.

Using the 1-2-3 Help System

When you make a mistake in the program, 1-2-3 beeps, goes into ERROR mode, and, in certain cases, displays an error message. Whenever 1-2-3 displays an error message you can press **HELP (F1)** to get information about how to fix the error. You can also press **HELP (F1)** at any time in a 1-2-3 session to see a screen of information about the part of the program you are using. When you press **HELP (F1)**, the worksheet temporarily disappears and a Help screen appears. To see how Help works from READY mode do the following:

Press **HELP (F1)** *to use Help*

When you press **HELP (F1)** in READY mode, the Help Index appears. From there, you can view a Help screen on any topic you choose. To select a topic from the Help Index, use the pointer-movement keys to move the highlight to the topic you want and then press **ENTER**.

Highlight a topic you want to read about

Press **ENTER** *to select the topic*

Notice the words that appear in a contrasting color or a brighter intensity within the current Help screen and at the bottom of the screen. These words represent related topics on which you can also get Help. To select one of these topics, use the pointer-movement keys to move to the topic you want and press **ENTER**.

Spend some time now experimenting with the Help system. When you are ready to leave Help and return to your worksheet, do the following:

Press **ESC** *to leave Help*

Lesson 2 Using 1-2-3 Menus

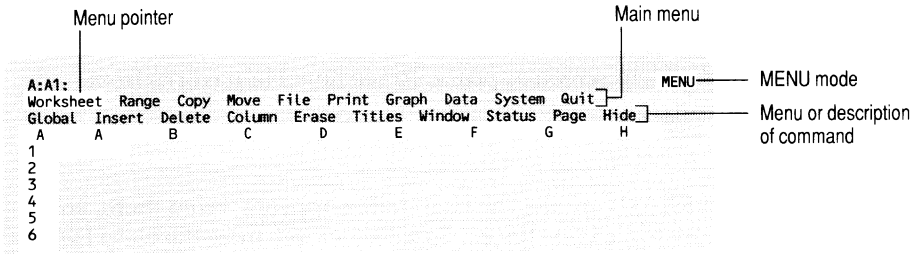
Many of the tasks you do in 1-2-3 require you to use 1-2-3 menus. In this lesson you will

- Move around a menu
- Select commands from menus
- Cancel commands
- Select commands using a shortcut
- Retrieve a file

Moving Around a Menu

To perform tasks such as saving a file, copying data, and printing a worksheet, you use 1-2-3 commands. You select commands from **menus**, which are sets of related commands that 1-2-3 displays in the second line of the control panel. To begin any command, you display the main 1-2-3 menu by pressing / (slash) when 1-2-3 is in READY mode. Try it now:

Press */ to display the 1-2-3 main menu*



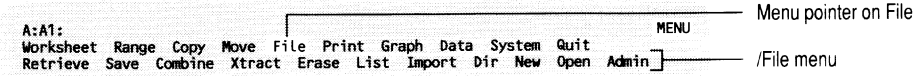
Notice that 1-2-3 changes the mode indicator from READY to MENU. The 1-2-3 main menu commands now appear in the second line of the control panel. The highlighted rectangle positioned on the Worksheet command is the **menu pointer**. The third line of the control panel displays information about the highlighted command. This information changes each time you move the menu pointer to highlight a different command.

1-2-3 commands are organized in a hierarchical structure. Many main menu commands lead to sets of lower level commands that offer further options. When you position the menu pointer on such a command, you will see that command's menu listed in the third line of the control panel. For example, when Worksheet is highlighted, the third line of the control panel lists the /Worksheet menu (Global, Insert, Delete, and so on). If the highlighted command does not lead to a menu, 1-2-3 displays a description of the command.

To explore other commands on the main menu, try moving the menu pointer. Before you begin, make sure the menu pointer is on Worksheet:

Press **HOME** *to highlight Worksheet if the menu pointer is not already located there*

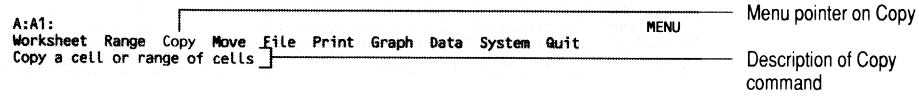
Press → four times *to highlight File and display the /File menu*



Now the third line of the control panel displays the /File menu. Move the menu pointer again:

Press ← two times *to highlight Copy*

Since the Copy command does not have a menu, the third line of the control panel displays a description of the command.



In addition to using ← and → to move the menu pointer one command at a time, you can use **HOME** and **END** to move the menu pointer to the first and last command in the menu, respectively. Try it:

Press **END** *to highlight Quit*

Press **HOME** *to highlight Worksheet*

The menu pointer moves in a circular pattern. Pressing → when the last command in the menu is highlighted moves the menu pointer back to the first command in the menu. Similarly, pressing ← when the first command in the menu is highlighted moves the menu pointer to the last command in the menu:

Press ← *to highlight Quit*

Press → *to highlight Worksheet*

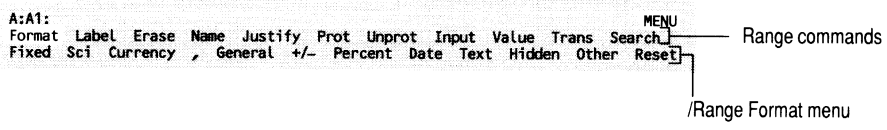
Selecting Commands from Menus

To select a command, highlight the command and then press **ENTER**. For example, to select the Range command, do the following:

Press → *to highlight Range*

Press **ENTER** *to select the Range command*

The main menu is gone and instead the second line of the control panel displays the Range commands. Format is highlighted and the third line of the control panel displays the /Range Format menu (the commands you can use after you press / (slash) to display the main menu, select Range, and then select Format).

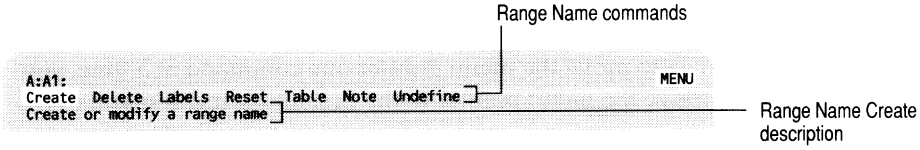


Press → three times *to highlight Name*

Each time you press →, the third line of the control panel changes to reflect the command highlighted on the second line.

Press **ENTER** *to select Name*

Now the second line of the control panel shows the Range Name commands. Create is highlighted and the third line of the control panel displays a description of the Range Name Create command (the command you can use after you press / (slash) to display the main menu, select Range, then Name, and then select Create).



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

Canceling Commands

It is not uncommon to select a command by mistake or to decide not to complete a command after you have started making selections from menus. For example, you are now in the middle of the /Range Name menu, but in this case you don't really want to complete the command. Now you will learn how to back out of menus. Before you complete the last step in any sequence of commands you can move backwards through the sequence, one menu level at a time, by pressing **ESC**. The **ESC** key lets you back out of any menu until 1-2-3 returns to READY mode.

Press **ESC** *to return to the menu from which you selected Name*

Press **ESC** *to return to the menu from which you selected Range*

Press **ESC** *to return 1-2-3 to READY mode*

The menu is no longer displayed in the control panel and 1-2-3 is in READY mode.

Selecting Commands: A Shortcut

Now you know how to select a command by moving the menu pointer to a command and then pressing **ENTER**.

This method is very useful when you are learning to use 1-2-3, because you can see the commands you are selecting as well as information about each highlighted command. As you become more proficient with 1-2-3, however, you may want to use a faster method of selecting commands. After pressing the / (slash) key to display the main menu, you can just press the first character of the command you want to select. With this method, you do not move the menu pointer or press **ENTER**; 1-2-3

automatically selects the command and displays the next menu as soon as you press the character. Try this method:

Press */ to display the main menu*

Press r *to select Range*

The main menu commands are gone and the second line of the control panel now displays the Range commands. Format is highlighted and the third line of the control panel displays the /Range Format menu. Again, notice that each command in this menu begins with a different letter.

Press n *to select Name*

Now the second line of the control panel shows the Range Name commands. Create is highlighted and the third line of the control panel displays a description of the Range Name Create command.

Press **ESC** three times *to return 1-2-3 to READY mode*

Retrieving a File

You have learned the two methods of selecting commands from menus. Now you are going to use the first method (highlighting a command and pressing **ENTER**) to retrieve a sample file named INC2S.WK3. Complete the following steps to retrieve the file:

Press */ to display the 1-2-3 main menu*

Press → four times *to highlight File*

Press **ENTER** *to select File*

Press **ENTER** *to select Retrieve*

Notice that the mode indicator changed from MENU to FILES. The names of worksheet files saved in the current directory appear across the third line of the control panel. 1-2-3 lists the files alphabetically.

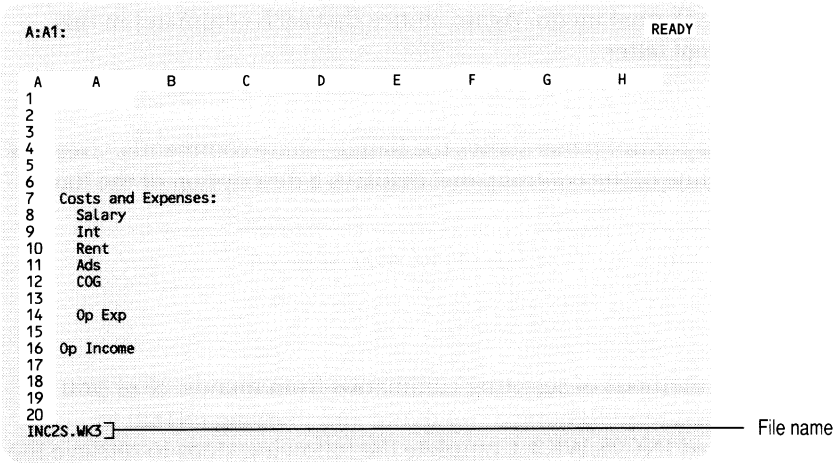
When there are more files than you can see in the control panel, you can press ↓ to display the next row of file names. Alternatively, you can press **NAME (F3)** to display the names of all the files in the current directory at once.

To specify the file to retrieve, you can highlight the file name using ←, → , ↑, ↓, **HOME**, or **END** and then press **ENTER** to select it, or you can type the file name and press **ENTER**. In this case, you'll highlight the file name:

Highlight INC2S.WK3

Press **ENTER** *to retrieve INC2S.WK3*

The mode indicator briefly displays WAIT as 1-2-3 retrieves the file. You can see the file name INC2S.WK3 in the file-and-clock indicator in the bottom left corner of your screen. This sample file contains some data that has already been entered for you. In the next lesson, you will learn how to enter data on your own as you continue building this worksheet.



NOTE This lesson taught you the two methods of selecting commands (highlighting the command and pressing ENTER and pressing the first character of the command). From now on in this *Tutorial*, whenever an exercise involves using a command, the keystroke instructions simply tell you to "Select" a command. You can use either method, but you may want to use the highlighting method until you become more familiar with the 1-2-3 menu structure.

A / (slash) preceding the name of a command means that the command is in the main menu and you must press / to display the main menu in order to select the command. For example, the instruction "Select /File" means press / to display the main menu and then select File from that menu.

Lesson 3 Entering Labels in a Worksheet

A cell can store two types of data: labels and values. **Labels** are text, such as Sales or Inventory. You can use labels to identify and organize the values you enter in a worksheet. **Values** are numbers, such as 5 or 339500, or they are the results of formulas.

Because labels give meaning to the values in a worksheet, creating labels is a logical place to begin building the income statement for Sloane Camera and Video. In this lesson, you will

- Enter labels
- Correct typing errors
- Use the GOTO (F5) key
- Use the pointer-movement keys to enter data
- Save your work

Entering Labels

First you'll enter a title for the worksheet in cell A1. As you type, your entry will appear in the second line of the control panel.

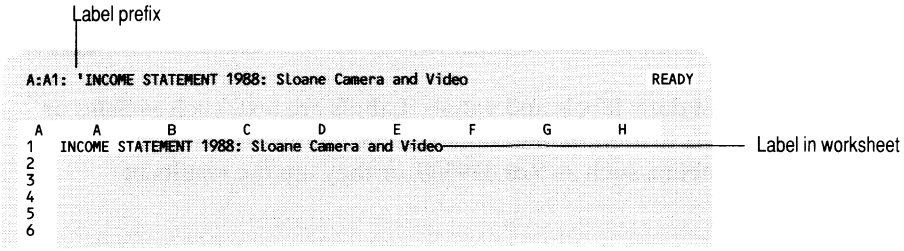
Press HOME *to move to A1 if the cell pointer is not there*

Type INCOME STATEMENT 1988: Sloane Camera and Video

The mode indicator has changed from READY to LABEL. 1-2-3 distinguishes between a label and a value by the first character of the entry. Because labels are usually text, 1-2-3 assumes that any entry beginning with a letter is a label.

Press ENTER *to enter the label in the worksheet*

When you press ENTER, 1-2-3 stores the entry in the current cell. The following screen shows the cell contents in the control panel and the label in the worksheet. Notice the ' (apostrophe) at the beginning of the label in the control panel. This is a **label prefix**, a character that controls the label's position in a cell. 1-2-3 automatically inserts the ' (apostrophe) to align labels with the left edge of a cell. (In Lesson 6 you will learn how to enter other label prefixes to align labels differently in cells.)



Even though you entered the label in A1, it overflows into the blank cells to the right of it (B1 through E1). A label that contains more characters than the width of the column is called a **long label**. Although the label appears to occupy more than one cell, 1-2-3 stores it entirely in A1. Verify this by moving the cell pointer to B1:

Move the cell pointer to B1

The first line of the control panel shows that B1 contains no entry.

Move the cell pointer back to A1

The complete text of the label reappears in the control panel. This illustrates that a cell can contain more information than can fit within the width of the column. In fact, a cell can hold up to 512 characters. If you enter data in the cell to the right of a long label, 1-2-3 truncates the label on the screen, but still stores the entire label.

Correcting Typing Errors

If you make an error while typing an entry and you haven't yet pressed **ENTER**, press **BACKSPACE** to erase incorrect character(s) to the left of the **cursor** (which underscores the current character) and then continue typing the entry.

If, however, you notice a typing error after you press **ENTER**, you can correct it in one of two ways:

- Move the cell pointer to the cell that contains the incorrect entry, type a new entry, and press **ENTER**. This method is the best choice for replacing an entire entry.
- Press the **EDIT (F2)** key to put 1-2-3 in EDIT mode, edit the entry in the second line of the control panel, and press **ENTER**. This is the best method for making a minor change in a long entry.

In EDIT mode you use the pointer-movement keys to move the cursor to the mistake in the entry. To delete characters, use **BACKSPACE** to erase the character to the left of the cursor or **DEL** to delete the current character (positioned over the cursor). To insert characters, use the pointer-movement keys to move the cursor to the place in the entry where you want to insert the new text and then type the text. Once you correct the mistake, press **ENTER** to store the correction in the current cell. Try changing 1988 to 1989:

Press **EDIT (F2)** *to put 1-2-3 in EDIT mode*

The label you previously entered appears in the second line of the control panel. The cursor appears just after the last character in the label.

Press	**BIG LEFT (CTRL-←)** five times *to move the cursor to the colon in the label*
Press	**BACKSPACE** *to erase the last 8 in 1988*
Type	9 *to change the year to 1989*
Press	**ENTER** *to enter the correction in the worksheet*

1-2-3 returns to READY mode.

NOTE If you want to leave EDIT mode without entering any change in the worksheet, press **ESC** instead of **ENTER**. This leaves the entry as it was before editing.

Using the GOTO (F5) Key

Now you are going to enter more labels, beginning in A5. Rather than using the pointer-movement keys to move the cell pointer to A5, however, you are going to use the **GOTO (F5)** key. The **GOTO (F5)** key is a shortcut for moving around a worksheet.

Press	**GOTO (F5)**

1-2-3 prompts you to enter the address of the cell you want to move to.

Type	a5
Press	**ENTER** *to move the cell pointer to A5*
Type	Net Sales
Press	**ENTER** *to enter the label in the worksheet*

Using the Pointer-Movement Keys

There is another way to enter data in a cell besides pressing **ENTER** when you're done typing: You can use the pointer-movement keys. If you press one of the pointer-movement keys after you type an entry, 1-2-3 enters the data in the current cell and then moves the cell pointer in the direction indicated by the pointer-movement key you pressed. This is a useful shortcut when you are entering a series of data in a row or column. Try it now:

Move	the cell pointer to B3
Type	Q1 *(for Quarter 1)*
Press	→ *to enter Q1 and move the cell pointer to C3*
Type	Q2 *(for Quarter 2)*
Press	→ *to enter Q2 and move the cell pointer to D3*
Type	Q3 *(for Quarter 3)*
Press	→ *to enter Q3 and move the cell pointer to E3*
Type	Q4 *(for Quarter 4)*
Press	→ *to enter Q4 and move the cell pointer to F3*

Type YTD *(for Year-to-Date)*

Press **ENTER** *to enter YTD*

Your worksheet should look like this:

```
A:F3: 'YTD                                                          READY

 A      A          B          C          D          E          F          G          H
1   INCOME STATEMENT 1989: Sloane Camera and Video
2
3            Q1         Q2         Q3         Q4         YTD
4
5   Net Sales
6
7   Costs and Expenses:
8     Salary
9     Int
10    Rent
11    Ads
12    COG
13
14    Op Exp
15
16  Op Income
```

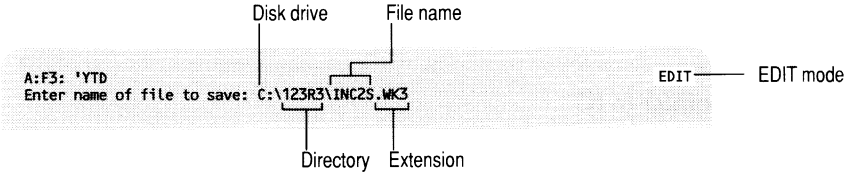
Saving Your Work

One of the most important 1-2-3 commands is /File Save, which copies your worksheet data from the computer's memory to a file on a disk. This procedure makes the data in your worksheet permanent; if you don't save your work, your data will be lost when you retrieve a new file or end 1-2-3. Save your work frequently to minimize the risk of losing data. To save the current worksheet, begin by doing the following:

Select /File

Select Save

1-2-3 displays the following screen:



In this screen, 1-2-3 prompts you for a file name in the second line of the control panel and displays a default response after the prompt. **Defaults** are values and settings that 1-2-3 automatically provides. In this case, the defaults include: the current disk drive (C), the current directory (123R3), the name of the current file (INC2S), and the default **extension,** or three-character suffix for 1-2-3 Release 3.1 worksheet files (.WK3).

NOTE If you select /File Save when you are creating a new worksheet (one that hasn't already been saved in a file), 1-2-3 supplies a default file name using a sequential numbering system: FILE0001.WK3 through FILE1999.WK3.

Specifying a File Name

To finish saving the file, you must specify a file name either by accepting the default name or by typing a new one.

You have made changes to the file named INC2S.WK3, which you retrieved at the end of Lesson 2. You can either update this file with the changes by using the same file name, or you can save these changes in a new file and preserve the original file. In this case, you are going to save the file with the new file name INC3.WK3 so that INC2S.WK3 remains unchanged. This allows others to use the original file if they want to complete the *Tutorial*.

You can use uppercase or lowercase letters when you enter a file name. 1-2-3, however, always displays the file names in uppercase letters. In this case, you don't have to type the whole file name; you can edit the default file name 1-2-3 suggests.

Move	the cursor under the 2 *(Use the pointer-movement key ←.)*
Press	DEL twice *to erase 2S*
Type	3
Press	ENTER *to save the file with the name INC3.WK3*

Your worksheet looks the same as it did before you saved it, except that the new file name appears in the bottom left corner of your screen. A copy of the worksheet is now saved permanently in a file on disk named INC3.WK3. For more information on file names, see "Working with Files" in Chapter 1 of *Reference*.

Lesson 4 Entering Values in a Worksheet

The labels in the worksheet form a structure for the values that will go into the income statement. In this lesson, you will

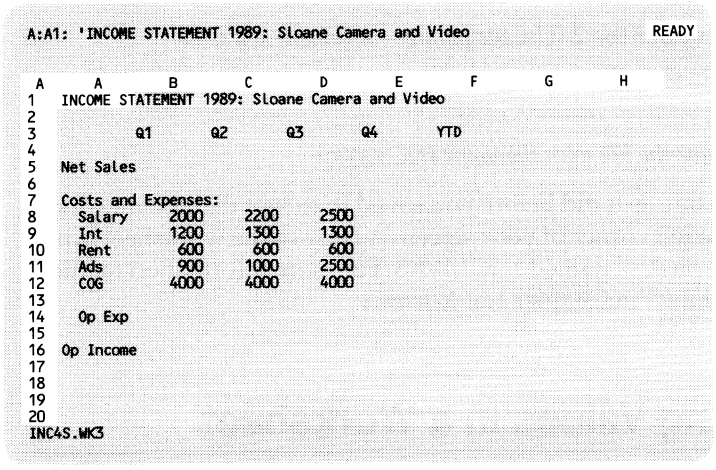
- Enter values
- Erase a range
- Enter more values
- Create a line to visually separate items in the worksheet
- Copy ranges
- Highlight a range
- Name a range
- Name another range

- Save your work
- End a 1-2-3 work session

To begin this lesson, use the following steps to retrieve the sample file INC4S.WK3. This file will replace INC3.WK3 in your computer's memory. A copy of INC3.WK3 is still saved in a file on disk if you want to retrieve it at a later time.

Select	/File
Select	Retrieve
Highlight	INC4S.WK3
Press	**ENTER** *to retrieve INC4S.WK3*

The following worksheet appears on your screen. This worksheet contains the labels you entered in the last lesson. You will also notice that the worksheet contains some values. In this lesson, you will learn to enter values on your own.



Entering Values

Now you will enter the quarterly Net Sales figures for the income statement in row 5. As you type each figure, notice that the mode indicator changes from READY to VALUE. 1-2-3 assumes that any entry beginning with a number is a value. Begin entering the Net Sales figures in B5.

Move	the cell pointer to B5
Type	12000
Press	→ *to enter 12000 and move the cell pointer to C5*
Type	19000
Press	→ *to enter 19000 and move the cell pointer to D5*

Type	16000
Press	→ *to enter 16000 and move the cell pointer to E5*
Type	22000
Press	**ENTER** *to enter 22000*

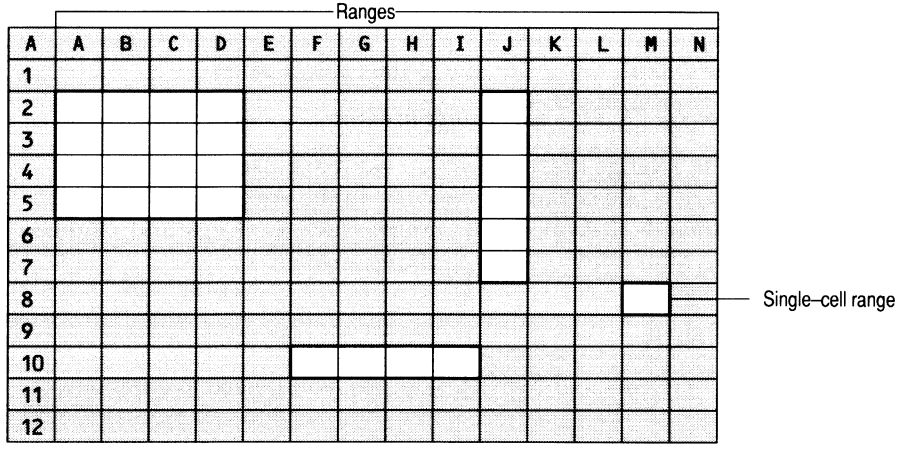
Your worksheet should look like the following screen. The values do not line up with the left-aligned labels above them. This is because 1-2-3 automatically aligns values with the right edge of a cell. You will change the alignment of the labels later in this chapter.

```
A:E5: 22000                                                    READY

 A     A         B         C         D         E         F         G         H
 1   INCOME STATEMENT 1989: Sloane Camera and Video
 2
 3             Q1        Q2        Q3        Q4       YTD
 4
 5   Net Sales   12000     19000     16000     22000
 6
```

Erasing a Range

Suppose you want to erase the contents of one or more cells in the worksheet, but you don't want to replace the cells with new entries. You can do this using /Range Erase, one of the 1-2-3 commands that works with ranges. A **range** is a single cell or rectangular group of adjoining cells that 1-2-3 treats as a unit. Ranges are useful because they let you work with cells collectively instead of individually in commands and formulas.



To specify a range, you indicate the location of that range in the worksheet. You can do this by typing its range address, highlighting the range, or using its range name. Right now, you are going to learn how to specify a range using its range address. A **range address** consists of the cell addresses of the two most distant cells in the range separated by two periods. This address tells 1-2-3 where the range begins and ends and follows these guidelines:

- If a range is a group of adjoining cells in a single column or row, the range address consists of the cell addresses of the two opposite ends of the range. For example, J2..J7 includes the cells in rows 2 through 7 in column J.
- If a range is a group of adjoining cells that spans several columns or rows, the range address consists of the cell addresses of two diagonally opposite corners of the range. For example, A2..D5 means cells A2 through D5.
- If a range is a single cell, the range address consists of that cell address as both the starting and ending point of the range. For example, M8..M8 means cell M8.

NOTE Although the control panel displays the worksheet letter in range addresses, the *Tutorial* refers to ranges in the current worksheet by just their column and row location (such as B12..D12). When you work with more than one worksheet in Chapter 3, however, the *Tutorial* refers to ranges by their worksheet, column, and row location (such as A:B12..C:D12).

Suppose the Q2 and Q3 Costs and Expenses figures are not correct. Try erasing this data by selecting /Range Erase and specifying the range containing those figures:

Select	/Range
Select	Erase

Because the cell pointer is currently in E5, 1-2-3 suggests E5..E5 as the range to erase. Don't accept this default. Specify a different range by doing the following:

Type	c8..d12

What you type replaces the default range (E5..E5) in the control panel.

Press	**ENTER** *to accept C8..D12 as the range to erase*

Now the cells are blank. Use /Range Erase when you want to erase the contents of any range, whether the range is one cell or several cells. In the lessons that follow, you will learn about other commands that operate on ranges (such as /Copy and /Range Format). You will also learn other methods of specifying a range.

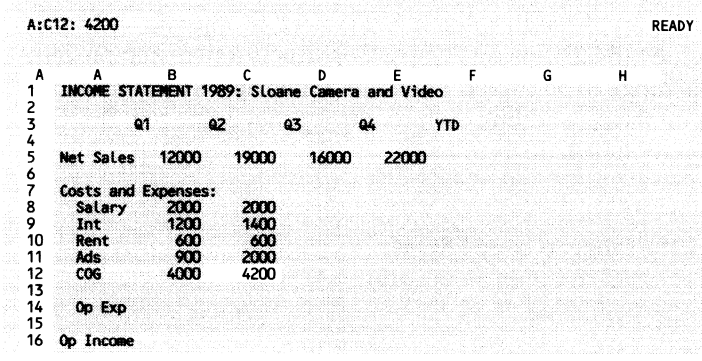
Entering More Values

Having erased the Q2 and Q3 Costs and Expenses figures, you'll need to enter new ones, beginning in C8.

Move	the cell pointer to C8
Type	2000
Press	↓ *to enter 2000 and move the cell pointer to C9*

Type	1400
Press	↓ *to enter 1400 and move the cell pointer to C10*
Type	600
Press	↓ *to enter 600 and move the cell pointer to C11*
Type	2000
Press	↓ *to enter 2000 and move the cell pointer to C12*
Type	4200
Press	**ENTER** *to enter 4200*

When you finish entering the numbers, your worksheet should look like this:

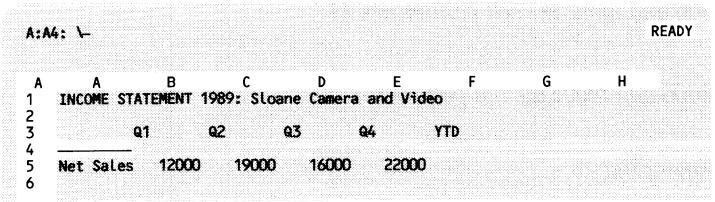


Creating a Line

You can make a worksheet easier to read by visually separating the various sections with lines. To create a line, you could type an ' (apostrophe) label prefix followed by a series of dashes. But there is an easier way: Type a \ (backslash) followed by a single dash. The \ (backslash) is the **repeating label prefix**; it repeats the label that follows it until it fills the cell. You'll use the repeating label prefix to create a line starting in A4.

Move	the cell pointer to A4
Type	\ *(backslash)*
Type	– *(dash)*
Press	**ENTER** *to enter the repeating label*

1-2-3 now displays a series of dashes in A4. (Some monitors display a solid line rather than a dashed line.)

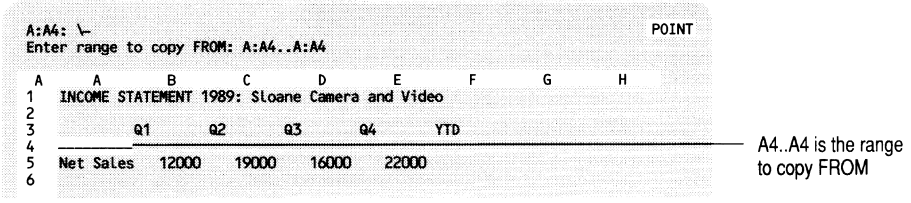


Copying Ranges

To extend the line in A4 all the way through column F, you need to copy the contents of A4 to the range B4 through F4 (B4..F4) using /Copy. Copying is a two-step process in which you first specify the range to be copied FROM and then specify the place you want it copied TO. Prompts on the second line of the control panel guide you through the process. With the cell pointer in A4, do as follows:

Select /Copy

1-2-3 prompts you to specify the range to copy FROM.



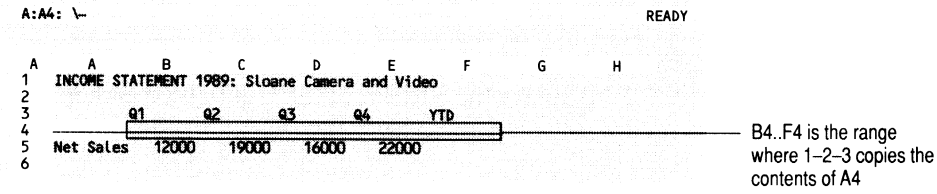
Press ENTER *to accept A4..A4 as the range to copy FROM*

1-2-3 prompts you to specify the range to copy TO.

Type b4..f4

Press ENTER *to accept B4..F4 as the range to copy TO*

1-2-3 makes a copy of the dashes in A4 in each cell in the range B4..F4.



Highlighting a Range

So far in this lesson, you have specified ranges by typing their range address (for example, B4..F4). Now you are going to learn how to specify a range by highlighting it.

When 1-2-3 is in POINT mode, you can **highlight** a range by using the pointer-movement keys to expand the highlighted area of the worksheet to cover all the cells in the range you want to specify. Before you highlight a range, however, the cell pointer must be anchored in one corner of the range so it remains stationary.

For several commands, 1-2-3 automatically anchors the cell pointer in the current cell when it prompts you for a range. In other instances, you must anchor the cell pointer yourself. You can tell if the cell pointer is anchored by looking at the prompt in the control panel. A cell address by itself (such as A4) means the cell pointer is not anchored, while a range address (A4..A4) means it is anchored.

- If the cell pointer is on the first (or last) cell of the range you want to specify but it is not anchored, press . (period) to anchor the cell pointer in that cell. If the cell pointer is on the wrong cell, reposition it before pressing . (period). Once the cell pointer is anchored, use the pointer-movement keys to expand the highlight to cover the range and press **ENTER**.
- If the cell pointer is anchored in the wrong cell, press **ESC** to unanchor it. Move the cell pointer to the first (or last) cell of the range and press . (period) to anchor it in that cell. Then use the pointer-movement keys to expand the highlight to cover the range and press **ENTER**.

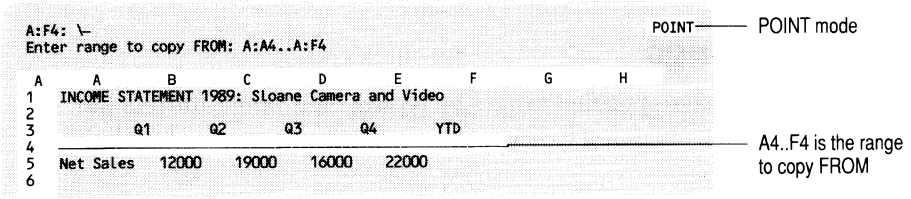
Now you are going to add another line to the worksheet, to separate the Net Sales figures from the rest of the data. This time when you use /Copy, you are going to make an identical copy of the dashes in range A4..F4 in range A6..F6. In addition, you are going to highlight the ranges to copy FROM and TO instead of typing their addresses. With the cell pointer in A4, do as follows:

Select /Copy

1-2-3 prompts you to enter the range to copy FROM. Because 1-2-3 automatically anchors the cell pointer when you select /Copy, you don't have to press . (period) to anchor the cell pointer when specifying the FROM range, unless you want to highlight a range that starts in a different cell.

Press → five times *to highlight A4..F4*

As you expand the highlight, 1-2-3 displays the address of the highlighted area in the control panel.

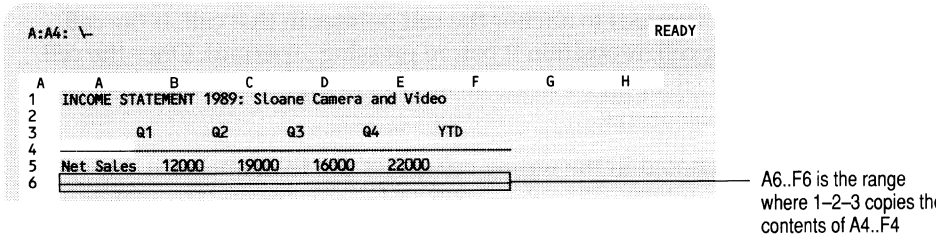


Press ENTER *to accept A4..F4 as the range to copy FROM*

When you make an identical copy of a range, you need to specify only the first cell of the TO range. You do not need to specify the entire range as you did when you copied a single-cell range to a larger range.

Move the cell pointer to A6

Press ENTER *to accept A6 as the range to copy TO*



Naming a Range

The worksheet needs two more separating lines, one below the row that contains the COG figures (A13..F13) and one below the Operating Expenses figures (A15..F15). When you used /Copy in the previous example, you specified the range to copy FROM by highlighting it. The next time you use /Copy, you will use a range name to specify the range to copy FROM.

A **range name** is a name you assign to a range in the worksheet. Naming ranges of cells often makes a worksheet much easier to work with. For example, it is easier to remember that a name like QTRLY_NETSALES refers to the range that contains the

quarterly Net Sales figures than it is to remember that cells B5 through E5 comprise the range. After creating a range name, you can use the name with any command that prompts for a range, from /Copy and /Move to /Range Format and /Graph.

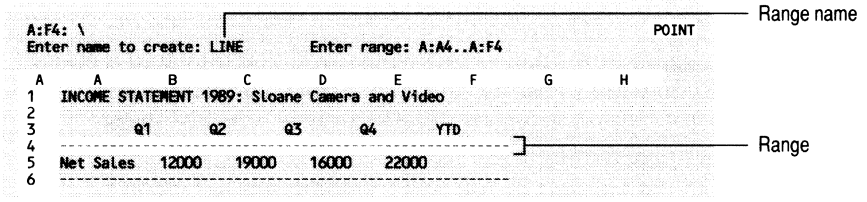
Range names can be almost any combination of up to 15 characters. They should not, however, include spaces, commas, semicolons, or the characters + * – / & > < @ #. Nor should they start with numbers. When typing a range name, you can use uppercase or lowercase letters. 1-2-3, however, always displays the range name in uppercase letters.

Create a range name for the first line of dashes so you can use that range name to copy the line to any location in the worksheet:

Select	/Range
Select	Name
Select	Create
Type	line
Press	ENTER

Now specify the range:

Press	→ five times *to highlight A4..F4*



Press	ENTER *to accept A4..F4 as the range to name*

Although nothing changes on your screen, you now have the range name LINE to represent the range A4..F4. Using this range name will save you time when you make copies of the line.

Select	/Copy

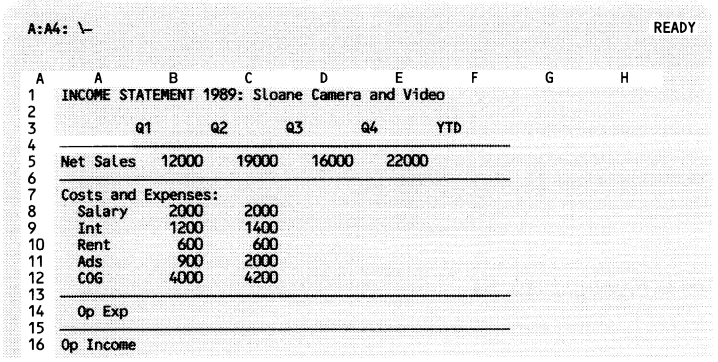
1-2-3 prompts you to enter the range to copy FROM. Type the range name in either uppercase or lowercase letters.

Type	line
Press	ENTER *to accept LINE as the range to copy FROM*
Move	the cell pointer to A13
Press	ENTER *to accept A13 as the range to copy TO*

Dashes appear in A13..F13. Now copy the line of dashes to row 15:

Select	/Copy
Type	line
Press	ENTER *to accept LINE as the range to copy FROM*
Move	the cell pointer to A15
Press	ENTER *to accept A15 as the range to copy TO*

Your worksheet should now have lines in rows 4, 6, 13, and 15.



NOTE If you create a number of range names in a worksheet, you may find it easier to specify the named range you want to use by selecting it from a list rather than typing its name. Whenever 1-2-3 prompts you to specify a range, you can press NAME (F3) to display a list of range names in the worksheet. Highlight the range name you want to use and press ENTER to select it. You will try doing this in Lesson 5.

Naming Another Range

Now that you know how to name a range, you are going to name the range that contains the Net Sales figures. In Lesson 5, you will use this range name in a formula.

Name the range containing the Net Sales figures QTRLY_NETSALES by doing the following:

Move	the cell pointer to B5
Select	/Range
Select	Name
Select	Create
Type	qtrly_netsales
Press	ENTER

Now specify the range:

Move	the cell pointer to E5 *to highlight B5..E5*
Press	**ENTER** *to accept B5..E5 as the range to name*

Although nothing changes on your screen, you now have the range name QTRLY_NETSALES, which represents the range B5..E5, as well as the range name LINE, which represents A4..F4.

Saving Your Work

To save the range names and the other changes you have made to the worksheet, do the following:

Select	/File
Select	Save
Type	inc5
Press	**ENTER** *to save INC5.WK3*

The worksheet is now saved permanently in a file on disk named INC5.WK3. When you save a worksheet that contains range names, 1-2-3 automatically saves those range names so they remain available the next time you use the worksheet.

Ending 1-2-3

If you want to go directly to the next lesson, skip this section. If you want to stop here, you can end the 1-2-3 session with the /Quit command.

Select	/Quit
Select	Yes *to end 1-2-3*

1-2-3 returns you to the operating system prompt (C >).

Lesson 5 Calculating in a Worksheet

Until now, you have used 1-2-3 to enter labels and numbers in the worksheet just as you would on a piece of 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. You are going to enter formulas in the worksheet that calculate the Operating Expenses and Operating Income for Sloane Camera and Video. In this lesson, you will

- Enter a formula
- Total numbers with @SUM
- Copy formulas
- Enter more formulas
- Save your work

If you ended 1-2-3 at the end of the last lesson, start 1-2-3 as described at the beginning of this chapter. Then use the following steps to retrieve INC5.WK3, the file you saved in Lesson 4. If you did not complete Lesson 4, retrieve the sample file, INC5S.WK3.

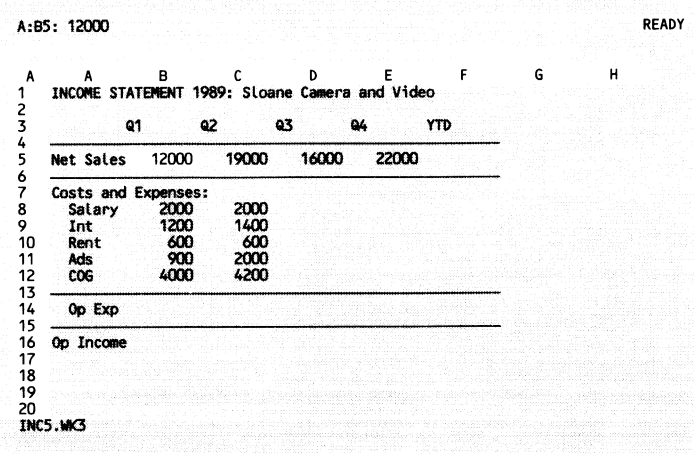
Remember that you can specify the file you want to retrieve in the following three ways:

- Use → or ← to highlight the file name and press **ENTER**.
- Type the file name and then press **ENTER**.
- Press **NAME (F3)** to display a list of all your 1-2-3 files in the current directory, highlight a name in that list, and then press **ENTER**.

For now, use the highlight method:

Select	/File
Select	Retrieve
Highlight	INC5.WK3 *(the file you saved in Lesson 4)* or INC5S.WK3 *(sample file)*
Press	**ENTER** *to retrieve the file*

The worksheet you created in the previous lesson appears on your screen. If you retrieved INC5.WK3, the cell pointer is in B5 because that's where it was located when you saved the file in Lesson 4.



Entering Formulas

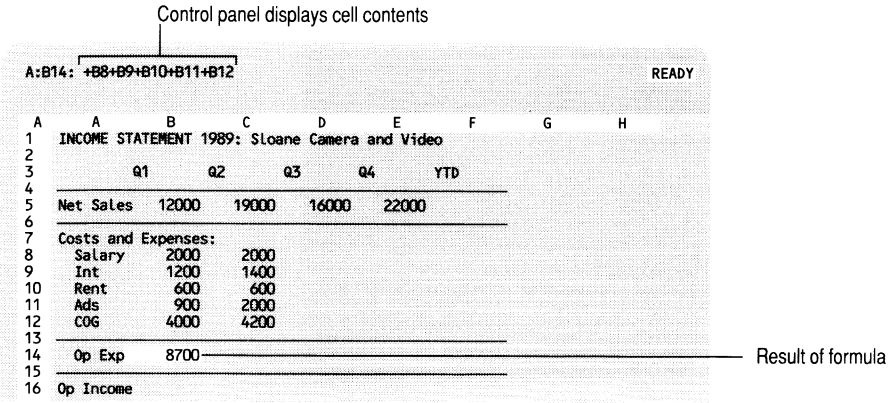
The numeric formulas you create in 1-2-3 can include any combination of mathematical operations: addition, subtraction, multiplication, division, and/or exponentiation. They can perform any type of calculation from simple arithmetic to advanced financial and statistical analysis. Whenever you enter a formula in a cell, 1-2-3 calculates the formula's result automatically and displays the result in the cell. Try entering a formula in B14 that totals the Q1 Costs and Expenses. Note that when a formula starts with a cell address, you must type a + (plus sign) in front of the formula.

Move the cell pointer to B14

Type +b8+b9+b10+b11+b12 *(1-2-3 doesn't accept spaces in formulas.)*

As soon as you type the initial + (plus sign), the mode indicator changes from READY to VALUE. This is because 1-2-3 assumes you are entering a value (actually, a formula that results in a value) when the + (plus sign) is the first character of the entry.

Press ENTER *to enter the formula in the worksheet*



Note that the result 8700, not the formula (+B8+B9+B10+B11+B12), appears in B14. Although 1-2-3 stores the formula you typed in B14, it displays the result of the calculation in the worksheet, as you can see in the control panel and in the preceding screen. Also note that you used cell addresses in the formula rather than the values in those cells. You could have entered the values +2000+1200+600+900+4000 as the formula. Because you used cell addresses, however, you can change the contents of any cell referred to in the formula and 1-2-3 will automatically recalculate the formula. To see this happen, try changing a Q1 Costs and Expenses figure:

Move the cell pointer to B10

Type 1000 *to change the Rent for Q1*

Press ENTER *to enter the change in the worksheet*

1-2-3 recalculates the formula in B14 and changes the result from 8700 to 9100. Now change the rent back to 600:

Type 600

Press ENTER *to enter the change in B10*

1-2-3 changes the Rent for Q1 back to 600 and recalculates the formula in B14.

Totaling with @SUM

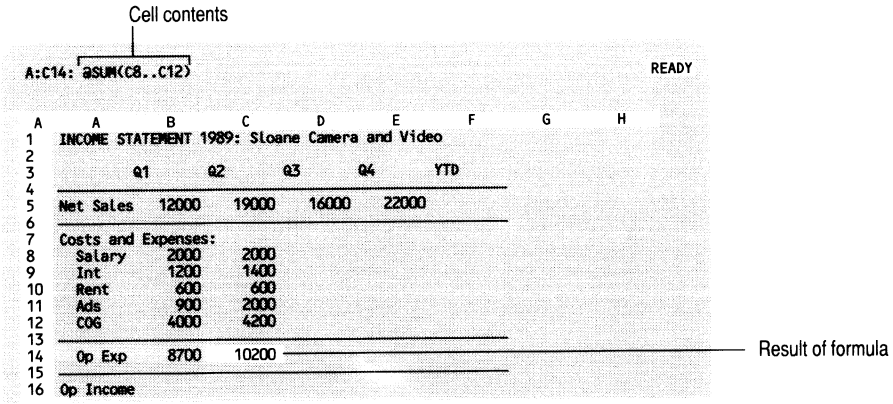
You can save time when adding a range of numbers, such as Q2 Operating Expenses, by using the 1-2-3 @SUM function (pronounced "at sum function"). **@Functions** are built-in 1-2-3 formulas that perform a variety of specialized mathematical, statistical, and financial calculations. (See Chapter 3 of *Reference* for complete information on all the 1-2-3 @functions.) Each @function is made up of three parts:

- The @ (at sign), which you must type as the first character
- The name of the @function, which you can type in uppercase or lowercase letters
- One or more arguments enclosed in parentheses (An **argument** specifies the data the @function works on, and can be anything from a single value to a range of cells, depending on the particular function.)

The @SUM function lets you add a range of values without typing each + (plus sign) and cell address. You specify the range as the @SUM argument. To use @SUM to total Q2 Operating Expenses, do the following:

Move	the cell pointer to C14
Type	@sum(
Move	the cell pointer to C8 *(the first cell of the range to total)*
Press	. (period) *to anchor the cell pointer*
Move	the cell pointer to C12 *to highlight C8..C12, the @function argument*
Type	)
Press	ENTER *to enter the @function in the worksheet*

The resulting worksheet with the Q2 Operating Expenses is shown below. Remember, the cell displays the result of the formula and the control panel shows the cell contents — in this case the @SUM formula.



Copying Formulas

Once you create a formula in one location, you can copy it to other cells in the worksheet. Rather than type the @SUM formula again for the Q3, Q4, and YTD totals, you can copy the formula in C14 to cells D14, E14, and F14.

With the cell pointer in C14, do the following:

Select	/Copy
Press	**ENTER** *to accept C14..C14 as the range to copy FROM*

Now highlight the TO range, which is where you want copies of the formula, by doing the following:

Move	the cell pointer to D14
Press	. (period) *to anchor the cell pointer in D14*
Move	the cell pointer to F14 *to highlight D14..F14*
Press	**ENTER** *to accept D14..F14 as the range to copy TO*

The cell pointer returns to C14. Zeros appear in D14 through F14 because although you entered formulas, you have not yet entered numbers to calculate. Later in this lesson, you will enter the Q3 and Q4 Costs and Expenses figures. When you do this, 1-2-3 will automatically recalculate the formulas and display the correct total Operating Expenses for each quarter.

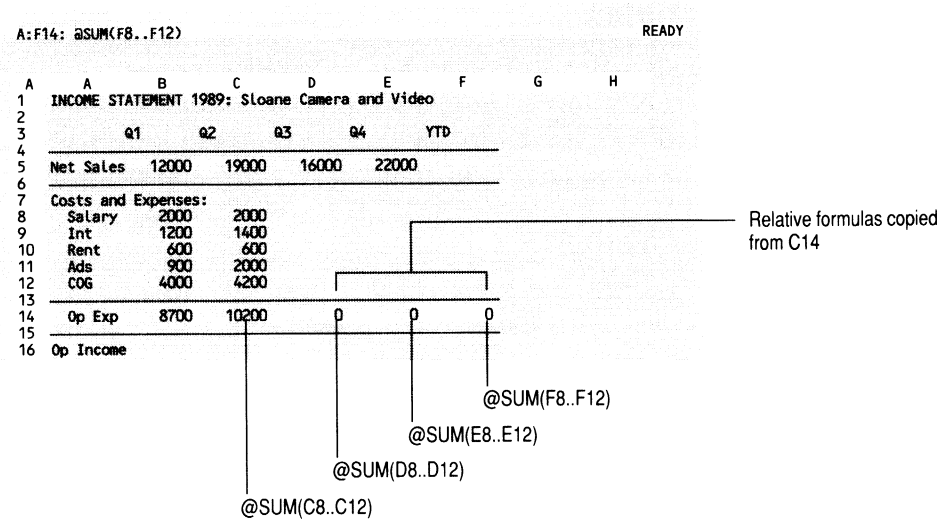
Relative References

Compare the formula in C14 with the formulas in D14 through F14. In C14 the formula appears in the control panel as @SUM(C8..C12).

Move	the cell pointer to D14

In D14 the formula appears in the control panel as @SUM(D8..D12).

Move	the cell pointer to E14 *(Notice how the formula changes.)*
Move	the cell pointer to F14 *(Notice how the formula changes.)*



The formulas in D14, E14, and F14 are not exact copies of the formula in C14. 1-2-3 has changed the range @SUM calculates in each of the copied formulas. This is because the formula in C14 uses a relative reference. A **relative reference** is a cell or range address in a formula that 1-2-3 interprets by its location relative to the cell that contains the formula. When you copy a formula that contains a relative reference, you copy the relationship between the formula and the cell or range it refers to, so 1-2-3 adjusts the addresses in the copied formulas to maintain that relationship.

Because the range address in the formula in C14 is relative, 1-2-3 interprets the formula as "calculate the sum of the range that starts six rows above and ends two rows above the current cell," not as "calculate the sum of range C8..C12." The copied formulas in D14, E14, and F14 can be interpreted in exactly the same way.

With relative references, you can easily create a series of formulas that operate on the same cell or range relative to each formula. Simply enter one of the formulas and then copy that formula to the remaining formula cells.

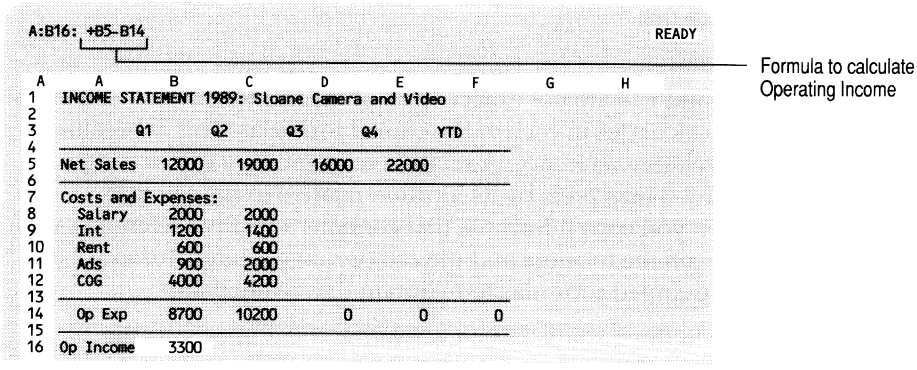
1-2-3 treats every cell or range address in a formula as a relative reference except when you precede the address's column letter(s) and/or row number(s) with a $ (dollar sign) to create an absolute or mixed reference. 1-2-3 handles absolute and mixed references differently from relative references in copied formulas. For more information on relative, absolute, and mixed references, see "Working with Formulas" in Chapter 1 of *Reference*.

Entering More Formulas

Next, you will create a formula in B16 to calculate the Q1 Operating Income. Operating Income equals Net Sales minus Operating Expenses. The Q1 Net Sales figure is in B5 and the total Operating Expenses figure is in B14, so you will use the formula +B5–B14 to calculate the Q1 Operating Income. To enter this formula in B16, do the following:

Move	the cell pointer to B16
Type	+b5–b14 *(Remember, start formulas with a + (plus sign) when the first part of the formula is a cell address or range name.)*
Press	**ENTER** *to enter the formula in the worksheet*

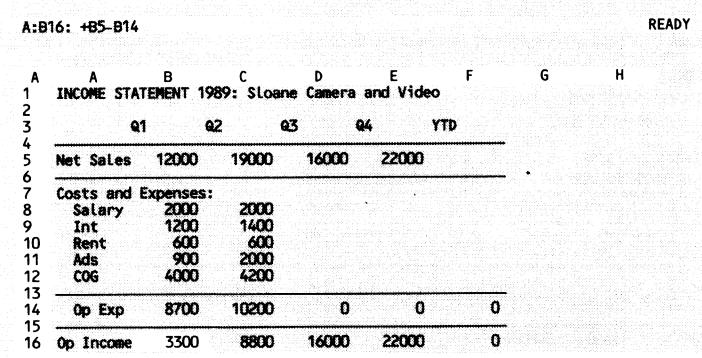
Your worksheet should look like this:



Now, with the cell pointer in B16, copy the Operating Income formula to C16, D16, E16, and F16:

Select	/Copy
Press	**ENTER** *to accept B16..B16 as the range to copy FROM*
Move	the cell pointer to C16
Press	. (period) *to anchor the cell pointer in C16*
Move	the cell pointer to F16 *to highlight C16..F16*
Press	**ENTER** *to accept C16..F16 as the range to copy TO*

Your worksheet should look like this:



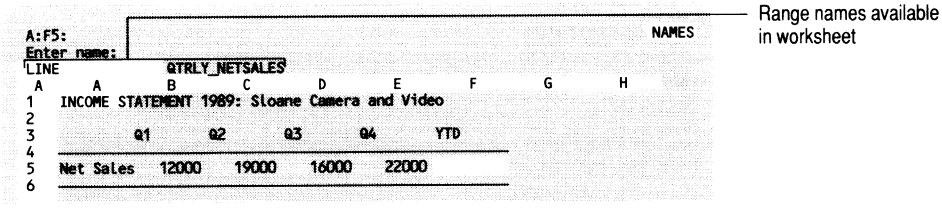
To finish the worksheet for this lesson, enter an @SUM formula to calculate the YTD Net Sales. You will use the range name you created at the end of Lesson 4 as the @SUM argument.

Move the cell pointer to F5

Type @sum(

After you type @sum and the opening parenthesis, you can press **NAME (F3)** to display all the range names in the worksheet.

Press **NAME (F3)** *to display a list of range names*



Range names available in worksheet

Highlight QTRLY_NETSALES *as the range to total*

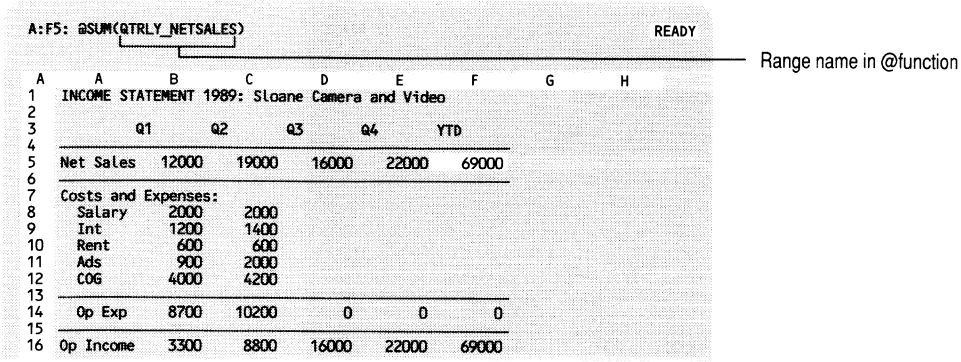
Press **ENTER** *to select QTRLY_NETSALES*

1-2-3 inserts the range name in the @function you are entering in the control panel.

Type)

Press **ENTER** *to enter the @function in the worksheet*

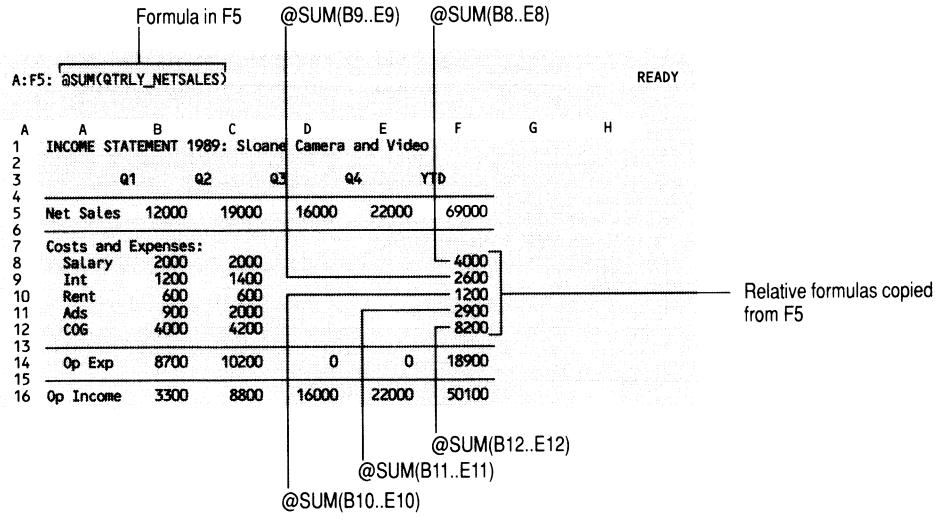
Your worksheet should look like this:



Now use /Copy to set up YTD totals for each Costs and Expenses item (Salary, Interest, Rent, Ads, and COG) and for Operating Expenses.

Select	/Copy
Press	**ENTER** *to accept F5..F5 as the range to copy FROM*
Move	the cell pointer to F8
Press	. (period) *to anchor the cell pointer in F8*
Move	the cell pointer to F12 *to highlight F8..F12*
Press	**ENTER** *to accept F8..F12 as the range to copy TO*

When you copy a formula that uses a range name, 1-2-3 treats the range name as a relative cell address. If you compare the formula in F5 with the formulas in F8 through F12, you can see how the formula changes.



Saving Your Work

Finish this lesson by saving the file:

Select	/File
Select	Save
Type	inc6 *(to use with Lesson 6)*
Press	**ENTER** *to save INC6.WK3*

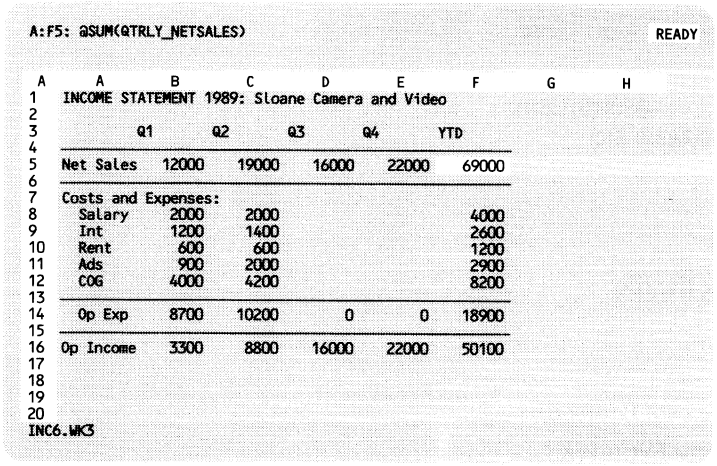
Lesson 6 Formatting and Printing a Worksheet

1-2-3 offers a variety of options for tailoring the appearance of your worksheet. The appearance of your worksheet is especially important if you want to print copies for others to look at. In this lesson you will

- Change cell formats to include a currency symbol
- Change the column width
- Align labels
- Insert rows and columns
- Automatically format numbers
- Print the worksheet
- Save your work and end 1-2-3

If you ended 1-2-3 at the end of the previous lesson, start 1-2-3 as described at the beginning of this chapter. Then use the following steps to retrieve INC6.WK3, the file you saved in Lesson 5. If you did not complete Lesson 5, retrieve the sample file named INC6S.WK3.

Select	/File
Select	Retrieve
Highlight	INC6.WK3 or INC6S.WK3 *(sample file)*
Press	**ENTER** *to retrieve the file*



Changing the Cell Format

1-2-3 lets you use several different **cell formats**, ways of displaying values and labels in worksheet cells. You might, for example, want to display some values with one decimal place (100.1) and others with a percent sign (14%).

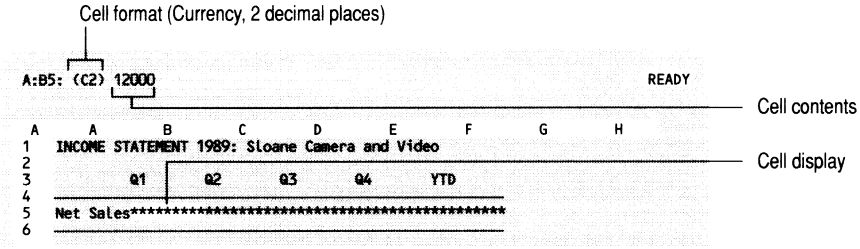
You can specify one cell format for the entire worksheet with /Worksheet Global Format. You can also specify a variety of cell formats for individual cells and ranges with /Range Format. For this example, you will format two ranges (rows 5 and 16) using /Range Format.

In an income statement, the first and last rows of figures usually include a currency symbol, so Currency is the appropriate cell format for those rows. Format the first row of figures in the Sloane Camera and Video income statement (Net Sales) as Currency by completing the following steps.

NOTE The new format will make the numbers too wide to fit within the current column width, so 1-2-3 will display asterisks instead. Don't worry about the asterisks for now; you will fix them shortly.

Move	the cell pointer to B5
Select	/Range
Select	Format
Select	Currency
Press	ENTER *to accept 2, the default number of decimal places*
Move	the cell pointer to F5 *to highlight B5..F5*
Press	ENTER *to accept B5..F5 as the range to format*

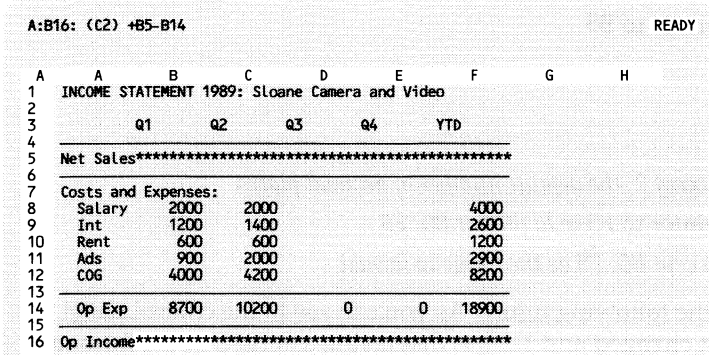
The screen now looks like the following figure. As you can see in the control panel, even though the cell format changed and 1-2-3 is displaying asterisks in the formatted cells, the cells' contents remain the same.



Now format the last row of figures (Operating Income) in Currency format:

Move	the cell pointer to B16
Select	/Range
Select	Format
Select	Currency
Press	ENTER *to accept 2, the default number of decimal places*
Move	the cell pointer to F16 *to highlight B16..F16*
Press	ENTER *to accept B16..F16 as the range to format*

Your worksheet should look like this:



```
A:B16: (C2) +B5-B14                                                READY

 A     A         B         C         D         E         F         G         H
 1   INCOME STATEMENT 1989: Sloane Camera and Video
 2
 3           Q1        Q2        Q3        Q4        YTD
 4   ---------------------------------------------------------------
 5   Net Sales**************************************************
 6   ---------------------------------------------------------------
 7   Costs and Expenses:
 8     Salary      2000      2000                    4000
 9     Int         1200      1400                    2600
10     Rent         600       600                    1200
11     Ads          900      2000                    2900
12     COG         4000      4200                    8200
13   ---------------------------------------------------------------
14     Op Exp      8700     10200         0         0     18900
15   ---------------------------------------------------------------
16   Op Income**************************************************
```

Now display the Q1 and Q2 Costs and Expenses figures in Comma format with 2 decimal places. (Leave the Q3 and Q4 Costs and Expenses columns unformatted for use in later exercises.)

Move	the cell pointer to B8
Select	/Range
Select	Format
Select	, (Comma)
Press	**ENTER** *to accept 2, the default number of decimal places*
Move	the cell pointer to C14 *to highlight B8..C14*
Press	**ENTER** *to accept B8..C14 as the range to format*

Commas now appear in the numbers in that range. Next format the YTD Costs and Expenses figures in the same way:

Move	the cell pointer to F8
Select	/Range
Select	Format
Select	, (Comma)
Press	**ENTER** *to accept 2, the default number of decimal places*
Move	the cell pointer to F14 *to highlight F8..F14*
Press	**ENTER** *to accept F8..F14 as the range to format*

Changing the Column Width

The 1-2-3 default global column width (the width 1-2-3 uses for all columns unless you change it) is 9 characters. This width is not sufficient to display the numbers that you formatted as Currency with 2 decimal places, so 1-2-3 displays asterisks instead. By widening the columns that contain those figures to 12 characters, you will be able

to see the actual values contained in those cells instead of asterisks. You can change the width of individual columns or ranges of adjacent columns in the worksheet using /Worksheet Column Set-Width or /Worksheet Column Column-Range Set-Width. In the following example, however, you will use a command that changes the width of *all* the columns in the worksheet:

Select /Worksheet

Select Global *(Global affects the entire worksheet.)*

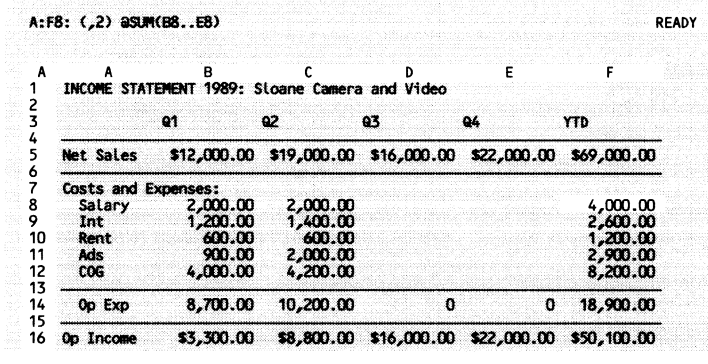
Select Col-Width

To change the global column width setting, you can type a new number (from 1 to 240) and press **ENTER**. Or, if you do not know the exact width you want, use → and ← to test different widths visually before you choose one by pressing **ENTER**.

Press → three times *as you watch the worksheet*

Each time you press →, the columns grow wider. When the columns are wide enough, 1-2-3 replaces the asterisks in cells formatted as Currency with the actual entries. Until you press **ENTER** you can continue to press → and ← to change the column width. Try experimenting with the column sizes. When you finish, return the column width to 12 characters.

Press **ENTER** *when the columns are 12 characters wide*



A:F8: (,2) @SUM(B8..E8) READY

	A	B	C	D	E	F
1	INCOME STATEMENT 1989: Sloane Camera and Video					
2						
3		Q1	Q2	Q3	Q4	YTD
4						
5	Net Sales	$12,000.00	$19,000.00	$16,000.00	$22,000.00	$69,000.00
6						
7	Costs and Expenses:					
8	Salary	2,000.00	2,000.00			4,000.00
9	Int	1,200.00	1,400.00			2,600.00
10	Rent	600.00	600.00			1,200.00
11	Ads	900.00	2,000.00			2,900.00
12	COG	4,000.00	4,200.00			8,200.00
13						
14	Op Exp	8,700.00	10,200.00	0	0	18,900.00
15						
16	Op Income	$3,300.00	$8,800.00	$16,000.00	$22,000.00	$50,100.00

NOTE Remember in Lesson 2 you found that sometimes the display of long labels is cut off. You can display labels that are cut off, as well as values that are replaced by asterisks, by increasing the column width of the cells.

Aligning Labels

The column labels in cells B3 through F3 (Q1 through YTD) do not line up with the figures in the columns. The labels are left-aligned while the columns of values below them are right-aligned. You can't change the alignment of the values (values are always right-aligned), but you can change the alignment of the labels to make the worksheet look better.

The **label prefix**, a special character at the beginning of a label, controls the alignment of labels. The following table shows the 1-2-3 label prefixes and how they affect label alignment.

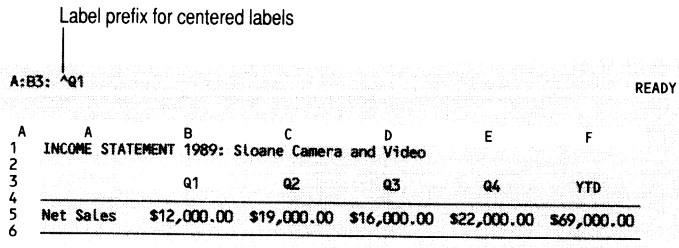
Label prefix	Cell display	Alignment
'	label	Left-aligned
^	label	Centered
"	label	Right-aligned
\	labellabellabellabellabel	Repeating

You can change the default left-alignment label prefix (') by typing an alternative label prefix when you enter a label. You can also change the alignment of a range of labels by using /Range Label. Changing the label alignment makes the worksheet easier to read. Commands that change the appearance of the worksheet, such as /Range Format and /Range Label, do not change your data, only the way 1-2-3 displays and prints the data.

Try centering the labels in B3..F3. Start by moving the cell pointer to B3, which contains the column heading for Q1:

Move	the cell pointer to B3
Select	/Range
Select	Label
Select	Center
Move	the cell pointer to F3 *to highlight B3..F3*
Press	ENTER *to accept B3..F3 as the range of labels to center*

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



NOTE Besides changing the alignment of labels, label prefixes are also used to enter labels that begin with a character other than a letter. For example, if you want to enter an address (such as 234 Eastland Drive) or a telephone number (such as 601-999-1111), you must precede the entry with a label prefix. 1-2-3 then interprets the entry as a label.

Inserting Rows and Columns

As you develop a worksheet, you may need to insert blank rows and columns, either to improve the appearance of the worksheet or to make room for new data. 1-2-3 inserts rows between the current row (the row that contains the cell pointer) and the row above it, and inserts columns between the current column and the column to its left.

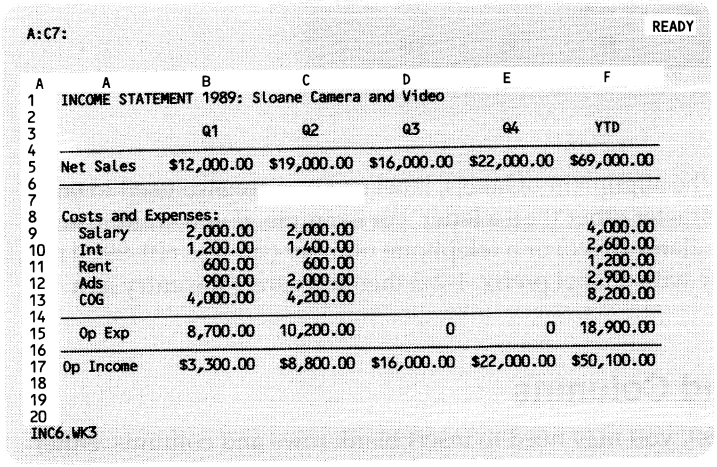
Inserting a blank row between the Net Sales and Costs and Expenses figures will make that part of the worksheet less crowded and easier to read. To insert a row, begin by moving the cell pointer to any cell in the row below where you want the new row to appear:

Move	the cell pointer to C7
Select	/Worksheet
Select	Insert
Select	Row

/Worksheet Insert Row adds an entire row that extends the length of the worksheet. You need to highlight only one cell for each row you want to insert.

Press	ENTER *to accept C7..C7 as the insert range*

1-2-3 moves the data in rows 7 through 16 down one row, to open up a blank row. Your worksheet should look like this:



NOTE When a worksheet contains a formula that refers to a range and you insert a row within that range, all the cell addresses in the formulas change to reflect the new row/column relationships. You must, however, insert rows within the limits of the range. You cannot specify the first row referred to in the range as the insert range, because this moves the range down one row and inserts a row above the range. For example, if a worksheet contains the formula @SUM(B8..B12) and you specify B8..B8 as the insert range, 1-2-3 moves the data in rows 8 through 12 down one row and changes the formula to @SUM(B9..B13).

Automatic Formatting

Normally, displaying a value in a particular cell format requires two separate operations: First you enter the value and then you format the cell. To display $25.00 in a cell, for example, you enter 25 and then use /Range Format to format the cell as Currency, 2 decimal places. With **automatic formatting**, however, you can enter data and format the cell in the same step. When you use automatic formatting, 1-2-3 formats cells according to the way values look when you enter them. You can, for example, enter $25.00 to have 1-2-3 format the cell as Currency, 2 decimal places. Or, you can enter 35% to have 1-2-3 format the cell as Percent, 0 decimal places.

Automatic formatting is available both globally (for the entire worksheet) and for specific ranges. See /Worksheet Global Format or /Range Format in Chapter 2 of *Reference* for more information.

Set Automatic format as the worksheet's global format by doing the following:

Select	/Worksheet
Select	Global
Select	Format
Select	Other
Select	Automatic

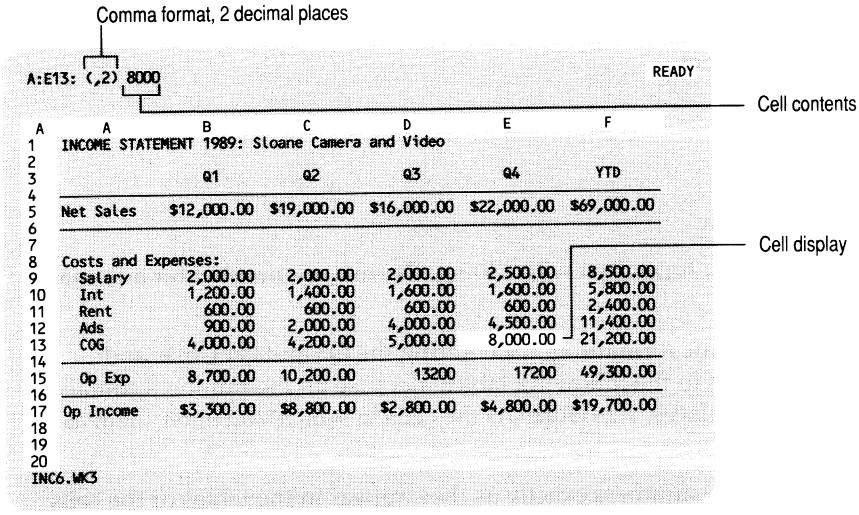
Any cells that haven't been formatted with /Range Format are now set for automatic formatting.

To see the effect of automatic formatting, try entering the Q3 and Q4 Costs and Expenses figures as shown in the following tables. Because all the numbers contain a comma and two decimal places, 1-2-3 formats the cells in which you enter them as Comma, 2 decimal places.

NOTE Be sure to type the numbers exactly as they appear in the tables or the cells will not be formatted correctly. Do not leave out any commas or zeros. Notice that the cells D11 and E11 contain the value 600. In order to format these cells as Comma, you must type a 0 (as a thousands place holder) and a comma in front of the 600.

In cell	Enter	In cell	Enter
D9	2,000.00	E9	2,500.00
D10	1,600.00	E10	1,6000.00
D11	0,600.00	E11	0,600.00
D12	4,000.00	E12	4,500.00
D13	5,000.00	E13	8,000.00

Look at the resulting worksheet. 1-2-3 displays the values as you entered them, including commas and decimal points. If you move the cell pointer to any of these entries and check the control panel, you will see (, 2) displayed before the value. This means the cell is formatted for Comma, 2 decimal places. If you had entered a currency symbol with each value, 1-2-3 would have formatted the cells as Currency, 2 decimal places.



Notice that 1-2-3 has recalculated the formulas you entered in Lesson 5, so there are now Operating Expenses totals for Q3 and Q4 (cells D15 and E15). Now you need to format the resulting values:

Move	the cell pointer to D15
Select	/Range
Select	Format
Select	, (Comma)
Press	**ENTER** *to accept 2, the default number of decimal places*
Move	the cell pointer to E15 *to highlight D15..E15*
Press	**ENTER** *to accept D15..E15 as the range to format*

Now that you've entered and formatted all the data for the income statement, your worksheet is ready to print.

Printing the Worksheet

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

Print your work as follows:

Select	/Print
Select	Printer

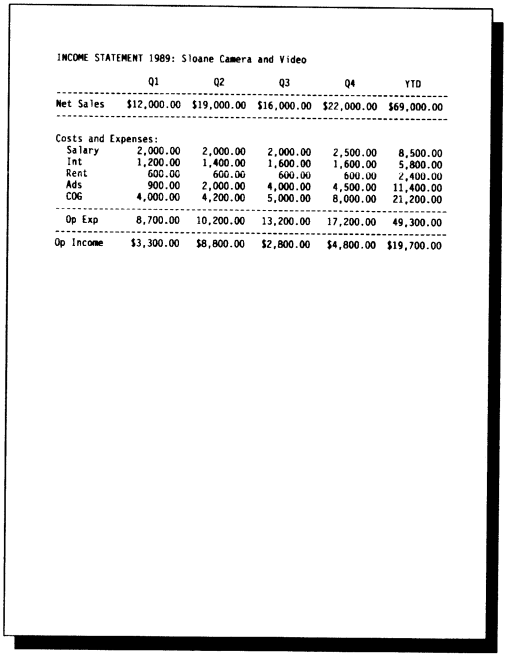
After selecting /Print Printer, you must tell 1-2-3 which part of the worksheet you want to print by specifying a print range:

Select	Range
Press	**HOME** *to move to A1*
Press	. (period) *to anchor the cell pointer in A1*
Move	the cell pointer to F17 *to highlight A1..F17*
Press	**ENTER** *to accept A1..F17 as the print range*

When you print during a 1-2-3 session, you must use /Print Printer Align so that the printer will begin printing each page at the top of the paper. If necessary, adjust the paper in your printer so the print head (the part of your printer that prints characters) is at the beginning of a new sheet. Then do the following:

Select	Align *to tell 1-2-3 that you have positioned the paper at the top of a sheet*
Select	Go *to begin printing*
Select	Page *to advance the paper to the top of the next page*

1-2-3 begins printing the range. You can begin another task immediately because 1-2-3 prints in the background. **Background printing** is a 1-2-3 feature that lets you continue to work while 1-2-3 prints. While 1-2-3 is printing, it displays a PRT indicator at the bottom of the screen. The printed worksheet should look like this:



INCOME STATEMENT 1989: Sloane Camera and Video

	Q1	Q2	Q3	Q4	YTD
Net Sales	$12,000.00	$19,000.00	$16,000.00	$22,000.00	$69,000.00
Costs and Expenses:					
Salary	2,000.00	2,000.00	2,000.00	2,500.00	8,500.00
Int	1,200.00	1,400.00	1,600.00	1,600.00	5,800.00
Rent	600.00	600.00	600.00	600.00	2,400.00
Ads	900.00	2,000.00	4,000.00	4,500.00	11,400.00
COG	4,000.00	4,200.00	5,000.00	8,000.00	21,200.00
Op Exp	8,700.00	10,200.00	13,200.00	17,200.00	49,300.00
Op Income	$3,300.00	$8,800.00	$2,800.00	$4,800.00	$19,700.00

This is a basic printed copy of the worksheet. If you want to enhance the appearance of a printed worksheet, you can use various 1-2-3 print options. For example, you may want to change the margins and create headers and footers that include information

such as page numbers and the current date. For more information on print options, see /Print Printer Options in Chapter 2 of *Reference*.

To leave the /Print menu and return 1-2-3 to READY mode:

Select	Quit

Saving Your Work and Ending 1-2-3

You will finish this lesson (and the chapter) by saving the file.

Select	/File
Select	Save
Type	inc7 *(to use with Lesson 7 in Chapter 2)*
Press	ENTER *to save INC7.WK3*

If you want to continue to another chapter, skip the following steps. If you want to stop here, do the following:

Select	/Quit
Select	Yes *to end 1-2-3*

1-2-3 returns you to the operating system prompt (C >).

Designing Worksheets Efficiently

Now that you know how to use 1-2-3 to build a worksheet, consider some essential issues. The worksheets you build become the basis for important decisions. The care you exercise in designing and building worksheets is the key to using 1-2-3 successfully. Try following these basic guidelines each time you build a new worksheet:

- Always start with a plan for your worksheet. Before you even start 1-2-3, it's a good idea to sketch out the worksheet. Consider the data you have and the questions you need to answer. Be specific at the outset about what you want to accomplish.
- Duplicate layouts with which you are familiar. If you use a particular layout in your account books or budget, use the same layout in your 1-2-3 worksheet.
- Use successful worksheets as models. Modify an existing worksheet and save it with a new file name to preserve the original.
- Arrange all worksheet data in either columns or rows, not a combination of both. 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 by testing them. Enter some sample values and check the results.
- Annotate formulas by including an explanatory note when you enter a formula. You can do this by typing a ; (semicolon) after the formula and then typing the note. For example, you can enter @SUM(B8..B12);totals our quarterly cost and expenses. The annotation doesn't appear in the cell but does appear in the control panel when you move the cell pointer to that cell.
- Document your worksheets. As soon as the worksheet begins to take form, write down the logic, details, assumptions, and procedures you used to build the worksheet. If you document your worksheet, either in the worksheet itself or in another worksheet in the same file, you will find it easier to work with later. In addition, you will make it easier for someone else to work with the worksheet.
- Make a list of checks and balances, or tests that you might perform if you or someone else modifies the worksheet at a later date.
- You have seen how frequently ranges are used in a worksheet. To make it easier to identify your data and use a worksheet, name ranges as often as possible and use those names in commands and formulas.

For More Information

Now that you have learned the fundamentals of 1-2-3, you have several options about what to do next. Use the reading path that suits your needs. Continuing with the *Tutorial*, choose from the following:

- Read Chapter 2 to learn about graphing worksheet data and printing graphs.
- Read Chapter 3 to learn about using several worksheets at a time, multiple-sheet files, and three-dimensional ranges.
- Read Chapter 4 to learn about database management.
- Read Chapter 5 to learn to create keystroke macros and use the record feature.

If you want to start on your own work now, rather than continue with this *Tutorial*, read Chapter 1 of *Reference* for a review of the fundamentals of 1-2-3. Then use Chapter 2 to learn about specific commands, Chapter 3 to learn to use @functions, and Chapter 4 to learn how to automate tasks with macros.

Chapter 2
Graphing Your Worksheet Data

With 1-2-3, you can visually represent your worksheet data with graphs. Graphs reveal important patterns in rows and columns of values and they can clarify overall trends. What's more, you can change the data in the worksheet and 1-2-3 instantly redraws graphs to reflect the changes.

In this chapter, you will create several graphs using data in the Sloane Camera and Video income statement you created in Chapter 1. You will also learn how to add explanatory text and legends to your graphs, view graphs side-by-side with the worksheet data they are based on, and print the graphs you create.

Depending on your monitor, the graphs you create will appear on your screen in either monochrome (for example, green on a black background) or color. The *Tutorial* illustrates all graphs as they would appear in monochrome, distinguishing data categories with different hatch patterns. If you have a color monitor, 1-2-3 will use contrasting colors to distinguish data categories.

NOTE Some monitors cannot display graphs. If, however, you have a printer that can print graphs, you will still be able to print your graphs when you reach Lesson 9. If you're not sure if your monitor can display graphs or if your printer can print graphs, check your hardware chart in Chapter 1 of *Setting Up 1-2-3*.

Lesson 7 Creating Graphs

There are many different types of graphs, and many options for refining graphs, to explore in 1-2-3. In this lesson, you will

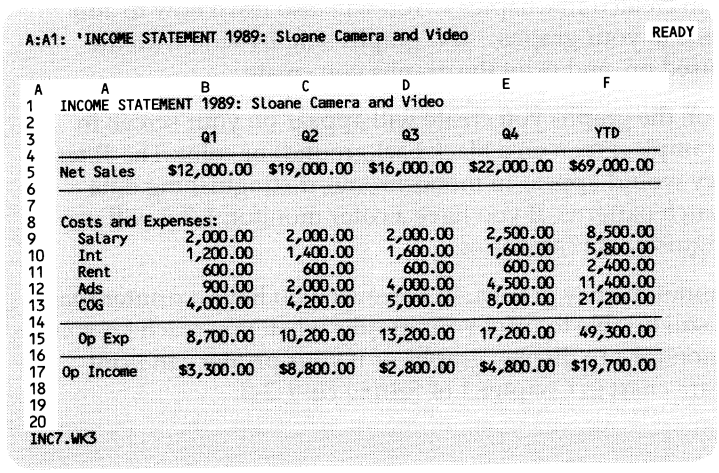
- Create a **line graph**, which represents numeric values as points along a line
- Add explanatory text to a graph
- Switch the graph type
- Specify multiple data ranges at once
- Edit a graph title
- Add legends to a graph
- Save the current graph settings

To begin this lesson, start 1-2-3 as described at the beginning of Chapter 1. If you are already using 1-2-3, select /Worksheet Erase Yes to remove all files from memory and replace them with a single blank worksheet. Then use the following steps to retrieve

INC7.WK3, the file you saved in Lesson 6. If you did not complete Lesson 6, retrieve the sample file named INC7S.WK3.

Select	/File
Select	Retrieve
Highlight	INC7.WK3 or INC7S.WK3
Press	**ENTER** *to retrieve the file*

The Sloane Camera and Video worksheet appears on the screen.



A:A1: 'INCOME STATEMENT 1989: Sloane Camera and Video — READY

	A	B	C	D	E	F
1	INCOME STATEMENT 1989: Sloane Camera and Video					
2						
3		Q1	Q2	Q3	Q4	YTD
4						
5	Net Sales	$12,000.00	$19,000.00	$16,000.00	$22,000.00	$69,000.00
6						
7						
8	Costs and Expenses:					
9	Salary	2,000.00	2,000.00	2,000.00	2,500.00	8,500.00
10	Int	1,200.00	1,400.00	1,600.00	1,600.00	5,800.00
11	Rent	600.00	600.00	600.00	600.00	2,400.00
12	Ads	900.00	2,000.00	4,000.00	4,500.00	11,400.00
13	COG	4,000.00	4,200.00	5,000.00	8,000.00	21,200.00
14						
15	Op Exp	8,700.00	10,200.00	13,200.00	17,200.00	49,300.00
16						
17	Op Income	$3,300.00	$8,800.00	$2,800.00	$4,800.00	$19,700.00
18						
19						
20						

INC7.WK3

Creating a Line Graph

Creating any type of 1-2-3 graph requires three basic steps:

- Specifying one or more data ranges to graph
- Selecting the graph type
- Viewing the graph

The first graph you'll create in this lesson is a line graph showing how COG (cost of goods) expenses have changed over the year. Seeing this trend can help you make projections.

Specifying the Data to Graph

To create a graph, you must identify the range(s) in the worksheet that contains the values to be graphed. Each range of worksheet values to be graphed is called a **data range**. Most types of 1-2-3 graphs can include up to six different data ranges. You use the letters A through F to specify these data ranges.

The line graph you are going to create uses only one range of values: the range that contains the COG figures for each quarter (B13..E13). Complete the following steps to specify this range as the A data range:

Select	/Graph
Select	A *(Select A when you want to graph only one range of values.)*
Move	the cell pointer to B13
Press	. (period) *to anchor the cell pointer in B13*
Move	the cell pointer to E13 *to highlight B13..E13*
Press	ENTER *to accept B13..E13 as the A data range*

Notice that the /Graph menu reappears when you press ENTER. Each time you select a /Graph command, unless you are selecting items from the /Graph Options menu, the /Graph menu reappears.

Selecting the Graph Type

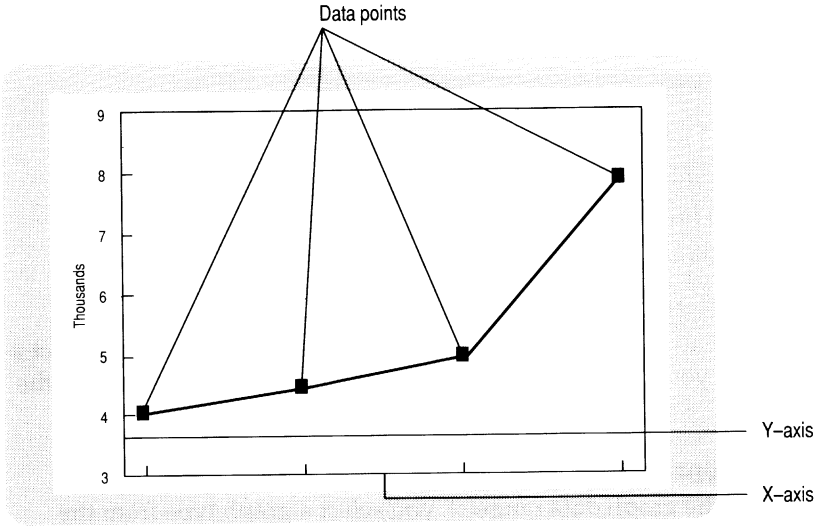
Usually after you specify the graph data range(s), you select a graph type from the /Graph Type menu: Line, Bar, XY (scatter graph), Stacked-Bar, Pie, HLCO (high-low-close-open stock market graph), or Mixed (combined bar and line graph). Each displays data in a different way.

Because you are creating a line graph right now, however, you don't need to select a graph type. Line is the **default graph type**, the type of graph 1-2-3 creates when no other graph type has been previously selected.

Viewing the Graph

1-2-3 now has enough information to draw the graph. To look at the line graph, do the following:

Select	View *to see the graph on your screen*



The line graph has two axes: the x-axis (horizontal) and the y-axis (vertical). It depicts the quarterly COG values as four data points along a line. The position of each data point relative to the y-axis corresponds to the values that data point represents.

Press	any key *to return to the /Graph menu*

Adding Explanatory Text to a Graph

Although the data points in the graph accurately reflect the COG values in the worksheet, the graph provides no clues as to what the data points represent or what time period is being covered. You need to add explanatory text to the graph.

First you will identify the time periods being graphed by adding the labels Q1, Q2, Q3, and Q4 to the graph's x-axis. Then, you will add a two-line title to the graph.

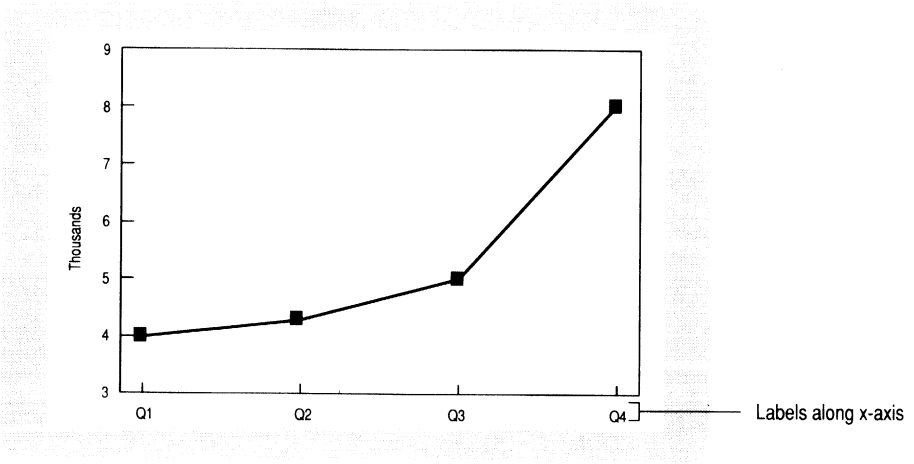
Adding X-Axis Labels

You add x-axis labels to a graph by specifying the **X data range**, the worksheet range that contains the x-axis labels:

Select	X
Move	the cell pointer to B3
Press	. (period) *to anchor the cell pointer in B3*
Move	the cell pointer to E3 *to highlight B3..E3*

Press	ENTER *to accept B3..E3 as the X data range*
Select	View *to see the graph on your screen*

Now the graph includes an x-axis label for each data point on the line.



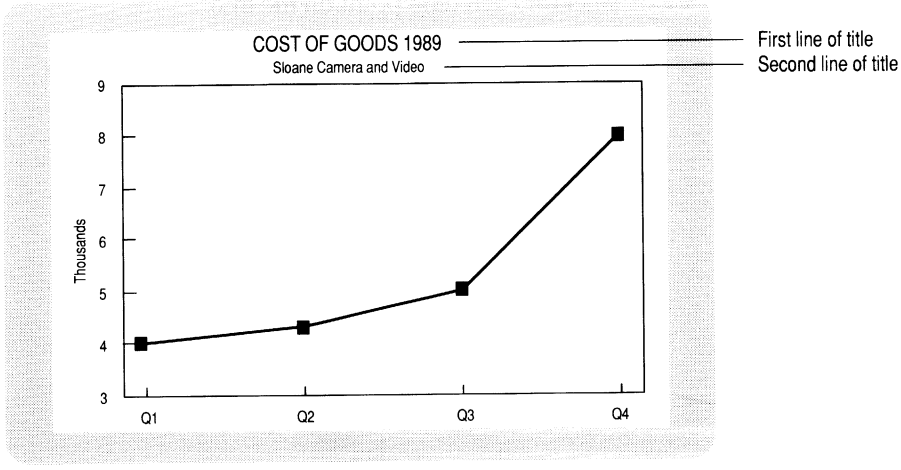
Press	any key *to return to the /Graph menu*

Adding a Graph Title

To add a two-line explanatory title to the graph, do the following:

Select	Options
Select	Titles
Select	First
Type	COST OF GOODS 1989
Press	ENTER *to enter the first line of the title*
Select	Titles
Select	Second
Type	Sloane Camera and Video
Press	ENTER *to enter the second line of the title*
Select	Quit *to return to the /Graph menu*
Select	View *to see the graph on your screen*

Notice the title at the top of the graph.



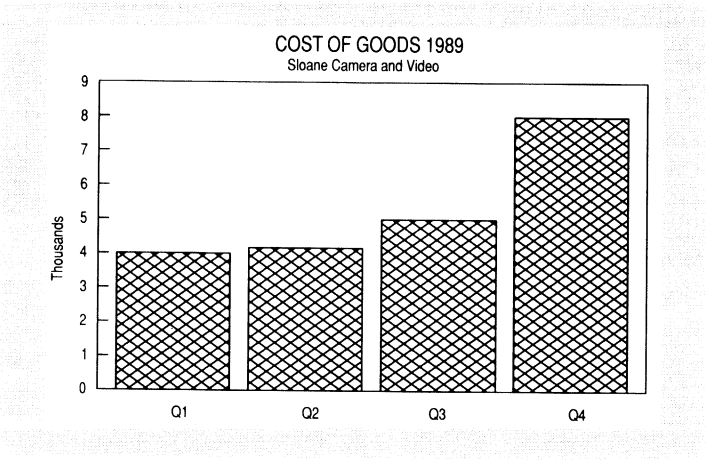
Press any key *to return to the /Graph menu*

Switching the Graph Type

It is often useful to create different types of graphs from the same data. That way, you can decide which graph best represents your data. For example, after viewing the COG data as a line graph, you might also want to view the data as a bar graph. In a **bar graph**, the values in the graph data range are represented as vertical bars. The height of each bar corresponds to the value the bar represents.

To view the COG data as a bar graph, do the following:

Select Type
Select Bar
Select View *to see the graph on your screen*



Press any key *to return to the /Graph menu*

Suppose that after viewing the bar graph, you decide the line graph was more effective for showing how COG expenses for Sloane Camera and Video have changed from quarter to quarter. To switch back to the line graph, you would select /Graph Type Line.

Every time you switch graph types or change any other graph settings, the new graph replaces the previous graph and becomes the **current graph**, that is, the most recent graph created. The current graph appears on your screen when you select /Graph View. When you select /File Save, 1-2-3 automatically saves the current graph with the worksheet file.

Specifying Multiple Data Ranges at Once

The line and bar graphs you created to view Sloane Camera and Video's COG expenses over four quarters used a single data range. Suppose you now want to create a graph that shows how all the Costs and Expenses items (Salary, Interest, Rent, Ads, and COG) have changed over four quarters. To do this, you must specify four data ranges for the graph, with each data range containing Costs and Expenses items for a different quarter.

You could specify the data ranges by using four separate Graph commands: /Graph A for the first data range, /Graph B for the second data range, /Graph C for the third data range, and /Graph D for the fourth data range. But there is a shortcut. When the data ranges you want to graph are in adjacent rows or columns, you can use /Graph Group to specify them collectively. To specify the four data ranges for the graph you are now creating in one step, do the following:

Select Group

1-2-3 prompts you for the graph **group range**, the range that contains all the data ranges you want to include in the graph. 1-2-3 will divide the graph group range into the individual data ranges by columns or rows, starting with the X data range and proceeding through the A, B, C, D, E, and F data ranges. Therefore, when you specify the graph group range, you must always include the X data range, which in this case is the range containing the Costs and Expenses labels (A9..A13).

Move the cell pointer to A9

Press . (period) *to anchor the cell pointer in A9*

Move the cell pointer to E13 *to highlight A9..E13*

Press **ENTER** *to accept A9..E13 as the graph group range*

Now you must select either Columnwise or Rowwise to tell 1-2-3 whether to divide the graph group range into individual data ranges by columns or rows:

Select Columnwise *(You want each column in the graph group range to be a data range for the graph.)*

This specifies A9..A13 as the X data range, B9..B13 as the A data range, C9..C13 as the B data range, D9..D13 as the C data range, and E9..E13 as the D data range for the graph.

Select View *to see the graph on your screen*

1-2-3 displays a bar graph because Bar is the currently selected graph type. In this graph, each of the five x-axis labels (the five Costs and Expenses items) has four corresponding bars (the four quarterly values for that item). The four bars are shown in different shading patterns or colors to identify the quarter they represent.

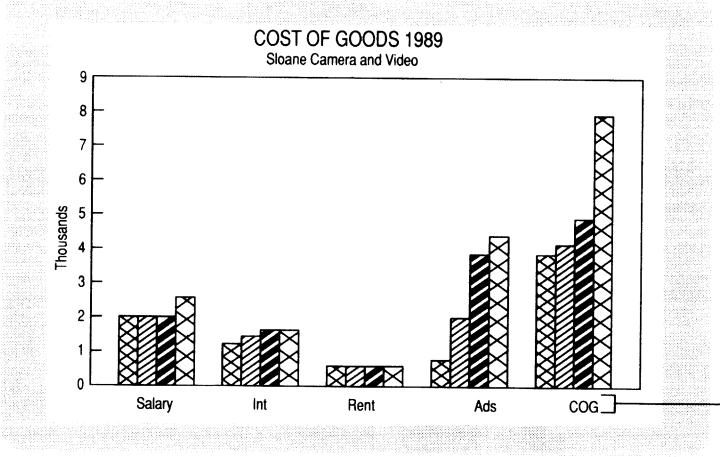
The following illustrations show the relationship between the data in the Sloane Camera and Video worksheet and the graph.

A:A1: 'INCOME STATEMENT 1989: Sloane Camera and Video READY

	A	B	C	D	E	F
1	INCOME STATEMENT 1989: Sloane Camera and Video					
2						
3		Q1	Q2	Q3	Q4	YTD
4						
5	Net Sales	$12,000.00	$19,000.00	$16,000.00	$22,000.00	$69,000.00
6						
7	X	A	B	C	D	
8	Costs and Expenses:					
9	Salary	2,000.00	2,000.00	2,000.00	2,500.00	8,500.00
10	Int	1,200.00	1,400.00	1,600.00	1,600.00	5,800.00
11	Rent	600.00	600.00	600.00	600.00	2,400.00
12	Ads	900.00	2,000.00	4,000.00	4,500.00	11,400.00
13	COG	4,000.00	4,200.00	5,000.00	8,000.00	21,200.00
14						
15	Op Exp	8,700.00	10,200.00	13,200.00	17,200.00	49,300.00
16						
17	Op Income	$3,300.00	$8,800.00	$2,800.00	$4,800.00	$19,700.00
18						
19						
20						

INC7.WK3

Data ranges in worksheet



X range

Editing the Graph Title

Notice that the first line of the title, COST OF GOODS 1989, is not appropriate for the new bar graph, which shows all costs and expenses for 1989. Edit this graph title by doing the following:

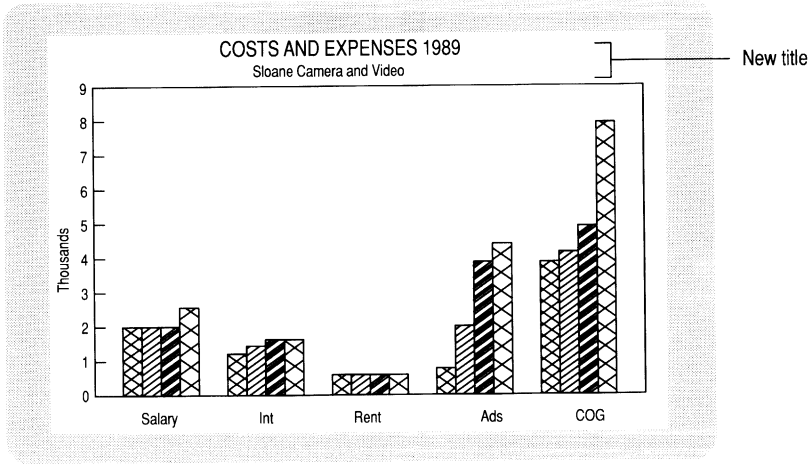
Press	any key *to return to the /Graph menu*
Select	Options
Select	Titles
Select	First

1-2-3 displays the first line of the current title in the control panel. You can edit it as you would edit a worksheet entry:

Move	the cursor to the space after the "T" in COST
Type	S
Move	the cursor to the "O" in OF
Press	**DEL** eight times
Type	AND EXPENSES

The complete first line of the title should read COSTS AND EXPENSES 1989.

Press	**ENTER** *to enter the new title*
Select	Quit *to return to the /Graph menu*
Select	View *to see the graph on your screen*



Press	any key *to return to the /Graph menu*

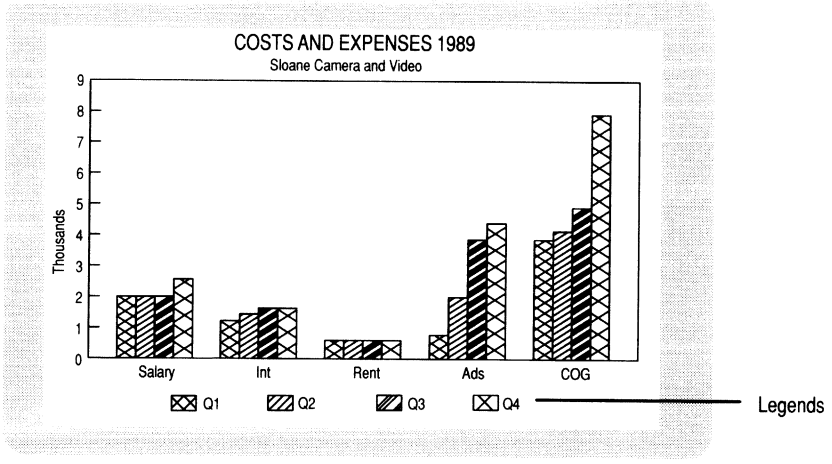
Adding Legends

For each x-axis label in the current bar graph, there are four differently shaded bars — one bar per data range. To identify what each color or shading pattern (called a **hatch** pattern) stands for in a graph, you create legends. A **legend** is an explanation of the color, symbol, or hatch pattern used to represent a particular data range. 1-2-3 places legends below the graph.

Like data ranges, you can set the legend for each data range one at a time or you can set all of the legends in one step. Because the labels you want to use for the legends are next to each other (Q1, Q2, Q3, and Q4 in range B3..E3), you can set them all at once.

Select	Options
Select	Legend
Select	Range
Move	the cell pointer to B3
Press	. (period) *to anchor the cell pointer in B3*
Move	the cell pointer to E3 *to highlight B3..E3*
Press	ENTER *to accept B3..E3 as the legend range*
Select	Quit *to return to the /Graph menu*
Select	View *to see the graph on your screen*

Now the bar graph has legends that correlate the shading patterns or colors to the data ranges.



Press any key *to return to the /Graph menu*

Saving the Current Graph Settings

Like any other changes you make to worksheet settings, the graph settings you establish while working in a file are saved when you save the file. Save the current file, and therefore the current graph settings, by doing the following:

Select	Quit *to return 1-2-3 to READY mode*
Select	/File
Select	Save
Type	inc8 *(to use with Lesson 8)*
Press	**ENTER** *to save INC8.WK3*

Lesson 8 Working with Several Graphs

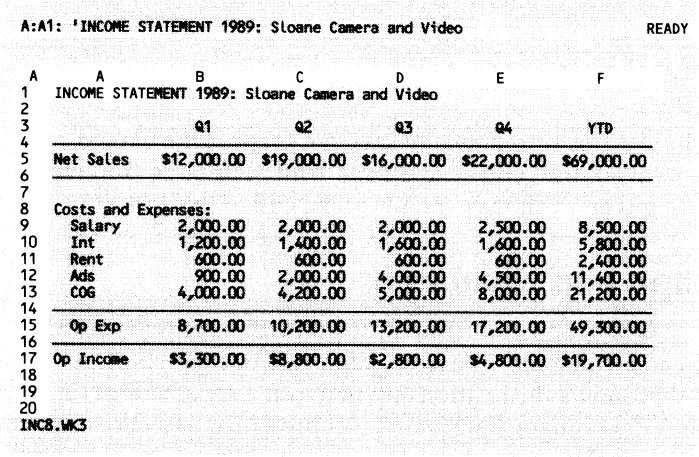
In Lesson 7, you created three graphs by changing the current graph settings. Each time you changed the graph settings to create a new graph, the previous graph was lost. But suppose you want to create a new graph without losing the previous graph. For example, suppose you want to create three graphs in a file — one to show Costs and Expenses for each quarter, another to show Operating Expenses for a quarter, and another to show Operating Income for each quarter — and use the three graphs interchangeably without manually re-establishing their settings each time. To do so, you must name the graphs as you create them. In this lesson you will

- Name the current graph
- Create a new graph and name it
- View named graphs
- Save named graphs
- Change worksheet values and see the changing results in the current graph (what-if graphing)

Retrieve the INC8.WK3 file if it is not already on the screen. If you did not complete Lesson 7, retrieve the sample file named INC8S.WK3.

Select	/File
Select	Retrieve
Highlight	INC8.WK3 or INC8S.WK3
Press	**ENTER** to *retrieve the file*

The Sloane Camera and Video worksheet appears on the screen.



```
A:A1: 'INCOME STATEMENT 1989: Sloane Camera and Video                    READY

 A      A              B            C            D            E            F
 1  INCOME STATEMENT 1989: Sloane Camera and Video
 2
 3                     Q1           Q2           Q3           Q4          YTD
 4  ---------------------------------------------------------------------------
 5  Net Sales      $12,000.00   $19,000.00   $16,000.00   $22,000.00   $69,000.00
 6  ---------------------------------------------------------------------------
 7
 8  Costs and Expenses:
 9    Salary        2,000.00     2,000.00     2,000.00     2,500.00     8,500.00
10    Int           1,200.00     1,400.00     1,600.00     1,600.00     5,800.00
11    Rent            600.00       600.00       600.00       600.00     2,400.00
12    Ads             900.00     2,000.00     4,000.00     4,500.00    11,400.00
13    COG           4,000.00     4,200.00     5,000.00     8,000.00    21,200.00
14  ---------------------------------------------------------------------------
15    Op Exp        8,700.00    10,200.00    13,200.00    17,200.00    49,300.00
16  ---------------------------------------------------------------------------
17  Op Income      $3,300.00    $8,800.00    $2,800.00    $4,800.00   $19,700.00
18
19
20
INC8.WK3
```

Naming the Current Graph

Frequently, you will want to create several graphs in the same file and work with them interchangeably. To do so, you must name the graphs as you create them. Naming a graph causes 1-2-3 to store all the settings for that graph, so you can redisplay the graph at any time.

Choose a descriptive name for the graph. For example, QTRLY_NETSALES is an appropriate name for a graph that shows Net Sales for each quarter. Like range names, graph names can be almost any combination of up to 15 characters. They should not, however, include spaces, commas, semicolons, or the characters + * – / & > < @ #. When typing a graph name, you can use uppercase or lowercase letters. However, 1-2-3 always displays the graph name in uppercase letters.

Right now, the current graph in the Sloane Camera and Video file is the last graph you created in Lesson 7 (the bar graph representing 1989 Costs and Expenses). View the bar graph so you can see that 1-2-3 saved the current graph settings when you saved the Sloane Camera and Video file.

Select	/Graph
Select	View

By naming this graph, you'll be able to change the current graph settings in order to create a new graph and still be able to view this bar graph later. To name the current graph, do the following:

Press	any key *to return to the /Graph menu*
Select	Name
Select	Create

Type	89_expenses
Press	ENTER *to name the graph*

Although nothing appears to happen, you now have a graph named 89_EXPENSES based on the current graph settings. When you create a new graph by changing graph settings, you will still be able to display this bar graph by selecting /Graph Name Use (described later in this lesson).

CAUTION Naming a graph does not automatically save the graph. Like named ranges, named graphs are not saved until you save the file with /File Save. You will save the graphs you are naming when you save the file at the end of this lesson.

Creating a New Graph and Naming It

Now you are going to create a new graph and name it, so you will have two named graphs in the Sloane Camera and Video file. The new graph will be a pie chart. A **pie chart** is a circular graph that shows the relationship between a set of values (in 1-2-3, the set of values in the A data range). Each value is represented as a slice of pie. If one value is twice as large as another, for example, it gets a slice that is twice as large as the other. A pie chart is useful for comparing parts to the whole. The pie chart you create will compare the percentages of Q1 Operating Expenses spent on each of the Costs and Expenses items: Salary, Interest, Rent, Ads, and COG.

You have two options when creating a new graph. You can modify the existing current graph settings, or you can delete all the current graph settings and start with a clean slate. In this case, you'll delete all of the current settings and start over.

Resetting the Graph

Select	Reset
Select	Graph *to delete all current graph settings*

Now you are ready to create the new graph.

Creating the Pie Chart

Because a pie chart compares parts to the whole, you can graph only a single range of values. The value in each cell of the range becomes one slice in the pie. You identify the slices of pie with labels. Pie charts use the X data range for this purpose. Because there is no x-axis in a pie chart, 1-2-3 places labels next to the corresponding slices of the pie.

You are going to use /Graph Group to specify the Costs and Expenses labels (A9..A13) as the X data range and the Q1 Costs and Expenses values (B9..B13) as the A data range simultaneously.

Select	Group
Move	the cell pointer to A9
Press	. (period) *to anchor the cell pointer in A9*
Move	the cell pointer to B13 *to highlight A9..B13*

Press ENTER *to accept A9..B13 as the graph group range*

Select Columnwise *(You want each column in the graph group range to be a data range for the graph.)*

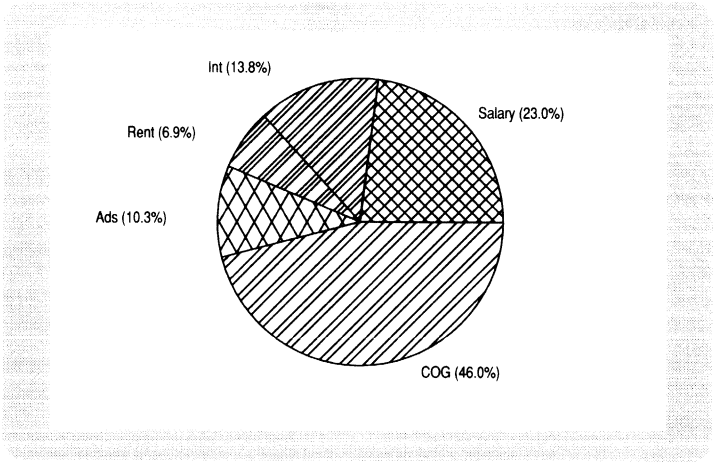
Complete the following steps to select the graph type:

Select Type

Select Pie

You've already viewed the current graph by selecting View from the /Graph menu. You can also use a shortcut. Pressing **GRAPH (F10)** allows you to view the current graph either from READY mode or from any menu. Try using this key to view the new graph:

Press **GRAPH (F10)** *to see the graph on your screen*



You now have a pie chart with five slices. Each slice represents a Q1 Costs and Expenses value. 1-2-3 automatically calculates each slice's percentage of the whole and displays the percentage on the screen. The X data range labels serve to identify the pie slices. Legends are unnecessary because only one numeric value can be associated with each label.

Press any key *to return to the /Graph menu*

Adding a Title

Complete the graph by adding a title:

Select Options

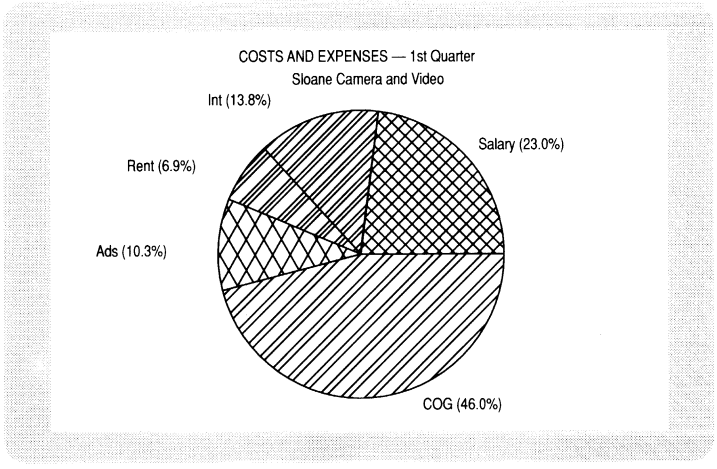
Select Titles

Select First

Type COSTS AND EXPENSES -- 1st Quarter

Press	**ENTER** *to enter the first line of the title*
Select	Titles
Select	Second
Type	Sloane Camera and Video
Press	**ENTER** *to enter the second line of the title*
Select	Quit *to return to the /Graph menu*
Press	**GRAPH (F10)** *to see the graph on your screen*

The title appears at the top of the graph:



Press	any key *to return to the /Graph menu*

Naming the New Graph

Now name the pie chart so you have two named graphs associated with this file:

Select	Name
Select	Create

The name of the first graph you named appears in the control panel. This serves as a reminder of the graph names you have already used.

Type	qtr1_expenses
Press	**ENTER** *to name the graph*

Viewing Named Graphs

Both the bar graph and the pie chart now have names and will be saved when you save the worksheet file. Use the following steps to view each graph:

Select	Name
Select	Use
Highlight	89_EXPENSES
Press	**ENTER** *to view the graph 89_EXPENSES*

1-2-3 displays the bar graph you named earlier in this lesson.

Press	any key *to return to the /Graph menu*
Select	Name
Select	Use
Highlight	QTR1_EXPENSES
Press	**ENTER** *to view the graph QTR1_EXPENSES*

1-2-3 displays the pie chart.

Press	any key *to return to the /Graph menu*
Select	Quit *to return 1-2-3 to READY mode*

CAUTION When you select /Graph Name Use to display a named graph, 1-2-3 replaces the current graph settings with the named graph's settings. Therefore, if you haven't named the current graph and you want to keep it, you must name the graph before selecting /Graph Name Use to work with a different graph.

Saving the Named Graphs

Whenever you save a worksheet file, 1-2-3 saves all the named graphs associated with that file. To save both the 89_EXPENSES and QTR1_EXPENSES graphs, you must save the current version of the Sloane Camera and Video file:

Select	/File
Select	Save
Type	inc9
Press	**ENTER** *to save INC9.WK3*

What-If Graphing

Suppose that the figures in the worksheet represent projected data rather than actual data for the store. After looking at the forecast, Sloane Camera and Video decide they need to increase Q3 Operating Income. To do this, you must determine which Q3 Costs and Expenses to cut and how much to cut them. The easiest way to try out different cost scenarios and immediately see the changing results in a graph is to use /Worksheet Window Graph. This command lets you view the current graph alongside the worksheet data on which the graph is based. When you change a figure in the worksheet, you see the change take effect in the graph.

You are going to create a new pie chart that shows Operating Income for each quarter, and then use that graph to see the effect of changing Q3 Costs and Expenses figures in the worksheet.

Creating a New Graph

Before you can create the new graph, delete the current graph settings by doing the following:

Select	/Graph
Select	Reset
Select	Graph

1-2-3 deletes the current graph settings.

Now you need to specify Q1 through Q4 Operating Income (B17..E17) as the range of values to graph, and the Q1 through Q4 labels (B3..E3) as the range of labels for the pie slices. Because these two data ranges are not adjacent, you cannot use /Graph Group to specify them collectively. You must specify each data range individually.

Select	A
Move	the cell pointer to B17
Press	. (period) *to anchor the cell pointer in B17*
Move	the cell pointer to E17 *to highlight B17..E17*
Press	**ENTER** *to accept B17..E17 as the A data range*

Select the graph type by doing the following:

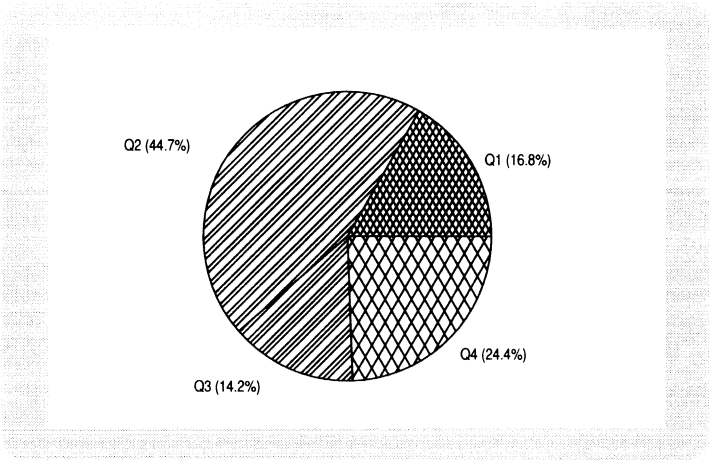
Select	Type
Select	Pie

Complete the following steps to specify labels for the slices of pie:

Select	X
Move	the cell pointer to B3
Press	. (period) *to anchor the cell pointer in B3*
Move	the cell pointer to E3 *to highlight B3..E3*
Press	**ENTER** *to accept B3..E3 as the X data range*

Now, view the new pie chart:

Press	**GRAPH (F10)** *to see the graph on your screen*



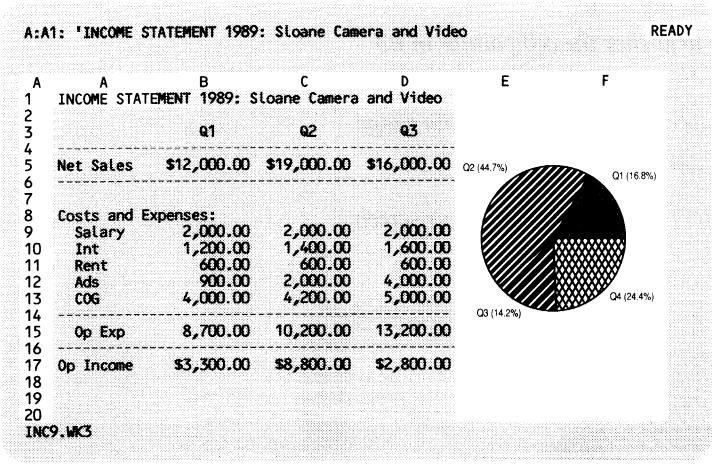
Press	any key *to return to the /Graph menu*
Select	Quit *to return 1-2-3 to READY mode*

Displaying the Graph in a Window

You are going to create a window for the current graph. You can make the graph any width you choose by placing the cell pointer in the cell where you want the left edge of the graph to begin:

Move	the cell pointer to any cell in column E
Select	/Worksheet
Select	Window
Select	Graph

The current graph appears covering the right half of your worksheet.



With the graph on the screen you can still move around in the worksheet. Try it:

Press	**HOME** *to move to A1*

Changing Values in the Worksheet

Watch the Q3 slice of the pie chart change when you enter a lower Q3 Salary figure in the worksheet.

Move	the cell pointer to D9
Type	1200
Press	**ENTER**

Lowering the Q3 Salary figure raises the Q3 Operating Income figure by $800. The graph adjusts to reflect this change. Now see the effect of a lower Q3 Ads figure.

Move	the cell pointer to D12
Type	2500
Press	**ENTER**

Lowering the Q3 Ads figure increases the Q3 Operating Income from $2,800 to $5,100, and so the graph changes again.

Continue experimenting on your own. Try changing Costs and Expenses for other quarters and see how the graph changes.

Closing the Graph Window

To finish up this lesson, remove the window you created for the graph:

Select	/Worksheet
Select	Window
Select	Clear

The graph window disappears and you can see the entire Sloane Camera and Video worksheet again.

NOTE Because you were just trying out different cost scenarios in the last exercise, you are not going to save the changes you made to the worksheet data and graph settings during the exercise.

Lesson 9 Printing Graphs

Before you begin this lesson, verify that you selected a printer capable of printing graphs when you installed 1-2-3. Refer to your printer manual to see if the printer you are using can print graphs, or select /Print Printer Sample Go to print a sample graph as well as some text. Make sure you have used /Print Printer Options Advanced Device Name to make this printer the current printer, and that you have used /Print Printer Options Advanced Device Interface to set the correct interface setting. Also, before proceeding, make sure that your printer is turned on, is on-line, and that the paper is adjusted so printing will begin at the top of the page.

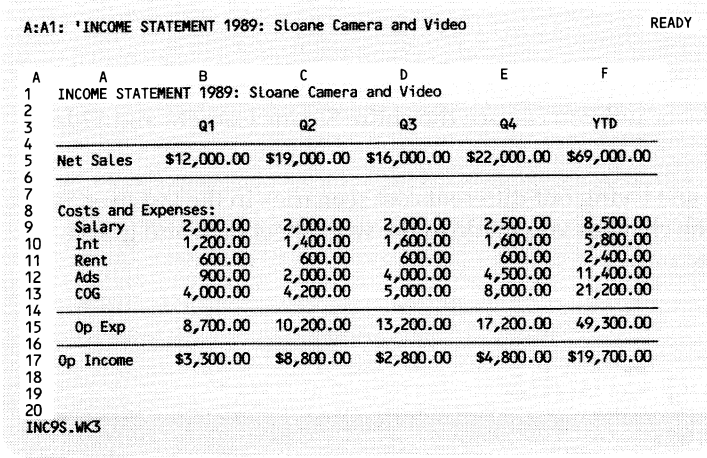
In this lesson you will

- Print the current graph
- Print a named graph
- Print a graph along with worksheet data

You will begin this lesson by retrieving the sample file named INC9S.WK3. This file is exactly like the file you were working with in Lesson 8, before you tried out different cost scenarios.

Select	/File
Select	Retrieve
Highlight	INC9S.WK3
Press	ENTER *to retrieve INC9S.WK3*

The Sloane Camera and Video worksheet appears on the screen.



A:A1: 'INCOME STATEMENT 1989: Sloane Camera and Video READY

	A	B	C	D	E	F
1	INCOME STATEMENT 1989: Sloane Camera and Video					
2						
3		Q1	Q2	Q3	Q4	YTD
4						
5	Net Sales	$12,000.00	$19,000.00	$16,000.00	$22,000.00	$69,000.00
6						
7						
8	Costs and Expenses:					
9	Salary	2,000.00	2,000.00	2,000.00	2,500.00	8,500.00
10	Int	1,200.00	1,400.00	1,600.00	1,600.00	5,800.00
11	Rent	600.00	600.00	600.00	600.00	2,400.00
12	Ads	900.00	2,000.00	4,000.00	4,500.00	11,400.00
13	COG	4,000.00	4,200.00	5,000.00	8,000.00	21,200.00
14						
15	Op Exp	8,700.00	10,200.00	13,200.00	17,200.00	49,300.00
16						
17	Op Income	$3,300.00	$8,800.00	$2,800.00	$4,800.00	$19,700.00
18						
19						
20						

INC9S.WK3

Printing the Current Graph

You can print the current graph or any named graph. You are going to print the current graph in the INC9S.WK3 file. Start by verifying that the current graph is the pie chart showing Q1 Costs and Expenses (QTR1_EXPENSES).

Press	**GRAPH (F10)** *to view the pie chart*
Press	any key *to return 1-2-3 to READY mode*

(The pie chart representing Operating Income is not the current graph because you did not save the file after you created that graph at the end of Lesson 8.)

Now print the graph:

Select	/Print
Select	Printer
Select	Align *to tell 1-2-3 that you have positioned the paper at the top of the page*
Select	Image *to print a graph*
Select	Current *to print the current graph*
Select	Go *to begin printing*

1-2-3 prints the pie chart representing Q1 Costs and Expenses.

Printing a Named Graph

Use the following steps to print a named graph without first making it the current graph. If there is enough room on the page, 1-2-3 will print the next graph on the same page. Otherwise, 1-2-3 will automatically skip to the top of the next page before printing. To print the named graph, do the following:

Select	Image *to print a graph*
Select	Named-Graph *to print a named graph*
Highlight	89_EXPENSES
Press	ENTER
Select	Go *to begin printing*

1-2-3 prints the bar graph.

Select	Page *to advance the paper to the top of the next page*
Select	Quit *to return 1-2-3 to READY mode*

NOTE Printing 89_EXPENSES does not make the bar graph the current graph. The pie chart, QTR1_EXPENSES, is still the current graph.

Printing a Graph with Worksheet Data

Until now you have printed graphs on pages by themselves. You can also print a graph (either the current graph or any named graph) on the same page as worksheet data. Use the following steps to print a graph and worksheet data on the same page. This procedure will print the data first and then the graph. (If you want to print the graph first, reorder the steps appropriately.)

Printing the Worksheet Data

You are going to print the range that contains the Q1 through Q4 Costs and Expenses figures. To print the data first, do the following:

Select	/Print
Select	Printer
Select	Range
Move	the cell pointer to A8
Press	. (period) *to anchor the cell pointer in A8*
Move	the cell pointer to E13 *to highlight A8..E13*
Press	ENTER *to accept A8..E13 as the range you want to print*
Select	Go *to begin printing*

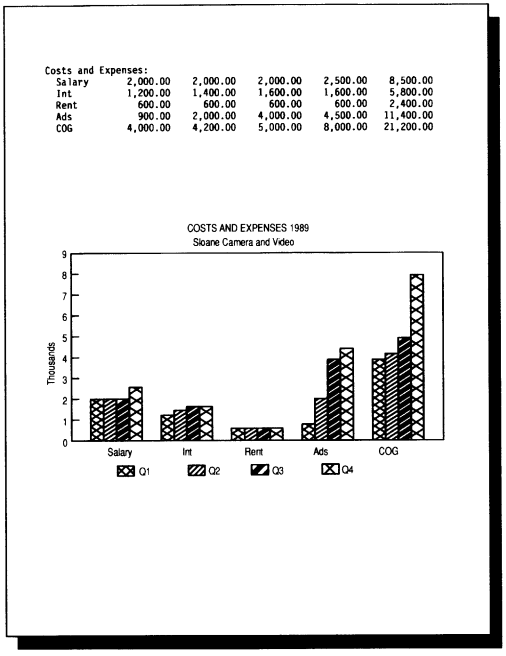
1-2-3 prints the range of data.

Printing the Graph

To print the graph on the same page as the worksheet data, do the following:

Select	Image *to print a graph*
Select	Named-Graph *to print a named graph*
Highlight	89_EXPENSES
Press	**ENTER**
Select	Go *to begin printing*

1-2-3 prints the bar graph on the same page as the worksheet data:



Select	Page *to advance the paper to the top of the next page*
Select	Quit *to return 1-2-3 to READY mode*

If you want to end 1-2-3 now, select /Quit Yes.

For More Information

This chapter includes basic information about graphing worksheet data. You've learned how to create line and bar graphs as well as pie charts. 1-2-3 also includes other types of graphs, such as high-low-close-open (stock market), XY (scatter), mixed (combined bar and line), and stacked-bar graphs.

Although you have learned how to add explanatory text to a graph (such as a title, x-axis labels, legends), you can also create much more sophisticated graphs in 1-2-3. The /Graph and /Print menus contain commands that refine graphs. You can use these more advanced commands after you create the basic graph. You might, for example, try any of the following:

- Set colors, hatch patterns, and fonts for the elements in a graph
- Display grid lines in a graph
- Change the scaling of a graph's axes
- Change the way numbers are displayed along a graph's axis
- Add footnotes to a graph
- Rotate a graph when you print it
- "Explode" (separate and lift out) one or more slices of a pie chart for emphasis
- Change the size of the printed graph
- Change the density of the printed graph

You may also want to explore creating graphs with the automatic graphing feature, which lets 1-2-3 automatically determine the data you want to graph based on the position of the cell pointer.

For more information about graphing your data, see "Graph Commands" in Chapter 2 of *Reference*.

For more information on printing your graphs, see "Print Commands" in Chapter 2 of *Reference*.

Chapter 3
Using Multiple Worksheets and Files

The 1-2-3 files you worked with in previous chapters were **single-sheet files** — files that contain just one worksheet. For the small amount of data in those files, one worksheet was sufficient. For larger amounts or more diverse collections of data, however, it is usually best to divide the data among several worksheets in **multiple-sheet files**.

For example, say you have a chain of stores and want to create a file that contains an income statement for each store as well as consolidated data for the entire chain. With a single-sheet file, you would have to enter all the income statements and the consolidated data in different areas of the same worksheet, format the different data areas one at a time, and probably spend a lot of time pressing keys to move from one area to another. But with a multiple-sheet file, you can enter each store's income statement in a separate worksheet and use another worksheet for the consolidated data. In addition, you can format all the data areas at once, and you can move from one area to another with a single keystroke.

Not only will you learn how to create and work with multiple-sheet files in this chapter, you will learn how to read several files into memory at the same time and how to create **linked files**, or files that are connected by a formula that uses data in another file.

Lesson 10
Getting Acquainted with Multiple Worksheets

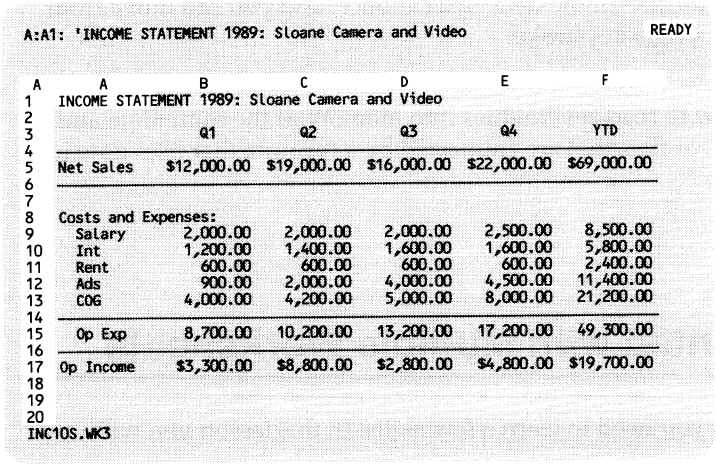
To use multiple-sheet files you need to learn a few skills. In this lesson you will

- Add new worksheets to a file
- Move from one worksheet to another
- Format all the worksheets in a file simultaneously
- Copy data from one worksheet to another
- Edit the worksheet titles
- Save your work

To begin this lesson, start 1-2-3 as described at the beginning of Chapter 1. If you are already using 1-2-3, select /Worksheet Erase Yes to remove all files from memory and replace them with a single blank worksheet. Then retrieve the sample file named INC10S.WK3. This is a copy of the Sloane Camera and Video worksheet you worked with in Lesson 9.

Select	/File
Select	Retrieve
Highlight	INC10S.WK3
Press	**ENTER** *to retrieve INC10S.WK3*

The Sloane Camera and Video worksheet appears on the screen. When you created this income statement, the company had only one store, which was located in Boston. Since then, the company has opened a new franchise in Chicago. This means you need to add a projected income statement for the Chicago store to the Sloane Camera and Video file, as well as an income summary that consolidates the figures for both stores.



A:A1: 'INCOME STATEMENT 1989: Sloane Camera and Video — READY

	A	B	C	D	E	F
1	INCOME STATEMENT 1989: Sloane Camera and Video					
2						
3		Q1	Q2	Q3	Q4	YTD
4						
5	Net Sales	$12,000.00	$19,000.00	$16,000.00	$22,000.00	$69,000.00
6						
7						
8	Costs and Expenses:					
9	Salary	2,000.00	2,000.00	2,000.00	2,500.00	8,500.00
10	Int	1,200.00	1,400.00	1,600.00	1,600.00	5,800.00
11	Rent	600.00	600.00	600.00	600.00	2,400.00
12	Ads	900.00	2,000.00	4,000.00	4,500.00	11,400.00
13	COG	4,000.00	4,200.00	5,000.00	8,000.00	21,200.00
14						
15	Op Exp	8,700.00	10,200.00	13,200.00	17,200.00	49,300.00
16						
17	Op Income	$3,300.00	$8,800.00	$2,800.00	$4,800.00	$19,700.00
18						
19						
20						

INC10S.WK3

Adding New Worksheets to a File

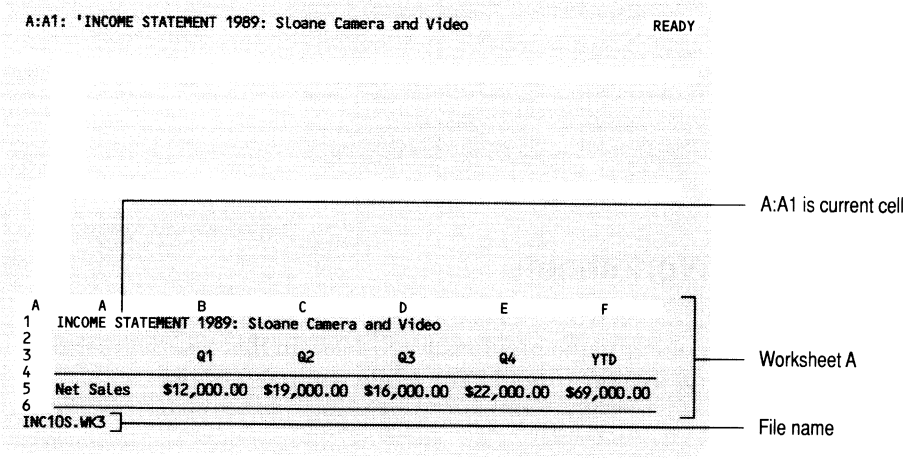
Although 1-2-3 always starts up with a single worksheet on the screen, you can create up to 255 additional worksheets depending on how much memory your computer has. When multiple worksheets are in memory, you can work with any one of them or with several at the same time, and move between them much like flipping through pages in a notebook. 1-2-3 assigns letters to worksheets as it does columns: The first worksheet is A, the second is B, the third is C, and so on through IV. When you insert a worksheet in a file or delete one you don't need anymore, 1-2-3 adjusts the worksheet letters accordingly.

Instead of adding the data for Sloane Camera and Video's Chicago store to the worksheet you see on the screen, you are going to insert two new worksheets in the file, one for the Boston store and one for the Chicago store. In the original worksheet, you will consolidate the data for both stores.

Before you insert the new worksheets, however, change your screen display so you will be able to view all three worksheets simultaneously:

Select	/Worksheet
Select	Window
Select	Perspective

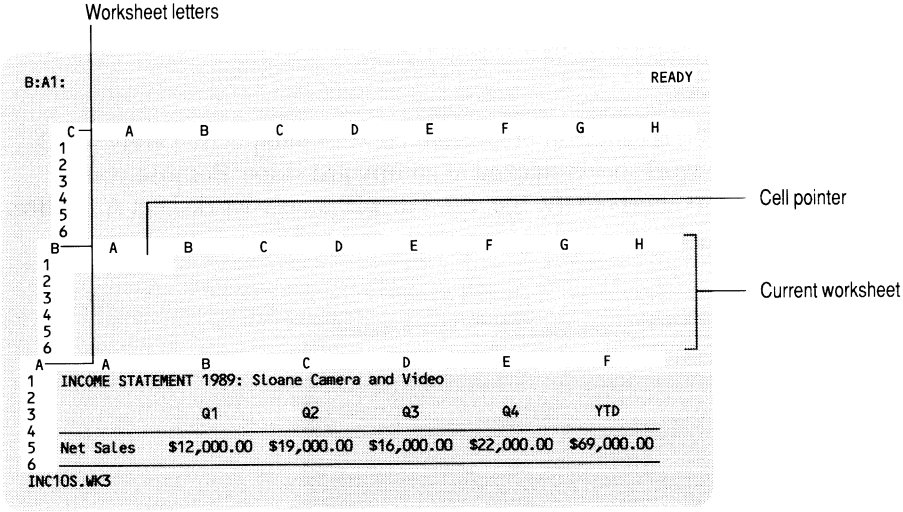
What you see on your screen is called a perspective view. In **perspective view**, 1-2-3 displays three consecutive worksheets stacked at an upward slope. Because you haven't yet added new worksheets to the file, 1-2-3 displays only worksheet A. Notice, however, two empty spaces have been left for new worksheets.



You can insert new worksheets either before or after the current worksheet. The **current worksheet** is the worksheet that contains the cell pointer. In this exercise, you will insert two worksheets after the current worksheet. Watch the screen as you do this:

Select	/Worksheet
Select	Insert
Select	Sheet
Select	After
Type	2 *to insert two worksheets after the current one*
Press	ENTER *to insert the worksheets*

The file now contains three worksheets, the original Sloane Camera and Video worksheet and two blank worksheets after it. Notice that the cell pointer has moved to the first worksheet you inserted, making worksheet B the current worksheet.



Moving Between Worksheets

You move back and forth between worksheets by using several different keys. For example, to move the cell pointer to the previous worksheet (in this case, worksheet A), you use PREV SHEET (CTRL-PGDN) — hold CTRL while you press PGDN:

Press	PREV SHEET (CTRL-PGDN) *to move to worksheet A*

Worksheet A is now the current worksheet. To make worksheet B the current worksheet again, use **NEXT SHEET (CTRL-PGUP)**:

Press **NEXT SHEET (CTRL-PGUP)** *to move to worksheet B*

Notice that the cell pointer moves to the cell you last highlighted in that worksheet.

You can also use **GOTO (F5)** to move between worksheets. Using **GOTO (F5)** is convenient because not only can you move to any worksheet, you can also specify which cell in that worksheet you want to move to.

Press **GOTO (F5)**

Type c:b5

Press **ENTER** *to move the cell pointer to C:B5*

To move to cell A1 in worksheet A (A:A1) from any other worksheet in a file, use **FIRST CELL (CTRL-HOME)**:

Press **FIRST CELL (CTRL-HOME)** *to move to A:A1*

Similarly, you use **LAST CELL (END CTRL-HOME)** to move the cell pointer to the lower right corner of the current file's active area.

Formatting Worksheets Simultaneously

Sometimes you want all the worksheets in a file to look the same — that is, have the same cell formats, column widths, and so on. To accomplish this, you could format all the worksheets individually. But by using GROUP mode, you format all the worksheets at once. With GROUP mode on, if you widen a column or format a range in one worksheet in a file, 1-2-3 duplicates that change in all the other worksheets.

When you turn on GROUP mode, 1-2-3 changes the format of all the worksheets in the file to match the format of the current worksheet. (So be sure, before you turn on GROUP mode, that the cell pointer is in the correct worksheet and that you really want all the worksheets in the file to have the same format.) For example, in Lesson 6 you set global column width for worksheet A to 12 characters; the two new worksheets have the default global column width of 9. Because worksheet A is the current worksheet, when you turn on GROUP mode in the following example, worksheets B and C will assume the same format as worksheet A. Therefore, the global column width for each worksheet changes to 12.

Make sure the cell pointer is in worksheet A, then do the following:

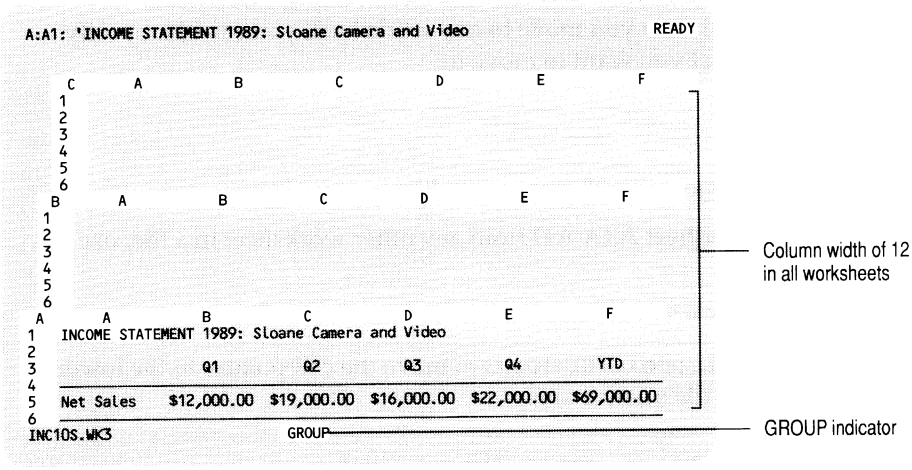
Select /Worksheet

Select Global

Select Group

Select Enable *to turn on GROUP mode*

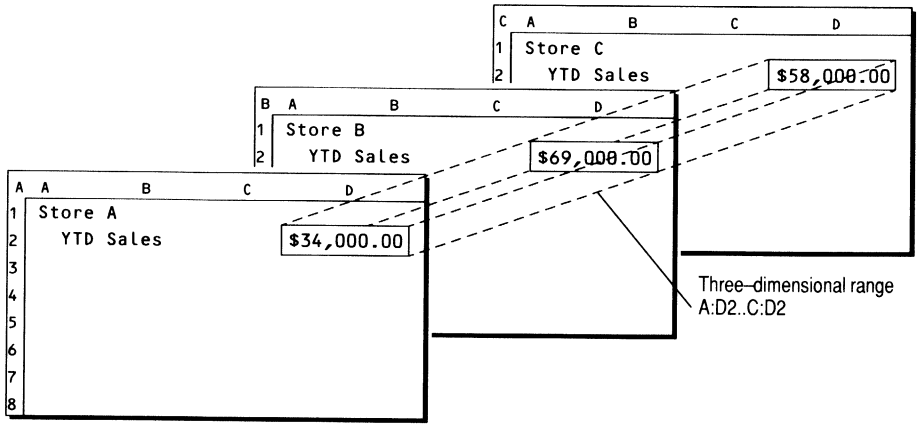
Although worksheets B and C are still blank, they now have the same global and range formatting as worksheet A. Notice the GROUP indicator at the bottom of the screen. Until you turn off GROUP mode, the worksheets continue to format simultaneously.



Copying Between Worksheets

As explained earlier, you are going to set up the income statements for Sloane Camera and Video's Boston and Chicago stores and a consolidated income summary in separate worksheets. Because worksheet A already contains the appropriate formulas and labels for an income statement, you can use that worksheet as a **template** or model worksheet. By copying the formulas and labels from worksheet A to worksheets B and C, you will have a ready-to-use worksheet for each store (worksheets B and C) — all you will have to do is change the data appropriately for the Chicago store. You can then enter new formulas in worksheet A to create a **summary worksheet** that consolidates the data from worksheets B and C.

To copy the contents of worksheet A to the other two worksheets, you'll specify a three-dimensional range to copy TO. A **three-dimensional range** is a range that spans two or more consecutive worksheets in the same file, for example, A:B3..C:F3 (B3..F3 in worksheets A, B, and C) in the file INC10S.WK3. Whenever you are working with a multiple-sheet file, you can use three-dimensional ranges in commands and formulas. Specify a three-dimensional range the same way you specify a single-sheet range: type its address, use its range name (if it has been previously named with /Range Name Create), or highlight it.



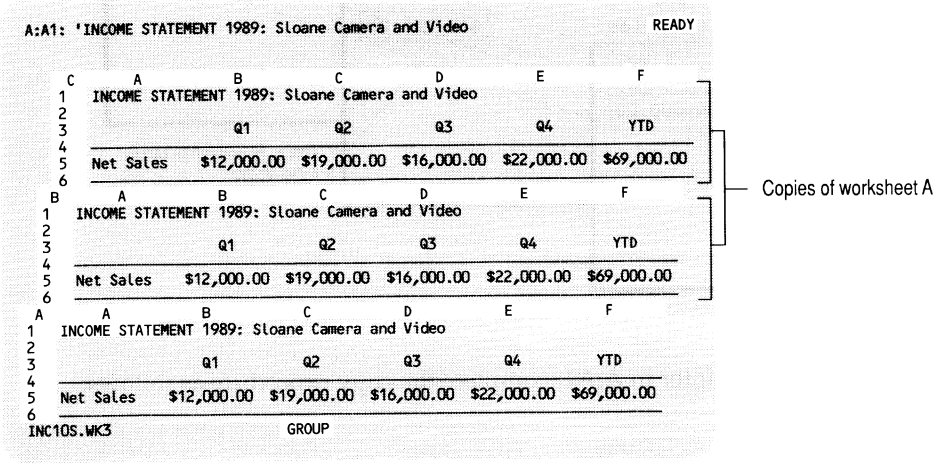
Beginning with the cell pointer in A:A1, complete the copy procedure as follows:

Select	/Copy
Move	the cell pointer to A:F17 *to highlight A:A1..A:F17*
Press	**ENTER** *to accept A:A1..A:F17 as the range to copy FROM*

Remember, for the TO range you need to specify only the upper left cell of the range or, for a three-dimensional range, the upper left cell in each worksheet in the range (in this case, B:A1 and C:A1).

Press	**NEXT SHEET (CTRL-PGUP)** *to move the cell pointer to B:A1*
Press	. (period) *to anchor the cell pointer in B:A1*
Press	**NEXT SHEET (CTRL-PGUP)** *to highlight B:A1..C:A1*
Press	**ENTER** *to accept B:A1..C:A1 as the range to copy TO*

Worksheets B and C now contain copies of the Sloane Camera and Video income statement worksheet.



Editing the Worksheet Titles

To identify what data will be stored in each worksheet, edit the title in worksheet A to reflect that worksheet A will be a summary worksheet, and edit the titles in the other two worksheets to reflect that they are the worksheets for the individual stores.

Beginning with the cell pointer in A:A1, do the following:

Press	**EDIT (F2)** *to change to EDIT mode*
Move	the cursor under the S in STATEMENT
Press	**DEL** *until you delete STATEMENT*
Type	SUMMARY
Press	**ENTER** *to enter the correction in the worksheet*

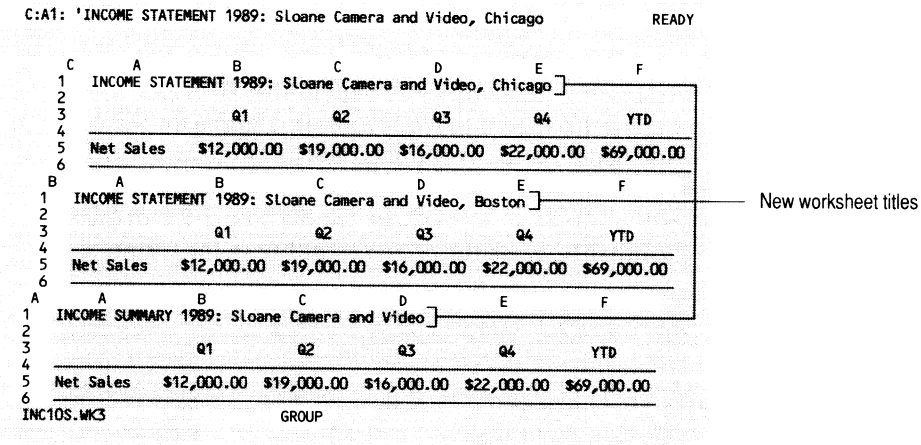
Now edit the title in worksheet B to identify it as the worksheet for the Boston store:

Press	**NEXT SHEET (CTRL-PGUP)** *to move the cell pointer to B:A1*
Press	**EDIT (F2)** *to change to EDIT mode*
Type	, Boston *(with a space after the comma)*
Press	**ENTER** *to enter the correction in the worksheet*

Finally, edit the title in worksheet C to identify it as the worksheet for the Chicago store:

Press	NEXT SHEET (CTRL-PGUP) *to move the cell pointer to C:A1*
Press	EDIT (F2) *to change to EDIT mode*
Type	, Chicago *(with a space after the comma)*
Press	ENTER *to enter the correction in the worksheet*

Your worksheets should look like this:



Because all the worksheets have the same layout, you can move easily from worksheet to worksheet to view related data; for example, Q1 Net Sales in Boston and Q1 Net Sales in Chicago and total Q1 Net Sales for both stores.

Saving Your Work

In the next lesson, you will complete the revisions to the multiple-sheet Sloane Camera and Video file. For now, save the file with the file name INC11.WK3:

Select	/File
Select	Save
Type	inc11
Press	ENTER *to save INC11.WK3*

When you save a file while in perspective view, 1-2-3 automatically displays worksheets in perspective view the next time you retrieve that file.

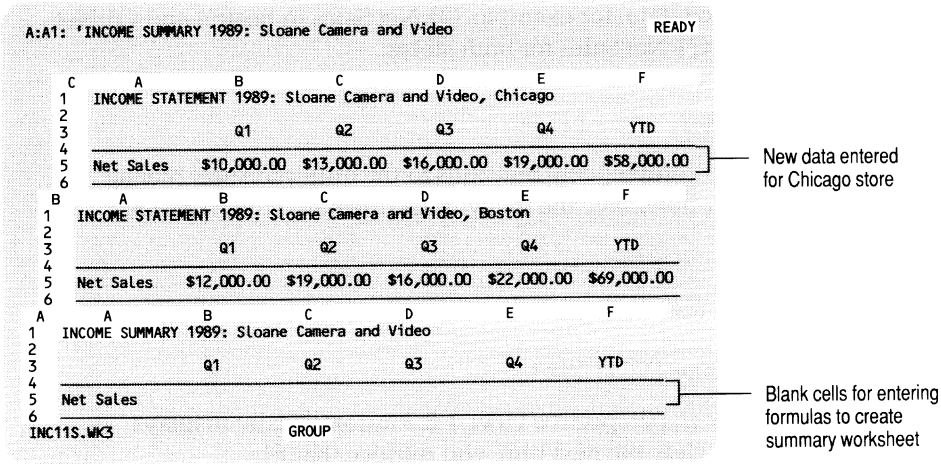
Lesson 11 Consolidating and Printing Data

With multiple-sheet files, you can enter formulas in one worksheet that refer to data in other worksheets. You can also print data from several worksheets simultaneously. In this lesson you will

- Create a summary worksheet with formulas that consolidate information in other worksheets in the same file
- Turn off GROUP mode
- Print data from multiple worksheets
- Save your work

You will begin this lesson by retrieving the sample file named INC11S.WK3. This file is like the file you created in Lesson 10, except that appropriate figures for the Chicago store have been entered in worksheet C, and everything but the labels and formulas to calculate Operating Expenses and Operating Income have been erased from worksheet A so you can create the summary worksheet. (Right now, 1-2-3 displays zeros as the values of those formulas because the cells referred to in the formulas are blank.)

Select	/File
Select	Retrieve
Highlight	INC11S.WK3
Press	**ENTER** *to retrieve INC11S.WK3*



Creating a Summary Worksheet

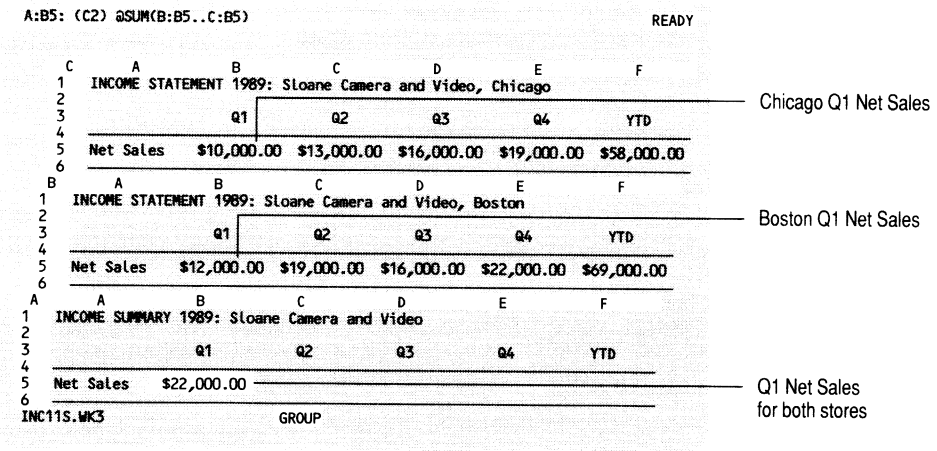
In this lesson, you will create a summary worksheet in the Sloane Camera and Video file by entering formulas in worksheet A that consolidate figures from worksheets B and C, the income statements for the Boston and Chicago stores.

Entering a Formula That Refers to Multiple Worksheets

The formulas you create in 1-2-3 can refer to any cell in any worksheet in a file. For example, you are going to enter an @SUM formula in cell A:B5 that totals Q1 Net Sales from worksheets B and C (cells B:B5 and C:B5). To do this, you need to specify a three-dimensional range as the @SUM argument:

Move	the cell pointer to A:B5
Type	@sum(
Press	**NEXT SHEET (CTRL-PGUP)** *to move to B:B5*
Press	. (period) *to anchor the cell pointer in B:B5*
Press	**NEXT SHEET (CTRL-PGUP)** *to highlight B:B5..C:B5*
Type	) *to complete the @function*
Press	**ENTER** *to enter the @function in the worksheet*

Worksheet A, the summary worksheet, now shows the combined Q1 Net Sales for the Boston and Chicago stores:

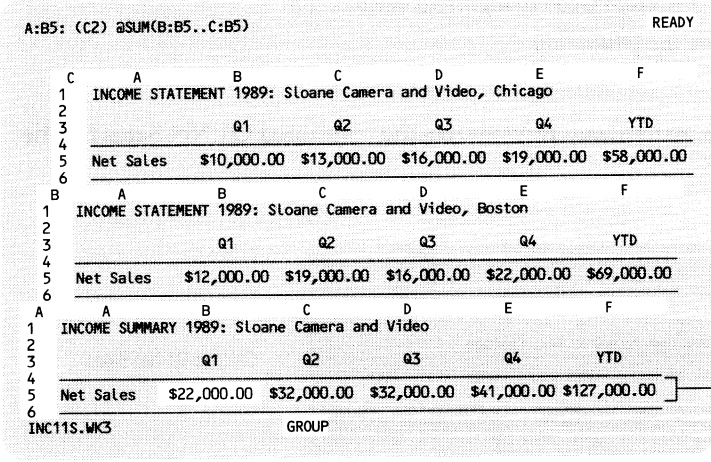


Copying the Formula

Now you are going to copy the formula in A:B5 to cells A:C5 through A:F5 to total Q2, Q3, Q4, and YTD Net Sales figures for both stores. Starting with the cell pointer in A:B5, do the following:

Select	/Copy
Press	ENTER *to accept A:B5..A:B5 as the range to copy FROM*
Move	the cell pointer to A:C5
Press	. (period) *to anchor the cell pointer in A:C5*
Move	the cell pointer to A:F5 to highlight A:C5..A:F5
Press	ENTER to accept A:C5..A:F5 as the range to copy TO

Worksheet A, the summary worksheet, now shows the total quarterly and YTD Net Sales figures for both stores.



Entering More Formulas

You now need to enter @SUM formulas in rows 9 through 13 to consolidate Costs and Expenses for the Boston and Chicago stores:

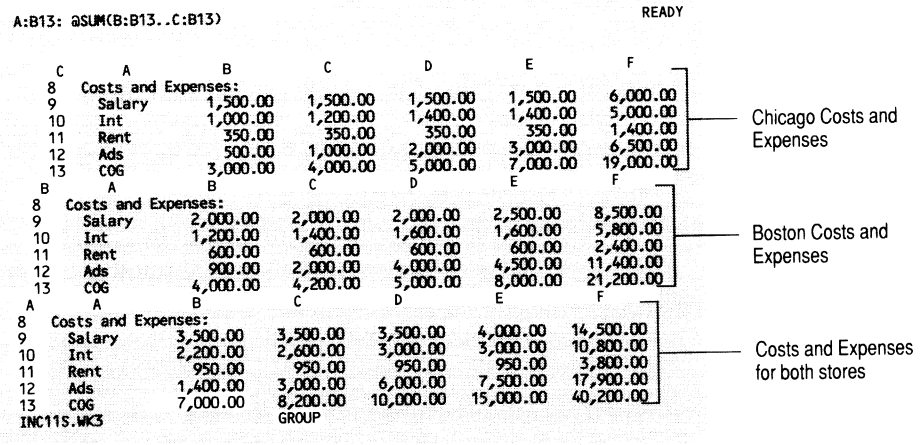
Move	the cell pointer to A:B9
Type	@sum(
Press	NEXT SHEET (CTRL-PGUP) *to move to B:B9*
Press	. (period) *to anchor the cell pointer in B:B9*
Press	NEXT SHEET (CTRL-PGUP) *to move to worksheet C:B9*
Type	) *to complete the @function*
Press	ENTER *to enter the @function in the worksheet*

Now copy this formula for all the Costs and Expenses items (A:B9..A:F13):

Select	/Copy
Press	ENTER *to accept A:B9..A:B9 as the range to copy FROM*
Press	. (period) *to anchor the cell pointer in A:B9*
Move	the cell pointer to A:F13 *to highlight A:B9..A:F13*
Press	ENTER *to accept A:B9..A:F13 as the range to copy TO*

Now all the quarterly and YTD Costs and Expenses figures from worksheets B and C are consolidated in worksheet A. To see this, do the following:

Move	the cell pointer to A:B13



Press	HOME *to move to A:A1*

The transformation of the Sloane Camera and Video file from a single-sheet file to a multiple-sheet file is now complete. You don't need to change the formulas that total Operating Expenses because they are now calculating values that reflect the consolidated Costs and Expenses for both stores (A:B9..A:F13). The resulting values in row 15 are the total quarterly and YTD Operating Expenses for both stores.

You also don't need to change the formulas in row 17 that calculate Operating Income (the difference between Net Sales and Operating Expenses) because they are now calculating values that reflect consolidated Net Sales (A:B5..A:F5) and Operating Expenses (A:B15..A:F15) for both stores. The resulting values in row 17 are the total quarterly and YTD Operating Income figures for both stores.

Turning Off GROUP Mode

Now that you are done setting up and formatting the income summary worksheet and the income statement worksheets for the individual stores, you can turn off GROUP mode:

Select	/Worksheet
Select	Global
Select	Group
Select	Disable *to turn off GROUP mode*

In the next exercise, you will learn how to create a printout of the data in the Sloane Camera and Video file.

Printing Data from Multiple Worksheets

Now that you have income statements for the Boston and Chicago stores as well as an income summary, it would be useful to print this data so you can easily compare the figures and share the data with other people in the company. This exercise shows you two methods for printing data in multiple worksheets. Before you continue with this exercise, make sure your printer is turned on and ready to print.

To print the same group of cells in two or more consecutive worksheets in a file, you specify a three-dimensional print range. For example, to print rows 1 through 17 in all three worksheets in the Sloane Camera and Video file, specify A:A1..C:F17 as the print range. Beginning with the cell pointer in A:A1, do the following:

Select	/Print
Select	Printer
Select	Range
Press	. (period) *to anchor the cell pointer in A:A1*
Move	the cell pointer to A:F17 *to highlight A:A1..A:F17*
Press	**NEXT SHEET (CTRL-PGUP)** twice *to highlight A:A1..C:F17*
Press	**ENTER** *to accept A:A1..C:F17 as the print range*
Select	Align *to tell 1-2-3 that you have positioned the paper at the top of a sheet*
Select	Go *to begin printing*

1-2-3 prints the income summary (worksheet A), the income statement for Boston (worksheet B), and the income statement for Chicago (worksheet C) — one after another.

Select	Page *to advance the paper to the top of the next page*

To specify a group of print ranges at once, you specify all the ranges you want to print, separated by commas and with no spaces. Complete the following steps to print all of worksheet A and just the worksheet title and Net Sales figures from worksheets B and C:

Select	Range

1-2-3 highlights the print range you previously specified (A:A1..C:F17). You need to specify a new print range.

Press	**ESC** *to unanchor the cell pointer*
Move	the cell pointer to A:A1
Press	. (period) *to anchor the cell pointer in A:A1*
Move	the cell pointer to A:F17 *to highlight A:A1..A:F17*
Press	, (comma) *to indicate you want to print another range*
Press	**NEXT SHEET (CTRL-PGUP)** *to move to worksheet B*
Press	. (period) *to anchor the cell pointer in B:A1*
Move	the cell pointer to B:F6 *to highlight B:A1..B:F6*
Press	**NEXT SHEET (CTRL-PGUP)** *to highlight B:A1..C:F6*
Press	**ENTER** *to accept A:A1..A:F17,B:A1..C:F6 as the ranges to print*
Select	Go *to begin printing*

1-2-3 prints the data in the print ranges — the entire income summary (worksheet A), rows 1 through 6 in the Boston income statement (worksheet B), and rows 1 through 6 in the Chicago income statement (worksheet C).

Select	Page *to advance the paper to the top of the next page*
Select	Quit *to return 1-2-3 to READY mode*

Saving Your Work

Now save the Sloane Camera and Video file, with the new consolidation formulas and the current print settings, with the name INC12.WK3:

Select	/File
Select	Save
Type	inc12 *(to use with Lesson 12)*
Press	**ENTER** *to save INC12.WK3*

Lesson 12 Working with Multiple Active Files

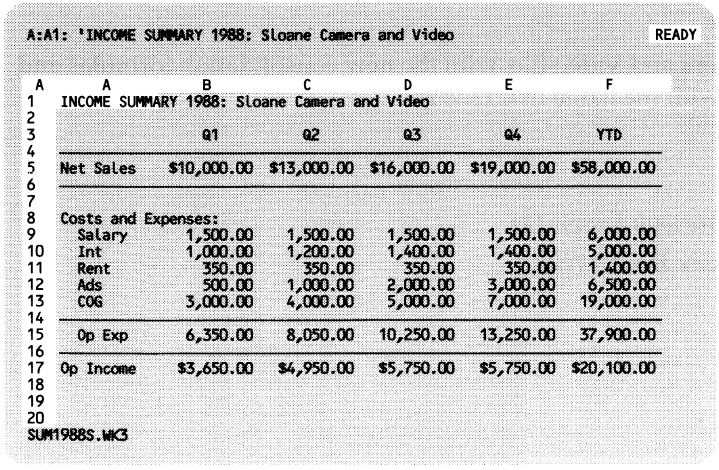
In the previous lesson you worked with a single file containing three worksheets. Suppose you want to compare the 1989 consolidated income summary, stored in one file, with the 1988 income statement, which is stored in a different file. You can do this easily with 1-2-3. Besides having multiple-sheet files, you can also have multiple active files. An active file is a file in memory as opposed to on disk; you make a file active in order to look at or change its data.

In this lesson you will

- Make several files active
- Move from one active file to another
- Link files by entering formulas in one file that refer to data in other files
- Examine the relationship between linked files
- Save multiple active files
- Selectively delete active files from memory

To begin this lesson, retrieve the 1988 Sloane Camera and Video income summary, which is in a file named SUM1988S.WK3:

Select	/File
Select	Retrieve
Highlight	SUM1988S.WK3
Press	**ENTER** *to retrieve SUM1988S.WK3*



A:A1: 'INCOME SUMMARY 1988: Sloane Camera and Video READY

	A	B	C	D	E	F
1	INCOME SUMMARY 1988: Sloane Camera and Video					
2						
3		Q1	Q2	Q3	Q4	YTD
4						
5	Net Sales	$10,000.00	$13,000.00	$16,000.00	$19,000.00	$58,000.00
6						
7						
8	Costs and Expenses:					
9	Salary	1,500.00	1,500.00	1,500.00	1,500.00	6,000.00
10	Int	1,000.00	1,200.00	1,400.00	1,400.00	5,000.00
11	Rent	350.00	350.00	350.00	350.00	1,400.00
12	Ads	500.00	1,000.00	2,000.00	3,000.00	6,500.00
13	COG	3,000.00	4,000.00	5,000.00	7,000.00	19,000.00
14						
15	Op Exp	6,350.00	8,050.00	10,250.00	13,250.00	37,900.00
16						
17	Op Income	$3,650.00	$4,950.00	$5,750.00	$5,750.00	$20,100.00
18						
19						
20						

SUM1988S.WK3

Now SUM1988S.WK3 is an active file.

Making Several Files Active

At this point, SUM1988S.WK3 is the only active file. To make another file active as well, you must use /File Open. You cannot use /File Retrieve, because that command replaces the current file when it retrieves the new file. /File Open, however, inserts the new file either before or after the current file.

To make the 1989 Sloane Camera and Video file active along with the 1988 file, open INC12.WK3, the file you saved at the end of Lesson 11. If you did not complete Lesson 11, open the sample file named INC12S.WK3.

Select	/File
Select	Open
Select	After
Highlight	INC12.WK3 or INC12S.WK3
Press	**ENTER** *to open the file*

NOTE If you opened INC12S.WK3, the sample file, you must now save it as INC12.WK3, as follows:

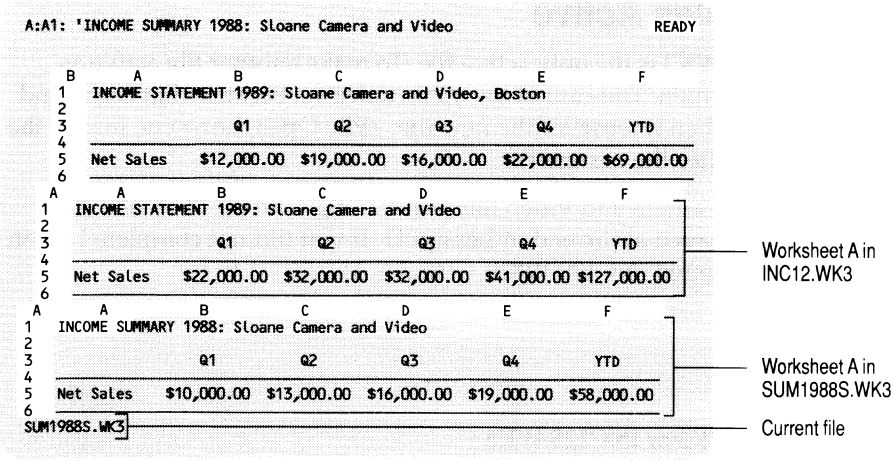
Select	/File
Select	Save

1-2-3 displays [ALL MODIFIED FILES] because you have more than one active file.

Press	**ESC** twice *to clear the current file name*
Type	inc12
Press	**ENTER** *to save the file with the name INC12.WK3*
Select	Replace *if you saved INC12.WK3 in the previous lesson*

INC12.WK3 is now the current file. To see SUM1988S.WK3 again, do the following:

Press	**PREV SHEET (CTRL-PGDN)**



Notice that the 1988 file, which was not in perspective view before you opened the 1989 file, is now in perspective view. 1-2-3 uses the window settings for the most recently opened file (INC12.WK3) for all active files. Because INC12.WK3 was in perspective view when you saved it in Lesson 11, it is in perspective view when you open it now; SUM1988S.WK3 assumes the same window settings.

To verify that both files are active, do the following:

Select /File

Select List

Select Active

1-2-3 displays the names of the two active files, INC12.WK3 and SUM1988S.WK3.

Press ENTER *to return 1-2-3 to READY mode and redisplay the current worksheet*

Moving Between Active Files

To move between active files you use **FILE (CTRL-END)** in combination with other keys. Each key combination has a name, for example, **NEXT FILE (CTRL-END CTRL-PGUP)** and **PREV FILE (CTRL-END CTRL-PGDN)**. Try using **NEXT FILE (CTRL-END CTRL-PGUP)** to move to Sloane Camera and Video's 1989 file (INC12.WK3) — hold down **CTRL**, press **END** (the FILE indicator appears), and then release those keys. Next, hold down **CTRL** and press **PGUP**.

Press NEXT FILE (CTRL-END CTRL-PGUP) *to move to INC12.WK3*

Notice the file name INC12.WK3 appears in the file-and-clock indicator at the bottom of the screen. This indicator shows you the current file. The **current file** is the one that contains the cell pointer. Now move back to the SUM1988S.WK3 file:

Press PREV FILE (CTRL-END CTRL-PGDN) *to move to SUM1988S.WK3*

SUM1988S.WK3 is now the current file.

You can also use **PREV SHEET (CTRL-PGDN)** and **NEXT SHEET (CTRL-PGUP)** to move consecutively through all the worksheets in all active files:

Press	**NEXT SHEET (CTRL-PGUP)** *to move to worksheet A in INC12.WK3*
Press	**NEXT SHEET (CTRL-PGUP)** *to move to worksheet B in INC12.WK3*
Press	**NEXT SHEET (CTRL-PGUP)** *to move to worksheet C in INC12.WK3*

When you have more than one active file, pressing **FIRST FILE (CTRL-END HOME)** always moves the cell pointer to the first active file:

Press	**FIRST FILE (CTRL-END HOME)** *to move to SUM1988S.WK3*

1-2-3 moves the cell pointer to the cell you last highlighted in this file.

Likewise, you use **LAST FILE (CTRL-END END)** to move the cell pointer to the last active file.

Linking Files

Now that you have the two files to compare, you will enter formulas that calculate the difference between the 1989 and 1988 YTD Net Sales, Operating Expenses, and Operating Income figures. This will let you see whether the company is on an upward or downward trend. When you enter a formula in one file that uses information from another file, you link the two files.

Adding a New Worksheet

Start by inserting a new worksheet in the INC12.WK3 file. You will use this worksheet to enter the formulas that link INC12.WK3 and SUM1988S.WK3.

Move	the cell pointer to C:A1 in the file INC12.WK3 *to make worksheet C the current worksheet*
Select	/Worksheet
Select	Insert
Select	Sheet
Select	After
Press	**ENTER** *to accept the default of 1*

The INC12.WK3 file now contains four worksheets: the 1989 income summary (worksheet A), the Boston store's income statement (worksheet B), the Chicago store's income statement (worksheet C), and a blank worksheet (worksheet D). Worksheet D is the current worksheet.

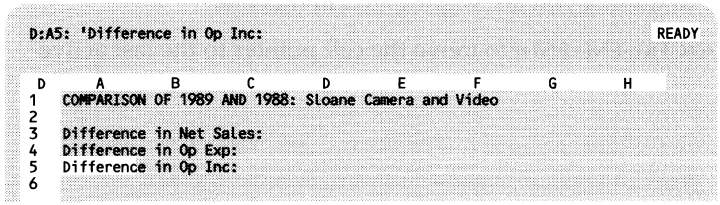
Entering Labels

Now enter a title for the worksheet and labels for the new data. Begin with the cell pointer in D:A1 in the INC12.WK3 file:

Type	COMPARISON OF 1989 AND 1988: Sloane Camera and Video
Move	the cell pointer to D:A3

Type	Difference in Net Sales:
Press	↓ *to enter the label and move the cell pointer to D:A4*
Type	Difference in Op Exp:
Press	↓ *to enter the label and move the cell pointer to D:A5*
Type	Difference in Op Inc:
Press	**ENTER** *to enter the label*

Worksheet D in INC12.WK3 should look like this:

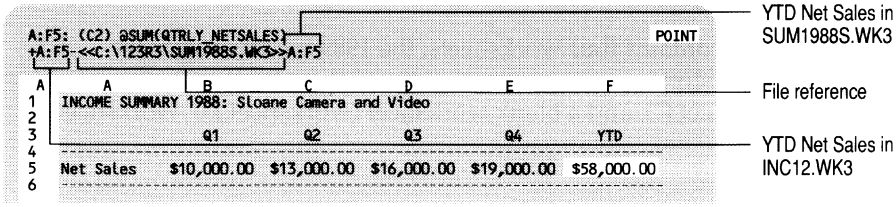


Entering Formulas That Refer to Multiple Files

Next, enter the formulas to calculate the difference between the YTD Net Sales, Operating Expenses, and Operating Income for the two years. Start with the formula to calculate the difference between 1989 and 1988 YTD Net Sales:

Move	the cell pointer to D:D3 in the file INC12.WK3
Type	+
Move	the cell pointer to A:F5 in the file INC12.WK3
Type	–
Press	**PREV FILE (CTRL-END CTRL-PGDN)** *to move to SUM1988S.WK3*
Move	the cell pointer to A:F5 in the file SUM1988S.WK3

Before you press **ENTER**, look at the control panel.



To calculate the difference between 1989 and 1988 YTD Net Sales, you are subtracting one cell from another — one cell in INC12.WK3 and one cell in SUM1988S.WK3. So the first A:F5 in the formula refers to the YTD Net Sales cell in the current file, INC12.WK3, and the second A:F5 refers to the YTD Net Sales cell in SUM1988S.WK3.

The file reference <<C:\123R3\SUM1988.WK3>> in front of the second A:F5 indicates the cell is in a file other than the current file.

Whenever you are specifying a range in another file for use in a command or formula, you must precede the range specification with a file reference. A **file reference** consists of a file name and extension enclosed in << >> (double angle brackets). When you create a formula by highlighting the cell to calculate in another active file, 1-2-3 automatically adds the file reference. (You can also type the file reference, as you will see in the next example.)

Press	ENTER *to complete the formula*

Because the formula you entered in INC12.WK3 uses data in the file SUM1988S.WK3, the files are now linked.

Next enter a formula to calculate the difference between 1989 and 1988 YTD Operating Expenses. This time you'll type the formula.

Move	the cell pointer to D:D4 in the file INC12.WK3

The YTD Operating Expenses figure is in cell A:F15 in both files.

Type	+a:f15-<<c:\123r3\sum1988s.wk3>>a:f15
Press	ENTER

Finally, enter a formula to calculate the difference between 1989 and 1988 YTD Operating Income. You can do this by subtracting the difference in Operating Expenses from the difference in Net Sales:

Move	the cell pointer to D:D5 in the file INC12.WK3
Type	+d:d3-d:d4
Press	ENTER *to enter the formula in the worksheet*

Although this cell is not itself linked, its value will change if you change the values in the linked file (SUM1988S.WK3) because it depends on cells that are linked to that file (D:D3 and D:D4).

Formatting the Data

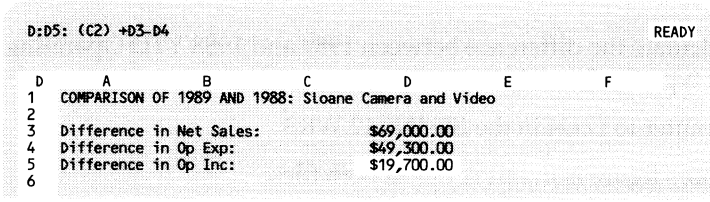
Now format the new values using Currency format:

Select	/Range
Select	Format
Select	Currency
Press	ENTER *to accept 2 decimal places*
Move	the cell pointer to D:D3 *to highlight D:D5..D:D3*
Press	ENTER *to accept D:D5..D:D3 as the range to format*

1-2-3 displays asterisks because the formatted values exceed the current column width. Widen the columns in worksheet D to 12 characters:

Select	/Worksheet
Select	Global
Select	Col-Width
Type	12
Press	ENTER *to change the column width*

Worksheet D in INC12.WK3 should look like this:



As you can see, because the differences between the 1989 and 1988 figures for Net Sales and Operating Income are positive, Sloane Camera and Video is on an upward trend.

Examining the Relationship Between Linked Files

Using formulas, you can link a 1-2-3 file to any other 1-2-3 file. If the file containing the referenced data is active, you can create the linking formula by highlighting the cells to calculate. If, however, the file is on disk, you must create the linking formula by typing the entire formula. Include the path as well as the file name and extension. The **path** is the root directory and all the subdirectories in which you save a file. For example, in <<C:\MYDATA\EXPENSES.WK3>>, the path is C:\MYDATA\.

Take a closer look at one of the formulas you entered, to see how 1-2-3 handles a formula that links files.

Move	the cell pointer to D:D3 in the file INC12.WK3

The control panel displays +A:F5–<<C:\123R3\SUM1988S.WK3>>A:F5..A:F5. The file reference <<C:\123R3\SUM1988S.WK3>> indicates that the formula uses data in another file and, therefore, that the current file is linked to another file. In this case, the cell D:D3 in INC12.WK3 uses the information in A:A5 in the SUM1988S.WK3 file, so INC12.WK3 is linked to SUM1988S.WK3. See "Working with Formulas" and "Working with Multiple Files" in Chapter 1 of *Reference* for more information on linking.

When you retrieve a file that is linked to another file, you must select /File Admin Link-Refresh to update the formulas that contain the links. See "File Commands" in Chapter 2 of *Reference* for information on using /File Admin Link-Refresh.

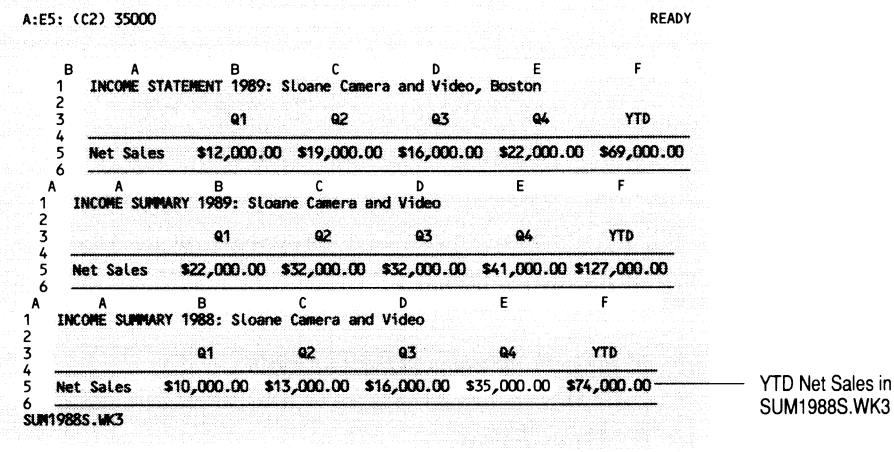
Try changing a value in the SUM1988S.WK3 file to see the effects of the link:

Move the cell pointer to A:E5 in the file SUM1988S.WK3

Type 35000

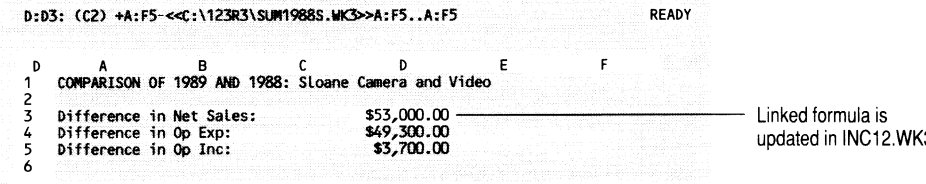
Press ENTER *to enter the new value in the worksheet*

Because you changed the Q4 Net Sales figure, 1-2-3 recalculates the YTD Net Sales formula.



Move the cell pointer to D:D3 in the file INC12.WK3

You can see that 1-2-3 has recalculated the Difference in Net Sales to reflect the new YTD Net Sales figure in SUM1988S.WK3. The Difference in Net Sales has decreased from $69,000 to $53,000. Because the Difference in Operating Income is dependent on the value of D:D3, this formula has also been updated appropriately.



Saving Multiple Active Files

Save the two active files as follows:

Select	/File
Select	Save

1-2-3 displays [ALL MODIFIED FILES] because you have more than one active file.

Press	**ESC** *to display the file name INC12.WK3*
Press	**ENTER** *to save INC12.WK3*
Select	Replace *to replace the existing version of INC12.WK3*

Now save SUM1988S.WK3 as SUM1988.WK3.

Press	**PREV FILE (CTRL-END CTRL-PGDN)** *to move to SUM1988S.WK3*
Select	/File
Select	Save

1-2-3 displays [ALL MODIFIED FILES] because you have more than one active file.

Press	**ESC** twice *to clear the current file name*
Type	sum1988
Press	**ENTER** *to save the file with the name SUM1988.WK3*

Selectively Deleting Active Files

Every active file takes up memory, so the more files that are active, the less memory you have available for entering data and inserting new worksheets. To regain memory, you can delete active files you aren't using. For example, suppose you finish working on the 1988 Sloane Camera and Video file and want to work only on the 1989 file. You can delete the 1988 file from memory by completing the following steps. This procedure does not erase the file on disk.

Select	/Worksheet
Select	Delete
Select	File

1-2-3 displays a list of all the active files, and you select the one you want to delete from memory:

Highlight	SUM1988.WK3
Press	**ENTER** *to remove SUM1988.WK3 from your computer's memory*

Now only INC12.WK3 is active. You can no longer see SUM1988.WK3. To verify that SUM1988.WK3 is no longer active, you can use /File List.

Select	/File
Select	List
Select	Active

1-2-3 lists only INC12.WK3.

Press	**ENTER** *to return 1-2-3 to READY mode and redisplay the current worksheet*

If you want to end 1-2-3 now, Select /Quit Yes.

For More Information

In this chapter you've learned how to transform a single-sheet file into a multiple-sheet file, and how to use multiple worksheets to organize and consolidate your data. You've also learned how to work with several active files, how to create formulas that link files, and how to save and delete active files.

There are many other ways to use multiple-sheet files and multiple active files. For more information on topics covered in this chapter, see "Using Multiple-Sheet Files" and "Working with Multiple Files" in Chapter 1 of *Reference* and "File Commands" and "Worksheet Commands" in Chapter 2 of *Reference*.

Chapter 4
Managing a Database Table

In this chapter, you'll learn how to work with a database table. A **database table** is a set of related information organized in rows and columns in a single worksheet. Examples of database tables include personnel records, client records, inventories, and mailing lists.

You will be working with a personnel database table for Sloane Camera and Video. After you complete the lessons in this chapter, you will understand database table structure and basic database operations.

Lesson 13
Setting Up and Sorting a Database Table

To use database tables effectively, you need to master some basic concepts and skills. In this lesson, you will

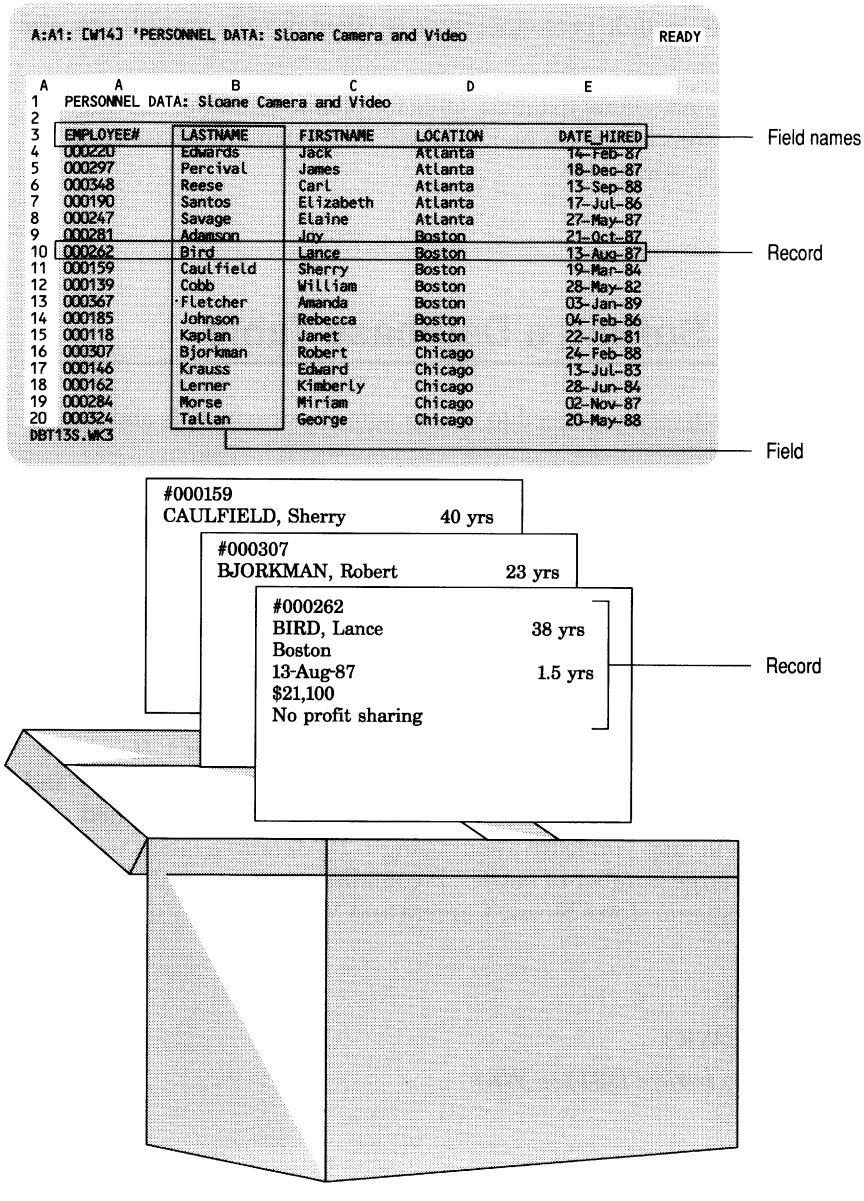
- Identify the elements of a 1-2-3 database table
- Learn the rules for setting up a database table
- Move around a database table
- Sort the information in a database table
- Save your work

To begin this lesson, start 1-2-3 as described at the beginning of Chapter 1. If you are already using 1-2-3, select /Worksheet Erase Yes to remove all files from memory and replace them with a single blank worksheet. Then retrieve the sample file named DBT13S.WK3. This file will help you learn about using 1-2-3 database tables without requiring you to make a large number of entries. It contains information about each employee from the six regional stores Sloane Camera and Video has now opened.

Select	/File
Select	Retrieve
Highlight	DBT13S.WK3
Press	ENTER *to retrieve DBT13S.WK3*

Elements of a 1-2-3 Database Table

The following screen shows a portion of the employee database table. Compare it with the data illustrated in the card index — a traditional tool for recording and organizing information.



Records

Just as each card in the card index contains information about one employee, so does each row in the database table. Each single-row collection of information in a database table is a **record**.

Fields

Just as all cards in the card index contain the same categories of information (employee number, last name, first name, location, and so on), so do all records in the database table. Each single-column category of information in a database table is a field.

Field Names

The label at the top of each column in the database table is a **field name**, for example, EMPLOYEE#, LASTNAME, and DATE_HIRED. Field names identify the type of information in fields in a database table.

Database Table Rules

Any collection of data that you organize as records and fields can be a 1-2-3 database table. When you create your own database tables, keep these rules in mind:

- The first row of the database table must contain the field names. Subsequent rows must contain the records. Do not insert blank rows or divider lines between the field names and the records, or you will get incorrect results when you work with the database table.
- Each field name must be unique within the database table and should identify the type of information you will enter in that field. For example, the field name LASTNAME indicates the field that contains employees' last names.
- Each field name must be a label and must be entered in a single cell. Because you can't use field names that contain spaces in formulas, you should avoid using spaces in field names.
- The entries in a field must be either all labels or all values; you cannot mix labels and values within the same field. The entries in a field cannot be formulas.
- A database table can contain up to 256 fields and 8,191 records.

Moving Around a Database Table

In the next exercise, you will use the pointer-movement keys to move around a database table. Start by moving the cell pointer to the first cell in the database table:

Move the cell pointer to A3

To move to the last field in the database table (the PROFITSHARING field), press and release **END** and then press →.

Press **END** → *to move to the last field in the database table*

The cell pointer moves to I3. Notice that the database table extends beyond what you previously saw on the screen, with fields in columns F through I (YEARS_EMPLOYED, SALARY, AGE, and PROFITSHARING).

Now move to the last record in the database table:

Press **END** ↓ *to move to the last record in the database table*

The cell pointer moves to I33. Again, the database table extends beyond what you saw on the screen, with records in rows 21 through 33.

Try using other pointer-movement keys (such as **PGUP** and **PGDN**) to explore the database table. Examine the formats in each field. Notice that column widths and cell formats have been specified for each field. When you set up a database table yourself, you can adjust column widths and change cell formats however you like. When you are done exploring the database, do the following:

Press **HOME** *to move to A1*

Sorting a Database Table

Currently the records are in the order in which they were entered in the database table — that is, in no special order. You will not always want to work with records in the order in which they were entered. Suppose, for example, that you want to look at the records in this database table in alphabetical order by employees' last names. /Data Sort lets you **sort** (or rearrange) the records in a database table. This command requires that you specify three items:

- A range to sort
- A field by which to sort
- A sort order

Begin by selecting /Data Sort:

Select /Data
Select Sort

Specifying a Range to Sort

The range you want to sort is called the **data range**. The data range should include all records and fields in the database table. It should not, however, include the row of field names, because you do not want them sorted along with the records.

Select	Data-Range
Move	the cell pointer to A4 *(the first cell of the range that contains the database table records)*
Press	. (period) *to anchor the cell pointer in A4*
Move	the cell pointer to I33 *to highlight A4..I33*
Press	**ENTER** to accept A4..I33 *(all the records and fields in the database table) as the data range*

Specifying a Sort Key

Now that you have specified what range to sort, you must specify one or more sort keys. A **sort key** is a field in the database table that 1-2-3 uses to determine the order for the records. You can specify a primary and secondary sort key, as well as up to 253 extra sort keys.

The **primary sort key** determines the primary order for records in the database table. In this case, you want to arrange the records in alphabetical order by last name, so specify the LASTNAME field as the primary sort key:

Select	Primary-Key
Move	the cell pointer to any cell in the LASTNAME field (except the cell that contains the field name) *to sort by last name*
Press	**ENTER** *to specify the LASTNAME field as the primary sort key*

Specifying a Sort Order

Finally, you must specify the **sort order**, or the order in which you'd like to sort the records: ascending order (a through z and 1 through 9) or descending order (z through a and 9 through 1). For this example, specify ascending order:

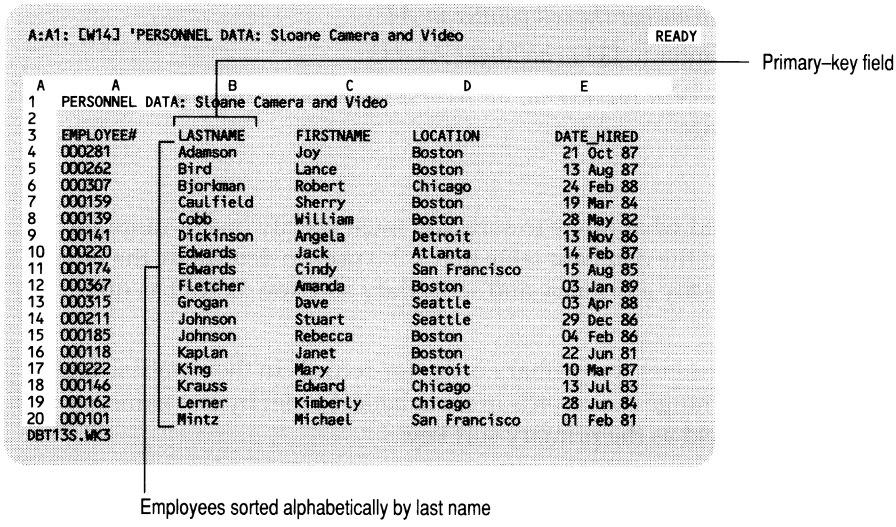
Type	a *for ascending sort order*
Press	**ENTER**

Beginning the Sort

Now you are ready to sort the records:

Select Go to sort the records

1-2-3 sorts all the records in ascending order by last name and returns to READY mode. Move the cell pointer around the database table to see the results of the sort.



Using Two Sort Keys

At present, the records in the database table are listed in alphabetical order by employees' last names. Now suppose you want the records to be listed in alphabetical order by store location, but you also want the employees working at each store to be listed in alphabetical order by last name. To do so, you need to specify two sort keys: the LOCATION field as the primary sort key and the LASTNAME field as the secondary sort key.

The **secondary sort key** determines the order for records in the database table that have the same entry in the primary-key field. When you specify the LOCATION field as the primary sort key and the LASTNAME field as the secondary sort key, 1-2-3 lists the records in alphabetical order by location and then arranges the records within each location in alphabetical order by last name.

Begin by selecting /Data Sort:

Select /Data

Select Sort

1-2-3 remembers the data range you specified the last time you sorted the database table (A4..I33). All you need to specify now is a new primary sort key, a secondary sort key, and a sort order:

Select Primary-Key

1-2-3 moves the cell pointer to a cell in the LASTNAME field, the primary sort key you specified the last time you sorted the database table. However, you want to specify a different primary sort key:

Move the cell pointer to any cell in the LOCATION field (except the cell that contains the field name) *to sort by location*

Press **ENTER** *to specify the LOCATION field as the primary sort key*

1-2-3 displays an A for ascending order, the sort order you specified for the primary sort key the last time you sorted the database table.

Press **ENTER** *to accept ascending order*

Select Secondary-Key

Move the cell pointer to any cell in the LASTNAME field (except the cell that contains the field name) *to sort by last name*

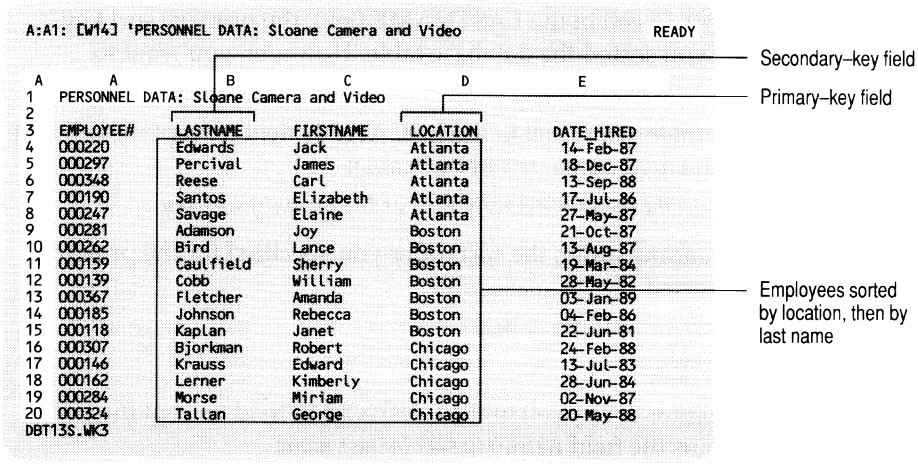
Press **ENTER** *to specify the LASTNAME field as the secondary sort key*

Type a *for ascending order*

Press **ENTER**

Select Go *to sort the records*

Move the cell pointer around the database table to see the results of the sort. Notice that employees are now listed according to the location where they work. The locations are listed in alphabetical order (Atlanta, Boston, Chicago, Detroit, San Francisco, and Seattle). Also notice that within each group of employees working in a particular location, the records are in alphabetical order by last name. If several people working in the same location have the same last name, you could specify the FIRSTNAME field as a third sort key when you sort the database table.



Saving Your Work

Save this new arrangement of the database table along with the data range, sort key, and sort order settings in a new file called DBT14.WK3:

Select	/File
Select	Save
Type	dbt14 *(to use with Lesson 14)*
Press	**ENTER** *to save DBT14.WK3*

Lesson 14 Querying a Database Table

In Lesson 13, you learned how to sort records in a database table. In this lesson, you will learn how to do the following:

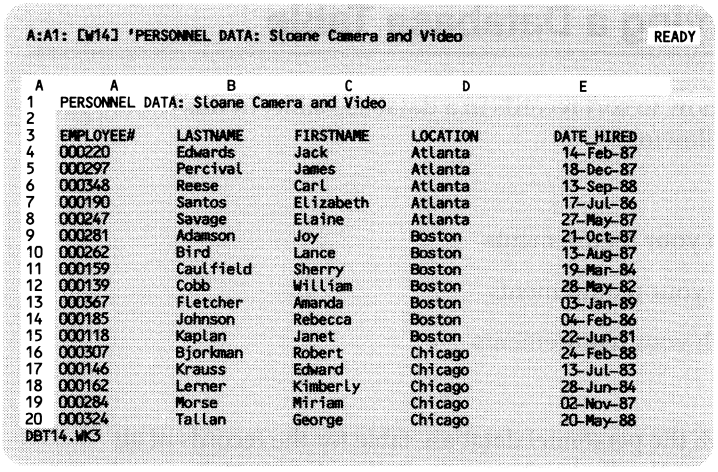
- Set up a query
- Find records that match your requirements
- Edit records that match your requirements
- Copy records that match your requirements
- Save your work

Suppose you want to search the personnel database table for the records of all employees who are not currently eligible for profit sharing. Fortunately, you do not have to check each record in the database table to determine whether it matches this **criterion**, or requirement. You can set up a **query**, which is a search that automatically locates all records that meet your requirements.

Once you set up a query, you have several options. You can view the matching records in the database table, edit them, or **extract** them — that is, copy the records to another part of the worksheet or to a separate worksheet.

To begin this lesson, retrieve DBT14.WK3, the file you saved at the end of Lesson 13. If you did not complete Lesson 13, retrieve the sample file named DBT14S.WK3.

Select	/File
Select	Retrieve
Highlight	DBT14.WK3 or DBT14S.WK3
Press	ENTER *to retrieve the file*



A:A1: [W14] 'PERSONNEL DATA: Sloane Camera and Video READY

	A	B	C	D	E
1	PERSONNEL DATA: Sloane Camera and Video				
2					
3	EMPLOYEE#	LASTNAME	FIRSTNAME	LOCATION	DATE_HIRED
4	000220	Edwards	Jack	Atlanta	14-Feb-87
5	000297	Percival	James	Atlanta	18-Dec-87
6	000348	Reese	Carl	Atlanta	13-Sep-88
7	000190	Santos	Elizabeth	Atlanta	17-Jul-86
8	000247	Savage	Elaine	Atlanta	27-May-87
9	000281	Adamson	Joy	Boston	21-Oct-87
10	000262	Bird	Lance	Boston	13-Aug-87
11	000159	Caulfield	Sherry	Boston	19-Mar-84
12	000139	Cobb	William	Boston	28-May-82
13	000367	Fletcher	Amanda	Boston	03-Jan-89
14	000185	Johnson	Rebecca	Boston	04-Feb-86
15	000118	Kaplan	Janet	Boston	22-Jun-81
16	000307	Bjorkman	Robert	Chicago	24-Feb-88
17	000146	Krauss	Edward	Chicago	13-Jul-83
18	000162	Lerner	Kimberly	Chicago	28-Jun-84
19	000284	Morse	Miriam	Chicago	02-Nov-87
20	000324	Tallan	George	Chicago	20-May-88

DBT14.WK3

As you can see, the records are arranged in the order they were in when you saved the database table in Lesson 13.

Setting Up a Query

Setting up a query is a four-part process. You must do the following:

- Set up a range in which to enter the criteria (criteria range)
- Enter the criteria
- Specify the range that contains the criteria
- Specify the range to query (input range)

Setting Up a Criteria Range

The first step in setting up a query is to set up a **criteria range**, a range that contains the selection requirements. Criteria ranges consist of at least two rows: the first row must include one or more field names from the database table you are querying and the second row must include criteria. (Complex searches can involve more than one row of criteria. See /Data Query in Chapter 2 of *Reference* for more information.)

To set up a criteria range, you copy the field names from the database table to a separate worksheet. By placing the criteria range on a separate worksheet, you prevent the possibility of writing over it if you add more records or fields to the database table.

First, insert a new worksheet after the current worksheet.

Select	/Worksheet
Select	Insert
Select	Sheet
Select	After
Press	ENTER *to insert one worksheet*

The new worksheet appears on the screen. To see both worksheets at the same time, use perspective view.

Select	/Worksheet
Select	Window
Select	Perspective

The screen shows the two worksheets. Notice that the columns in worksheet B all have the default column width (9) rather than the different column widths of worksheet A. To make the format of worksheet B the same as worksheet A, turn on GROUP mode.

Move	the cell pointer to worksheet A
Select	/Worksheet
Select	Global
Select	Group
Select	Enable

The column widths in worksheet B change to match those of worksheet A.

Now you copy the field names from the database table in worksheet A to worksheet B. It is a good idea to copy all the field names, even though you are using only some of them right now. This lets you change criteria easily later on.

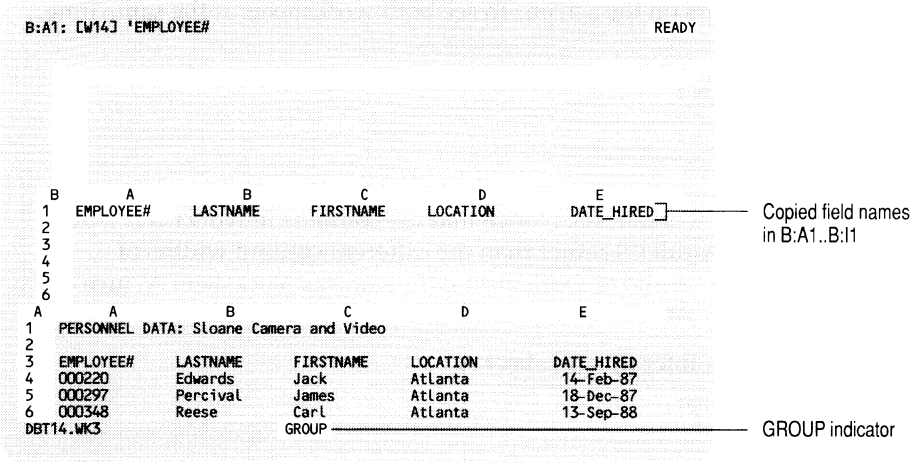
Follow these steps to copy the field names to worksheet B:

Move	the cell pointer to A:A3 *(the first cell in the row that contains the field names)*
Select	/Copy
Move	the cell pointer to A:I3 *to highlight A:A3..A:I3*
Press	ENTER *to accept A:A3..A:I3 as the FROM range*
Move	the cell pointer to B:A1 *to highlight B:A1*
Press	ENTER *to accept B:A1 as the TO range*

1-2-3 moves the cell pointer back to A:A3. To see the results of the copy procedure, do the following:

Move the cell pointer to B:A1

Keep moving the cell pointer to the right to see all the field names 1-2-3 copied. They are located in B:A1..B:I1.



Entering the Criteria

To search for employees who are not currently eligible for profit sharing, you enter the criterion No in cell B:I2, directly under the field name PROFITSHARING in the criteria range:

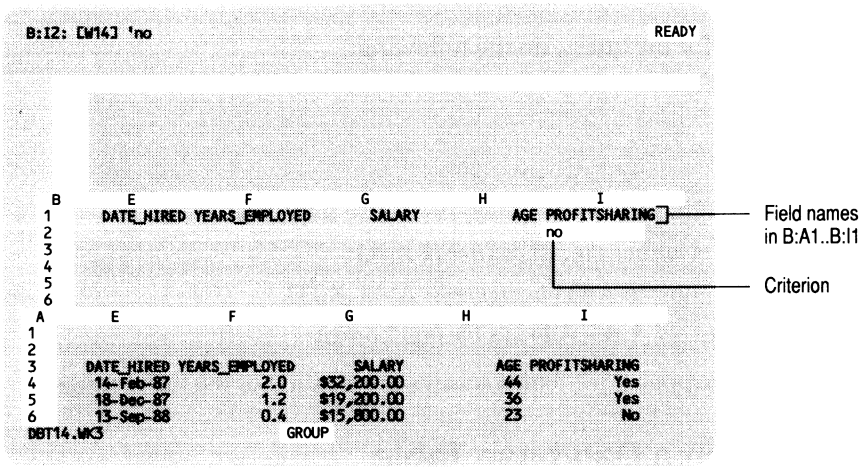
Move the cell pointer to B:I2

When you enter a label as the criterion, it can be in uppercase or lowercase letters, but the spelling must match the database table entry exactly.

Type no *to indicate the employee is not eligible for profit sharing*

Press ENTER

Your screen should look like this:



Specifying the Criteria Range

For 1-2-3 to use the criteria range you have set up, you need to specify the location of the range. When you specify the criteria range, you must include both the field names and the row that contains the criteria:

Select	/Data
Select	Query
Select	Criteria
Move	the cell pointer to B:A1 *(the first cell of the criteria range)*
Press	. (period) *to anchor the cell pointer in B:A1*
Move	the cell pointer to B:I2 *to highlight B:A1..B:I2*
Press	**ENTER** *to accept B:A1..B:I2 as the criteria range (one row of field names and one row of criteria)*

Although nothing visible happens, 1-2-3 now knows the location of the criteria range.

Specifying an Input Range

For 1-2-3 to find records that meet your criteria, you must specify the range you want to search, called the **input range**. The input range for a query is the area of the worksheet that contains the database table. It is similar to the data range you specify for a sort, except that an input range must contain the database table's field names as well as the records.

Before you specify the input range, return worksheet A, which contains the database table, to full-screen size using the **ZOOM (ALT-F6)** key. **ZOOM (ALT-F6)** switches a window between its original size and full-screen size.

Select	Quit *to leave the /Data Query menu*
Move	the cell pointer to cell A:A1
Press	**ZOOM (ALT-F6)** *to return worksheet A to full-screen size*

To specify the input range for the query, do the following:

Select	/Data
Select	Query
Select	Input
Move	the cell pointer to cell A:A3 *(the first cell of the database table)*
Press	. (period) *to anchor the cell pointer in A:A3*
Move	the cell pointer to A:I33 *to highlight A:A3..A:I33*
Press	**ENTER** *to accept A:A3..A:I33 as the input range*

Although nothing visible happens, 1-2-3 now knows the location of the input range.

Finding Records in a Database Table

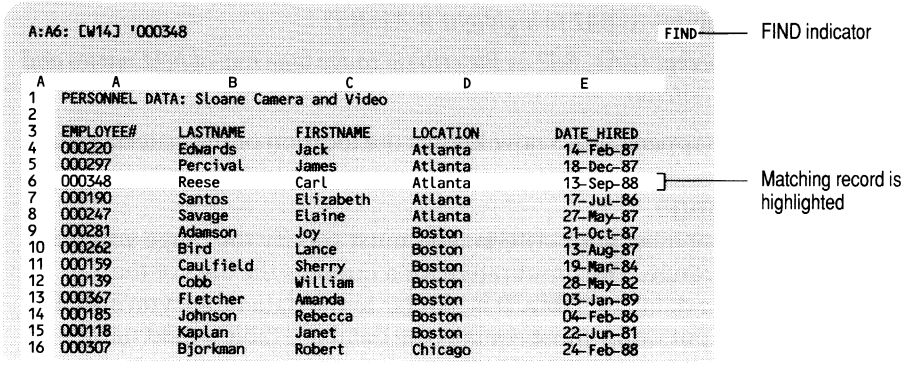
With the criteria and input ranges set up and specified, you are now ready to search for the records that match your criterion.

Beginning the Search

To find employees who are not eligible for profit sharing, do the following:

Select	Find *to begin the search*

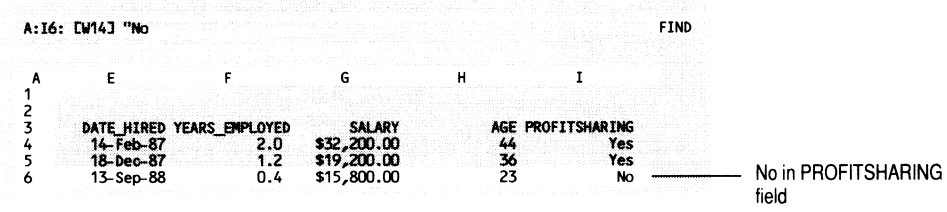
The mode indicator in the control panel changes to FIND, and 1-2-3 highlights the first record in the input range that matches the criterion in the criteria range. Your screen should look like this:



Right now, you cannot verify that the currently highlighted record contains information on an employee who is not eligible for profit sharing because you cannot see the PROFITSHARING field. In FIND mode, use → and ← to see fields not currently in view:

Press → eight times *to move the cell pointer to column I, the PROFITSHARING field*

You are now viewing the part of the database table you could not previously see on your screen.



To see the record for the next employee with No entered in the PROFITSHARING field, do the following:

Press ↓ *to move to the next matching record*

1-2-3 highlights the next matching record. Each time you press ↓, 1-2-3 highlights the next record that matches your criterion. To see previous records that match your criterion, use ↑. If you try to move beyond the first or last record that matches the criterion, 1-2-3 beeps.

Press ↓ *to move to the next matching record*

When you are done viewing the records that match your criterion, end the search:

Press ENTER *to end the search*

Select Quit *to return 1-2-3 to READY mode*

Using Formulas As Criteria

Suppose you want to search the personnel database table for the records of all employees who are not currently eligible for profit sharing, have worked at the company for three or more years, do not work in Atlanta, and earn more than $20,000 a year. These criteria can be summarized as follows:

- PROFITSHARING: No
- YEARS_EMPLOYED: 3 or more years
- LOCATION: not Atlanta
- SALARY: more than $20,000

In the last exercise, you entered the criterion for finding employees who are not eligible for profit sharing. Now you are going to create criteria for the other three conditions.

For 1-2-3 to understand the concept of "3 or more years," you need to express "3 or more" as a logical formula. A **logical formula** evaluates whether a condition is true or false — a given employee has either worked for 3 or more years or has not. A logical formula uses **logical operators** (such as = < and >) that express the relationship between two values.

To specify "3 or more years," you will use the formula +YEARS_EMPLOYED>=3. The operator >= means greater than or equal to. You must enter the formula in cell B:F2 of the criteria range, directly below the field name YEARS_EMPLOYED:

Move	the cell pointer to B:F2
Type	+years_employed>=3 *(Be sure to type the underscore.)*
Press	ENTER

1-2-3 displays ERR because 1-2-3 cannot display a value for this formula. This does not mean the formula is incorrect. You will change the format of the cell so you can see the actual formula later in this lesson.

Entering More Criteria

You can express the condition "not Atlanta" by using a ~ (tilde) in front of a label. This tells 1-2-3 to exclude that label in its search for matching records.

When you enter ~atlanta below the field name LOCATION in the criteria range (cell B:D2), you are telling 1-2-3 that you want to search for records with any entry in the LOCATION field that is not Atlanta. When you enter the criterion, it can be in uppercase or lowercase letters, but the spelling must match the database table entry exactly:

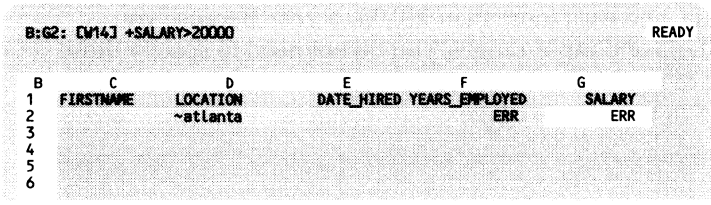
Move	the cell pointer to B:D2
Type	~atlanta
Press	ENTER

For 1-2-3 to understand the concept of "more than $20,000," you need to express "more than $20,000" as a logical formula. The formula for this is +SALARY>20000. The operator > means greater than. You must enter the formula in cell B:G2 of the criteria range, directly below the field name SALARY:

Move	the cell pointer to B:G2
Type	+salary>20000
Press	ENTER

Again, 1-2-3 displays ERR because it cannot display a value for this formula.

Your screen should look like this:



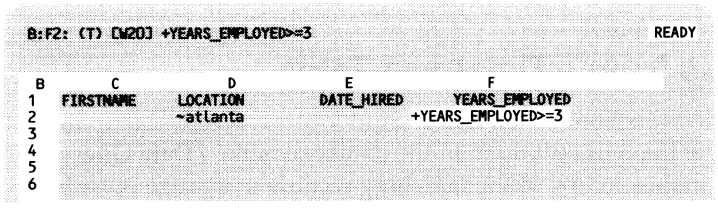
To display the actual formulas you entered in the criteria range rather than ERR, you will change the format of those cells. Beginning with the cell pointer in B:G2, do the following:

Select	/Range
Select	Format
Select	Text *to display formulas as text rather than as their values*
Move	the cell pointer to B:F2 *to highlight B:G2..B:F2*
Press	**ENTER** *to accept B:G2..B:F2 as the range to format*

Now widen column F so you can see the complete formula in that column:

Move	the cell pointer to B:F2
Select	/Worksheet
Select	Column
Select	Set-Width
Type	20 *to widen column F to 20 characters*
Press	**ENTER**

Your screen should look like this:



Finding More Records

You are ready to search for the records that match all the criteria: employees who are not currently eligible for profit sharing, have worked at the company for three or more years, do not work in Atlanta, and earn more than $20,000 a year. Because you previously specified the criteria and input ranges, you do not need to specify those ranges again. You just need to tell 1-2-3 to begin searching. 1-2-3 automatically uses the new criteria you entered in the criteria range:

Select	/Data
Select	Query
Select	Find

Use ↓ and ↑ to view the records that match the criteria. 1-2-3 highlights the records for three employees: Rebecca Johnson from the Boston store, Kimberly Lerner from the Chicago store, and Cindy Edwards from the San Francisco store.

Editing Records During a Search

When 1-2-3 is in FIND mode, you can edit any field in any of the records that match your criteria. For example, you can change the PROFITSHARING field for Kimberly Lerner as follows:

Highlight	the record for Kimberly Lerner
Press	→ eight times *to position the cell pointer in the PROFITSHARING field*
Press	**EDIT (F2)**

The current entry appears in the control panel. Change Kimberly Lerner's profit sharing status to Yes by doing the following:

Press	**BACKSPACE** twice *to erase No*
Type	Yes
Press	**ENTER** *to enter the correction in the database table*
Press	**ENTER** *to end the search*
Select	Quit *to return 1-2-3 to READY mode*

Extracting Records from a Database Table

As you learned in the previous section, /Data Query Find locates records that match your criteria so you can view them or edit them in the database table. /Data Query Extract, on the other hand, makes a copy of the matching records in a range outside the database table. This allows you to work with a subset of the database table, which is useful, for example, if you want to print only records that match your criteria.

The /Data Query Extract command requires that you specify three items:

- An input range
- A criteria range
- The range where 1-2-3 will copy the records that match your criteria (output range)

Because you already specified the input range (A:A3..A:I33) and the criteria range (B:A1..B:I2) in the last exercise, the only remaining step is to set up and specify an output range.

Setting Up an Output Range

An **output range** is an area of the worksheet where 1-2-3 copies the records that match your criteria. The first row of the output range must contain the names of the fields you want included when 1-2-3 extracts the records. For example, if you want to see only the last name, first name, and salary for each employee who matches the criteria, you would enter only the field names LASTNAME, FIRSTNAME, and SALARY in the first row of the output range.

The field names in the output range must be identical to the corresponding field names in the input and criteria ranges, but can appear in any order. 1-2-3 uses the remaining rows of an output range to place the records that match your criteria.

You should enter the field names for the output range in a separate worksheet to prevent accidentally writing over data. Insert a new worksheet after worksheet B.

Move	the cell pointer to cell B:A1
Select	/Worksheet
Select	Insert
Select	Sheet
Select	After
Press	**ENTER** *to insert one worksheet*

The new worksheet appears on the screen. To see all three worksheets at the same time, use **ZOOM (ALT-F6)** to return to perspective view.

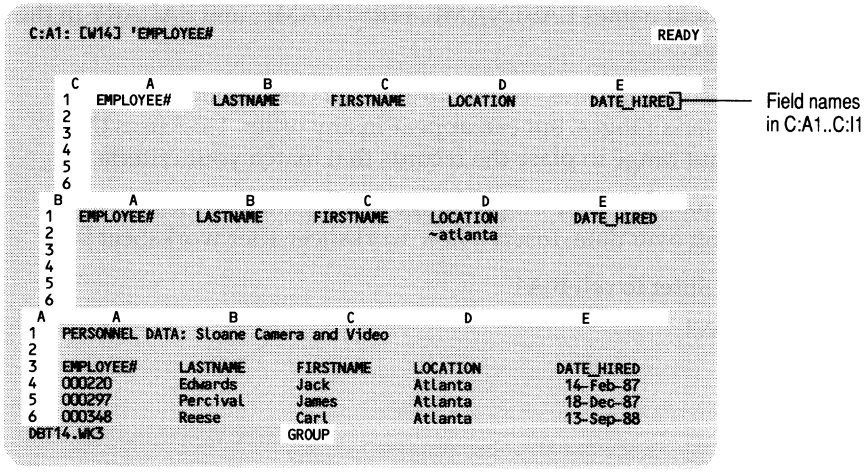
Press	**ZOOM (ALT-F6)**

The screen shows the three worksheets. Because you are in GROUP mode, the new worksheet has the same formats and column widths as the other worksheets.

To ensure that the field names are identical to the field names in the input range, copy them as follows:

Move	the cell pointer to A:A3
Select	/Copy
Move	the cell pointer to A:I3 *to highlight A:A3..A:I3*
Press	ENTER *to accept A:A3..A:I3 as the FROM range*
Move	the cell pointer to C:A1
Press	ENTER *to accept C:A1 as the TO range*
Move	the cell pointer to C:A1

Keep moving the cell pointer to the right to see the rest of the field names 1-2-3 copied.



Specifying the Output Range

You have two choices when specifying an output range: You can specify a single-row output range or a multiple-row output range.

If you specify a single-row output range, 1-2-3 erases everything in the worksheet below the field names in the output range before it puts anything in the output range.

If you specify a multiple-row output range, 1-2-3 uses only the number of rows you specify. If the output range is too small to hold all the extracted records, 1-2-3 beeps and displays an error message. If this happens, press ESC to clear the error message and return 1-2-3 to READY mode. Then specify an output range with more rows.

CAUTION Do not specify a single-row output range if you have any data below the field names. Instead, specify a multiple-row output range.

In this example, the entire worksheet containing the output range is blank, so you can safely specify a single-row output range:

Select	/Data
Select	Query
Select	Output
Move	the cell pointer to C:A1
Press	. (period) *to anchor the cell pointer in C:A1*
Move	the cell pointer to C:I1 *to highlight C:A1..C:I1*
Press	ENTER *to accept C:A1..C:I1 as the output range*

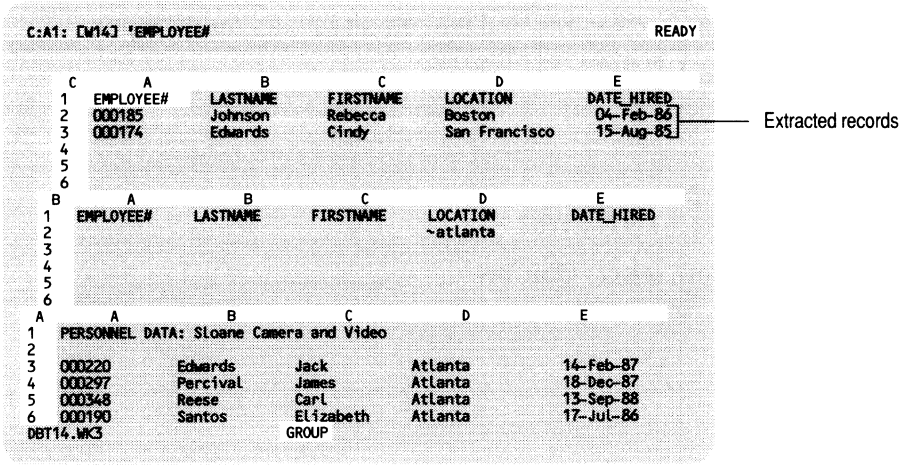
Although nothing visible happens, 1-2-3 now knows where to place the records it extracts.

Extracting Records

You are now ready to extract from the database table the records that meet your criteria (employees who are not currently eligible for profit sharing, have worked at the company for three or more years, do not work in Atlanta, and earn more than $20,000 a year):

Select	Extract
Select	Quit *to return 1-2-3 to READY mode*

1-2-3 places a copy of all the records that match the criteria in the output range. You can print these records or incorporate them into a report. Right now, move the cell pointer around the output range so you can see that these records meet the criteria you entered.



Printing the Extracted Records

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

To print the first four fields of the extracted records, do the following:

Select	/Print
Select	Printer
Select	Range
Move	the cell pointer to C:A1 *if it is not already there*
Press	. (period) *to anchor the cell pointer in C:A1*
Move	the cell pointer to C:D3 *to highlight C:A1..C:D3*
Press	**ENTER** *to accept C:A1..C:D3 as the print range*
Select	Align *to tell 1-2-3 that you have positioned the paper at the top of the page*
Select	Go *to begin printing*

1-2-3 prints the first four fields of the extracted records.

Select	Page *to advance the paper to the top of the next page*
Select	Quit *to return 1-2-3 to READY mode*

Before printing, you can specify a page format for your printed copy. By selecting /Print Printer Options you can change margins and create headers and footers that include information such as page numbers and the current date. For more information on print options, see /Print [E,F,P] Options in Chapter 2 of *Reference*.

Saving Your Work

To save the criteria, the extracted records, and the current settings for the input, criteria, and output ranges, you must save the file:

Select	/File
Select	Save
Type	dbt15
Press	**ENTER** *to save DBT15.WK3*

If you want to end 1-2-3 now, select /Quit Yes.

For More Information

In this chapter you've learned about the structure of database tables and basic database operations, including how to sort, find, and extract information from a database table.

In addition to performing the database table operations described in this chapter, you can use the Data commands to do other database table tasks such as filling a range automatically with a sequence of values, dates, or times (/Data Fill), performing "what-if" analysis with one, two, three, or more variables (/Data Table), performing regression analysis (/Data Regression), and using queries for more than one database table simultaneously (/Data Query).

Many of the Data commands also let you manipulate data in external tables (tables created using other database management programs). For example, you can copy the contents of an external table to a range in a worksheet (/Data External Use and /Data Query), get information about the fields in an external table (/Data External List Fields), perform special functions available through the database management program (/Data External Other), and create formulas and database @functions that refer to the contents of an external table (/Data External Use).

For more information on these commands, see "Data Commands" in Chapter 2 of *Reference*.

Chapter 5
Automating Your Work with Macros

Any task that 1-2-3 can perform, from the simplest to the most complex, can be automated with a 1-2-3 macro. A **macro** is a series of keystrokes and special commands (collectively called **macro instructions**) that performs a 1-2-3 task. When you run the macro, 1-2-3 reads through the instructions and performs the task automatically, much faster than you could perform it manually. Once you create a macro, you can use it over and over again.

Although macros require some planning and time to develop, they ultimately save you considerable time and expedite your work in a 1-2-3 session. For example, if you spend an hour printing reports every week, you can create a macro that lets you print the same reports in half the time or even less. Even if you initially spend an hour creating the macro, you will save time over the long run.

In this chapter, you will explore the uses and construction of macros by creating several yourself. Each macro demonstrates a different concept or technique. You will create a macro that enters labels in the worksheet, a macro that prints a worksheet, and a macro that enters the current date.

Lesson 15 Macro Fundamentals

In this lesson you'll create a macro that enters three labels. As you'll see, every macro you create requires that you complete the same seven steps:

1. Plan the macro.
2. Enter the macro instructions.
3. Name the macro.
4. Document the macro.
5. Run the macro.
6. **Debug** or correct problems in the macro, if necessary.
7. Save the macro by saving the file.

To begin this lesson, start 1-2-3 as described at the beginning of Chapter 1. If you are already using 1-2-3, select /Worksheet Erase Yes. A single blank worksheet appears on your screen. You will use this blank worksheet to create your first macro.

Planning the Macro

When creating a macro, it is important to plan carefully. You must identify each step involved in the task you want to automate. In most cases, this means performing the task manually and writing down each key you press.

In this example, you want to create a macro that enters the address for Sloane Camera and Video's Boston store because you frequently type this address as a heading for new worksheets. To create this macro, you must know that the task involves these steps:

- Type the label Sloane Camera and Video.
- Press ↓ to enter the label and move the cell pointer down one cell.
- Type the label One Emerson Place.
- Press ↓ to enter the label and move the cell pointer down one cell.
- Type the label Boston, MA 02176.
- Press **ENTER** to enter the label and leave the cell pointer in the current cell.

Now that you have worked out the steps, you are ready to start translating them into 1-2-3 macro instructions.

Entering the Macro

When you enter a macro, you need to know two things: where you will put the macro and how to write the macro instructions.

Choosing a Macro Location

You can enter macros in a file with other data, or you can enter them in a file that contains only macros, called a **macro library**. (For more information on macro libraries, see "Sample Macros" in Chapter 4 of *Reference*.) Macros that you enter in a file with other data should generally be placed in a separate worksheet from the data. That way, you avoid the possibility of writing over data when you enter the macro or of damaging the macro when you insert or delete rows and columns of data. If you do enter macros in the same worksheet as other data, enter the macros in an area below and to the right of the data.

Wherever you decide to put a macro, do not put it directly before or after another macro. Make sure there is at least one blank cell separating each macro.

In this lesson, you'll enter a macro in a single-sheet file that contains no other data. In Lesson 16, you'll enter a macro in a multiple-sheet file that contains other data. Finally, in Lesson 17, you'll learn the basic concept of a macro library by entering a macro in one file and then using it in another file.

Writing the Macro Instructions

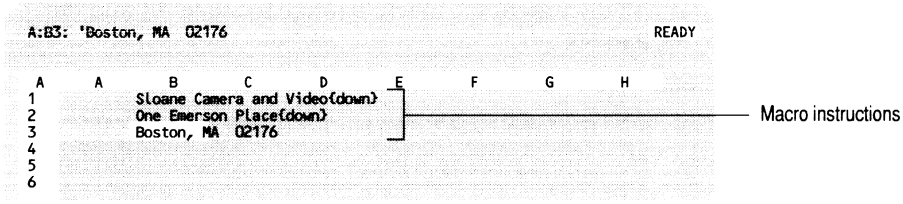
All macro instructions must be entered as labels in the worksheet. You can include the entire set of macro instructions (up to a total of 512 characters) in one label, or you can divide the instructions among a series of labels, in which case you must enter the labels in consecutive cells in a column. Generally, a macro is easier to read and debug when you divide the instructions among a series of labels.

In the following example, you will divide the macro instructions among three labels.

Move	the cell pointer to B1
Type	Sloane Camera and Video{down}
Press	ENTER *to enter the first part of the macro*
Move	the cell pointer to B2
Type	One Emerson Place{down}
Press	ENTER *to enter the second part of the macro*
Move	the cell pointer to B3
Type	Boston, MA 02176
Press	ENTER *to enter the last part of the macro*

NOTE The last line of macro instructions intentionally omits a necessary character so you can learn how to debug a macro and correct an error later in this lesson.

Your screen should look like this:



The {down} instructions in the macro represent the ↓ key. In a macro, all pointer-movement and function keys are represented by their key names enclosed in { } (braces). You can type the key names in uppercase or lowercase. See "Entering a Macro" in Chapter 4 of *Reference* for a complete list of key names.

Naming the Macro

The next step is to use /Range Name Create to assign a range name to the macro. The range name you assign is the name you use to run the macro.

There are two types of macro range names: a \ (backslash) followed by a single letter (such as \a or \t) and a multiple-character name up to 15 characters in length (such as HEADING_BOSTON). The type of name you use determines how you run the macro, as you'll see later in this lesson.

In the following example, you are going to use a name consisting of \ (backslash) followed by a single letter. Because the macro you are creating will enter a heading in the worksheet, you will name the macro \H. (It doesn't matter whether you use an uppercase or lowercase "H" to name the macro.)

When you name a macro you need to specify only the first cell of the macro, in this case B1. To assign a range name to the macro, do the following:

Move	the cell pointer to B1 *(the first cell of the macro)*
Select	/Range
Select	Name
Select	Create
Type	\h *(Be sure to type the backslash; the "h" can be uppercase or lowercase.)*
Press	**ENTER** *to complete the range name*
Press	**ENTER** *to accept B1..B1 as the range to name*

Documenting the Macro

After entering and naming a macro, it is good practice to document both the macro's range name and the macro instructions. To document the macro's range name, you enter the range name as a label to the immediate left of the macro. To document the macro instructions, you enter explanatory comments to the immediate right of the macro. This documentation is not part of the macro; it is only a reminder of the macro's name and purpose.

In the following example, you will document the macro's range name in A1 and the macro's purpose in cells F1, F2, and F3:

Move	the cell pointer to A1

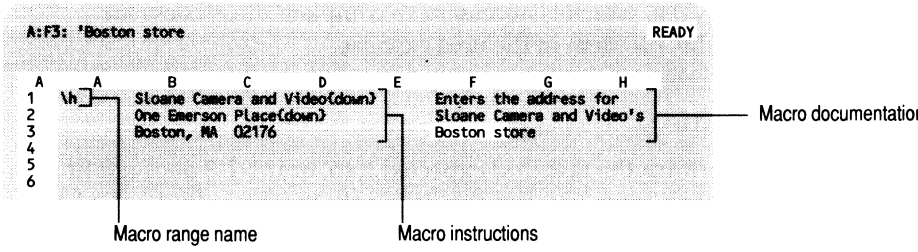
You must type a label prefix to start the label in A1, or else 1-2-3 will interpret the \ (backslash) in the range name \H as the repeating label prefix and display hhhhhhhhh in A1:

Type	' *(the apostrophe label prefix)*
Type	\h *(Do not type a space between the label prefix and the backslash.)*
Press	**ENTER** *to enter the label*

Now enter a description of the macro's purpose:

Move	the cell pointer to F1
Type	Enters the address for
Press	↓ *to enter the label and move the cell pointer to F2*
Type	Sloane Camera and Video's
Press	↓ *to enter the label and move the cell pointer to F3*
Type	Boston store
Press	**ENTER** *to enter the label*

Your screen should look like this:



Using the ALT Key to Run a Macro

When you run a macro, 1-2-3 reads macro instructions from left to right in each cell and then moves down to the next cell. 1-2-3 continues down a column of macro instructions until it reaches a blank cell, a cell that contains a number or numeric formula, or the advanced macro command {QUIT}. (See Chapter 4 of *Reference* for information about {QUIT}.)

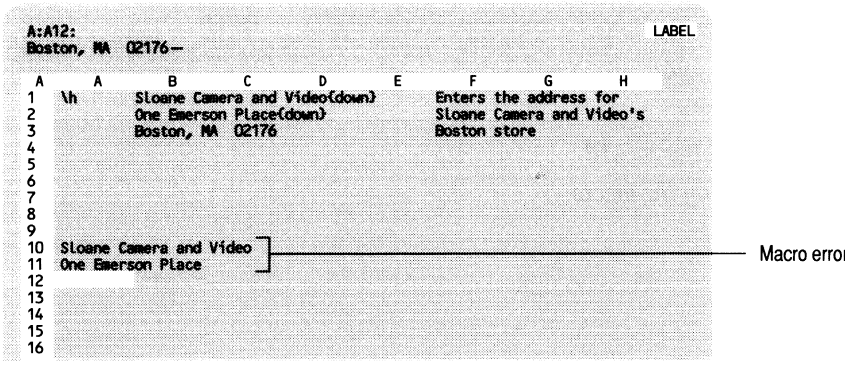
Because the macro you created enters data, be sure the cell pointer is in a blank area of the worksheet when you run the macro so it doesn't write over other data.

Move the cell pointer to A10

To run a macro whose name consists of a \ (backslash) and a letter, hold down **ALT** while you press the letter key:

Press **ALT-h** *to run the macro*

Your screen should look like this:



Notice that 1-2-3 entered the first two lines of the address in the worksheet, but the third line of the address appears in the control panel. The macro typed "Boston, MA 02176" but did not enter it in the worksheet. This is because you did not include a keystroke instruction for **ENTER**, which is necessary to complete the process for entering a label. You'll fix this problem in the next exercise.

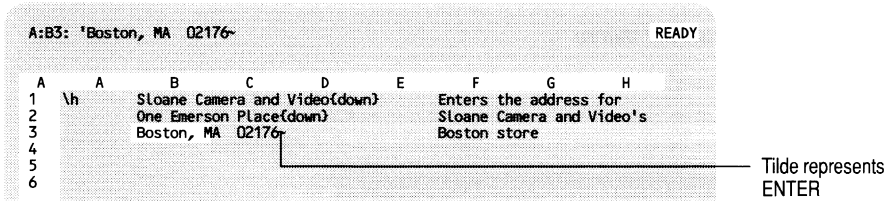
Debugging the Macro

When a macro does not perform the task you expected it to, or if 1-2-3 does not finish running a macro because of an error, you need to debug the macro — find out what instructions are causing the problem and edit them.

Macros often require some experimentation to debug, so when you create a macro, it's a good idea to schedule time for such adjustments. In this case, however, the problem is immediately obvious: the **ENTER** instruction is missing from the third line of the macro. To fix this macro, you need to edit the label in B3 by adding a ~ (tilde). The tilde is the macro instruction that represents **ENTER**.

Press	**ESC** *to clear the control panel*
Move	the cell pointer to B3
Press	**F2 (EDIT)** *to change to EDIT mode*
Type	*~ (tilde)*
Press	**ENTER** *to enter the correction in the worksheet*

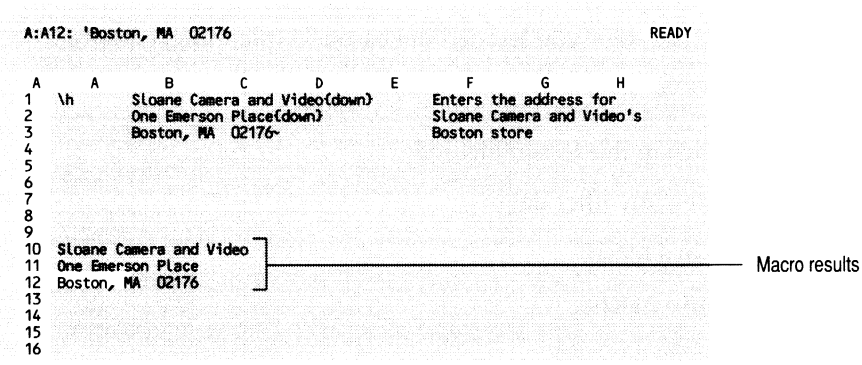
Now your screen should look like this:



Try running the macro again.

Move	*the cell pointer to A10*
Press	**ALT-**h *to run the macro*

This time, the full address appears in the worksheet.



Saving the Macro

Now that the macro works correctly, save the macro by saving the file:

Select	/File
Select	Save
Type	firstmac
Press	**ENTER** *to save FIRSTMAC.WK3*

You've now completed your first macro by following the seven basic steps — planning the macro, entering the macro instructions, naming the macro, documenting the macro, running the macro, debugging the macro, and saving the macro.

Clearly it took longer to create this macro than to type the heading once manually. If you had to type this heading several times each day, however, the macro would save you a lot of time.

Lesson 16 Creating a Macro to Print Data

In this lesson, you will create a macro that prints worksheet data. To create the macro, you will follow the seven basic steps you learned in Lesson 15 (planning, entering, naming, documenting, running, debugging, and saving the macro). In the course of the exercise, however, you will also learn some new techniques.

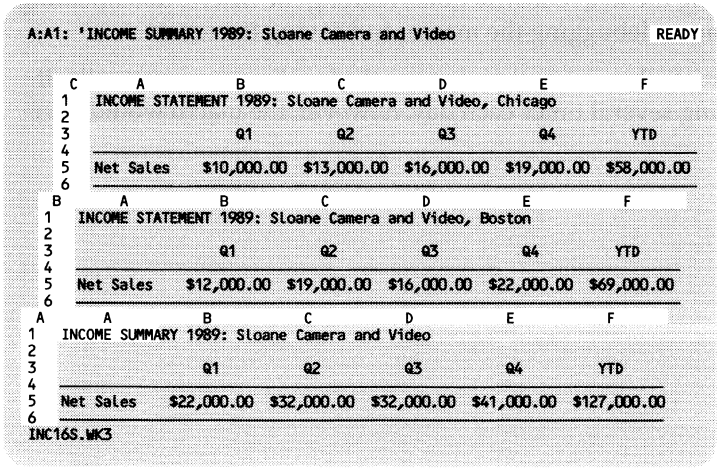
The techniques you will learn in this lesson include

- Entering a macro in a file with other data
- Using 1-2-3 commands in a macro
- Using **RUN (ALT-F3)** to run a macro
- Using STEP mode to debug a macro

In this exercise, you'll create a macro in the same file as other data, so begin by retrieving the sample file named INC16S.WK3. It is a copy of Sloane Camera and Video's 1989 income file that you worked with in Lesson 12.

Select	/File
Select	Retrieve
Highlight	INC16S.WK3
Press	**ENTER** *to retrieve INC16S.WK3*

The screen should look like this:



The Sloane Camera and Video file already contains four worksheets. You are going to insert a new worksheet in the file so you can enter the macro in a worksheet that doesn't contain data. This way, you avoid the possibility of writing over data when you enter the macro or of damaging the macro when you insert or delete rows and columns of data.

Move	the cell pointer to D:A1 *to make worksheet D the current worksheet*
Select	/Worksheet
Select	Insert
Select	Sheet
Select	After
Press	ENTER *to accept the default of 1*

The file now contains five worksheets. The cell pointer is in E:A1, the worksheet you just inserted. Move back to worksheet A by doing the following:

Press	FIRST CELL (CTRL-HOME) *to move back to worksheet A*

Planning the Macro

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

In this example, you want to create a macro that prints Sloane Camera and Video's 1989 income summary for all stores. To identify the steps involved in this task, you are going to work through the task manually. Write the steps down as you complete them for reference when you enter the macro instructions.

Select	/Print
Select	Printer
Select	Range
Type	a:a1..a:f17
Press	ENTER *to accept A:A1..A:F17 as the print range*
Select	Align *to tell 1-2-3 that you have positioned the paper at the top of a sheet*
Select	Go *to begin printing*
Select	Page *to advance the paper to the top of the next page*
Select	Quit *to return 1-2-3 to READY mode*

1-2-3 prints the data in A:A1..A:F17. Now that you know the steps necessary to print the income summary, you're ready to automate the process with a macro.

Entering the Macro

For this example, you will enter the macro in E:B1..E:B3. Although you could enter all the instructions in E:B1, the macro will be easier to read if you divide the instructions among three cells. Begin by moving the cell pointer to E:B1, where you will enter the first line of the macro:

Move the cell pointer to E:B1

Remember, the first steps for printing the income summary worksheet are to select /Print Printer Range and specify a print range. In a macro, a 1-2-3 command is represented by a / (slash) followed by the keystroke sequence you would use if you were selecting the command manually using the typing method explained in Lesson 2, where you type the first letter of each command.

When a line of macro instructions begins with a 1-2-3 command, you must type the label prefix ' " or ^ in front of the starting slash, or 1-2-3 displays the main menu instead of entering LABEL mode.

Type ' *(the apostrophe label prefix)*

1-2-3 is now in LABEL mode. (Remember, all macro instructions must be entered as labels.)

Type /ppr *(Do not type a space between the label prefix and the command.)*

Press ↓ *to enter the first part of the macro and move the cell pointer to E:B2*

Now you need to include the print range specification in the macro instructions. Because you press **ENTER** to complete a range specification, you must type the macro keystroke instruction for **ENTER**, a ~ (tilde), after the print range specification:

Type a:a1..a:f17~ *(Be sure to include the tilde.)*

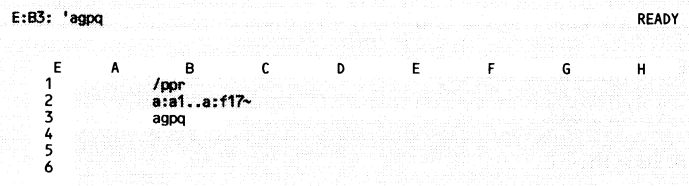
Press ↓ *to enter the second part of the macro and move the cell pointer to E:B3*

Remember that when you stepped through the printing procedure manually, the final step was to select Align, Go, Page, and then Quit from the /Print menu. You do not need to start this sequence of Print commands with a slash because you are already in the /Print menu at this point.

Type agpq

Press **ENTER** *to enter the final part of the macro in the worksheet*

Your worksheet should look like this:



Naming the Macro

Now you will name the macro, using /Range Name Create.

For this example, try using a longer macro range name instead of a backslash-letter combination. The macro prints the 1989 income summary, so use the name PRINT_SUM1989.

Move	the cell pointer to E:B1 *(the first cell of the macro)*
Select	/Range
Select	Name
Select	Create

1-2-3 displays the names of the ranges you named in Chapter 1.

Type	print_sum1989
Press	**ENTER** *to complete the range name*
Press	**ENTER** *to accept E:B1..E:B1 as the range to name*

Documenting the Macro

Next you will document the macro by entering the macro's range name and an explanation of its purpose in the worksheet. First enter the macro's range name:

Move	the cell pointer to E:A1
Type	print_sum1989
Press	**ENTER** *to enter the label*

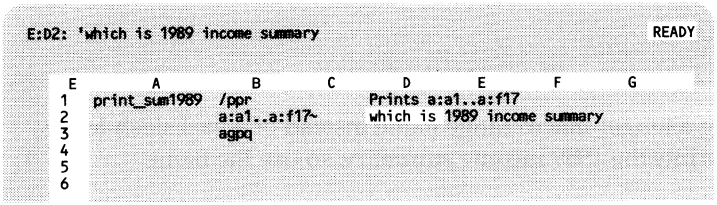
The label is cut off because the column is not wide enough to display it. To see the entire range name, do the following:

Select	/Worksheet
Select	Column
Select	Set-Width
Type	15
Press	**ENTER** *to widen column A in worksheet E to 15 characters*

Now enter a description of the macro's purpose:

Move	the cell pointer to E:D1
Type	Prints a:a1..a:f17
Press	↓ *to enter the label and move the cell pointer to E:D2*
Type	which is 1989 income summary
Press	**ENTER** *to enter the label*

Your worksheet should look like this:



Using the RUN (ALT-F3) Key to Run a Macro

In Lesson 15, you used the **ALT** key to run the macro you created and named \H. That method, however, can be used to run only macros named with a backslash-letter combination. To run the macro PRINT_SUM1989, you must press **RUN (ALT-F3)** and then select the name of the macro to run.

Press	**RUN (ALT-F3)**
Highlight	PRINT_SUM1989 *(the name of the macro)*
Press	**ENTER** *to run PRINT_SUM1989*

1-2-3 reads through the macro instructions and prints the income summary.

In this case, the macro worked correctly the first time you ran it (no errors were deliberately introduced as was the case with the macro in Lesson 15). In order to practice debugging the macro in STEP mode, however, you are going to change the macro instructions so it does contain an error.

Move	the cell pointer to E:B2
Press	**EDIT (F2)** *to change to EDIT mode*
Move	the cursor under the a in a:f17
Press	**DEL** *to delete the a*
Type	g *to change the range specification to G:F17*

This makes the range specification invalid because there is no worksheet G.

Press	**ENTER** *to enter the change in the worksheet*

Run the macro to see the effects of the error:

Press RUN (ALT-F3)
Highlight PRINT_SUM1989 (the name of the macro)
Press ENTER *to run PRINT_SUM1989*

The macro resulted in an error. You're now going to use STEP mode to find and fix the error.

Press ESC *to clear the error message*

Debugging a Macro in STEP Mode

If a macro does not work as expected when you run it and you can't immediately identify the problem, you may want to run the macro in STEP mode to see exactly what the macro is doing. When you run a macro in STEP mode, 1-2-3 pauses after each macro instruction until you press a key to continue. You can run a macro one instruction at a time, until you locate the error.

Turning On STEP Mode

To turn on STEP mode, you will press RECORD (ALT-F2) and select Step from the Record menu:

Press RECORD (ALT-F2) *to display the Record menu*
Select Step *to turn on STEP mode*

1-2-3 enters STEP mode, displaying STEP at the bottom of your screen.

Press RUN (ALT-F3)
Highlight PRINT_SUM1989
Press ENTER *to run PRINT_SUM1989*

The STEP indicator changes to a flashing SST (for Single STep) to indicate the macro is running in STEP mode.

Press the space bar *to execute the first macro instruction*

1-2-3 displays the main menu because the first macro instruction is a / (slash). Keep stepping through the macro instructions until you find the error. Although you can press any key to execute the next macro instruction, it is recommended that you use the space bar.

Press the space bar repeatedly *to keep stepping through the macro instructions*

When attempting to execute the print range specification, 1-2-3 enters ERROR mode, showing you that the print range specification is incorrect.

Press ESC *to end the macro so you can correct the error*

When you end the macro to edit it, the STEP indicator replaces the SST indicator to remind you that STEP mode is still on. You do not need to turn off STEP mode before you edit the macro.

Correcting the Error

Starting with the cell pointer in E:B2, do the following:

Press	**EDIT (F2)** *to change to EDIT mode*
Move	the cursor under the g in g:f17
Press	**DEL** *to delete the g*
Type	a
Press	**ENTER** *to enter the correction in the worksheet*

Now run the macro again in STEP mode to make sure there are no other problems.

Press	**RUN (ALT-F3)**
Highlight	PRINT_SUM1989
Press	**ENTER** *to run PRINT_SUM1989*
Press	the space bar repeatedly until 1-2-3 completes the macro by printing the income summary

When the macro is finished, the SST indicator changes back to STEP.

Turning Off STEP Mode

To turn off STEP mode and return 1-2-3 to READY mode, do the following:

Press	**RECORD (ALT-F2)** *to display the Record menu*
Select	Step *to turn off STEP mode*

Saving the Macro

Save the macro you created by saving the file in which you entered it:

Select	/File
Select	Save
Type	mac17 *(to use with Lesson 17)*
Press	**ENTER** *to save MAC17.WK3*

The macro is now in the MAC17.WK3 file; you can use the printing macro whenever this file is active.

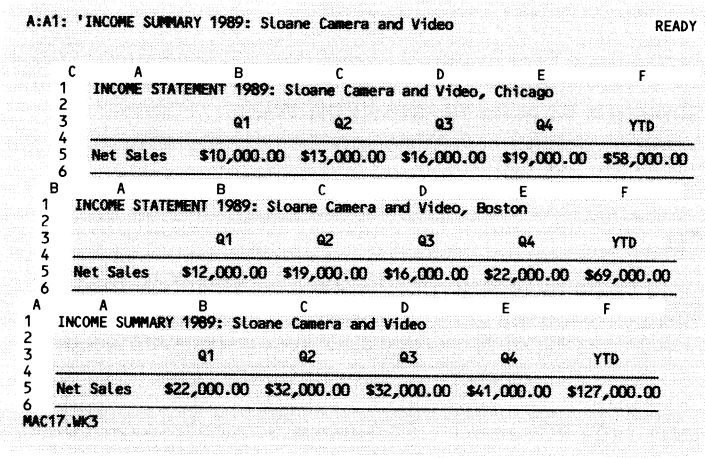
Lesson 17
Using the Record Feature to Create Macros

With the macros you created in previous lessons, you entered the macro instructions by typing them directly in the worksheet. You can also enter macro instructions by using **RECORD (ALT-F2)**.

RECORD (ALT-F2) gives you access to the **record buffer**, an area of computer memory where 1-2-3 records the keys you press during a work session, in the same format as macro keystroke instructions. To create a macro, you can perform the macro task manually and then use RECORD (ALT-F2) to copy the keystroke instructions for the task from the record buffer to the worksheet. Copying the keystrokes 1-2-3 recorded instead of typing them yourself saves you time and prevents typing errors.

This lesson leads you through the process of creating a macro with the record feature. It also illustrates the concept of macro libraries by showing you how to run a macro that you entered in one file in a different file. To begin the lesson, retrieve MAC17.WK3, the file you saved in Lesson 16. If you did not complete Lesson 16, retrieve the sample file named MAC17S.WK3.

Select	/File
Select	Retrieve
Highlight	MAC17.WK3 or MAC17S.WK3
Press	ENTER *to retrieve the file*



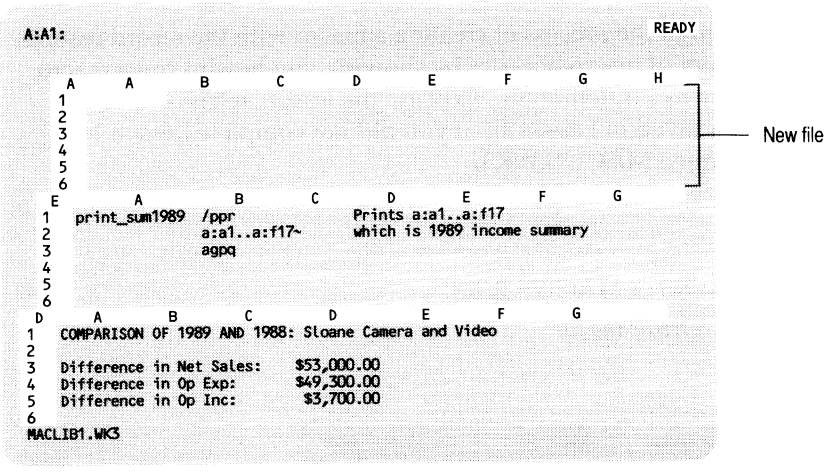
Now use /File New to create a new file in which you will enter the macro. This command creates a new worksheet file on disk and reads the file into memory before or after the current file. The new file contains one blank worksheet.

Select	/File
Select	New
Select	After

1-2-3 prompts you to enter a name for the new file.

Type maclib1

Press ENTER *to place the new file after the current file*



Move the cell pointer to A:B1 in the file MACLIB1.WK3

This is the cell where you will begin performing the task to automate.

Planning the Macro

As with all macros, you should begin by identifying the steps necessary for the task you want to accomplish. The macro you are going to create will enter today's date in the current cell. This type of macro is useful if, for example, you write daily reports.

This first thing the macro must do is to calculate the date number for today's date. A **date number** is a number from 1 to 73050 that 1-2-3 assigns in sequence to each date from January 1, 1900 through December 31, 2099. Do this by typing @TODAY (an @function that calculates the date number for today's date). Next, the macro must convert the formula @TODAY to its current value. This keeps the date from changing when you retrieve the file on a different date.

To change the date number into a recognizable date, the macro must change the cell format to Date using the /Range Format Date command. This command gives you a choice of five formats. For example, you can display the date number 32871 as 29-Dec-89, 29-Dec, Dec-89, 12/29/89, or 12/29. This macro will assign the Date 1 (D1) format (DD-MMM-YY).

But the D1 format requires a column width of 10; 1-2-3 displays asterisks instead of the date if the column width is less than 10. Therefore, the last thing the macro must do is set the column width to 10.

Entering the Macro

To enter a macro using the record feature, you need to do three things:

1. Erase the record buffer.
2. Perform the task you want to automate.
3. Copy the recorded keystrokes to the worksheet.

Erasing the Record Buffer

As you work, 1-2-3 automatically records your keystrokes. When you look at the record buffer, it will probably contain keystrokes you do not want in your macro. To get rid of unwanted keystrokes and make it easier to locate the keystrokes you do want to use in the macro, you erase the contents of the record buffer before you perform the task you want to automate.

Before you erase the record buffer, take a look at its current contents:

Press RECORD (ALT-F2) *to display the Record menu*
Select Copy

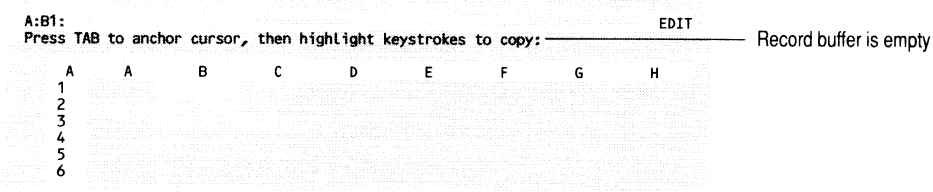
1-2-3 displays your most recent keystrokes at the top of your screen. To remove these keystrokes from the record buffer, do the following:

Press ESC two times *to return to the Record menu*
Select Erase

1-2-3 erases the record buffer. Check to see that the record buffer is empty:

Press RECORD (ALT-F2) *to display the Record menu*
Select Copy

Nothing appears after the prompt on the top of your screen, showing you that the record buffer is now empty.



Press ESC two times *to return 1-2-3 to READY mode*

Performing the Macro Task

The next step in creating the macro is to perform the macro task manually so that 1-2-3 can record the keystrokes.

Type	@today
Press	**ENTER**
Press	**EDIT (F2)** *to change to EDIT mode*
Press	**CALC (F9)** *to convert the formula @TODAY to its current value*
Press	**ENTER** *to enter the value in the worksheet*

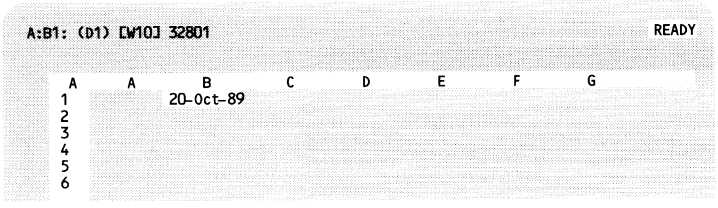
The date number for today's date appears in A:B1. Now use /Range Format Date to format the date number as a date:

Select	/Range
Select	Format
Select	Date
Type	1 *to select DD-MMM-YY as the Date format*
Press	**ENTER** *to accept A:B1..A:B1 as the range to format*

1-2-3 displays asterisks because the column isn't wide enough. Widen the column using /Worksheet Column Set-Width:

Select	/Worksheet
Select	Column
Select	Set-Width
Type	10 *to set the width of column B to 10 characters*
Press	**ENTER** *to change the width of column B*

Although your date will be different, the worksheet should look like this:



Copying the Macro Instructions from the Record Buffer

Now you will copy the sequence of keystrokes you just used from the record buffer to the worksheet:

Press	**RECORD (ALT-F2)** *to display the Record menu*
Select	Copy

Your most recent keystrokes appear at the top of your screen:

@today~{EDIT}{CE}*a date number*~/RFD1~/WCS10~

NOTE If you made an error while you were performing the task, your keystrokes may look different. You can edit the keystrokes after you copy them to the worksheet. In addition, the date number you see will reflect the current date.

Notice that 1-2-3 records keystrokes in the same format you use to represent them as macro instructions (for example, /Range Format Date is /RFD). For keystrokes that have several possible formats, 1-2-3 always uses the shortest format. For example, 1-2-3 records the ↓ keystroke as {D} rather than {DOWN}.

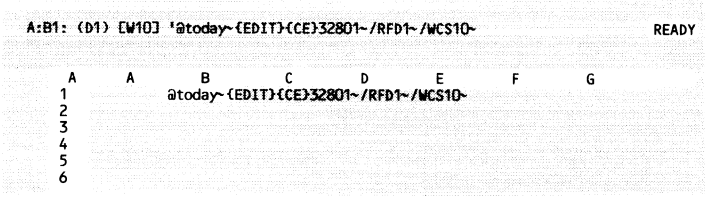
Selecting keystrokes from the record buffer is similar to highlighting a range. You position the cursor on the first character you want to select, anchor the highlight, and then use → to highlight the keystrokes. The only difference is that instead of using . (period) to anchor the highlight, you use **TAB**.

Press	**HOME** *to move to the beginning of the keystrokes*
Press	**TAB** *to anchor the highlight*
Press	**END** *to highlight all the keystrokes in the record buffer*
Press	**ENTER** *to accept all the keystrokes as the macro instructions to copy*

You no longer need the current date, so it is all right to copy over the contents of A:B1.

Move	the cell pointer to A:B1 in the file MACLIB1.WK3
Press	**ENTER** *to accept A:B1..A:B1 as the range to copy TO*

Your worksheet should look like this:



From this point on, the steps for creating a macro are exactly the same as if you had typed the macro instructions in the worksheet manually: name, document, run, debug, and save the macro.

Naming the Macro

The keystrokes you typed and 1-2-3 recorded in the record buffer are now in cell A:B1 in the MACLIB1.WK3 file. To use these keystrokes as macro instructions, you must name the range containing the keystrokes. You are going to name the macro \D for date. With the cell pointer in A:B1 in the MACLIB1.WK3 file, do the following:

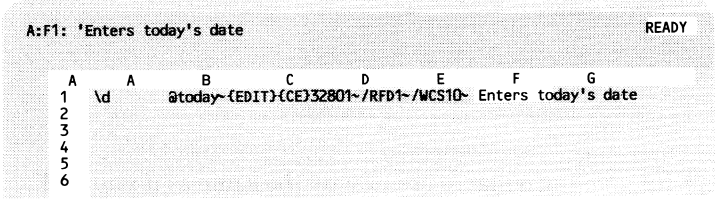
Select	/Range
Select	Name
Select	Create
Type	\d
Press	**ENTER** *to complete the range name*
Press	**ENTER** *to accept A:B1..A:B1 as the range to name*

Documenting the Macro

Now you will document the macro by entering the macro's range name in A:A1 and a description of the macro's purpose in A:F1.

Move	the cell pointer to A:A1 in the MACLIB1.WK3 file
Type	' *(the apostrophe label prefix)*
Type	\d *(Do not type a space between the label prefix and the backslash.)*
Press	**ENTER** *to enter the label*
Move	the cell pointer to A:F1 in the MACLIB1.WK3 file
Type	Enters today's date
Press	**ENTER** *to enter the label in the worksheet*

Your screen should look like this:



Running the Macro

To test the macro, try running it in MAC17.WK3, the other active file.

Move	the cell pointer to A:H1 in the file MAC17.WK3
Press	ALT-d *to run the macro*

The macro enters today's date in the current cell.

NOTE To run a backslash-letter macro with the ALT key when the macro is in another file, it must be the only macro named with that backslash-letter combination in any active file.

Saving the Macro

Save the macro you created by saving the file in which you entered it:

Press	NEXT FILE (CTRL-END CTRL-PGUP) *to make MACLIB1.WK3 the current file*
Select	/File
Select	Save

1-2-3 displays [ALL MODIFIED FILES], which is the default for saving multiple files. To save only the file you entered the macro in

Press	EDIT (F2) *to display the name of the current file, MACLIB1.WK3*
Press	ENTER
Select	Replace

The macro is now saved in the MACLIB1.WK3 file. This file is called a **macro library** because it will contain only macros and no other data. You may want to use this file as the start of your own macro library and add other macros to it.

The advantage of storing your macros in a separate file is that you can use the macros with any active worksheet. Use /File Open to read the macro file into memory with other active files. As long as the macro file is in memory, you can use the macros with any other active files. See "Sample Macros" in Chapter 4 of *Reference* for more information on macro libraries.

If you want to end 1-2-3 now, select /Quit Yes.

For More Information

In this chapter you've learned the basic process for creating a macro, including typing macro instructions directly in the worksheet and using the record feature to automate macro creation. You created a macro that enters labels in the worksheet, another macro that prints a worksheet, and a third macro that enters today's date and formats the cell for dates.

1-2-3 also includes **advanced macro commands**, special macro instructions that perform 1-2-3 programming functions. Advanced macro commands let you manipulate data and files, direct the flow of control to create branching and looping macros, suspend macro processing to allow input from the keyboard, and control different parts of the screen display.

For example, in the last macro you created, you could use the advanced macro command {IF} to determine whether the column width of the current cell is greater than or equal to 10 characters. If so, don't change it; otherwise, do.

For more information on advanced macro commands and the commands described in this chapter, see Chapter 4 of *Reference*.

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