How to Use This Book

Subtopics +

The *User's Guide* describes how to use 1-2-3® for Windows™. It includes step-by-step instructions for many 1-2-3 procedures.

The steps in Chapters 1 through 15 of the *User's Guide* are designed to use with your own work. In most cases, examples are illustrated along with the steps. Chapter 16 provides a tutorial, which applies the concepts and skills covered in previous chapters to a series of specific examples. Worksheet illustrations contain example information, and dialog box instructions show the dialog box as it appears after you make a selection. Steps in Chapter 17 help you display the Control menu commands and steps in Appendix A teach you how to use the Translate utility.

Who should read this book
Conventions used in this book
Organization

How to Use This Book

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Who should read this book
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   Mouse and keyboard conventions
Organization

Who should read this book

The *User's Guide* is designed for inexperienced spreadsheet users who prefer a task-oriented approach to learning 1-2-3. Readers who are familiar with a previous release of 1-2-3 will also find the *User's Guide* helpful as a way to review 1-2-3 basics and learn how to use commands and features specific to 1-2-3 for Windows.

Conventions used in this book   〈〈

Topic

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The *User's Guide* uses the conventions below to indicate notes, tips, cautions, references to Help, and mouse and keyboard instructions.

> **Note**   introduces additional technical information about a command or procedure.

> **Tip**   introduces additional information you may find helpful when you perform a command or procedure.

> **Caution**   introduces information that is essential to the safety of the data and software.

> **Help**   introduces a reference to Help.

The *User's Guide* uses the conventions below for function keys, key names, and information you type.

- Function keys appear in small capitals and are identified by the 1-2-3 key name. For example, F1 (HELP).

- Key names separated by a + (plus sign) indicate that you must press and hold down the first key, press the second key, and then release both keys. For example, ALT+F3.

- Key names separated by a space indicate that you must press the first key and release it, and then press the second key and release it. For example, END HOME.

- Information that you are to type appears in a different typeface. For example, Operating Expenses.

- A word in **bold** is a new word that is followed by a definition. For example, the **cell pointer** is the highlight that indicates the current cell.

Mouse and keyboard instructions

You can use either the mouse or the keyboard to perform 1-2-3 tasks. The mouse, like the keyboard, lets you choose commands, highlight ranges, and manipulate objects on the screen. For some tasks, such as manipulating windows, setting column widths in worksheets, and navigating dialog boxes, using the mouse may be quicker and easier than using the keyboard.

The *User's Guide* uses the conventions below to refer to mouse and keyboard instructions in a procedure.

> **Mouse**   introduces a procedure using the mouse.

> **Keyboard**   introduces a procedure using the keyboard.

> **Note**   You can use the Windows Control Panel to specify either right-handed (the left mouse button selects items) or left-handed (the right mouse button selects items) use of the mouse. When a procedure in this manual instructs you to use a mouse button, use the left mouse button unless you specified left-handed use of the mouse in the Windows Control Panel. For more information about the Windows Control Panel, see *Microsoft Windows User's Guide*.

The *User's Guide* contains 18 chapters and 3 appendixes.

- **Chapter 1, "Using 1-2-3 for Windows,"** introduces basic 1-2-3 for Windows concepts such as windows, menus, and dialog boxes. It also presents basic tasks, such as choosing commands and starting and ending 1-2-3.

- **Chapter 2, "Using Worksheets,"** describes the three-dimensional 1-2-3 worksheet file and presents basic worksheet tasks, such as entering and editing data, copying and moving data, and saving the worksheet file.

- **Chapter 3, "Changing the Appearance of Data,"** describes how to make data appear in a variety of formats, typefaces, and colors.

- **Chapter 4, "Calculating with Formulas and @Functions,"** describes the different categories of formulas and @functions, and also provides basic rules for entering formulas and @functions.

- **Chapter 5, "Creating Graphs,"** introduces graphing with 1-2-3 data.

- **Chapter 6, "Enhancing a Graph,"** describes how to add text and other objects to a graph, how to select and rearrange objects in a graph, how to change fonts and colors in a graph, and how to resize a graph.

- **Chapter 7, "Adding Text to a Worksheet,"** describes how to align text in a range, specify text fonts and colors, and justify a column of labels.

- **Chapter 8, "Printing Data,"** describes printing and previewing data and graphs.

- **Chapter 9, "Protecting Data,"** describes how to prevent changes to data and how to prevent unauthorized access to a worksheet file.

- **Chapter 10, "Using More Than One Worksheet File,"** describes using data in different worksheet files, combining worksheet files, and extracting data from a worksheet file.

- **Chapter 11, "Using Dynamic Data Exchange (DDE) Links,"** describes how to use DDE to transfer data between Windows applications and update the information in the destination file as information in the source file changes.

- **Chapter 12, "Using a 1-2-3 Database,"** describes setting up and using a 1-2-3 database, and introduces external databases.

- **Chapter 13, "Performing Statistical Analysis,"** describes the 1-2-3 for Windows features that simplify analysis of data, including @functions, frequency distribution tables, regression analysis, and data matrixes.

- **Chapter 14, "Solving What-if Problems,"** describes using Backsolver, what-if tables, and the Solver to find solutions to problems.

- **Chapter 15, "Using Macros to Automate Your Work,"** provides basic information on macros and lists the macro key equivalents and the different categories of macro commands.

- **Chapter 16, "A Tutorial: Putting It All Together,"** applies the concepts and skills covered in previous chapters to a series of specific examples.

- **Chapter 17, "Summary of Control Menu Commands,"** describes the Control menu commands, which manipulate the size and placement of windows.

- **Chapter 18, "Summary of 1-2-3 for Windows Commands,"** describes the 1-2-3 for Windows commands.

- **Appendix A, "The Translate Utility,"** describes how to use the Translate utility to convert files from one file format to another.

- **Appendix B, "The Lotus Multibyte Character Set (LMBCS),"** describes how 1-2-3 displays, stores, and

prints characters.

- **Appendix C, "Using Memory Efficiently,"** provides some basic information about how to use memory efficiently with 1-2-3.

Contents

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Use the Search button to find what you're looking for.

1   Using 1-2-3 for Windows

Subtopics +

This chapter introduces 1-2-3 for Windows. It describes the different components of 1-2-3 and provides step-by-step instructions for basic tasks such as starting and ending 1-2-3, choosing commands, and managing windows.

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Managing windows
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1 Using 1-2-3 for Windows   Subtopics ⊟

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What is 1-2-3 for Windows?

Topic

1-2-3 for Windows is an application for Microsoft® Windows 3.0 that helps you manage and present data. 1-2-3 offers an advanced spreadsheet (the 1-2-3 worksheet) with complete spreadsheet publishing and presentation features. 1-2-3 takes advantage of the Microsoft Windows graphical interface, while maintaining compatibility with other releases of 1-2-3.

Starting 1-2-3 for Windows

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Topic
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You must start 1-2-3 for Windows from the Windows 3.0 environment.

> **Note**   Before you start 1-2-3, you must complete the instructions for installing 1-2-3.

To start 1-2-3 from the Windows Program Manager

1.   Start Windows.

2.   Open the Windows Program Manager.

3.   Open the Lotus® Applications window (or the group window that contains 1-2-3).

4.   Select the 1-2-3 for Windows application icon (or the name assigned):

> **Mouse**   Double-click the application icon for 1-2-3 for Windows.

> **Keyboard**   Move the highlight to the application icon for 1-2-3 for Windows with , ↓, →, ←, and press ENTER.

1-2-3 displays the program title screen briefly and then opens a new worksheet file in the 1-2-3 window.

Topic

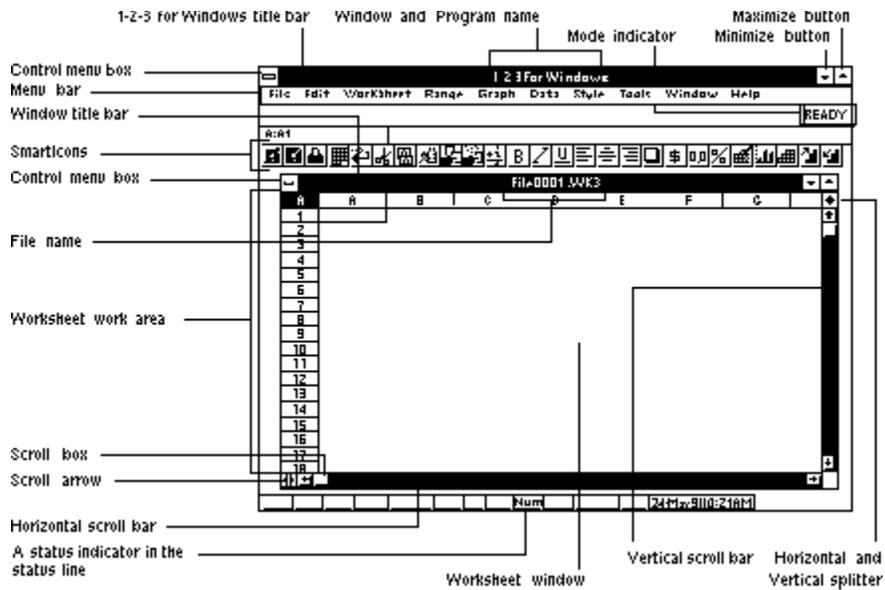You use the following types of windows to choose commands and enter and manipulate data in 1-2-3.

- **1-2-3 window** -- The 1-2-3 window contains 1-2-3. All other 1-2-3 windows, except the Help window, open within the 1-2-3 window.

- **Worksheet window** -- When you start 1-2-3, a Worksheet window automatically opens. A Worksheet window contains a **worksheet file** -- the 1-2-3 electronic spreadsheet. You enter and manipulate values, formulas, and text in a worksheet file. For complete information, see **Chapter 2**.

- **Graph window** -- You view and enhance a graph in a Graph window. For an introduction to graphing, see **Chapter 5** and **Chapter 6**.

- **Help window** -- You display online Help about 1-2-3 in the Help window. For more information about Help, see **"Using Help"**.

- **1-2-3 Classic window** -- You display the 1-2-3 Release 3.1 menu or the Wysiwyg menu, which you can use as an alternative to the 1-2-3 for Windows menu, in the 1-2-3 Classic® window. For more information, see **"Using the 1-2-3 Classic window"**.

- **Macro Trace window** -- You debug 1-2-3 macros in the Macro Trace window, which shows the current location and instructions of a macro as it runs.

- **Print Preview window** -- You preview how a printed copy of the worksheet appears by using the Print Preview window. For more information about using the Print Preview window, see **"Previewing before you print"** in Chapter 8.

- **Transcript window** -- You create a 1-2-3 macro by copying or cutting and pasting recorded keystrokes from the Transcript window into a worksheet, or you can run a macro directly from the Transcript window. The Transcript window records tasks you perform during a 1-2-3 session. For more information about using the Transcript window to create a macro, see **"Creating a macro with the Transcript window"** in Chapter 15.

  Note   Only one window can be active at one time. When a window is active, the title bar is highlighted.

1-2-3 windows have several components. The 1-2-3 for Windows program name appears in the title bar of the 1-2-3 window. The title bar of a Worksheet window contains the file name. The title bar of other 1-2-3 windows contains the window name.

Other components let you adjust the window to make your work easier. They are labeled in the illustration below, which shows the 1-2-3 window and a new Worksheet window. The title bar in the illustration below displays the 1-2-3 for Windows program name. When you start 1-2-3, it displays a new, empty worksheet file and displays Untitled in the title bar.

  Note   When you save a file with File Save or File Save As, 1-2-3 supplies a default file name unless you specify another file name. The first default file name is FILE0001.WK3, the next default file name is FILE0002.WK3, and so on.

1-2-3 for Windows title bar   Window and Program name   Maximize button / Minimize button

Mode indicator

Control menu box

Menu bar

Window title bar

Smarticons

Control menu box

File name

Worksheet work area

Scroll box

Scroll arrow

Horizontal scroll bar

A status indicator in the status line

Worksheet window

Vertical scroll bar   Horizontal and Vertical splitter

1 2 3 For Windows

File Edit Worksheet Range Graph Data Style Tools Window Help

READY

A:A1

Fil▲0001.WK3

Num

Note   If you maximize a Worksheet, Graph, or Transcript window, 1-2-3 displays the Control menu box in the menu bar, removes the title bar, and displays the file name in the 1-2-3 window title bar. For more information about maximizing a window, see **"To maximize a window"**.

Using a mouse

Topic

The mouse, like the keyboard, lets you choose commands, highlight ranges, and manipulate objects on the screen. For some tasks, such as using windows, setting column widths in worksheets, and navigating dialog boxes, using the mouse may be quicker and easier than using the keyboard.

Mouse instructions

The table below lists the terms you need to know to follow instructions for the mouse.

Term	Means
Click	Press and release the mouse button quickly
Double-click	Press and release the mouse button twice quickly
Drag	Press and hold the mouse button while you move the mouse
Point	Position the mouse pointer

The mouse pointer shapes

The **mouse pointer** is the symbol that indicates the area of the screen your next mouse action affects. To move the mouse pointer, you move the mouse. The mouse pointer changes shapes, depending on the task you can perform at that location.

For example, when you move the mouse pointer to a window border, it changes to a white two-headed arrow. This means you can use the mouse to resize the window.

The table below shows the mouse pointer shapes and describes tasks you can perform when they appear.

Mouse pointer shape	Description	Tasks
	White arrow	Moves the cell pointer and selects cells and ranges; makes a window active; moves a window; scrolls a window; opens a Control menu; chooses commands; navigates a dialog box; selects dialog box options
	White four-headed arrow	Resizes a window with the keyboard
	White two-headed arrow	Resizes a window
	I-beam	Enters and edits data
	Black two-headed vertical arrow	Resizes a row; creates or resizes a horizontal pane
	Black two-headed horizontal arrow	Resizes a column; creates or resizes a vertical pane
	Thin black cross	Positions an object in a graph
	Hourglass	Reminds you to wait until 1-2-3 finishes performing a task
	Pencil	Creates a freehand drawing in a graph
	Hand	Moves an object in a graph
	Pointing hand	Displays a definition or goes to a cross-reference in Help
	Pointing finger	Selects one or more objects in a graph

Choosing a command

The 1-2-3 window has a **menu** associated with it. You choose **commands** from a menu to perform actions. The commands you use with 1-2-3 appear in the **menu bar**, which is directly below the title bar. You use the commands in the menu bar to work with the contents of a window. When a Worksheet window is active, the menu bar contains 10 commands, as shown below.

When a Graph or Transcript window is active, the menu bar displays commands associated with graphs or transcripts. The Help window has its own menu bar, which displays commands associated with the Help window.

> **Note**   You can also use the 1-2-3 Release 3.1 menu. For more information, see **"Using the 1-2-3 Classic window"**.

You use commands in the menu bar to work with the contents of the window. To use commands, you choose them from the menu by clicking them or by moving the **menu pointer** -- the dark rectangle that highlights the current command when you are using the menu.

The items in the menu bar are not complete commands. When you choose a command in the menu bar, a **pulldown menu** appears, which lists additional commands. For example, to save a file, you use the File Save As command: First, you choose File from the menu bar, and then you choose Save As from the pulldown menu.
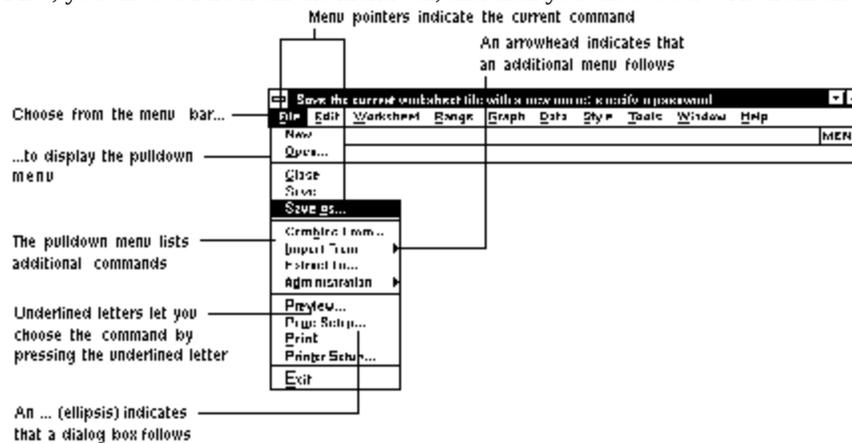
Some commands in a pulldown menu have an arrowhead after them. When you highlight a command followed by an arrowhead, another menu, called a **cascade menu**, appears. The File Administration cascade menu looks like this.
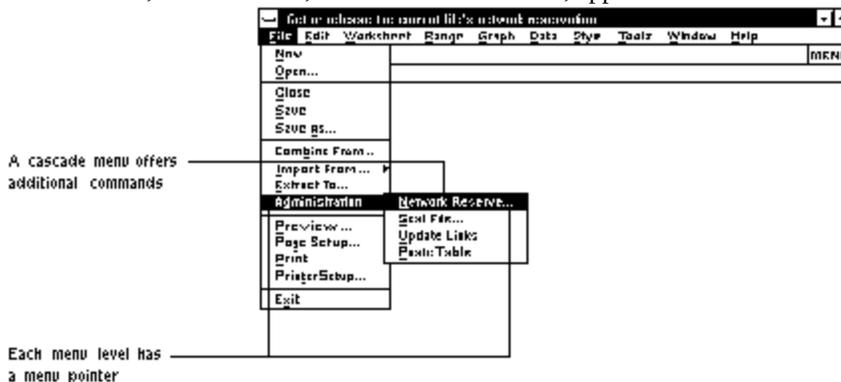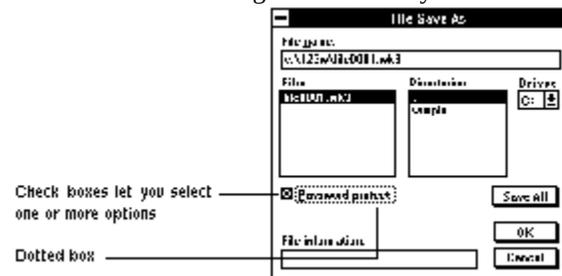
Many commands are followed by an   ... (ellipsis). When an ... (ellipsis) follows a command, it means you must

select options and identify the data the command affects in a special window called a **dialog box**. The File Combine From dialog box looks like this.
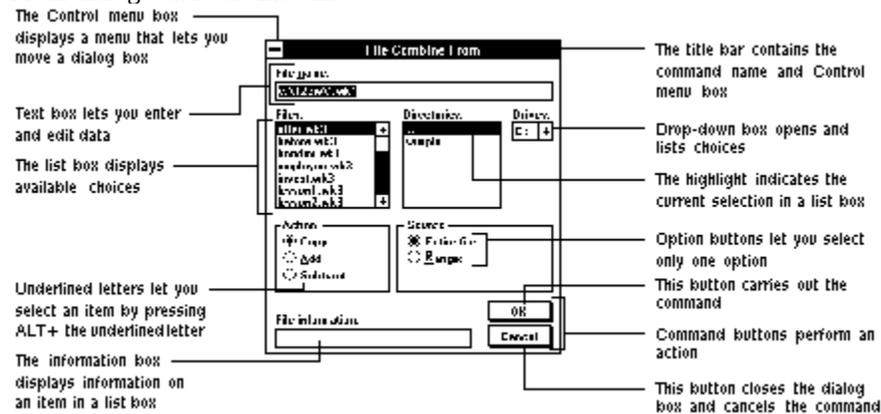
A dotted box in a dialog box indicates your current location within the dialog box.

A menu or dialog box may contain dimmed items. These items are not applicable, based on one or more other selections in the dialog box. You cannot choose a dimmed command or select a dimmed option.

> **Note** Commands not followed by an arrowhead or ... (ellipsis) perform the task immediately without displaying a dialog box.

To choose a command

1. Make the menu active and highlight the command:

    Mouse Click the command with the mouse button. The pulldown menu appears.

    Keyboard Press ALT or F10 (MENU), press the underlined letter of the command (usually the first letter) or use → and ← to move the menu pointer, and press ENTER when the command is highlighted. The pulldown menu appears.

    For example, to choose File from the 1-2-3 main menu, click File or press ALT and press F. The File pulldown menu appears.

2. Choose the next part of the command from the pulldown menu:

    Mouse Click the command.

    Keyboard Press the underlined letter of the command (usually the first letter) or use and ↓ to move up and down in the pulldown menu and press ENTER to choose the highlighted command.

    For example, to choose Combine From from the File pulldown menu, click Combine From or press b. The File Combine From dialog box appears.

3. (If necessary) Choose the command from the cascade menu:

    Mouse Click the command.

    Keyboard Press the underlined letter of the command (usually the first letter) or use and ↓ to move up and

down in the cascade menu and press ENTER to choose the highlighted command.

The rest of this book condenses these three steps into one. For example, instead of listing each menu choice for saving a file separately (Choose File, then choose Save As), a single step says Choose File Save As.

For many commands, you can select additional options from dialog boxes.

To use a dialog box

1. Select an option button:

Mouse   Click an option button.

Keyboard   Hold down ALT and press the underlined letter in an option button name or press TAB or SHIFT+TAB to move the dotted box to a group of option buttons and use , ↓, →, or ← to select an option button.

A selected option button contains a black dot. You can only select one option button in a group of option buttons.

2. Select a check box:

Mouse   Click a check box.

Keyboard   Hold down ALT and press the underlined letter in the check box name or press TAB or SHIFT+TAB to move the dotted box to a check box and press space bar.

A selected check box contains an X. You can select as many or as few check boxes as you want.

3. Enter text as necessary in a text box.

In text boxes that require a worksheet range:

Mouse   Click the text box and select the range in the Worksheet window; the range address appears in the text box. The dialog box disappears when you select the range in the Worksheet window. It reappears when you click the Confirm button.

Keyboard   Hold down ALT and press the underlined letter in the text box name or press TAB or SHIFT+TAB to move to the text box. Enter the range name or address, or select the range in the Worksheet window with , ↓, →, and ← and press ENTER; the address appears in the text box. The dialog box disappears when you select the range in the Worksheet window. It reappears when you press ENTER.

Note   For more information about selecting ranges, see **"Selecting a range"** in Chapter 2.

4. Select an item from a list box:

Mouse   Click the item. If the item you want does not appear in the list box, click the up or down scroll arrow until your choice appears, then click the item.

Keyboard   Hold down ALT and press the underlined letter in the list box name or press TAB or SHIFT+TAB to move to the list box. Use , ↓, →, and ← to scroll to the item you want and press ENTER.

Tip   Press the first letter of the item you want in a list box to make 1-2-3 move the highlight to the first item that starts with that letter.

5. Select an item from a drop-down box:

Mouse   Click the arrow to open a drop-down box and click the item.

Keyboard   Hold down ALT and press the underlined letter in the drop-down box name or press TAB or SHIFT+TAB to move to the drop-down box. Press ALT+ or ALT+↓ to open the drop-down box and press   or ↓ until you reach the item you want. Press ALT+ or ALT+↓ to close the drop-down box.

6. Complete the command:

Mouse   Click OK.

Keyboard   Press ENTER.

1-2-3 carries out the command using the options and data you selected.

7. To close a dialog box without completing the command:

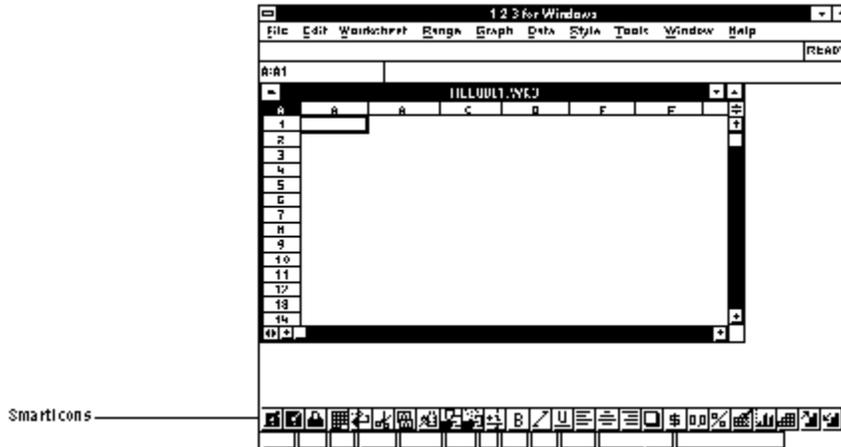**Mouse**   Click Cancel.

**Keyboard**   Press ESC.

Using SmartIcons

Topic

You can select commonly used commands and macros by clicking SmartIcons™ on the icon palette. The illustration below shows the SmartIcons when a Worksheet window is active.

To display a description of one of the SmartIcons, position the mouse pointer on the icon and press the right mouse button. The description appears in the first line (the title bar) of the 1-2-3 window.

When a Graph window is active, 1-2-3 displays SmartIcons associated with graphs.
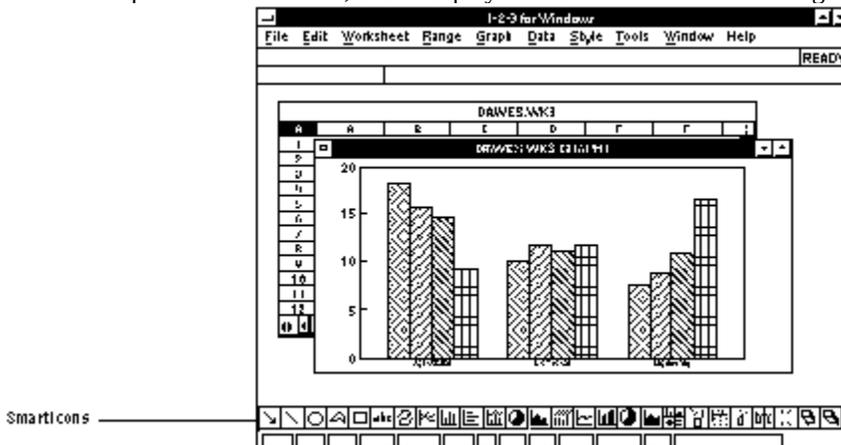
Use Tools SmartIcons to change the position of the icon palette in the 1-2-3 window and customize it. For example, you can change available SmartIcons and assign a macro to a custom SmartIcon.

> **Help**   For information about available SmartIcons, choose Help Contents and select **SmartIcons** (under Reference). For information about changing available SmartIcons and assigning a macro to a custom SmartIcon, choose **Tools SmartIcons Customize** and press F1 (HELP). If you are not sure how to use Help, see **"Using Help"**.

To use SmartIcons

Mouse

1. If the SmartIcon acts on a range, select the range.

2. Click the SmartIcon.

1-2-3 carries out commands that affect ranges without displaying a dialog box. Other SmartIcons display a dialog box or carry out some other action.

Note   You cannot select SmartIcons with the keyboard.

To change the position of the icon palette

1.   Choose Tools SmartIcons.
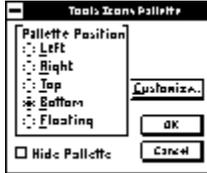
2.   Under Palette position, select one of the following:

Bottom -- Positions the icon palette horizontally at the bottom of the 1-2-3 window.

Floating --   Lets you move the icon palette to any position on the screen and resize it to display more or fewer icons.

Left -- Positions the icon palette vertically on the left side of the 1-2-3 window.

Right -- Positions the icon palette vertically on the right side of the 1-2-3 window.
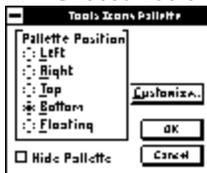
Top -- Positions the icon palette horizontally at the top of the 1-2-3 window.

3.   Select OK.

1-2-3 displays the icon palette in the new position.

To hide the icon palette

1.   Choose Tools SmartIcons.

2.   Select Hide palette.

3.   Select OK.

1-2-3 removes the icon palette from the screen.

Using the 1-2-3 Classic window

You can also use the 1-2-3 Classic window, which is the 1-2-3 Release 3.1 menu or the Wysiwyg menu. To use the 1-2-3 Release 3.1 menu, press / (slash) or < (less-than symbol) with 1-2-3 in READY mode. 1-2-3 displays the 1-2-3 Release 3.1 main menu in the 1-2-3 Classic window at the top of the 1-2-3 window. The 1-2-3 Release 3.1 main menu looks like this.

To use the Wysiwyg menu, press : (colon) with 1-2-3 in READY mode. 1-2-3 displays the Wysiwyg menu in the 1-2-3 Classic window at the top of the 1-2-3 window. The Wysiwyg main menu looks like this.

> **Tip**   You can move the 1-2-3 Classic window to a different location in the 1-2-3 window. 1-2-3 displays the 1-2-3 Classic window in the new location each time you press / (slash), < (less-than symbol), or : (colon). For more information about moving a window, see **"To move a window"**.

You work with the 1-2-3 Release 3.1 menu or Wysiwyg menu just as you do when you use 1-2-3 Release 3.1. When you complete a command, the 1-2-3 Classic window disappears.

> **Note**   You cannot use the mouse to choose commands in the 1-2-3 Classic window.

For more information on using 1-2-3 Release 3.1 commands in 1-2-3 for Windows, see **Chapter 5** of *Quick Start for 1-2-3 Upgraders*.

Selecting data for a command

Most commands require that you specify data for the command to act on. You can specify data for a command by entering a range name or range address in the dialog box, or by selecting data in the worksheet with the mouse or keyboard.

It is often easier to select data *before* you begin a command. 1-2-3 displays the address of the current selection in a text box in a dialog box. If you select data before you choose a command, the data remains selected after the command is completed. This means you select data only once and can perform several commands on it.   For example, you might select a row of values, format them as currency with Range Format, and copy the range with Edit Quick Copy. For each command, you need only confirm the selection in the dialog box.

For more information about selecting data, see **"Selecting a range"** in Chapter 2.

Help   For Help about selecting ranges, choose Help Contents, select Ranges, and select **Range Basics.** If you are not sure how to use Help, see **"Using Help"**.

Moving a dialog box

Sometimes dialog boxes cover a part of the worksheet or graph that you want to see. You can move dialog boxes so they do not block data.

To move a dialog box

Mouse

1. Move the mouse pointer to the dialog box title bar and click and hold down the mouse button.

2. Drag the dialog box to its new location.

3. When you have positioned the dialog box where you want it, release the mouse button.

Keyboard

1. Press ALT and then press space bar to display the Control menu for the dialog box.

2. Choose Move.

3. Use , ↓, →, and ← to move the dialog box.

4. Press ENTER to anchor the dialog box.

Canceling a command

You can cancel a command at any stage.

To cancel a command

Mouse

1.   Click outside the menu or click the Cancel command button in a dialog box.

Keyboard

1.   Press ESC or CTRL+BREAK.

When you cancel a command, 1-2-3 returns the worksheet to the condition it was in when you chose the command.

> **Tip**   1-2-3 also lets you use Edit Undo to cancel many commands and actions even after you confirm them. For more information about Edit Undo, see **"Undoing actions"** in Chapter 2.

You use the File commands to open new and existing worksheet files. Opening a file lets you work in it. You can have several files open at a time, but you can work in only one file at a time.

When you open a worksheet file, 1-2-3 displays it in a Worksheet window.

Note   To close a file, choose File Close.

To open a new file

1.   Choose File New.

1-2-3 opens a new worksheet file, supplies a default file name for the new file, and displays it in a Worksheet window. The first default file name is FILE0001.WK3, the next default file name is FILE0002.WK3, and so on. 1-2-3 increases the number in the file name by one for each new file that uses the default name.

Tip   You can change the name of a file to something other than the default file name, by using File Save As to save the file. For more information about saving a file with File Save As, see **"Saving a worksheet file"** in Chapter 2.

To open an existing file

1.   Choose File Open.

2.   Specify the name of the file you want to open.

Edit the file name in the File name text box or use the Files, Directories, and Drives lists boxes to select the file you want.

Help   For more information about specifying file names, choose Help Contents, select How Do I?, select S from the alphabet, and then select **Specifying a File.** If you are not sure how to use Help, see **"Using Help"**.

3.   Select OK.

1-2-3 opens the file in a Worksheet window and makes it the active window. Other windows remain open.

If you specify the name of a file that is password protected in step 2, 1-2-3 asks you to enter the password. If someone else is using the file and has the file reservation, 1-2-3 asks whether you want to open the file with read-only access. For more information about file passwords, see **"Limiting access to data"** in Chapter 9.

Help   For more information about file reservations, choose Help Contents, select 1-2-3 Main Menu (under Commands), select File, and select **Administration.** If you are not sure how to use Help, see **"Using Help"**.

Within the 1-2-3 window, you can move a window, change the size of a window, open and close a window, and arrange how 1-2-3 displays Graph, Transcript, and Worksheet windows. You manage windows either with a mouse, with the Window commands, or with each window's **Control menu**.

The Control menu lets you move the window, change its size, or close it. The Control menu for the 1-2-3 window also gives you access to the Windows Switch To command, which lets you switch to a different application by using Windows Task List.
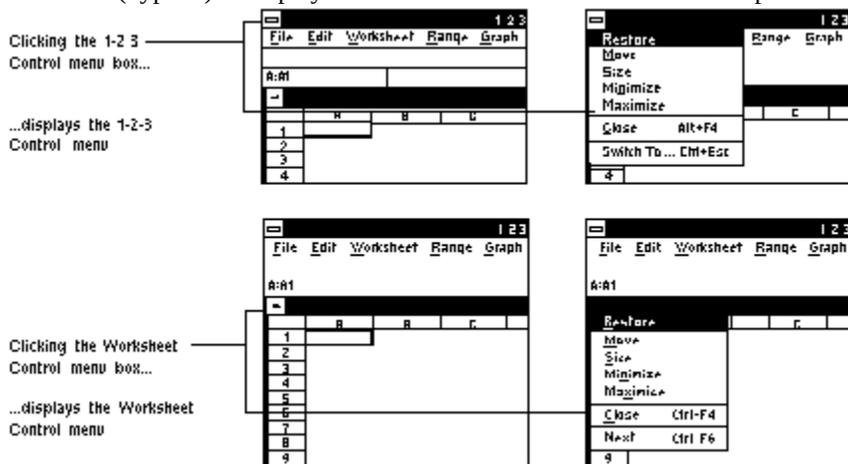
To display a Control menu

Mouse

1. Click the Control menu box in the top left corner of the window.

Keyboard

1. Press ALT and then press space bar to display the Control menu for the 1-2-3 window or a dialog box, or press ALT+ - (hyphen) to display the Control menu for a window that is open in the 1-2-3 window.
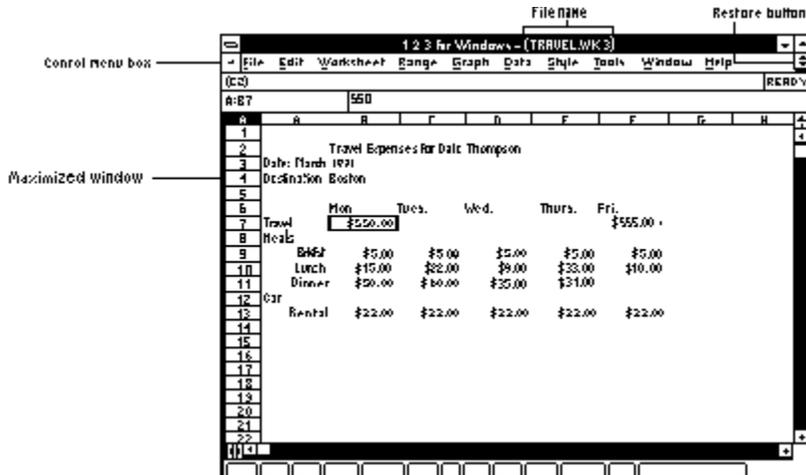
Moving a window lets you change the position of the window on the screen.

Changing the size of a window lets you see more or less of the contents of the window, depending on your needs. For example, if you want to see as much worksheet data as possible, you can **maximize** the window so you can see more data. If you need to work in another Windows application, but you want 1-2-3 to remain open, **minimize** the 1-2-3 window so that it appears as an icon in the bottom left corner of the screen. Finally, after you maximize or minimize the window, you can restore the window to its original shape and size.

   Tip   The mouse is usually the simplest and most efficient way to adjust the window.

The Window commands let you adjust many aspects of a window. You can split worksheets into vertical or horizontal panes, display three-dimensional (3-D) worksheet files in perspective view, change display options, change the active window, and arrange open windows as **tiles** (side-by-side like floor tiles, with the active window in the top left corner) or in a **cascade** (with the active window on top and only the title bars of each underlying window visible).

To display the Window menu, choose Window from the 1-2-3 main menu.

Help For more information about splitting windows, displaying a 3-D worksheet file in perspective view, or changing window display options, choose Help Contents, select 1-2-3 Main Menu (under Commands), and select **Window.** If you are not sure how to use Help, see **"Using Help"**.

To make a window active

Mouse

1. Click anywhere in the window.

Keyboard

1. Choose Window.

2. Select the window name.

> **Tip** Press CTRL+F6 to make the next Worksheet, Graph, or Transcript window active.

To maximize a window

Mouse

1. Click the Maximize button.

Keyboard

1. Make the window active.

2. Press ALT+ - (hyphen) to display the Control menu.

3. Choose Maximize.

After you maximize a window, the Maximize button becomes the Restore button. 1-2-3 displays the Control menu box for a maximized window in the menu bar, removes the window title bar, and displays the file name in the 1-2-3 window title bar.

To restore a maximized window

Mouse

1. Click the Restore button.

Keyboard

1. Press ALT+ - (hyphen) to display the Control menu.

2. Choose Restore.

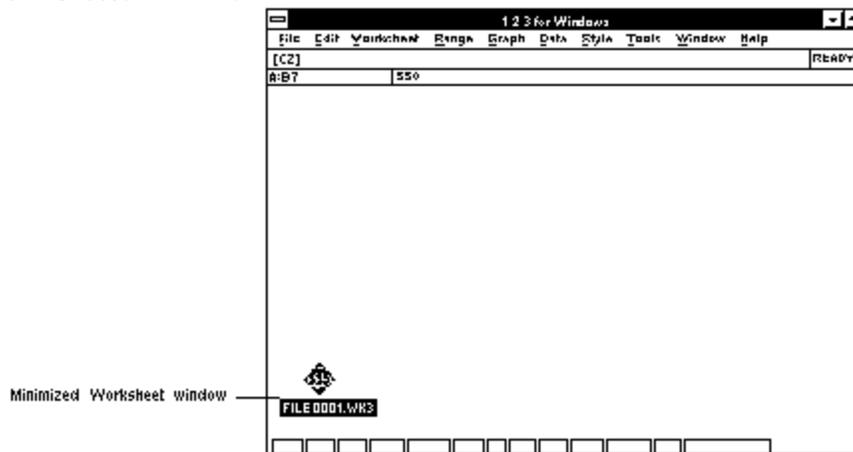1-2-3 displays the window in its original position and size.

To minimize a window

Mouse

1. Click the Minimize button.

Keyboard

1. Make the window active.

2. Press ALT+ - (hyphen) to display the Control menu.

3. Choose Minimize.

To restore a minimized window

Mouse

1. Double-click the minimized window.

Keyboard

1. Make the window active.

2. Press ALT+ - (hyphen) to display the Control menu.

3. Choose Restore.

    1-2-3 restores the window to its original size and shape and makes it the active window.

To adjust the window size

Mouse

1. Move the mouse pointer to a window border. The mouse pointer changes to a white two-headed arrow.

2. Click and hold down the mouse button and drag the window border or corner.

    Dragging a border expands or contracts the window either vertically or horizontally. Dragging a corner expands or contracts both dimensions of the window simultaneously.

3. Release the mouse button to anchor the border.

    The window size changes as you drag the borders.

Keyboard

1. Make the window active.

2. Press ALT+ - (hyphen) to display the Control menu.

3. Choose Size.

4. Resize the window:

    Press → or ← to select the right border or left border, and then use → and ← to move the border.

    Press ↓ or to select the bottom or top border, and then use and ↓ to move the border.

5. Press ENTER to finish sizing.

    The window size changes as you move the borders.

To move a window

Mouse

1. Move the mouse pointer to the title bar and press the mouse button.

2. Drag the window to any location.

3. Release the mouse button to anchor the window.

Keyboard

1. Make the window active.

2. Press ALT+ - (hyphen) to display the Control menu.

3. Choose Move.

4. Use , ↓, →, and ← to move the window.

5. Press ENTER to anchor the window.

To cascade windows

1. Choose Window Cascade

   1-2-3 arranges the open Worksheet, Graph, and Transcript windows in a cascade that goes up and to the left, with the active window displayed first. Subsequent windows appear behind and above the windows in front, so that only the title bars are visible.
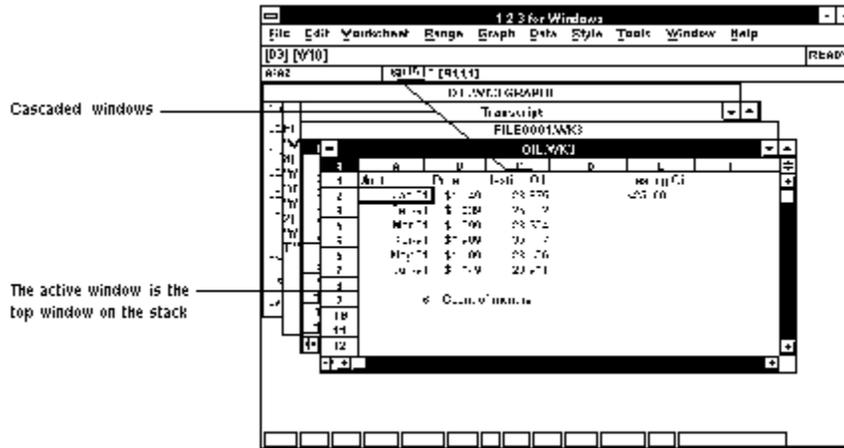
To tile windows

1. Choose Window Tile.

   1-2-3 arranges the open Worksheet, Graph, and Transcript windows as tiles and displays the active window in the top left corner.
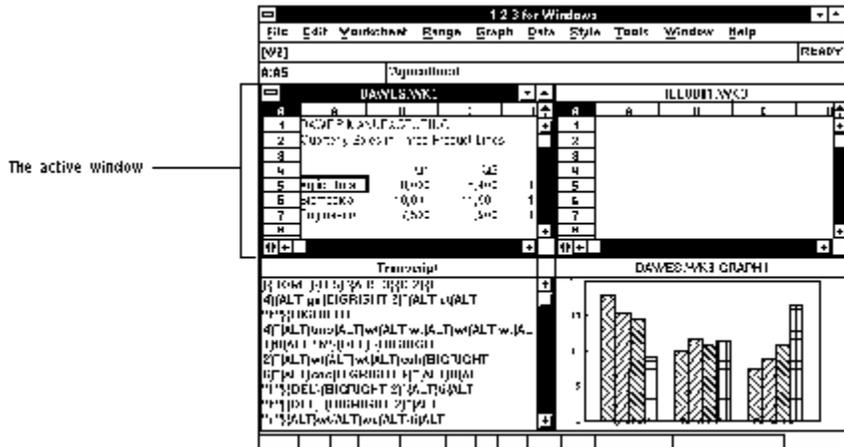
To close a window

Mouse

1. Double-click the Control menu box in the window.

Keyboard

1. Make the window active.

2. Press CTRL+F4.

If you close a Worksheet window and do not save changes, a prompt asks if you want to save the changes.

You can use some keys on your keyboard to perform special 1-2-3 operations. The accelerator keys perform tasks you can also perform with a command. The function keys perform different operations depending on whether you press only the function key, or you press the function key with ALT or CTRL simultaneously.

> **Note**   1-2-3 also has pointer-movement keys, which move the cell pointer around the worksheet; worksheet navigation keys, which move the cell pointer between worksheets in the current file; and file navigation keys, which move the cell pointer between active files. For information about the pointer-movement keys, see **"Moving around the worksheet"** in Chapter 2. For information about the worksheet navigation keys, see **"Moving around multiple worksheets"** in Chapter 2. For information about the file navigation keys, see **"Moving to another worksheet file"** in Chapter 10.

> **Help**   For information about editing keys, dialog box keys,   Control menu keys, and special keys, choose Help, then select **Keyboard** (under Reference). If you are not sure how to use Help, see **"Using Help"**.

Accelerator keys

Accelerator keys perform tasks you can also perform with a command.

ALT+BACKSPACE reverses the effect of the most recently executed command or action that you can undo. ALT+BACKSPACE is equivalent to Edit Undo.

ALT+F4 ends the 1-2-3 session, prompts you to save any unsaved files, and returns you to the Windows Program Manager. ALT+F4 is equivalent to File Exit.

CTRL+INS copies selected data and related formatting from the worksheet to the Clipboard. CTRL+INS is equivalent to Edit Copy.

CTRL+ a letter runs a macro. This is true if the macro's name consists of a \ (backslash) and a letter. CTRL+ a letter is equivalent to Tools Macro Run.

DEL deletes the contents of selected cells without using the Clipboard. DEL is equivalent to Edit Clear.

> **Caution**   DEL permanently deletes data. However, you can restore the data you deleted if you use Edit Undo before you perform another action.

SHIFT+DEL cuts selected data and related formatting from the worksheet to the Clipboard. SHIFT+DEL is equivalent to Edit Cut.

SHIFT+INS copies data and related formatting from the Clipboard to a selected location in the worksheet. SHIFT+INS is equivalent to Edit Paste.

Function keys

1-2-3 uses the function keys to perform special operations. The function keys perform different operations depending on whether you press only the function key, or you press the function key with ALT or CTRL

F1 (HELP) opens the Help window and displays context-sensitive Help. For more information, see **"Using Help"**.

F2 (EDIT) puts 1-2-3 in EDIT mode, which lets you edit cell entries.

F3 (NAME) displays a list of names related to the command you chose or the formula you are creating. To choose a name from the list, use or ↓ to highlight it and press ENTER, or double-click it with the mouse button.

You can use F3 (NAME) at the following times:

- When specifying a range in a text box, press F3 (NAME) to display a list of range names in the current worksheet file and the names of other open files.

- When entering a formula, press F3 (NAME) after specifying a cell or range address to replace the address with the

corresponding range name. If the specified cell or range has no range name, or if it has more than one name, 1-2-3 displays a complete list of range names when you press F3 (NAME).

- When entering a formula, press F3 (NAME) after typing any operator (for example, + & ^ #AND# or ;) to display a list of range names in the current worksheet file and the names of other active files.

- When entering an @function, press F3 (NAME) after entering @ in the edit line to display a list of @functions.

- When entering a macro command, press F3 (NAME) after entering { (open bracket) to display a list of macro commands.

- When in POINT mode or VALUE mode, press F3 (NAME) to display a list of named ranges.

F4 in READY mode anchors the cell pointer so you can specify a range. For more information, see **"Selecting a range"** in Chapter 2.

F4 (ABS) in EDIT, POINT, and VALUE modes, changes the cell or range reference in formulas from relative to absolute to mixed.

F5 (GOTO) moves the cell pointer to a specific cell or named range, another worksheet in the same file, or another active file.

F6 (PANE) moves the cell pointer between worksheet panes you create with Window Split Horizontal and Window Split Vertical or between worksheets you display in perspective view with Worksheet Split Perspective.

F7 (QUERY) repeats the most recent Data Query Extract or Find command. During a Data Query Find command, F7 (QUERY) switches 1-2-3 between FIND mode and READY mode.

F8 (TABLE) repeats the last Data What-if Table command you selected.

F9 (CALC) updates all formulas in all active files, except for formulas that refer to worksheet files on disk.

F10 (MENU) makes the menu bar active. F10 (MENU) is equivalent to ALT.

ALT+F1 (COMPOSE) creates characters in 1-2-3 that are not on your keyboard.

ALT+F2 (STEP) switches STEP mode on and off for debugging macros in the Macro Trace window.

ALT+F3 (RUN) displays a list of macros to run.

ALT+F6 (ZOOM) enlarges the current horizontal, vertical, or perspective pane to the full size of the window or shrinks it to its original size.

ALT+F7 (ADD-IN 1), ALT+F8 (ADD-IN 2), and ALT+F9 (ADD-IN 3) start an available 1-2-3 add-in assigned to the key.

Using Help

1-2-3 has online help you can display in a Help window. You can resize and move the Help window and keep it open while you continue to work in a Worksheet, Graph, or Transcript window. For example, you can display a procedure in the Help window, then perform the procedure in a Worksheet window, leaving the Help window open and available to use later.

Help contains information that is not available in the printed documentation. For example, Help is the primary source of information about 1-2-3 @functions and macros. It also includes comprehensive procedural information about every 1-2-3 command.

Help offers a number of special features that enhance its use. For example, you can

- Search for topics

- Print Help topics

- Add your own comments to a Help topic

- Copy the text of a Help topic to the Clipboard and paste it in another window or application

- Place bookmarks in topics you refer to frequently

- See definitions and examples in pop-up boxes

- Backtrack through Help topics you viewed

- Browse through sets of Help topics

The sections below describe some basic procedures for accessing and using Help. For detailed information about using 1-2-3 Help, choose Help Using Help from the 1-2-3 main menu.

> **Note**   If you choose Help Using Help from the Help window menu, control switches from 1-2-3 Help to Windows Help. To return to 1-2-3 Help, select the Index button in the Help window.

To get Help

You press F1 (HELP) to get help that is directly related to what you are currently doing in 1-2-3. For example,

- If you choose a command or display a dialog box and then press F1 (HELP), Help displays a Help screen with information about the command or dialog box.

- If you type @ and press F1 (HELP), Help displays the @Function Index. If you type @ followed by an @function name and an ((open parenthesis) and press F1 (HELP), Help displays the Help screen that describes the @function whose name you typed. For example, type @SUM(and press F1 (HELP) to display the Help screen that describes @SUM.

- If you type { and press F1 (HELP), Help displays the Macro Command Index. If you type { followed by a macro command keyword and   press F1 (HELP), Help displays the Help screen that describes the macro command whose keyword you typed. For example, type {BRANCH and press F1 (HELP) to display the Help screen that describes {BRANCH}.

- If you press F1 (HELP) while 1-2-3 displays a message, 1-2-3 displays the Help screen related to that message.

You can choose Help from the main menu and select a command from the Help pulldown menu.
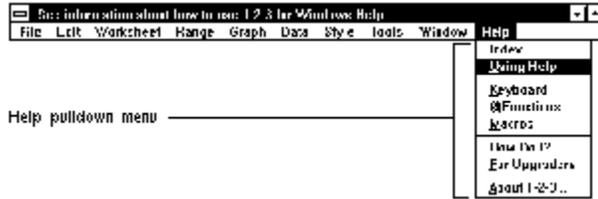
Help pulldown menu

The Help pulldown menu includes the commands below.

Command	Task
About 1-2-3	Provides information about 1-2-3, including version number, copyright notice, and the cell address of a circular reference.
@Functions	Provides information about how to use @functions, and a complete description of each 1-2-3 @function.
For Upgraders	Displays tables showing the 1-2-3 for Windows command that corresponds to a command in 1-2-3 Release 3.1.
How Do I?	Displays a list of common 1-2-3 tasks and provides information about each one.
Index	Displays all the categories of Help topics, including commands, terms, tasks, and messages. You can get to any part of the 1-2-3 Help system from the Help Index.
Keyboard	Provides information about 1-2-3 function keys, accelerator keys, and navigation keys.
Macros	Provides information about how to create and use macros, and a complete description of each 1-2-3 macro command and key name.
Using Help	Provides information about how to use 1-2-3 for Windows Help.

To view the Help window and the 1-2-3 window together

You can view the Help window together with the 1-2-3 window. In this way, you can work in the 1-2-3 window and view Help at the same time.

To view the Help window and the 1-2-3 window together, resize and arrange the windows so they both remain fully visible. For example, you can display the Help window in the right half of the screen and the 1-2-3 window in the left half, as shown below.
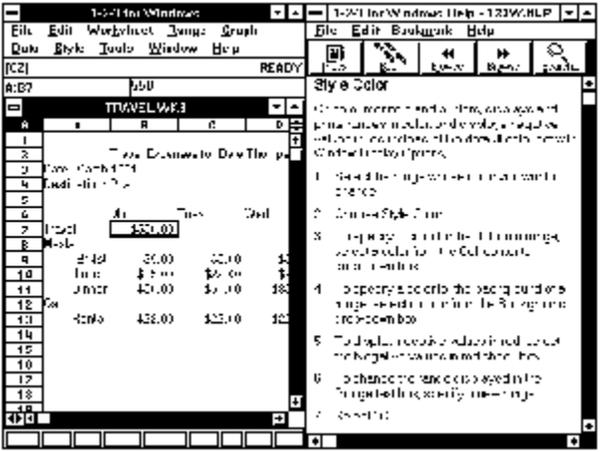
Help   For more information about viewing the Help window and the 1-2-3 window together, choose Help Using SmartHelp, select Using Help, and then select **Viewing 1-2-3 and Help Together on the Screen.**

To go to a cross-reference

Each Help screen includes cross-references, which appear in green and have a solid underline, to additional Help topics.

Mouse

1.   Point to a word or phrase that appears in green and has a solid underline.

   The mouse pointer changes to the pointing hand icon.

2.   Click the mouse button.

Keyboard

1.   Press TAB to move the highlight to a word or phrase that appears in green and has a solid underline.

2.   Press ENTER.

To use the Help buttons

The Help window displays five Help buttons in the Help icon bar at the top of the window, as shown below.

1.   Choose a Help button.

   Mouse   Click a button.

   Keyboard   Press the underlined letter for the button.

The Help buttons perform many tasks.

Help Button	Task
Back	Displays the last topic you viewed. You can move back through each topic, one at a time. When you are at the first topic you viewed, the button is dimmed.
Browse (backward)	Displays the previous topic in a predetermined series of related topics. When you are at the first topic in a series, the button is dimmed.
Browse (forward)	Displays the next topic in a predetermined series of related topics. When you are at the last topic in a series, the button is

dimmed.

Index	Displays a list of Help topics, from which you can gain access to all parts of Help.
Search	Lists all of the Help keywords for 1-2-3. Enter or select a keyword to search for and go to specific Help topics.

To use the Help commands

When the Help window is active, the Help menu bar displays the Help window commands.

The Help window commands perform the tasks below.

Command	Task
Bookmark	Places bookmarks in and removes bookmarks from Help topics. You use a bookmark to mark a specific Help reference.
Edit	Copies Help text to the Clipboard and adds annotations to Help text.
File	Opens Help files, prints Help topics, sets printer options, and closes Help.
Help	Switches control from 1-2-3 Help to Windows Help and displays information about using Windows Help. To return to 1-2-3 Help from Windows Help, select the Index button.

Help   For more information about the Help window commands, choose Help Using SmartHelp from the 1-2-3 main menu, select Using Help, and then select **Help Window Commands.**

To search for a Help topic

You can make Help search for topics associated with a keyword or phrase. For example, you can make Help display all of the topics associated with macros by searching on the keyword "Macro."

1. Display the Search dialog box:

Mouse   Click the Search button in the Help icon bar.

Keyboard   Press S.

2. Enter the word or phrase you want to find in the Search For text box or select a word or phrase from the list of keywords.

As you enter a word in the Search For text box, the list box scrolls automatically to those keywords that most closely match what you are entering in the text box. For example, if you type ma in the text box, the list box moves to the keywords beginning with the letters ma (or to the closest match alphabetically).

3. Select Search.

4. Select a topic from the Topics Found list box.

5. Select Go To:

Mouse Click Go To.

Keyboard Press ENTER.

Help For more information about searching for a Help topic, choose Help Using SmartHelp from the 1-2-3 main menu, select Using Help, and then select **Using Search.**

To display a definition or example

You can display the definition of a word or phrase that appears in green and has a dotted underline. You can display an example that illustrates a word or phrase that follows the word Example, and appears in green and has a dotted underline.

Mouse

1. Point to a word or phrase that appears in green and has a dotted underline.

The mouse pointer changes to the pointing hand icon.

2. Click and hold down the mouse button.

Help displays a definition or example in a pop-up box. The pop-up box disappears when you release the mouse button.

Keyboard

1. Press TAB to move the highlight to a word or phrase that appears in green and has a dotted underline.

2. Press and hold down ENTER.

Help displays a definition or example in a pop-up box. The pop-up box disappears when you release ENTER.

Tip To display a definition in the Help window rather than a pop-up box, choose Help Contents, select Glossary, and select the term.

To exit Help

1. Choose File Exit from the Help window menu.

Tip You can also exit Help by double-clicking the Help Control menu box, pressing ALT+F4 while the Help window is active, or choosing Close from the Help Control menu. All of these methods are the same as choosing File Exit from the Help window menu.

Ending 1-2-3 for Windows

When you end a 1-2-3 session, 1-2-3 removes all active files from memory (but does not delete the files from your disk) and redisplays the Windows Program Manager window.

To end a 1-2-3 for Windows session

1. Make sure that you save any changes you want to active files.

2. Choose File Exit.

   Tip   You can also end a 1-2-3 session by double-clicking the 1-2-3 Control menu box, pressing ALT+F4 while the 1-2-3 window is active, or choosing Close from the 1-2-3 Control menu. All of these methods are the same as choosing File Exit.

3. If 1-2-3 indicates that active files changed and asks whether you want to save changes, select one of the following options:

   Cancel -- Does not end the session.

   No -- Ends the session without saving changes.

   Yes -- Saves the changes and ends the session.

This chapter describes the 1-2-3 for Windows worksheet and how to work with it.

What is a 1-2-3 worksheet?
Moving the cell pointer
Viewing other worksheets
Selecting a range
Using GROUP mode for a file
Entering numbers and text
Entering a date
Entering a time
Editing data
Copying data
Moving data
Removing data
Naming ranges
Inserting columns, rows, and worksheets
Undoing actions
Saving a worksheet file

This chapter describes the 1-2-3 for Windows worksheet and how to work with it.

Saving a worksheet file

To save the current worksheet file

What is a 1-2-3 worksheet?

The **1-2-3 worksheet** is an electronic spreadsheet that consists of a grid of columns and rows. There are 256 columns, labeled A through Z, AA through AZ, BA through BZ, and so on to IV; there are 8,192 rows, labeled 1 through 8192.

The illustration below shows some parts of the worksheet.
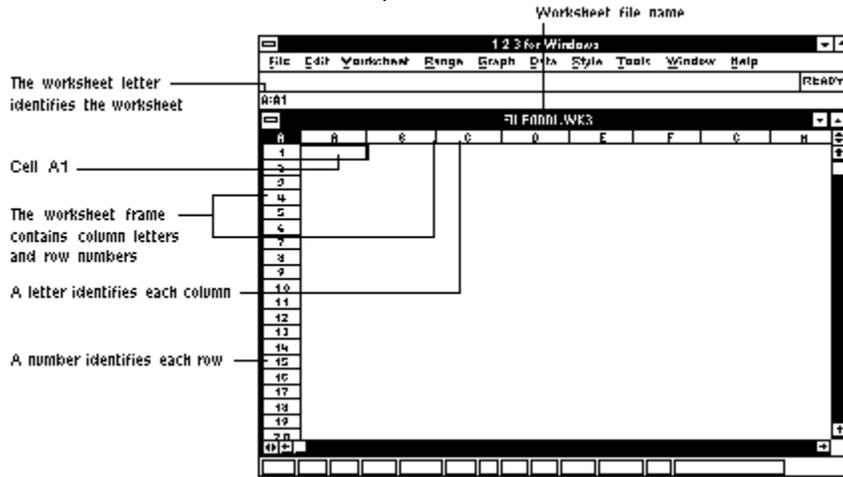
Each 1-2-3 worksheet file can include as many as 256 worksheets. The worksheets are labeled in the same way as columns, A through IV. Unless you display more than one worksheet, the window displays only the **current worksheet --** the worksheet you are currently using.

Cells (the intersections of columns and rows) are where you enter and store data in a worksheet. For example, cell C4 is the intersection of column C and row 4. C4 is called the **cell address**.

A full cell address includes the worksheet letter followed by a : (colon). For example, A:C4 is the address of cell C4 in worksheet A.

The rectangular highlight in the worksheet is the **cell pointer**. The cell pointer marks the **current cell** -- the cell that will store the next entry, or that the next command you choose will affect. You move the cell pointer from cell to cell to change the current cell. The address of the current cell appears in the address box, as illustrated below.
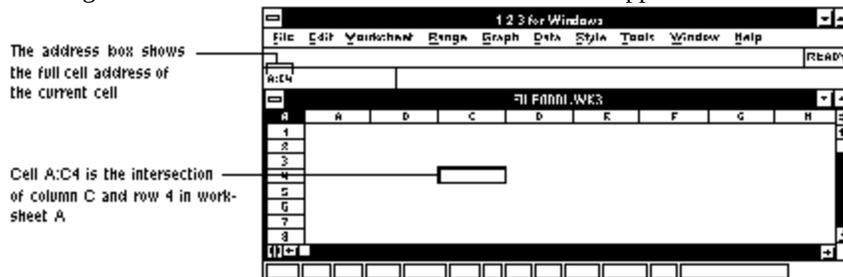
Before you can enter data in a cell or perform a command on a cell, you must select the cell. To select a single cell, you move the cell pointer to it.

To select a single cell

Mouse

1. Click the cell.

If the cell is not in view, use the scroll bars to move it into view, and then click it. If the cell is in another worksheet, use CTRL+PG UP or CTRL+PG DN to make the worksheet current, and then click the cell.
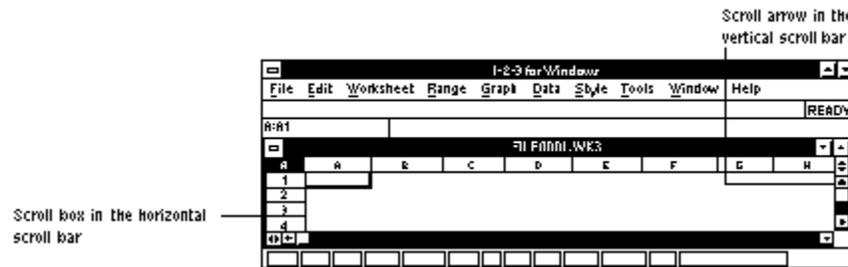
Tip   If you change to perspective viewing (described in **"Viewing other worksheets"**), you can click a cell in any visible worksheet.

Keyboard

1. Use , ↓, →, and ←, or other navigation keys to move the cell pointer to the cell.

Using the scroll bars

You use the horizontal and vertical scroll bars to move to a cell that is not in view.

The table below summarizes how to move around the 1-2-3 worksheet using a mouse and the scroll bars.

To move the cell pointer	Do this
Up or down one row	Click the up or down scroll arrow.
Left or right one column	Click the right or left scroll arrow**.**
One full screen to the left or right	Click the horizontal scroll bar to the left or right of the scroll box.
One full screen up or down	Click the vertical scroll bar above or below the scroll box.
To any position left or right	Drag the scroll box in the horizontal scroll bar.
To any position up or down	Drag the scroll box in the vertical scroll bar.
To cell A1, if column A is not hidden and worksheet titles are not set	Drag the scroll boxes to the far left of the horizontal scroll bar and to the top of the vertical scroll bar.

Moving around the worksheet

The table below summarizes how to move around the 1-2-3 worksheet using the keyboard.

Key	Effect
or ↓	Moves the cell pointer up or down one row.
← or →	Moves the cell pointer left or right one column.
CTRL+ or SHIFT+TAB	Moves the cell pointer one full screen to the left.
CTRL+→ or TAB	Moves the cell pointer one full screen to the right.
END or END ↓	Moves the cell pointer up or down the current column, to the next cell in the column that contains data and adjoins a cell above or below that does not contain data.
END ← or END →	Moves the cell pointer left or right in the current row, to the next cell in the row that contains data and adjoins a cell on either side that does not contain data.
END HOME	Moves the cell pointer to the bottom right corner of the worksheet's active area (the rectangular area between cell A1 and the lowest and rightmost cells that contain data in the worksheet).
HOME	Moves the cell pointer to cell A1, if column A is not hidden and worksheet titles are not set.
PG UP or PG DN	Moves the cell pointer up or down one full screen.

Moving around multiple worksheets

The table below summarizes the keys that move the cell pointer between worksheets in the current worksheet file. In most cases, cell-pointer movement stops at the end of the current worksheet file.

Key combination	Effect
CTRL+HOME	Moves the cell pointer to cell A:A1 in the current worksheet file, if worksheet A and column A are not hidden and worksheet titles are not set.
CTRL+PG DN	Moves the cell pointer to the previous worksheet, for example, from worksheet B to worksheet A.
CTRL+PG UP	Moves the cell pointer to the next worksheet, for example, from worksheet A to worksheet B.
END CTRL+HOME	Moves the cell pointer to the bottom right corner of the file's active area (the three-dimensional area between cell A:A1, the lowest and rightmost cells that contain data in the file, and the last worksheet that contains data in the file). For example, in a worksheet file that contains five worksheets, suppose B:D200 is the lowest, nonblank cell, C:AK200 is the rightmost, nonblank cell, worksheet D

contains data, and worksheet E is blank. In that file, END CTRL+HOME moves the cell pointer to D:AK200.

END CTRL+PG DN   Moves the cell pointer forward through worksheets in the current worksheet file. Staying in the same row and column, the cell pointer moves back to the next cell that contains data and is in front of or behind a blank cell.

For example, END CTRL+PG DN moves the cell pointer from F:A1 to D:A1 if E:A1 is blank and D:A1 contains data. The cell pointer stops at the first worksheet in the current worksheet file.

END CTRL+PG UP   Moves the cell pointer back through worksheets in the current worksheet file. Staying in the same row and column, the cell pointer moves back to the next cell that contains data and is in front of or behind a blank cell.

For example, END CTRL+PG UP moves the cell pointer from A:F5 to D:F5 if B:F5 and C:F5 are blank and D:F5 contains data. The cell pointer stops at the last worksheet in the current worksheet file.
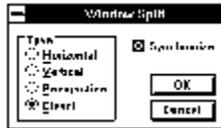
Viewing other worksheets

When you use CTRL+PG UP and CTRL+PG DN to move the cell pointer from one worksheet to another, one worksheet replaces the other. To see two or more worksheets at once in the window, change the window **perspective** so the window displays three worksheets at a time within the window.
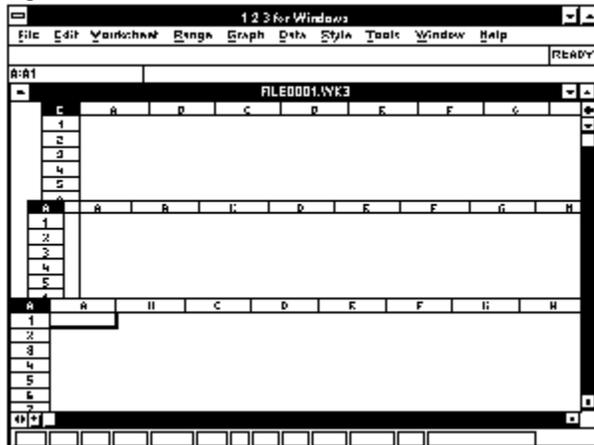
To change perspective

1. Choose Window Split.

2. Under Type, select Perspective.

3. Select OK.

The illustration below shows a Worksheet window in perspective view with worksheets A, B, and C displayed together.

To change back to a single-sheet view from perspective view, choose Window Split, select Clear, and select OK.

Selecting a range

A 1-2-3 **range** is a rectangular block of adjacent cells. A range can be as small as a single cell or as large as all the worksheets that make up a worksheet file. Ranges can be two-dimensional (2-D) -- entirely contained in one worksheet -- or three-dimensional (3-D) -- spanning two or more worksheets in a file. For example, the 2-D range C1..D2 contains cells C1, C2, D1, and D2 in a single worksheet; the 3-D range A:A1..C:C2 contains cells A1, A2, B1, B2, C1, and C2 in worksheets A, B, and C. A 3-D range always contains the same cells in each contiguous worksheet.
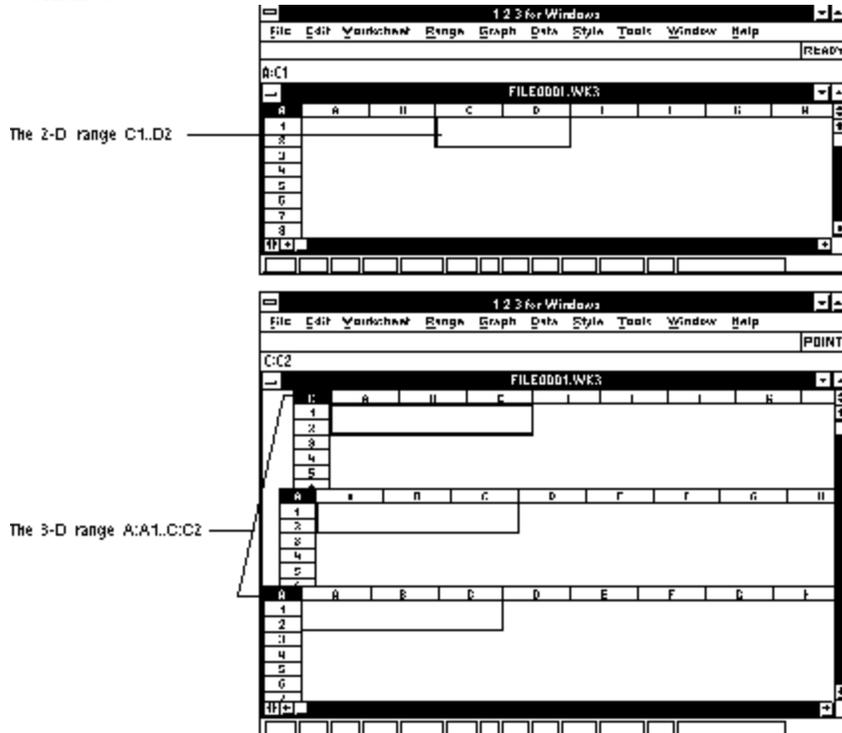
You can select a range either before you choose a command or, if you specify a range in the dialog box, after you choose a command.

If you select a range before you choose the command, the range remains selected after the command is complete. This lets you use several commands on the same data. For example, you might select a row of values, format them as currency with Range Format, change the color of the background with Style Color, and add shading with Style Shading. Finally, you might copy the same range with Edit Quick Copy.

If you do not select the range you want a command to act on *before* you choose a command that requires a range, you must specify the range in the text box in a dialog box by entering its name or address, or by selecting it with the mouse or keyboard. Specifying a range name or cell address in a text box (in a dialog box) selects the range for the command only. The range does not remain selected after the command is complete.

To select a 2-D range

1. Move the cell pointer to one corner of the range (the anchor cell).

For example, move the cell pointer to cell A:A1.

2. Anchor the cell pointer in the anchor cell:

Mouse   Press and hold the mouse button.

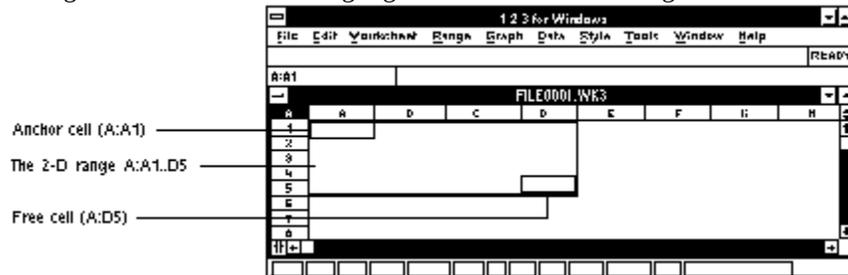**Keyboard**   Press F4 in READY mode.

3. Highlight the range by moving to the diagonally opposite corner or the free cell A:A5:

Mouse   Continue to hold the mouse button and drag the mouse pointer. Release the mouse button when the entire range is highlighted.

Keyboard   Use , ↓, →, and ← to move the free cell until you highlight the entire range. Press ENTER when the entire range is highlighted.

For example, drag the mouse pointer or move the free cell until you highlight the range A1..D5.

A range is selected when it is highlighted. You can use the range in commands.

To select a 3-D range

1. Choose Window Split, select Perspective, and select OK.
1-2-3 displays the worksheets in perspective view.

2. Move the cell pointer to one corner of the range (the anchor cell).
For example, move the cell pointer to cell A:A1.

3. Anchor the cell pointer in the anchor cell:

Mouse   Press and hold the mouse button.

Keyboard   Press F4 in READY mode.

4. Highlight the range by moving to the diagonally opposite corner (the free cell) in the current worksheet:

Mouse   Continue to hold the mouse button and drag the mouse pointer. Release the mouse button when the entire range is highlighted.

Keyboard   Use , ↓, →, and ← to move the free cell until you highlight the entire range.
For example, drag the mouse pointer or move the free cell until you highlight the range A:A1..A:C3.

5. Extend the selection to contiguous worksheets:

Keyboard   Press CTRL+PG UP or CTRL+PG DN. Press ENTER when you have highlighted the entire 3-D range.
For example, press CTRL+PG UP to extend the selection to include the range A:A1..C:C3 and press ENTER.

The range is highlighted in each of the contiguous worksheets.

The free cell (C:C3)

The 3-D range A:A1..C:C3

The anchor cell (A:A1)
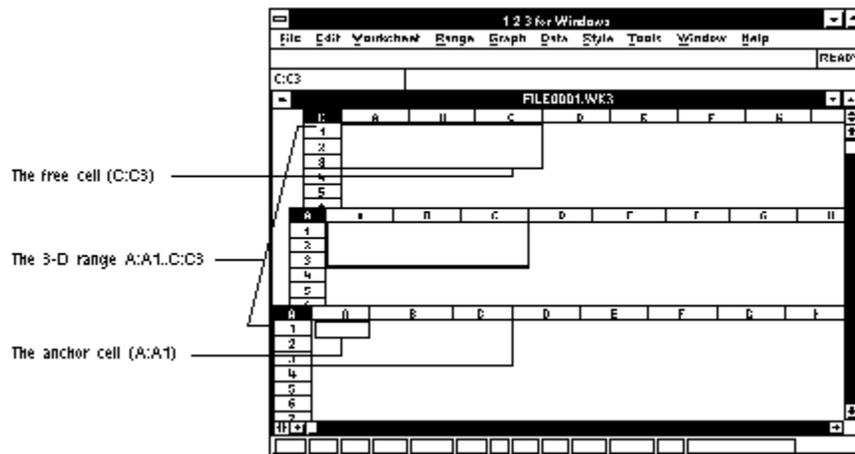
Using GROUP mode for a file

You can group together all the worksheets in a file by turning on GROUP mode for the file. When you turn on GROUP mode, 1-2-3 assigns the current worksheet's cell formats and settings to all worksheets in the current file and, as you move between worksheets in the file, keeps the cell pointer in the same cell in each worksheet. In addition, until you turn off GROUP mode, changes you make to one worksheet with any of the following commands affect every worksheet in the file: Range Format, Range Protect, Range Unprotect, Style Alignment, Worksheet Column Width, Worksheet Row Height, Worksheet Insert Row, Worksheet Insert Column, Worksheet Delete Row, Worksheet Delete Column, Worksheet Global Settings, Worksheet Page Break, or Worksheet Titles.

Use GROUP mode when you want all the worksheets in a file to look the same. For example, suppose you are setting up a multiple-sheet file, where each worksheet in the file contains expense figures for a different month. You can format one worksheet in the file and then, with the cell pointer in that worksheet, enable GROUP mode to format the remaining worksheets identically.

To turn on GROUP mode

1. Choose Worksheet Global Settings.

2. Select the Group mode check box.

1-2-3 displays a check in the check box.

3. Select OK.

The GROUP mode indicator appears in the status line.

Tip   Use Window Split Perspective to display three grouped worksheets simultaneously. Perspective viewing is useful when GROUP mode is on: Seeing other worksheets reminds you that some commands and actions affect data on other worksheets in the file.

To turn off GROUP mode

1. Choose Worksheet Global Settings.

2. Select the Group mode check box.

1-2-3 removes the check from the Group mode check box.

3. Select OK.

The GROUP indicator disappears from the status line and the current cell becomes the current selection.

Entering numbers and text

When you make an entry, the entry first appears in the contents box of the edit line. The I-beam shows where the next character will appear. You can enter up to and including 512 characters in a cell. When you confirm the entry, by pressing ENTER or by clicking the Confirm button, 1-2-3 displays the entry in the cell.
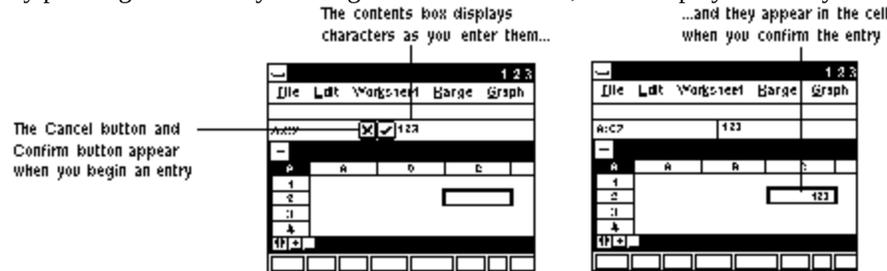
1-2-3 recognizes two types of entries: labels and values. Text is a **label** entry. A **value** entry is any number, formula, or @function. **Formulas** calculate or combine numbers and text. **@Functions** are built-in formulas that calculate with text and numbers.

The first character you enter tells 1-2-3 what type of entry you started, and the mode indicator displays either LABEL or VALUE. Entering a number or certain symbols   (such as   **+ - (. @ # $**   or any other currency symbol) signals a value. All other characters signal a label.

If the first character you enter signals a label entry, 1-2-3 inserts a **label-prefix character** before the first letter. Each of the label-prefix characters produces a different result, as shown in the table below.

Label prefix	Effect on label display
'	Aligns the label at the left of the cell (initial alignment for labels).
"	Aligns the label at the right of the cell.
^	Aligns the label at the center of the cell.
\	Repeats the characters in the label to fill the cell.
|	When used as a label prefix for a label in the first column of a print range, tells 1-2-3 not to print that row of data. If, however, the label is located elsewhere in a row (such as between other labels), 1-2-3 aligns the label at the left of the cell and prints it. The | (vertical bar) may appear as ¦ or | on your keyboard or screen. They both work in the same way.

Labels, by default, are left-aligned in cells; values are right-aligned. To change alignment for labels, choose Style Alignment. You cannot change the alignment for values.

> **Tip**   To enter a label that begins with a number or any other symbol that signals a value, start the entry with a label-prefix character.

Sometimes an entry is too large to fit in the cell. If the long entry is a label, 1-2-3 displays the entire label if cells to the right are blank, or displays only what will fit in the cell if the cells to the right contain entries. If a long entry is a value, 1-2-3 displays *** (asterisks) across the width of the cell. In both cases, 1-2-3 stores the entire entry in the

cell: It just cannot display it. To make the entire entry appear, you must widen the column, described in **"Changing a column width"** in Chapter 3.

To enter numbers or text

1. Select a cell:

Mouse   Click the cell.

Keyboard   Use , ↓, →, ← , or the other navigation keys to move the cell pointer to the cell.

2. Enter numbers or text.
As you begin the entry, characters appear in the contents box, the mode indicator changes to LABEL or VALUE, and the Confirm button and Cancel button appear.

3. Confirm the entry:

Mouse   Click the Confirm button.

Keyboard   Press ENTER or a navigation key.
1-2-3 enters the value or label in the cell. The mode indicator changes to READY.

You can enter dates as labels or as values. Enter dates as labels if you need to use them as text only: to identify a range of values, for example. Enter dates as values if you need to use them in calculations: to calculate the period between two dates, for example.

You enter a date as a label entry just as you enter any label entry. If the date begins with a number (for example, 1/20/79 or 20 January 1979), you must enter a label-prefix character, first, to make the date a label entry.

To enter a date as a value that you can use in calculations, you can enter the date in one of the following three ways:

- Enter a date @function that calculates the date number. For example, type @date(91,5,31) to enter the date number 33389.

- Enter the actual number. For example, to enter the date number for May 31, 1991, type 33389.

- Enter the date as it would appear in a cell formatted as day-month-year (Date format 1), day-month (Date format 2 -- 1-2-3 assumes the current year), or Long Intl Date (Date format 4). For example, type 31-May-91 to enter the date number May 31, 1991.

Each method calculates the date serial number for the date. A **date serial number** is an integer that represents a date between January 1, 1900 (date serial number 1) and December 31, 2099 (date serial number 73050). For example, to enter the date 31 May 1991 as a value, you could enter 33389, 3-May-91, or @DATE(91,5,31). All of these methods produce the date serial number 33389.

To display the date in a standard format, such as 5/31/91, use Range Format. For more information on formats, see **"Formatting numbers"** in Chapter 3.
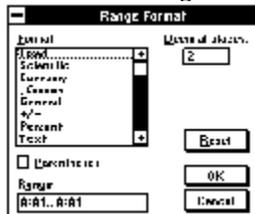
The section that follows shows how to enter the date February 14, 1991 and how to use Range Format to display it in a day-month-year format.

To enter a date

1. Select a cell.

2. Enter @date(91,2,14) or 14-feb-91 in the cell.

   The date number 33283 appears in the cell.

3. Choose Range Format.

4. Select 1: 31-Dec-90 from the Format list box.

5. Select OK.

   1-2-3 displays 14-Feb-91 in the cell.

   If the date is too long to fit in the cell, 1-2-3 displays *** (asterisks) instead. To display the date, widen the column. See **"Changing a column width"** in Chapter 3.

Times, like dates, can be either labels or values. To enter a time for use as text only, enter a label-prefix character and then enter the time. If you will need to use the time in a calculation, you must enter the time so 1-2-3 calculates its **time serial number**.

Time serial numbers are like date serial numbers, except they represent times of day. Time serial numbers are decimal numbers that range from .0 (12:00:00 AM) to .9999884 (11:59:59 PM).

You can enter times in three ways to calculate time serial numbers.

- Enter the time (in 24-hour format), and 1-2-3 will calculate the time serial number automatically. For example, to enter the time 7:30 AM, you type 7:30. To enter the time 2:33 PM, type 14:33.

- Use the @TIME @function. For example, to enter the time 7:30 AM, you type @TIME(7,30,0). To enter the time 2:33 PM, type @TIME(14,33,0) for 14 hours, 33 minutes, and 0 seconds after midnight.

- Enter the time as it would appear in a cell formatted as any Time format except 9 Short Intl Time when configured as hour.minutes. 1-2-3 translates the entry into the corresponding time number. For example, 11:59 PM corresponds to the time number .9993.

After you enter the time, the time serial number appears in the cell. To make it appear in a recognizable form, use Range Format.

> **Help**   For more information about time formats, choose Range Format, press F1 (HELP), and select **Time.** If you are not sure how to use Help, see **"Using Help"** in Chapter 1.
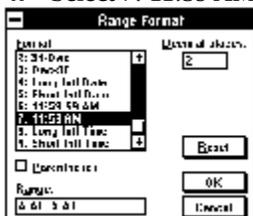
The section below shows how to enter the time so it is displayed as 02:33 PM.

To enter a time

1.   Select a cell.

2.   Enter @time(14,33,0), 14:33, or 2:33 PM in the cell.
The time serial number 0.60625 appears in the cell.

3.   Choose Range Format.
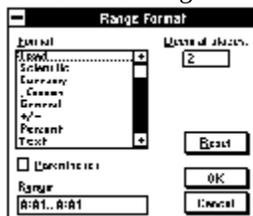
4.   Select 7: 11:59 AM from the Format list box.

5. Select OK.

The time appears in the cell as 02:33 PM.

Note If the time is too long to fit in the cell, 1-2-3 displays*** (asterisks) instead. To display the time, widen the column. See **"Changing a column width"** in Chapter 3.

You may need to modify worksheet entries to correct typing mistakes or to reflect changes to data. Editing an entry may involve deleting, inserting, or replacing characters. You also may use Edit Find to search for and replace entries in a range of data.

To edit as you make an entry

1. Press BACKSPACE to erase previous characters.

2. Enter replacement characters.

    When you correct an entry as you make it, erase and reenter the data. Do not use , ↓, →, and ← to move within the entry.

3. Press ENTER to confirm the corrected entry.

To replace a short entry

1. Select the cell you want to change.

2. Enter the new data.

3. Confirm the entry:

    Mouse   Click the Confirm button.

    Keyboard   Press ENTER.

To change an entry

1. Select the cell you want to change.

2. Switch to EDIT mode:

    Mouse   Click anywhere in the entry in the contents box.

    Keyboard   Press F2 (EDIT).

3. Move | (vertical bar) in the contents box to where you want to edit the entry:

    Mouse   Move the mouse pointer into the contents box. The mouse pointer changes to an I-beam. Move the I-beam to where you want to edit the entry and click the mouse button.

    Keyboard Use → or ← to move the | (vertical bar) to where you want to edit the entry.

    The | (vertical bar) marks the **insertion point** where you enter text in a contents box or text box.

4. Delete or insert the necessary characters.

    To delete characters, press BACKSPACE to delete characters to the left of the insertion point, or press DEL to delete characters to the right of the insertion point. You can also select characters by dragging across them while holding down the mouse button; press BACKSPACE or DEL to delete the selected characters, or enter new text to replace them.

    To insert characters, enter the new characters.

5. Confirm the entry:

    Mouse   Click the Confirm button.

    Keyboard   Press ENTER or a navigation key.

To find or replace an entry

1. Select the range or worksheets that contain the entry you want to find or replace.

2. Choose Edit Find.

3. Enter the characters you want to find in the Search for text box. You can enter up to 512 characters.

4. Select the action you want 1-2-3 to perform.

    Find -- Highlights occurrences of the characters in the search range.

    Replace with -- Replaces occurrences of the characters with the characters you enter in the Replace with text box.

5. (Optional) If you select Replace with, enter the replacement characters in the Replace with text box.

6. Select the kinds of entries you want to search through.

    Both -- Searches for the characters in cells that contain any kind of data.

    Formulas -- Searches for the characters only in cells that contain formulas and numbers.

    Labels -- Searches for the characters only in cells that contain labels.

7. To change the range in the Range text box, specify a new range.

8. To highlight the first occurrence of the search characters, select Find Next.

9. If you selected Find in step 4, select Find Next to highlight the next occurrence of the search characters.

10. If you selected Replace with in step 4, select one of the following options:

    Find Next -- Moves to the next occurrence of the search characters and does not replace the highlighted occurrence.

    Replace -- Replaces the highlighted characters with the replacement characters and highlights the next occurrence of the characters.

    Replace All -- Replaces, but does not display, all remaining occurrences of the search characters with the replacement characters.

11. To stop the search and return 1-2-3 to READY mode, select Cancel.

[»]
[»]

As you set up a worksheet, you often need to copy data. Edit Quick Copy copies a range of data from a single source to a destination in one or more worksheets or worksheet files. The source or destination can be a cell or range. Edit Copy and Edit Paste copy data to the Clipboard and insert it in a worksheet file or in another Windows application. The **Clipboard** is a Windows area (or buffer) that the Edit commands use to store data you cut or copy so you can paste that same data elsewhere.

Tip   Use File Combine From, File Import From, and File Extract To, respectively, to copy the contents of entire files, data from a **text file** (a file on disk in ASCII format) to a worksheet file, or large sections of data.

Help   For more information about File Combine From, File Import From, or File Extract To, choose Help Contents, select 1-2-3 Main Menu (under Commands), and select **File.** If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

To copy data using the Edit Quick Copy command

1.   Select a cell or range whose contents you want to copy.

For example, select the range A:A1..A:A5.
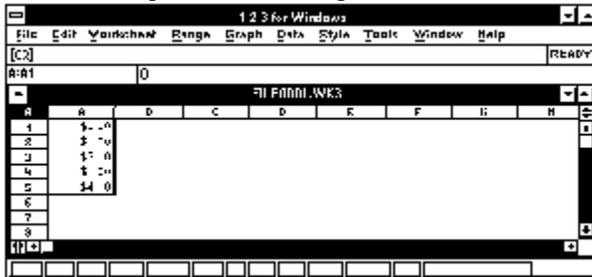
2.   Choose Edit Quick Copy.

3.   To change the cell or range to copy, specify another cell or range in the From text box.

You can edit the selection or specify a new selection if necessary.

4.   In the To text box, specify the range you want to copy to:

Mouse   Select the cell or range and click the Confirm button.

Keyboard   Enter the cell address or name in the To text box, or use the navigation keys to select the range in the Worksheet window and press ENTER.

For example, specify cell A:B1 in the To text box.

To make one copy of the From range, specify only one cell as the To range. To make more than one copy of a single cell, row, column, or sheet, specify a range of cells as the To range.

Caution If you copy data to a location that already contains data, 1-2-3 replaces the existing data with the new data. Press ALT+BACKSPACE or choose Edit Undo, immediately, to retrieve the lost data. See **"Undoing Actions"**.

5. (Optional) If you want to copy only formatting done with the Style commands, select the Styles only check box.

6. (Optional) If you want to copy data and replace any copied formulas with their current values, select the Convert to values check box.

7. Select OK.

   1-2-3 copies the data from the From range to the To range.
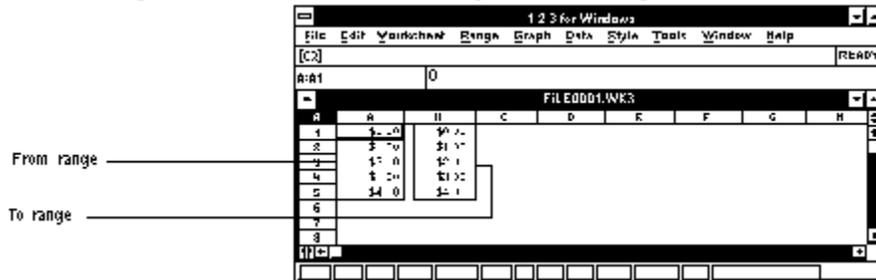
When you use Edit Quick Copy, 1-2-3 leaves the From range in the worksheet unchanged and copies the data to the To range in the worksheet. Unless you select the Styles only or Convert to values check box, 1-2-3 copies the data, including cell formats, protection setting, and styles to the new location.

What happens when you copy between worksheet locations depends on the relative sizes of the From range and To range and whether you are copying between ranges or worksheets. For example,

• If you copy from a single cell to a range, 1-2-3 puts a copy of the From range in each cell in the destination.
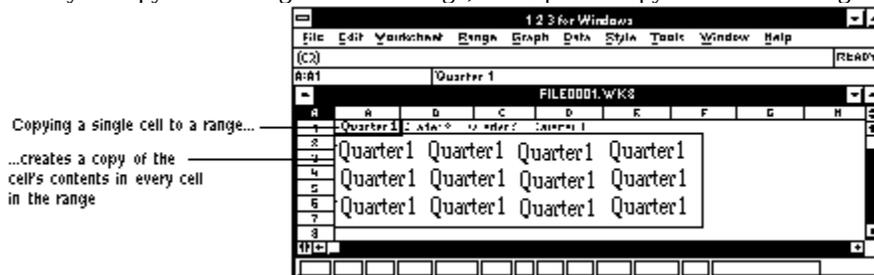
• If you copy from a range to a single cell, 1-2-3 copies the entire range, using the single cell as the top left corner cell of the new location.
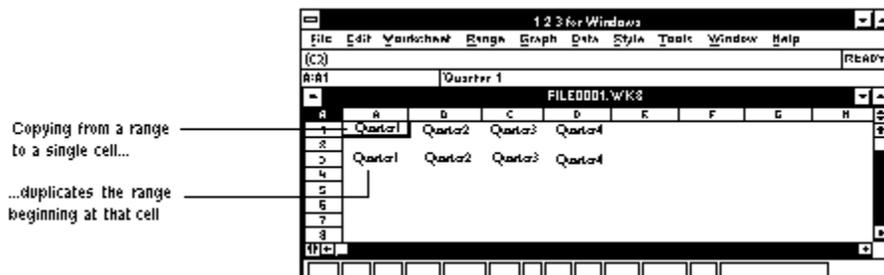
• If you copy from a single worksheet to another single worksheet, the results are the same as copying within the same worksheet (described above).

- If you copy from a single worksheet to two or more worksheets, 1-2-3 duplicates the 2-D source range in each worksheet in the destination.

- If you copy a 3-D range, 1-2-3 copies the 3-D range once. The location of the destination affects the copy: 1-2-3 cannot copy a 3-D range if the copy extends past worksheet IV.

When you copy numbers and labels, 1-2-3 makes exact duplicates of them.

You can also copy formulas, but you should be aware of what 1-2-3 does with your formulas when you copy them. When you copy formulas, 1-2-3 may adjust cell or range references in the formulas, depending on the kind of cell addresses (relative, absolute, or mixed) you used. For more information about copying formulas with relative, absolute, or mixed cell addresses, see **"Copying formulas"** in Chapter 4.

To copy data using the Clipboard

1. Select the cell or range whose contents you want to copy.

2. Choose Edit Copy, or press CTRL+INS.

   1-2-3 places a copy of the data on the Clipboard.

3. Select the destination for the copied data.

   The destination can be in the same window, in another window, or in another active Windows application.

4. Choose Edit Paste, or press SHIFT+INS.

Edit Copy (and Edit Cut) stores data in the Clipboard**.** When you copy data with Edit Copy, 1-2-3 erases the Clipboard contents and places a copy of the data on the Clipboard, where it stays until you copy or cut another selection. When you use Edit Paste, 1-2-3 enters the contents of the Clipboard in the destination.

To make multiple copies, repeat steps 3 and 4 as often as necessary to create more copies of the data.

Moving data

You move data to reorganize a worksheet. You can move data from a range in a single worksheet to a range in the same or another worksheet, or from a 3-D range to another 3-D range by using Edit Move Cells. When you move data, 1-2-3 leaves the source of the data blank and enters the data in the destination.

Edit Cut and Edit Paste move data also, but they work somewhat differently: They use the Clipboard. You can use Edit Cut and Edit Paste to move data within a worksheet, between worksheets, between worksheet files, or between 1-2-3 and other active Windows applications. Edit Cut and Edit Paste are also useful when you want to move data from a single location to several destinations. Edit Move Cells doesn't use the Clipboard.

> **Note**   When you use Edit Move Cells, 1-2-3 adjusts formulas that refer to data being moved and changes range definitions in order to reflect the move. For more information about moving formulas, see **"Moving formulas"** in Chapter 4. For more information about range name definitions, see **"Range name definitions"**.

To move data using the Edit Move Cells command

1.   Select the cell or range whose contents you want to move.

     For example, select the range A:A1..A:E6.
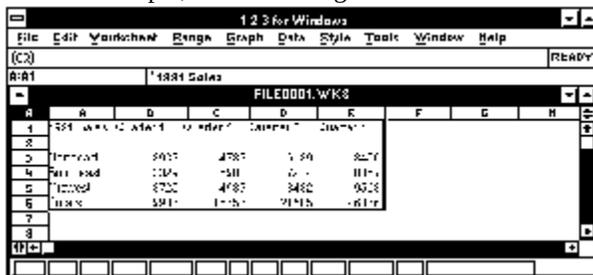
2.   Choose Edit Move Cells.
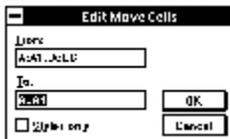
3.   To change the cell or range to move, specify another cell or range in the From text box.

     You can edit the selection or specify a new selection if necessary.

4.   In the To text box, specify the destination for the moved data:

     Mouse   Select the cell or range and click the Confirm button.

     Keyboard   Enter the cell address or name in the To text box, or use the navigation keys to select the range in the Worksheet window and press ENTER.

     For example, specify cell A:A8 in the To text box.

5.   (Optional) If you want to move only the formatting done with the Style commands, select the Styles only check box.

6.   Select OK.

1-2-3 moves the data from the From range to the To range.

The range that held the data is cleared

1-2-3 moves the data to the destination (A8..E13)
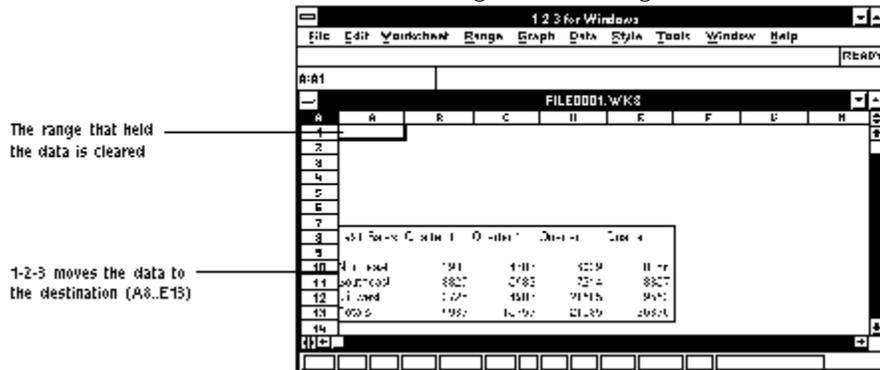
Caution   If you move data to a range that already contains data, 1-2-3 replaces existing data in the range with the new data. Press ALT+BACKSPACE or choose Edit Undo immediately to retrieve the lost data.

What happens when you move data between worksheet locations depends on the relative sizes of the source and destination.

- If you move data from a single cell to a range, 1-2-3 removes the data from the source and places a copy in each cell in the destination.

- If you move data from a range to a single cell, 1-2-3 moves the entire range, using the destination as the top left corner cell of the new range.

- If you move data between single worksheets, the results are the same as moving within a single worksheet.

- If you move data in a 3-D range, 1-2-3 removes the data from the source and enters it in the same number of worksheets, starting at the destination you specify in the From area. The destination can be a single cell, a 2-D range, or a 3-D range, but 1-2-3 enters the moved data in the destination only once, regardless of the size of the destination.

To move data using the Clipboard

1.   Select the cell or range whose contents you want to move.

2.   Choose Edit Cut or press SHIFT+DEL.

   1-2-3 places the data on the Clipboard and removes it from the worksheet.

3.   Select the destination for the data.

   The destination can be in the same file, in another open 1-2-3 worksheet file, or in another active Windows application.

4.   Choose Edit Paste or press SHIFT+INS.

   The contents of the Clipboard appear in the destination.

To paste the data in other destinations, repeat steps 3 and 4 as often as necessary.

As you use a worksheet, you will need to delete data to correct mistakes that reflect changes to your data or remove data you no longer need.

You may want to clear all of the data in a range, including the cell formats, completely so you can enter new data and select new cell formats. You can clear the data in a range, including the cell formats, with Edit Clear Special. You can clear the data in a range, but leave the cell formats intact, with Edit Clear.

You can also delete entire columns, rows, or worksheets. Deleting entire columns or rows removes the data and closes up the space, but the number of columns and rows stays the same. For example, if you delete column C, column D becomes column C, column E becomes column D, and so on. Deleting a worksheet removes all the data and settings the worksheet contains, and reduces the number of worksheets by one. For example, if you delete worksheet H in a file that contains 10 worksheets, lettered A through J, 1-2-3 reduces the file to 9 worksheets, lettered A through I. In the new file, worksheet I becomes worksheet H, worksheet J becomes worksheet I.

If you delete data and then decide you need that data, ALT+BACKSPACE or Edit Undo can undo the deletion. For more information about ALT+BACKSPACE and Edit Undo, see **"Undoing actions"**.

To clear a range

When you clear a range, you can either clear the range and all the cell formats in the range or clear selected aspects of a range, such as the cell contents, number formats, styles, or graphs.

To clear the cell contents of a range

1.   Select the cell or range whose contents you want to erase.

2.   Choose Edit Clear or press DEL.

To clear all or selected aspects of a range

1.   Select the cell or range whose contents you want to erase.

2.   Choose Edit Clear Special.

3.   Select one or more aspects of the range you want to erase.

Cell contents -- Clears the cell contents.

Graph -- Clears any graphs in the range.

Number format -- Removes formats set with Range Format from the range.

Style -- Removes styles set with the Style commands from the range.
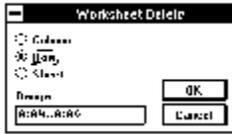
4.   Select OK.

The data, formats, styles, or graphs in the range disappear.

To delete a column or row

1.   Specify a range that includes at least one cell in each column or row you want to delete.

For example, to delete columns B, C, and D, select the range B1..D1. To delete rows 4, 5, and 6, select the range A4..A6.

2. Choose Worksheet Delete.

3. Select Column or Row.

4. To change the range displayed in the Range text box, specify a new range.

5. Select OK.

The columns or rows disappear from the worksheet, and the columns or rows to the right or below take their place.
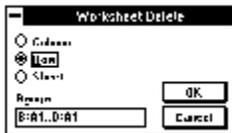
Caution   If GROUP mode is on, deleting columns or rows affects the same range in all worksheets in the file.

To delete a worksheet

1. Select at least one cell in each worksheet you want to delete.

For example, to delete worksheets B, C, and D, select cells B:A1..D:A1.

2. Choose Worksheet Delete.

3. Select Sheet.

4. Select OK.

1-2-3 removes the worksheets; subsequent worksheets take their place, if there are any.

Tip   To restore the deleted worksheets, press ALT+BACKSPACE or choose Edit Undo for consistency.

Naming ranges

Naming ranges provides a convenient way to refer to them in commands and formulas. For example, the @function @SUM(SALARIES) totals all the values in a range named SALARIES.

Names that describe the data in a range help you decipher formulas easily and teach other users what formulas do. Names also help you use the correct range in formulas; it is easier for most people to remember a name than a cell address.

You can give the same range several different names if you plan to use the data in different places, or if one name makes sense to you and another name makes sense to another user and you are both using the same data.

In addition to creating new range names, you can change or delete existing names. If you use the same range several times under several different names while you are setting up the worksheet and then wish to consolidate the worksheet after the initial work is done, you can delete all of the range names but one and edit the formulas.

You can name several single cells at once using labels in adjacent cells as range names with the Range Name Label Create command.

Range name definitions

Naming ranges is a good idea if you plan to expand them or move them around in the worksheet. When you move a range with Edit Move Cells or change the size of a range, its cell address changes. You must change any formula or command that refers to the range by its range address. Range names are permanent: Even if you change the size or location of the range, formulas and commands that refer to the range by name require no changes because the range name definition changes to reflect the new size or location of the range.

A **range name definition** is the cell address associated with the range. For example, in the worksheet below, the range name definition of the name TOTALS is the range address F3..F6.
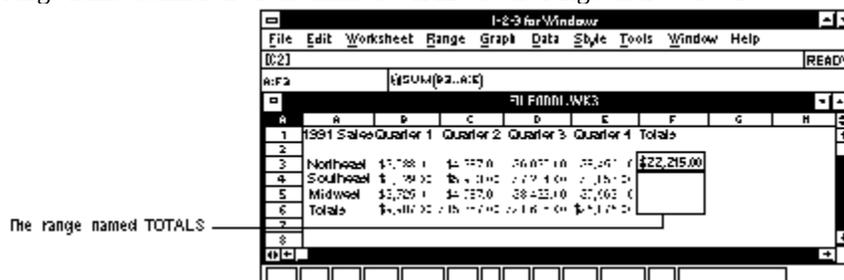
If you use Edit Move Cells to move the top left corner or bottom right corner of a named range, the range name definition expands or contracts accordingly. For example, if you name the range F3..F6 TOTALS and you move the contents of cell F5 to cell F8 so you can add more regions to the list, the definition of the name TOTALS becomes F3..F8.

If you insert columns or rows in a named range, the range name definition expands to accommodate the new rows or columns. If you remove columns or rows, the range name definition shrinks appropriately.

If you use Edit Move Cells to move data into the first or last cell of a named range, the range name is automatically deleted, with one exception. If a formula contains that range name, the range name becomes **undefined** -- it is no longer associated with a range address. The formula that refers to that range name results in ERR. ERR is a special value in 1-2-3 that indicates an error in a formula.

> **Help**   For more information about ERR, choose Help Contents, select @Functions (under Reference), select @Function Index, and then select **@ERR.** If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

Creating range names

Name single cells in the same way that you name ranges. Range names can be up to 15 characters long. Some rules to follow when you name ranges include:

- All range names should start with a letter.

- Do not include , (comma), ; (semicolon), . (period), or the characters + - * / & > < @ or # in range names.

- Do not include spaces in range names; if you need to separate words, use _ (underscore), for example, Q1_TOTALS.

- Never create a range name that looks like a cell address. 1-2-3 labels columns A through IV, so many one-letter or two-letter combinations followed by a number look like a cell address, not a range name.

- Do not use @function names, macro command keywords, or 1-2-3 key names as range names.

After you name a range, use the name anywhere that a range reference is required. Enter names in uppercase and lowercase characters, or a combination. When you enter the name, 1-2-3 automatically changes it to uppercase.

To name a range

1. Select the cell or range to name.

For example, select cells A:F3..A:F6.

2. Choose Range Name Create.
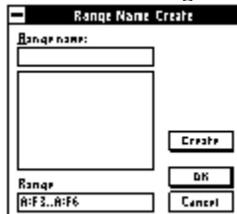
3. Enter the name for the range in the Range name text box.

4. To change the range displayed in the Range text box, specify a new range.

5. Select Create to create the range name and leave the Range Name Create dialog box open so you can create additional range names.

**6.** To create another range name, repeat steps 3 through 5.

7. Select OK.

The next time you choose a Range Name command, the range you named appears in the Range name list box.

To name single cells using adjacent labels

1. Select the range that contains the labels you want to use as range names.

The labels must be adjacent to the cells you want to name.

2. Choose Range Name Label Create.
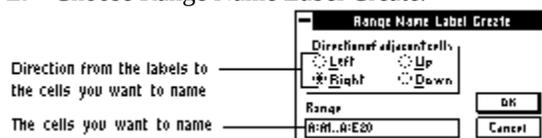
3. Select a direction (from label cells to named cells).

> **Down** -- Names cells below the labels (for example, labels in row 1 become names for cells in row 2).

> **Left** -- Names cells to the left of the labels (for example, labels in column B become names for adjacent cells in column A).

> **Right --** Names cells to the right of the labels (for example, labels in column A become names for adjacent cells in column B).
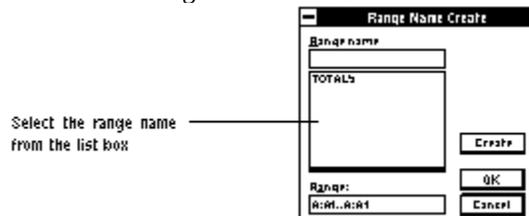
> **Up** -- Names cells above the labels (for example, labels in row 2 become names for cells in row 1).

4. To use labels contained in a range other than the one displayed in the Range text box, specify a new range.

5. Select OK.

> Each label in the range becomes the name of the adjacent cell in the direction you selected.

To edit range names

1. Choose Range Name Create.

2. In the Range name text box, specify the range name you want to edit:

> **Mouse**   Click the range name in the list box.

> **Keyboard**   Enter the name in the Range name text box or press TAB to move to the list box and use or ↓ to select the name.

3. Edit the range name in the Range name text box or the range name definition (the associated cell address) in the Range text box.

4. Select OK.

To delete existing range names

1. Choose Range Name Delete.

2. In the Range name text box, specify the range name you want
to delete:

> **Mouse**   Click the range name in the list box.

> **Keyboard**   Enter the name in the Range name text box or press TAB to move to the list box and use or ↓ to select the name.

3. Select a command button:

Delete -- Deletes the range name specified in the Range name text box.

Delete All -- Deletes all defined range names and closes the dialog box, but leaves the data in the ranges unchanged.

Undefine -- Creates an undefined range name by disassociating a range name from a range address.

4. Select OK when you finish deleting ranges.

Inserting columns, rows, and worksheets

As a worksheet grows, you'll often need to insert a column or row into an existing worksheet, or insert an empty worksheet into a worksheet file.

1-2-3 worksheets have a fixed number of columns (256) and rows (8,192). When you insert (or delete) a column or row, you do not change the number of columns or rows. Rather, you move the data to other columns or rows.

The maximum number of worksheets in a worksheet file is also 256. When you insert a worksheet between existing worksheets, 1-2-3 adjusts the worksheet letters of the subsequent worksheets to reflect the change.

1-2-3 inserts columns to the left of the first column of the insert range, rows above the first row of the insert range, and worksheets in front of or behind the current worksheet.

To insert a column or row

1. Select a range that includes at   least one cell in each of the columns or rows you are inserting.

    For example, to insert two rows below row 7, select the range A8..A9. To insert three columns after column B, select the range C1..E1.

2. Choose Worksheet Insert.

3. Select Column or Row.

4. To change the range displayed in the Range text box, specify a new range.

5. Select OK.

    1-2-3 inserts the new columns or rows. The cell pointer remains in the column and row it occupied before you chose Worksheet Insert (for example, if cell A7 was the current cell when you chose Worksheet Insert, it is still the current cell after you insert rows or columns).

    Caution   If GROUP mode is on, inserting columns or rows affects the same range in all worksheets in the worksheet file.

To insert a worksheet

1. Move the cell pointer to the worksheet in front of or in back of where you want new worksheets to appear.

2. Choose Worksheet Insert.

3. Select Sheet.

4. Select Before or After, depending on whether you are inserting the new worksheets before or after the current

worksheet.

5. Enter the number of worksheets to insert in the Quantity text box.

6. To change the range displayed in the Range text box, specify a new range.

7. Select OK.

1-2-3 inserts new worksheets. The cell pointer remains in the position it occupied when you chose Worksheet Insert (for example, if the current cell is D:A1 and you insert two worksheets before worksheet D, the current cell is D:A1 in the new, empty worksheet D).

If you change your mind after completing an action in 1-2-3, you can often cancel that action with Edit Undo. For example, if Edit Undo is enabled, you can undo the effects of editing a cell entry, and copying or moving data.

You cannot undo the effects of printing, cell-pointer movement, File commands, pressing F5 (GOTO), F6 (PANE), or F9 (CALC), and the result of using undo.

Help   For complete information on Edit Undo, choose Help Contents, select 1-2-3 Main Menu (under Commands), select Edit, and select **Undo.** If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

To undo an action

1.   Choose Edit Undo or press ALT+BACKSPACE.

**Note**   You cannot use Edit Undo or ALT+BACKSPACE to reverse a previous use of Edit Undo or ALT+BACKSPACE.

Saving your work is one of the most important 1-2-3 activities you perform. Saving a worksheet file copies worksheet data from computer memory to a file on disk. If you do not save a worksheet file, the data is lost when you close the file or end 1-2-3. It's a good idea to save the worksheet file often during the work session. That way, you have a recent copy on disk in case of a power failure or other accident.

To save the current worksheet file

1. Choose File Save As.
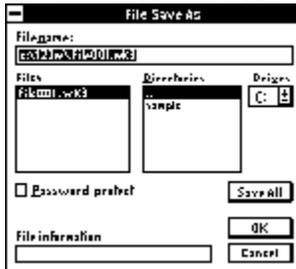
2. (Optional) To change the file name, specify a new name in the File name text box.

You can edit the file name in the File name text box, or you can use the Files, Directories, and Drives list and drop-down boxes to select the file you want.

Help   For more information about specifying a file name, choose File Save As, press F1 (HELP), and select **Specifying a File.** If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

3. Select OK.

If you specify a file name that already exists in step 2, 1-2-3 asks whether you want to cancel saving the new file, replace the data in the existing file with the data in the new file, or create a backup of the existing file before replacing data in it.

Tip   Use File Save to save the current worksheet file and not change the file name.

For information on protecting a file with a password, see **Chapter 9**.

This chapter describes how to align and format data, change column widths and row heights, use different fonts, add borders to a range, and select colors in your worksheet.

Why change the way data looks?
Formatting numbers
Changing a column width
Using different fonts
Changing row heights
Selecting colors
Aligning labels
Removing grid lines
Adding borders

This chapter describes how to align and format data, change column widths and row heights, use different fonts, add borders to a range, and select colors in your worksheet.

Why change the way data looks?
Formatting numbers
 To format numbers
Changing a column width
 To change a column width
Using different fonts
 To change fonts and attributes
 To replace a font in the current font set
Changing row heights
 To change a row height
Selecting colors
 To set colors
Aligning labels
 To align labels in cells
 To align labels in a range
Removing grid lines
 To remove grid lines
Adding borders
 To create a border

Why change the way data looks?

A worksheet is easier to read and interpret if you alter the way 1-2-3 for Windows displays the data. For example,

- Numeric formats distinguish different kinds of data, such as dollar amounts from percentages.

- Fonts and attributes set off one area of the worksheet from another, such as titles from data values.

- Colors, alignment, and borders also help accentuate one set of data or visually group similar data.

The procedures described in this chapter not only improve the look of the worksheet on the screen but also the look of printed data.

Formatting numbers

Use Worksheet Global Settings Format and Range Format to change the way 1-2-3 displays numbers. The 1-2-3 numeric formats include currency, percentages, dates, times, and scientific notation.

Both commands work the same way: You specify the range to format and select a format from a list of available formats. Depending on the format you select, you can supply additional information about the format, such as a number of decimal places to use, or the form for the date or time display.

Worksheet Global Settings Format sets the format for all cells in the current worksheet. Range Format overrides the global format for a specific area of the worksheet.

The initial default format is General, which means numbers in the thousands are displayed without a separator, such as , (comma), and negative numbers are preceded by - (minus sign). If a number has decimal places (numbers to the right of the decimal point), General displays as many decimal places as will fit in the cell and then rounds the last place. When the number of digits to the left of the decimal place exceeds the column width minus one, General uses scientific notation.

The illustration below contains examples of the available formats. The examples of each format use the number 517.456 in column B and -517.456 in column C.

Formats determine how values look on screen or in print, but they do not affect the actual values 1-2-3 uses for calculations.

To format numbers

1.   Select the range to format.

2.   Choose Range Format.

3. Select a format from the Format list box.

See the worksheet illustration above   for an example of each format.

4. If you select any numeric format except General, specify in the Decimal places text box the number of decimal places (0 through 15) you want 1-2-3 to display.

5. To display numeric values enclosed in parentheses, select the Parentheses check box.

6. To change the range displayed in the Range text box, specify a new range.

7. To reset a range's format to the current global cell format, select Reset.

8. Select OK.

If GROUP mode is on, formatting affects the same range in all worksheets in the worksheet file.

Note   If you select a format that adds characters to the displayed contents of the cell, such as $ (dollar sign) or , (comma), the width of the cell may not be large enough to display the number and the extra characters. In this case, 1-2-3 replaces the number with *** (asterisks). To redisplay the number with its format, change the width of the column that contains the number. For more information, see **"Changing a column width"**.

In the next worksheets, values are formatted in General format, then changed to Percent (H3..H13), Currency (C15..G15), and , Comma format (C3..G13).

Before

All values are in General format

After

Numbers in , Comma format (C3..G13)

Numbers in Percent format (H3..H13)

Numbers in Currency format (C15..G15)

Changing a column width

If you change the format for numeric data, the displayed format for the data may be longer than the width of the column that contains it. When a number is too long to fit in a cell, 1-2-3 fills the cell with *** (asterisks). If a label is too long, 1-2-3 extends the label into the cell to the right of the label, if that cell is empty. If the cell to the right of the label contains an entry, 1-2-3 cuts the label off at the border of the cell. To enlarge columns to fit data, use either the mouse or Worksheet Column Width.

If GROUP mode is on, changing the column width affects the range in all worksheets in the worksheet file.

To change a column width

Mouse

1. Move the mouse pointer to the column border to the right of the column letter.

   The mouse pointer changes to a black two-headed horizontal arrow.

2. Drag the mouse pointer left or right to size the column.

3. Release the mouse button when the column is the desired size.

   1-2-3 displays the width of the column in the format line.

Keyboard

1. Select the range of columns to change.

2. Choose Worksheet Column Width.
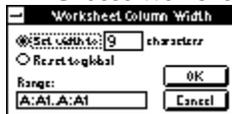
3. Select Set width to.

4. Enter the width, in characters, for the column in the Set width to text box.

5. To change the range displayed in the Range text box, specify a new range.

6. Select OK.

   1-2-3 makes all columns in the range the width you specified.

Using different fonts

Fonts determine how characters look on the screen and in a printed worksheet. A **font** is a typeface of a particular size, such as Times, 12 point or Helvetica, 10 point. Fonts also have attributes, such as boldface, underline, or italics.

Style Font sets fonts and attributes. In some cases, fonts may be taller than the height of the row. If you have not already adjusted the row heights manually, 1-2-3 automatically adjusts the height of the rows to fit the fonts you select.

To change fonts and attributes
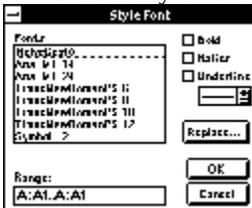
1.   Select the range to change.

2.   Choose Style Font.

3.   Select a font from the Fonts list box.

4.   To add boldface, italics, or underlining to the range, select the Bold, Italics, or Underline check box.

5.   If you select Underline, choose the line style from the drop-down box.

6.   To change the range displayed in the Range text box, specify a new range.

7.   Select OK.

1-2-3 displays the data in the font you select.

To replace a font in the current font set

1.   Choose Style Font.

2. Select Replace.

3. Select the font to replace from the Current fonts list box.

4. Select a font in the Available fonts list box.

5. Specify a point size to associate with the font in the Size list box.

6. Select Replace.

Help   You can also update and restore the default font set and save and retrieve named font sets. For more information, choose Style Font Replace and press F1 (HELP). If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

Changing row heights

After you change the font for a range of cell entries in the worksheet, you may want to adjust the row heights to make some cells fit better on the screen or in a printout. To override the default row height adjustments, use either the mouse or Worksheet Row Height.

If GROUP mode is on, changing row heights affects the same range in all worksheets in the worksheet file.

To change a row height

Mouse

1. Move the mouse pointer to the row border below the row number of the row you want to size.

   The mouse pointer changes to a black two-headed vertical arrow.

2. Drag the mouse pointer up or down to size the row.

3. Release the mouse button when the row is the desired size.
   1-2-3 changes the height of the row to the new size, and displays the height of the row in the format line.

Keyboard

1. Select the range of rows whose height you want to set.

2. Choose Worksheet Row Height.
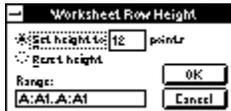
3. Select Set height to.

   Note   To reset a range of rows to the default row height for the current global font defined with Style font, select Reset height.

4. Enter a height for the row (in points) in the Set height to text box.

5. To change the range displayed in the Range text box, specify a new range.

6. Select OK.

   1-2-3 makes all rows in the range the height you specified.

Selecting colors

Every cell in a worksheet file has two color settings: the text color and the background color. The text color is the color for the contents of the cells (labels or values). The background color is the color of the cell itself, within the grid lines.

Changing these colors creates a contrast between different groups or types of data. For example, to make Total Sales results stand out, change the text or background color of these cells.

Style Color changes text and background colors.

> **Note**   You can change the color 1-2-3 uses to display other elements of the worksheet, such as grid lines, frame, negative values, unprotected cells, and range borders with the Window Display Options command.

If GROUP mode is on, the colors apply to the same range in all worksheets in the worksheet file.

> **Help**   For more information about Window Display Options, choose Window Display Options and press F1 (HELP). If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

To set colors

1.   Select the range whose color you want to change.

2.   Choose Style Color.

3.   To specify a color for the data in a range, select a color from the Cell contents drop-down box.

4.   To specify a color for the background of a range, select a color from the Background drop-down box.

5.   If you want negative values to appear in red, select the Negative values in red check box.

6.   To change the range displayed in the Range text box, specify a new range.

7.   Select OK.

   1-2-3 changes the range to the colors you selected.

Aligning labels

When you enter a label in a cell, 1-2-3 positions it at the left of the cell. To make a worksheet more readable, you may want to change this default alignment.

To align a label, use either Style Alignment or change the label-prefix character. The default **label-prefix character** is an ' (apostrophe). 1-2-3 automatically inserts the ' (apostrophe) in front of all labels. The meanings of these characters are defined in the table below.

Label prefix	Description
'	Left aligns labels
"	Right aligns labels
^	Centers labels
\	Repeats one or more characters across a cell
|	Entered in the first row of a print range, tells 1-2-3 not to print that row of data

To see the label-prefix character, select the cell and look at the entry in the contents box.

To change the alignment for one or two labels, press F2 (EDIT), delete the label-prefix character, and enter a new one. To change a range of labels, use Style Alignment. You can align a label within a cell or across the columns of a range.

If GROUP mode is on, changing alignment affects the same range in all worksheets in the file.

To align labels in cells

1.   Select the range that contains the labels you want to align.

2.   Choose Style Alignment.

3.   Under Align label, select one of the following options:

Center -- Centers labels in cells.

Left -- Positions labels at the left edge of cells.

Right -- Positions labels at the right edge of cells.

4.   To change the range displayed in the Range text box, specify a new range.

5.   Select OK.

Labels that exceed the width of a column appear left-aligned regardless of the label prefix.

The illustration below shows the labels in column B that are centered within cells.

Labels are centered within the cell

To align labels in a range

1. Select the range in which you want to align labels.

Make sure there are only labels in the leftmost column of the range. Labels in any other columns of the range are hidden by the labels in the leftmost column when you align labels in a range.

2. Choose Style Alignment.

3. Select the Align over columns check box.
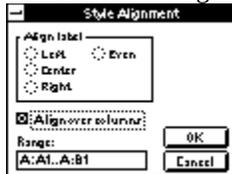
4. Under Align labels, select one of the following options:

Center -- Centers labels in the range.

Even -- Expands the space between words and between letters in words so as to stretch labels over wider space. Even has no effect on labels that end with a . (period), ! (exclamation point), ? (question mark), or : (colon).

Left -- Positions labels at the left edge of the range.

Right -- Positions labels at the right edge of the range.

5. To change the range displayed in the Range text box, specify a new range.

6. Select OK.

Labels that exceed the width of a range appear left-aligned regardless of the label prefix.

Removing grid lines

The worksheet grid lines are the lines that divide rows and columns into cells.

1-2-3 automatically displays grid lines. To remove grid lines, use Window Display Options. This command also changes the color of the grid lines from gray to any of the available colors.

To remove grid lines

1.   Choose Window Display Options.

2.   Select the Grid lines check box, under Options, to remove the check.

3.   Select OK.

1-2-3 removes grid lines from all worksheets in all active files.

Adding borders

Borders add emphasis to important data within a worksheet. 1-2-3 has three types of borders: single lines, double lines, and wide lines. To draw borders around a range or a single cell, use Style Border.

If you put a border around a three-dimensional (3-D) selection, 1-2-3 treats the selection as a group of two-dimensional (2-D) ranges, putting borders in each worksheet separately.

If GROUP mode is on, adding borders affects the same range in all worksheets in the file.

To create a border

1. Select the range to apply borders to.

2. Choose Style Border.
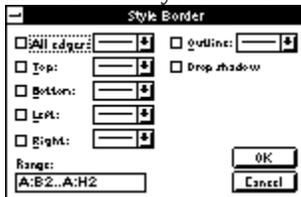
3. To draw borders around each cell in a range, select one of the following options:

    All edges -- Draws an outline around each cell in a range.

    Bottom -- Draws a line along the bottom edge of each cell in a range.

    Left -- Draws a line along the left edge of each cell in a range.

    Right -- Draws a line along the right edge of each cell in a range.

    Top -- Draws a line along the top edge of each cell in a range.

4. Select a line style from the drop-down box to the right of each option.

5. Repeat steps 3 and 4 as necessary.

6. To draw a border around the range as a whole, select Outline and select a line style from the drop-down box to the right of the Outline check box.

7. To draw a drop shadow below and to the right of the range, select Drop shadow.

8. To change the range displayed in the Range text box, specify a new range.

9. Select OK.

    1-2-3 displays borders around the range in the style you selected.   The worksheet illustration below shows the available line styles.

Wide border surrounds headings

Single line border

Double line

Drop shadow

1-2-3 for Windows

File Edit Worksheet Range Graph Data Style Tools Window Help

{Shadow}(,0) [W9]   READY

A:C13   20500

SALESQTR.WK3

City	Qtr1	Qtr2	Qtr3	Qtr4	Total	%

Total Sales:

4 Calculating with Formulas and @Functions

This chapter describes the different categories of formulas and @functions, and also provides basic rules for entering formulas and @functions.

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Entering formulas
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This chapter describes the different categories of formulas and @functions, and also provides basic rules for entering formulas and @functions.

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What is a formula?

A **formula** is an entry that calculates data. It can contain numbers, text, operators, cell and range addresses, range names, @functions, and other formulas. The result of a formula is text (a label) or a value.

The calculation can be a simple mathematical operation, such as subtracting one number from another, or a more complicated operation, such as determining the net present value of a series of future cash flows.

When you enter a formula in a cell, the formula appears in the contents box, but its result appears in the cell. Unless you format the cell as text, the formula itself appears only in the contents box.

Types of formulas

Using 1-2-3 for Windows to enter labels and values in the worksheet is similar to entering data on a piece of ledger paper. With paper, however, you do the arithmetic by hand or with a calculator. With 1-2-3, you enter data in the worksheet and then use formulas to calculate with the data. If you change an entry a formula uses, 1-2-3 automatically recalculates the result.

1-2-3 lets you enter three types of formulas: numeric, text, and logical.

- **Numeric formulas** perform calculations with values, using one or more of the **arithmetic operators**: + (addition),   - (subtraction),   * (multiplication), / (division), ^ (exponentiation), or @functions. @Functions are built-in formulas in 1-2-3 that perform numeric, text, and logical calculations.

  Two examples of numeric formulas are 2*H16 and @SUM(H16..H32)/2. The formula 2*H16 returns a numeric value by multiplying the value in cell H16 by 2. The formula @SUM(H16..H32)/2 returns a numeric value by dividing the sum of the values in H16..H32 by 2.

  1-2-3 can calculate any numeric formula whose value is from 3.36E - 4932 ($3.36*10_{-4932}$) through 1.19E+4932 ($1.19*10_{4932}$). However, the value of the formula must be from 1E - 99 ($1*10_{-99}$) and 9.99E+99 ($9.99*10_{99}$) for 1-2-3 to display it; otherwise, 1-2-3 displays *** (asterisks) in the cell that contains the formula.

  The number of decimal places 1-2-3 displays for a calculated value depends on the cell format. Regardless of how many decimal places 1-2-3 displays for the value, however, 1-2-3 calculates the value to a precision of between 18 and 19 decimal places unless you use @ROUND to specify a different precision or unless the magnitude of the calculated value differs widely from one or more values used in the calculation.

- **Text formulas** perform calculations with text enclosed in " " (quotation marks) and labels, using the **text operator** & (ampersand) or @functions.

  For example, when D4 contains the label PROFIT, the formula +"NET "&D4 returns NET PROFIT by concatenating (joining) the literal string "NET " with the contents of D4. The formula @LOWER(D4) returns the profit by converting the contents of D4 to lowercase.

- **Logical formulas** are statements that return 1 if true and 0 if false. For example, the logical formula +A12>=500 returns 1 if cell A12 contains a value greater than or equal to 500. Otherwise, the formula returns 0. The logical formula @ISRANGE(PROFIT) returns 1 if PROFIT is a range name in the current file; otherwise, the formula returns 0. Logical formulas use the logical operators <   >   =   <>   >=   <= #NOT# #AND# and #OR# and @functions.

The illustration below shows examples of the three formula types. Columns A and D contain identical formulas, but column D has been formatted as text with Range Format to display the formulas instead of their values.

The following section demonstrates how to enter a simple formula. Use the same steps to create formulas with your own data.

To enter a formula

1. Select the cell where you want to enter the formula (cell C1 in the example below).

2. Enter + (plus sign) to start the formula.

The mode indicator changes to VALUE.
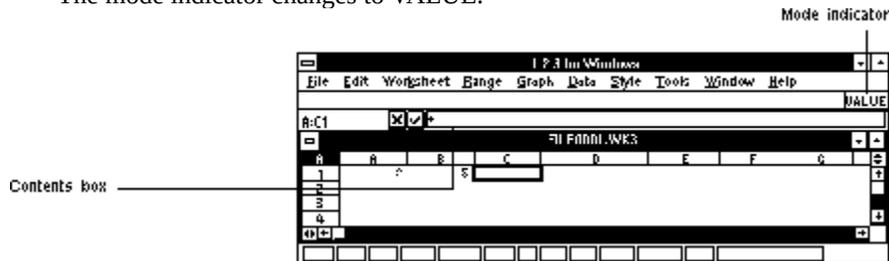
3. Enter the first operand (cell A1 in the example).

An **operand** is a value in a formula -- for example, a number or a cell address.

4. Enter the first operator (+ in the example).

5. Enter the next operand (cell B1 in the example).

6. Repeat steps 4 and 5 until the formula is complete.

The example uses only two operands and one operator, but a formula can contain several operands and operators.

7. Confirm the entry when the formula is complete to store the formula in the cell:

Mouse   Click the Confirm button.

Keyboard   Press ENTER.

Caution   Because you can select ranges for a formula, confirming a formula entry by clicking another cell or using the , ↓, →, and ← may not produce the results you intend. For more information about selecting ranges for a formula, see **"Selecting ranges for formulas and @functions"**.

The result (7), not the formula (+A1+B1), appears in the cell (cell C1). 1-2-3 displays the formula in the contents box.
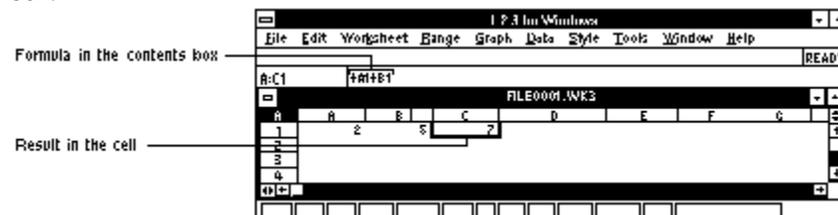
If the result of the formula is too long to fit in the cell, 1-2-3 displays *** (asterisks) instead. To display the result, widen the column. See **"Changing a column width"** in Chapter 3.

The formula in this example uses cell addresses in the formula rather than values. If the values in a formula won't change, enter them in the formula directly (2 + 5 in the example).

If values in a formula will change, entering the values in cells and using cell addresses in formulas is more efficient. Using cell addresses means you can change the contents of any cell referred to in the formula without rewriting the formula: 1-2-3 automatically recalculates the formula using the new values in the cells. For example, if you change cell A1 to 20, 1-2-3 recalculates the formula in C1 and changes the result from 7 to 25.

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4   Calculating with Formulas and @Functions
Selecting ranges for formulas and @functions   »

»
»

The previous sections describe specifying cell addresses in formulas by entering them. You can also select a cell address or a range for use in a formula or @function. Many @functions operate on ranges. The following section uses the same example as **"To enter a formula"**.

To select data for a formula or @function

1.   Select the cell where you want to enter the formula or @function (in the example, C1).

2.   Enter + (plus sign) to begin the formula, or enter the @function and ((open parenthesis).

The mode indicator changes to VALUE.

3.   Select a cell or a range (cell A1 in the example):

Mouse   Click the cell. (For a range, click a corner cell and drag to highlight the other cells in the range.)

Keyboard   Use the navigation keys to move the cell pointer to the cell. (For a range, move to a corner cell, press . (period), and use , ↓, →, and ← to highlight the other cells.)

4.   If you are entering a formula, enter an operator (+ in the example) and select the next cell or range (cell B1 in the example).

5.   If you are entering an @function, enter) (close parenthesis) to complete the @function.

6.   Confirm the entry.

1-2-3 enters the result of the formula or @function in the cell.

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Order of precedence

The next table shows the arithmetic, text, and logical operators you can use in formulas and their order of precedence. **Precedence numbers** represent the order in which 1-2-3 performs operations in a formula. The lower the precedence number, the earlier 1-2-3 performs the operation. Operations with the same precedence number are performed sequentially from left to right.

Operator	Operation	Precedence Number
^	Exponentiation	1
+	Identification of value as negative or positive	2
* /	Multiplication and division	3
+ -	Addition and subtraction	4
= <>	Equal-to and not-equal-to tests	5
< >	Less-than and greater-than tests	5
<=	Less-than-or-equal-to test	5
>=	Greater-than-or-equal-to test	5
#NOT#	Logical-NOT test	6
#AND# #OR#	Logical-AND and logical-OR tests	7
&	Text concatenation	7

Overriding order of precedence

You can override the order of precedence by enclosing an operation in ( ) (parentheses). 1-2-3 performs operations inside parentheses first. Within each set of parentheses, precedence numbers apply.

The illustration below shows the order in which 1-2-3 performs the operations in a formula that contains two pairs of parentheses (or nested parentheses).

Copying formulas

Copying affects formulas in different ways, depending on whether cell addresses in the formula are relative, absolute, or mixed.

Most cell addresses are **relative** -- they refer to another cell based on its position *relative* to the cell you're working in, like directions that say "go one block east and one block south."   Where you end up depends on where you start. If A1 is the current cell, B2 is a relative cell reference to the cell one column to the right and one row below. If you copy or move the cell reference to another cell (for example, E6), the reference will change to reflect the new position (for example, it will become F7, because F7 is one column to the right and one row below E6). If you copy a relative cell address (or the relative reference) to another worksheet, it becomes a reference to the cell in the same relative position in the new worksheet.

Range names are relative cell references: If you move or copy a formula that contains a range name, the formula changes to reflect its new position. For example, the @function @SUM(TOTALS) changes to @SUM(G3..G5) if you copy it from cell F6 to cell G6. To make a range name absolute, precede it with a $ (dollar sign).

An **absolute** cell address is a permanent reference to the address of the cell; the address remains the same, no matter where you copy or move the formula. For example, if you copy the absolute cell address $A$12 from cell A13 to cell F49, it still reads $A$12. If you copy $A:$A$12 to cell B:F49, it still refers to cell A12 in worksheet A. A $ (dollar sign) before an element of a cell address makes the element an absolute reference.

To make references absolute, type $ (dollar sign) before the element you want to be an absolute reference, or select the reference and press F4 (ABS) repeatedly until it is correct. Worksheet file names are always absolute references.

A **mixed** cell address combines relative and absolute cell addresses -- the worksheet letter, the column letter, or the row number is absolute. For example, if you copy A$5 from cell B1 to C1, it becomes B$5; if you copy $A:$A5 from cell A:B5 to cell B:B6, it becomes $A:$A6.

If you copy a formula, relative and mixed cell references in the formula change to reflect the formula's new position, but absolute references stay the same. For example, if you copy @SUM(B2..B5) from cell B6 to cell C6, C6 will contain the formula @SUM(C2..C5).

Moving formulas

Moving data affects formulas in different ways depending on whether you move the formulas, the cells they refer to, or both. For example,

- If you move a formula that refers to cells outside the source range, the cell addresses do not change. For example, if you move the formula +A1+B3 from cell C10 to cell D10, the formula remains +A1+B3.

- If you use Edit Move Cells to move data out of cells that a formula refers to, 1-2-3 adjusts the formula. For example, if cell C10 contains +A1+B3 and you use Edit Move Cells to move the contents of cell A1 to cell Q25, the formula in cell C10 changes to +Q25+B3.

  Note   If you use Edit Cut and Edit Paste to move data out of cells that a formula refers to, 1-2-3 does not adjust the formula. For example, if cell C10 contains +A1+B3 and you use Edit Cut and Edit Paste to move the contents of cell A1 to cell Q25, the formula in cell C10 stays +A1+B3.

- If you move a formula and cells it refers to, 1-2-3 adjusts all cell addresses, including absolute references. For example, if cell A3 contains the formula +$A$1+A2 and you move A1..A3 to B1..B3, the formula in cell B3 is +$B$1+B2.

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4   Calculating with Formulas and @Functions

Recalculating formulas

Depending on the current Tools User Setup Recalculation setting, 1-2-3 uses one of the following two methods to recalculate (update) your formulas when you change worksheet data they refer to.

- When Tools User Setup Recalculation is set to Automatic (the default), 1-2-3 immediately recalculates formulas whenever you change data they refer to. Automatic recalculation occurs in the background, so you can continue your work while it is happening.

  Note   If, in a complex worksheet with many dependent formulas, you enter or edit a formula when recalculation is set to Automatic, the formula's result may not appear in the cell immediately. It will appear as soon as 1-2-3 completes the background recalculation.

  1-2-3 displays the CALC indicator in the status line whenever it is performing an automatic recalculation pass.

- When Tools User Setup Recalculation is set to Manual, 1-2-3 recalculates formulas only when you press F9 (CALC). Manual recalculation occurs in the foreground, so you must wait for 1-2-3 to complete it before continuing your work.

  With manual recalculation, 1-2-3 displays the CALC indicator in the status line whenever you change worksheet data, to remind you that some of your formulas may now need updating.

  Note   These recalculation methods apply only to formulas that refer to data in active worksheet files. For information on how 1-2-3 recalculates formulas linked to files on disk, see **"Linking worksheet files with formulas"** in Chapter 10.

Whenever 1-2-3 performs a recalculation pass, it recalculates only those formulas that are affected by the changes in worksheet data; it skips over any formulas that are not affected by those changes. This technique, called **optimal recalculation**, can minimize recalculation time considerably, especially in large worksheets that contain many unrelated formulas.

You can also use Tools User Setup Recalculation to set the recalculation order to natural, columnwise, or rowwise.

  Help   For more information on recalculation methods, choose Tools User Setup, select **Recalculation,** and press F1 (HELP). If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

Tips on formulas

When you enter a formula in a cell, the formula appears in the contents box, but its result appears in the cell. Unless you format the cell as text (with Range Format), the formula itself appears only in the contents box.

Use the following guidelines to enter a formula:

- A formula can begin with a number or one of the characters + - @ . (# $ (or any currency symbol). The # (number symbol) indicates the beginning of a logical formula.

- When the first element of a formula is a cell address or range name, you must begin the formula with + (plus sign), - (minus sign), $ (dollar sign), or ((open parenthesis). For example, +B7/B8, -B7*B8, $JAN/B8, and (JAN-20) are all valid formulas.

- When the first character in a text formula is a " (quotation mark), you must begin the formula with + (plus sign) or ((open parenthesis). For example, +"Ms. "&LAST and ("Ms. "&LAST) are both valid formulas.

- When a formula looks like a date in month/day/year, day/month/year, or year-month-day format, begin the formula with + (plus sign); otherwise, 1-2-3 enters a date number instead of the formula. For example, +9/25/90 is a valid formula.

- A formula cannot contain spaces, with the following exceptions: within text enclosed in " " (quotation marks) in text formulas and string @functions or within range names containing spaces.

- To enter the name of an @function in a formula, you can type @, press F3 (NAME), and then select the @function from the list that appears on the screen.

What is an @function?

An **@function** is a built-in formula in 1-2-3 that performs a specialized calculation automatically. Some @functions are simple; for example, @SUM adds the values in a range. @SUM(D1..D7) adds the values in the range D1..D7, which is easier than writing out the formula +D1+D2+D3+D4+D5+D6+D7. Other @functions replace complex formulas; for example, @NPV calculates the net present value of a series of future cash-flow values.

You can use an @function by itself as a formula, combine it with other @functions and formulas, or use it in a macro.
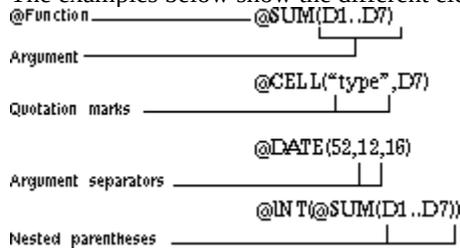
Most @functions have the following three parts:

- The @ (at sign), which you must enter as the first character.

- The name of the @function.

- 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.

    Help   For more information about @functions, choose Help Contents and then select **@Functions** (under Reference). If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

The examples below show the different elements you use when you enter @functions.

```
@Function ──────────── @SUM(D1..D7)
                              └───┘
Argument ─────────────
                       @CELL("type",D7)
Quotation marks ───────────────┘    ┘

                       @DATE(52,12,16)
Argument separators ───────────┘ ┘
                       @INT(@SUM(D1..D7))
Nested parentheses ────────────────┘   ┘
```

Argument is data you provide for 1-2-3 to use when it calculates the @function.

Argument separators separate two or more arguments. 1-2-3 lets you use three argument separators: , (comma), ; (semicolon), and . (period). A ; (semicolon) is always a valid argument separator. You can set either . (period) or , (comma) as an argument separator with Tools User Setup International Punctuation, but the argument separator cannot be the same as the decimal separator. Some countries use , (comma) as the decimal separator, while others use . (period); so you may want to use ; (semicolon) as the argument separator in worksheet files that will be used with varying international settings.

    Help   For more information about changing the argument separator, choose Tools User Setup, select International, press F1 (HELP), and select **Style.** If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

Quotation marks (" and ") enclose text in text arguments in string @functions. 1-2-3 assumes that text not in " " (quotation marks) is a range name.

Parentheses enclose arguments. If you use an @function as an argument for another @function, you must nest the ( ) (parentheses):   enclose the @function you are using as an argument within the ( ) (parentheses) of the primary @function. @INT(@SUM(D1..D7)), for example, uses @SUM and its argument as the argument for the primary @function @INT.

Argument types

1-2-3 @functions accept the following four types of arguments:

- A **condition** is an expression that uses a relational or logical operator (< > = <> >= <= #NOT# #AND# and #OR#), or the range address or name of a cell that contains such an expression. The @function evaluates the condition argument and proceeds according to whether it is true or false. You can also use a formula or @function, a value, text, or a range name or cell address as a condition argument.

- A **location** is the address or name of a cell or range, or a formula or @function that produces a range address or name. A location argument can refer to a single-cell or multiple-cell range in one or more worksheets in a single worksheet file.

- A **string** is text (any sequence of letters, numbers, and symbols) enclosed in " " (quotation marks), the range address or name of a cell that contains a label, or a formula or @function that returns a label. String @functions use string arguments.

- A **value** is a number, the address or name of a cell that contains a number, or a formula or @function that returns a number.

The following section shows you how to enter @SUM to calculate a total. @SUM lets you add a range of values without entering each + (plus sign) and cell address. You use the range address of the range of values as the @SUM argument.
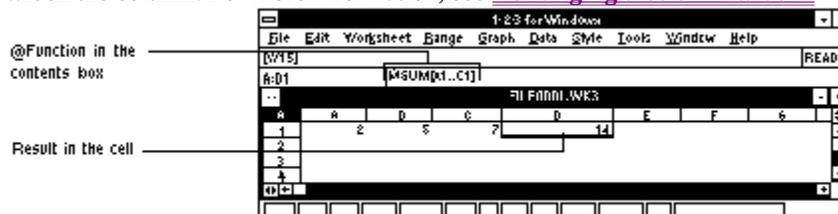
To enter an @function

1. Select the cell where you want to enter the @function (in the example, cell D1).

2. Enter the @function and ((open parenthesis). For example, type @sum(to begin the @function.

   The mode indicator changes to VALUE. You can use lowercase or uppercase letters to type the @function. 1-2-3 uses uppercase letters to display it.

3. Enter the arguments, either a range address or name, or a series of values (in the example, type a1..c1).

4. Enter) (close parenthesis) to complete the @function.

5. Confirm the entry to store the @function in the cell:

   Mouse   Click the Confirm button.

   Keyboard   Press ENTER.

   Caution   Because you can select ranges for @functions, confirming an @function entry by clicking another cell or using the , ↓, →, and ← may not produce the results you intend. For more information selecting ranges for @functions, see **"Selecting ranges for formulas and @functions"**.

The result (in the example, 14) appears in the cell, not the @function. The @function appears in the contents box. If the result of the @function is too long to fit in the cell, 1-2-3 displays *** (asterisks) instead. To display the result, widen the column. For more information, see **"Changing a column width"** in Chapter 3.

Tip Use F3 (NAME) to enter @functions. Type @ and press F3 (NAME); 1-2-3 enters ((open parenthesis) and displays a list of all @functions. Select the @function you want, and 1-2-3 places it in the contents box. Enter arguments as necessary and) (close parenthesis) to complete the @function.

Types of @functions

The @functions can be grouped in eight categories: database, date and time, financial, logical, mathematical, special, statistical, and string.

- **Database @functions** perform statistical calculations and queries in database tables in both worksheets and external databases.

- **Date and time @functions** calculate values that represent dates and times.

- **Financial @functions** calculate loans, annuities, and cash flows.

- **Logical @functions** calculate the results of conditional (logical) formulas.

- **Mathematical @functions** perform calculations with values.

- **Special @functions** perform tasks, such as looking up a value in a table or providing information about a specific cell.

- **Statistical @functions** perform calculations on lists of values.

- **String @functions** calculate with strings.

The tables below list the @functions by category and briefly describe each @function.

Database @functions

@DAVG	Averages values in a field of a database table, based on certain criteria.
@DCOUNT	Counts nonblank cells in a field of a database table, based on certain criteria.
@DGET	Finds a value or label in a field of a database table, based on certain criteria.
@DMAX	Finds the largest value in a field of a database table, based on certain criteria.
@DMIN	Finds the smallest value in a field of a database table, based on certain criteria.
@DQUERY	Gives you access to a function of an external database and uses the result of the function in a criteria range.
@DSTD	Calculates the population standard deviation of values in a field of a database table, based on certain criteria.
@DSTDS	Calculates the sample standard deviation of values in a field of a database table, based on certain criteria.
@DSUM	Sums values in a field of a database table, based on certain criteria.
@DVAR	Calculates the population variance of values in a field of a database table, based on certain criteria.
@DVARS	Calculates the sample variance of values in a field of a database table, based on certain criteria.

Date and time @functions

Date calculations:

@DATE	Calculates the date number for a set of year, month, and day values. For example, @DATE(91,7,21) returns 33440, the date number for July 21, 1991.
@DATEVALUE	Converts text that looks like a date into its equivalent date number. For example, @DATEVALUE("21-Jul-91") returns the date number 33440.
@DAY	Calculates the day of the month in a date number. For example, @DAY(33440) returns the value 21 because 33440 is the date number for July 21, 1991.
@DAYS360	Calculates the number of days between two date numbers, based on a 360-day year. (This conforms to the 1990 modifications to the Securities Industry Association's 1986 Standard Securities Calculation Methods.)
@D360	Calculates the number of days between two date numbers, based on a 360-day year (12 months, each with 30 days). For example, @D360(32560,32572) returns the value 14.
@MONTH	Calculates the number of the month in a date number. For example, @MONTH(33440) returns the value 7 because 33440 is the date number for July 21, 1991.
@YEAR	Calculates the year in a date number. For example, @YEAR(33440) returns the value 91 because 33440 is the date number for July 21, 1991.

Time calculations:

@HOUR	Calculates the hour in a time number (based on a 24-hour format). For example, @HOUR(0.604745) returns the value 14 (because 0.604745 is the time number for 2:30:50 p.m.).
@MINUTE	Calculates the minutes in a time number. For example, @MINUTE(0.604745) returns the value 30 (because 0.604745 is the time number for 2:30:50 p.m.).
@SECOND	Calculates the seconds in a time number. For example, @SECOND(0.604745) returns the value 50 (because 0.604745 is the time number for 2:30:50 p.m.).
@TIME	Calculates the time number for a set of hours, minutes, and seconds. For example, @TIME(14,30,50) returns 0.604745 (the time number for 2:30:50 p.m.).
@TIMEVALUE	Converts text that looks like a time into its equivalent time number. For example, @TIMEVALUE("02:30:50 PM") returns the time number 0.604745.

Current date and time calculations:

@NOW	Calculates the value that corresponds to the current date and time on the computer's clock. For example, @NOW returns the value 33440.604745 at 2:30:50 p.m. (the time number 0.604745) on July 21, 1991 (the date number 33440).
@TODAY	Calculates the date number that corresponds to the current date on the computer's clock. For example, @TODAY returns the value 33440 on July 21, 1991.

Financial @functions

Capital-budgeting tools:

@IRR	Calculates the internal rate of return for a series of cash flows.
@NPV	Calculates the net present value of a series of cash flows.

Depreciation:

@DDB	Calculates the double-declining balance depreciation allowance of an asset.
@SLN	Calculates the straight-line depreciation allowance of an asset for one period.
@SYD	Calculates the sum-of-the-years'-digits depreciation allowance of an asset.
@VDB	Calculates depreciation using the double-declining balance method and lets the percentage of straight-line depreciation to be values other than 200%.

Ordinary annuities:

@FV	Calculates the future value of a series of equal payments.
@PMT	Calculates the amount of the periodic payment needed to pay off a loan.
@PV	Calculates the present value of a series of equal payments.
@TERM	Calculates the number of payment periods of an investment.

Single-sum compounding:

@CTERM	Calculates the number of compounding periods necessary for an investment to grow to a future value.
@RATE	Calculates the periodic interest rate necessary for an investment to grow to a future value.

Logical @functions

@FALSE	Returns the logical value 0 (false).
@IF	Takes one action if a condition is true; another if the condition is false. For example, @IF(SALES>COSTS,SALES-COSTS,"No profit") returns the result of SALES minus COSTS if sales are greater than costs, or the string "No profit" if sales are less than or equal to costs.
@ISAAF	Returns 1 (true) for a defined add-in @function; 0 (false) for any other entry.
@ISAPP	Returns 1 (true) for a currently loaded add-in; 0 (false) for any other entry.
@ISERR	Returns 1 (true) for the value ERR (error); 0 (false) for any other entry.
@ISNA	Returns 1 (true) for the value NA (not available);

	0 (false) for any other entry.
@ISNUMBER	Returns 1 (true) for a value or a blank cell; 0 (false) for a string.
@ISRANGE	Returns 1 (true) for a defined range name or valid range address; 0 (false) for any other entry.
@ISSTRING	Returns 1 (true) for text enclosed in " " (quotation marks), a text formula, or the address or name of a cell that contains a label; 0 (false) for a value or a blank cell.
@TRUE	Returns the logical value 1 (true).

Mathematical @functions

General:

@ABS	Calculates the absolute (positive) value of a value.
@EXP	Calculates the value e raised to a specified power.
@INT	Returns the integer portion of a value.
@LN	Calculates the natural logarithm (base e) of a value.
@LOG	Calculates the common logarithm (base 10) of a value.
@MOD	Calculates the remainder (modulus) of two values.
@RAND	Generates a random value between 0 and 1.
@ROUND	Rounds a value to a specified number of decimal places.
@SQRT	Calculates the positive square root of a value.

Trigonometric:

@ACOS	Calculates the arc cosine of a value.
@ASIN	Calculates the arc sine of a value.
@ATAN	Calculates the arc tangent of a value.
@ATAN2	Calculates the four-quadrant arc tangent of two values.
@COS	Calculates the cosine of an angle.
@PI	Returns the value π (calculated at 3.14159265358979324).
@SIN	Calculates the sine of an angle.
@TAN	Calculates the tangent of an angle.

Special @functions

Cell and range information:

@@	Returns the contents of the cell whose name or address is specified in another cell.
@CELL	Returns information about a cell or its contents. For example, @CELL("type",B5) returns v if B5 contains a value, b if B5 is blank, and l if B5 contains a label.
@CELLPOINTER	Returns information about the current cell or its contents.

	For example, @CELLPOINTER("type") returns v if the current cell contains a value, b if the current cell is blank, or l if the current cell contains a label.
@COLS	Counts the columns in a range.
@COORD	Creates an absolute, mixed, or relative cell address from values provided as arguments.
@ROWS	Counts the rows in a range.
@SHEETS	Counts the worksheets in a range.

Error checking:

@ERR	Returns the value ERR (error).
@NA	Returns the value NA (not available).

Lookup calculations:

@CHOOSE	Finds a specified value or label in a list of values and/or labels.
@HLOOKUP	Finds the contents of a cell in a specified row in a horizontal lookup table.
@INDEX	Finds the contents of a cell in a specified row, column, and worksheet in a range.
@VLOOKUP	Finds the contents of a cell in a specified column in a vertical lookup table.

System and session information:

@INFO	Returns information for the current 1-2-3 session.
@SOLVER	Returns information about the status of the Solver.

Statistical @functions

@AVG	Averages a list of values.
@COUNT	Counts the nonblank cells in a list of ranges.
@MAX	Finds the maximum value in a list of values.
@MIN	Finds the minimum value in a list of values.
@STD	Calculates the population standard deviation of a list of values.
@STDS	Calculates the sample standard deviation of a list of values.
@SUM	Sums a list of values.
@SUMPRODUCT	Sums the products of corresponding elements in multiple ranges.
@VAR	Calculates the population variance of a list of values.
@VARS	Calculates the sample variance of a list of values.

String @functions

@CHAR	Returns the character that a Lotus Multibyte Character Set (LMBCS) code produces.
@CODE	Returns the LMBCS code that corresponds to the first character in a string.
@EXACT	Returns 1 (true) if two strings are the same; 0 (false) if the strings are different.
@FIND	Calculates the position of the first occurrence of one string within another string.
@LEFT	Returns a specified number of characters from the beginning of a string.
@LENGTH	Counts the characters in a string.
@LOWER	Converts all the letters in a string to lowercase.
@MID	Returns a number of characters in a string, starting at a specified character.
@N	Returns the value in the first cell in a range or 0 if the cell contains a label.
@PROPER	Converts the first letter in each word in a string to uppercase and the rest of the letters in each word to lowercase.
@REPEAT	Duplicates a string a specified number of times.
@REPLACE	Replaces characters in one string with characters from a different string.
@RIGHT	Returns a specified number of characters from the end of a string.
@S	Returns the label in the first cell in a range or an empty string if the cell contains a value or is blank.
@STRING	Converts a value into a label with a specified number of decimal places.
@TRIM	Removes leading, trailing, and consecutive spaces from a string.
@UPPER	Converts all the letters in a string to uppercase.
@VALUE	Converts a string that looks like a number into a value.

Formulas for @functions

The sections below list the formulas that are used to calculate some statistical and financial @functions.

Help For complete information about each @function, including calculation methods and examples, choose Help Contents and then select **@Functions** (under Reference). If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

@CTERM

$$\frac{\ln(fv / pv)}{\ln(1 + int)}$$

where: fv = future value

pv = present value

int = interest rate

ln = natural logarithm

@DDB

$$\frac{(bv * 2)}{n}$$

where: bv = book value in that period

n = life of the asset

@DSTD

$$\sqrt{\frac{\sum (v_i - avg)^2}{n}}$$

where: n = number of values in field

v_i = the ith value in field

avg = average of values in field

@DSTDS

$$\sqrt{\frac{\sum (v_i - avg)^2}{n - 1}}$$

where: n = number of values in field

v_i = the ith value in field

avg = average of values in field

@DVAR

$$\frac{\sum (v_i - avg)^2}{n}$$

where: n = number of values in field

v_i = the ith value in field

avg = average of values in field

@DVARS

$$\frac{\sum (v_i - avg)^2}{(n-1)}$$

where: n = number of values in *field*

v_i = the *i*th value in *field*

avg = average of values in *field*

@FV

$$pmt * \frac{(1 + inf)^n - 1}{inf}$$

where: pmt = periodic payment

inf = periodic interest rate

n = number of periods

@NPV

$$\sum_{i=1}^{n} \frac{v_i}{(1 + inf)^i}$$

where: $v_i..v_n$ = series of cash flows in range

inf = interest rate

n = number of cash flows

i = current iteration (1 through n)

@PMT

$$prin * \frac{inf}{1 - (inf + 1)^{-n}}$$

where: $prin$ = principal

inf = periodic interest rate

n = term

@PV

$$pmt * \frac{1 - (1 + inf)^{-n}}{inf}$$

where: pmt = periodic payment

inf = periodic interest rate

n = term

@RATE

$$\left(\dfrac{fv}{pv}\right)^{1/n} - 1$$

where: fv = future value
pv = present value
n = term

@SLN

$$\dfrac{(c - s)}{n}$$

where: c = cost of the asset
s = salvage value of the asset
n = useful life of the asset

@STD

$$\sqrt{\dfrac{\sum(v_i - avg)^2}{n}}$$

where: n = number of items in *list*
v_i = the *i*th value in *list*
avg = average of values in *list*

@STDS

@SYD

$$\dfrac{(c - s)*(n - p + 1)}{(n*(n + 1)/2)}$$

where: c = cost of the asset
s = salvage value of the asset
p = period for which depreciation is being calculated
n = calculated useful life of the asset

@TERM

$$\frac{\ln(1 + (fv * int / pmt))}{\ln(1 + int)}$$

where: pmt = periodic payment
fv = future value
int = periodic interest rate
ln = natural logarithm

@VAR

$$\frac{\sum (v_i - avg)^2}{n}$$

where: n = number of values in *list*
v_i = the *i*th value in *list*
avg = average of values in *list*

@VARS

$$\frac{\sum (v_i - avg)^2}{(n-1)}$$

where: n = number of values in *list*
v_i = the *i*th value in *list*
avg = average of values in *list*

@VDB

@VDB uses the following formula to calculate double-declining balance depreciation:

$$\frac{(bv * d)}{n}$$

where: bv = book value in that period
d = percentage of straight-line depreciation
n = useful life of the asset

@VDB uses the following formula to calculate straight-line depreciation:

$$\frac{(bv - s)}{r}$$

where: bv = book value in that period
s = salvage value of the asset
r = remaining useful life of the asset

This chapter describes how to create graphs using the Graph commands.

What is a 1-2-3 for Windows graph?
Creating a graph
Changing a graph
Adding a graph to a worksheet
Printing a graph
Saving a graph

This chapter describes how to create graphs using the Graph commands.

What is a 1-2-3 for Windows graph?
Creating a graph
To create a graph
To return to the worksheet window
Changing a graph
To change the graph type
To add a graph title
To add a legend
Adding a graph to a worksheet
To add a graph to a worksheet
Printing a graph
To print a graph
Saving a graph

What is a 1-2-3 for Windows graph?   `»`

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`»`

Graphs are tools for illustrating the relationships between one or more numbers. Because of their visual nature, graphs often convey messages about numbers more quickly and dramatically than the numbers themselves do. You might use a graph to analyze the cost of running your business, to see how the unit price of an item changes with the number of items ordered, to compare the number of sales calls you made last month with the number of actual sales, and so on. For example, if your business produces several products, you could create a bar graph to show the contribution each product makes to total revenues, as illustrated in the graph below.
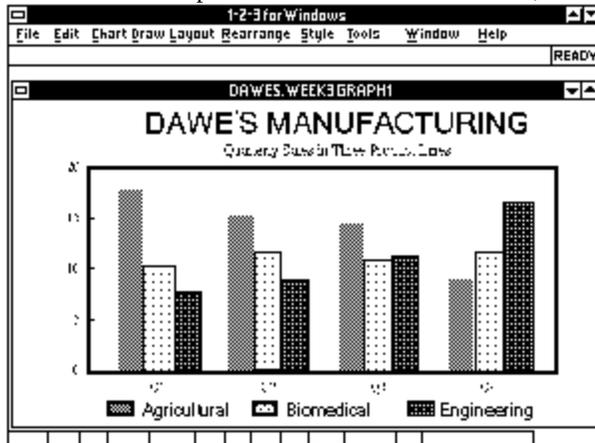

Graph types include the following:

- **Area** and **3-D Area** -- Area graphs are a variation on the basic line graph in which the lines are stacked and the areas between the lines are filled with different colors or hatch patterns. These graphs show the contribution of one set of values to the whole.

- **Bar** and **3-D Bar** -- Bar graphs consist of a series of bars, each bar representing a value. You can use bar graphs to compare related data at a given point in time. Stacked bar graphs compare different types of values by stacking them one on top of the previous in a single bar and using colors or hatch patterns to differentiate the parts of the bar.

- **High-Low-Close-Open (HLCO)** -- High-Low-Close-Open (HLCO) graphs track fluctuations in data over time. They depict each set of high, low, close, and open data as one vertical line on the graph. The line extends from the high value to the low value and includes tick marks for the closing and opening values. The tick mark for the closing value extends right from the line; the tick mark for the opening value extends left.

- **Line** and **3-D Line** -- Line graphs are generally used to plot changes in data over time. Each line in a line graph represents a category of data, and each point along the line represents the data's value at a particular time.

- **Mixed** -- Mixed graphs are combination bar and line graphs. They are useful for plotting different types of data, such as sales volumes and advertising expenditures or trading volumes and stock prices, in the same graph.

- **Pie** and **3-D Pie** -- Pie charts relate two or more positive values to one another by representing the values as slices of a pie. The size of each pie slice is proportional to the percentage each value contributes to the sum of the values. For example, in a set of values totaling 80, the pie slice representing the value 40 would be exactly half the size of the pie.

- **XY** -- XY graphs, also called scatter charts, are used to show correlations between different types of values. For example, you could use an XY graph to show correlations between sales and profits, purchase quantity and unit price, or golf course use and average daily temperature.

**Creating a graph**   ≫

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≫

You create 1-2-3 graphs using worksheet data. For example, the bar graph below, which shows a manufacturing company's quarterly sales for three product lines, was created using the four ranges of data shown in the accompanying worksheet.
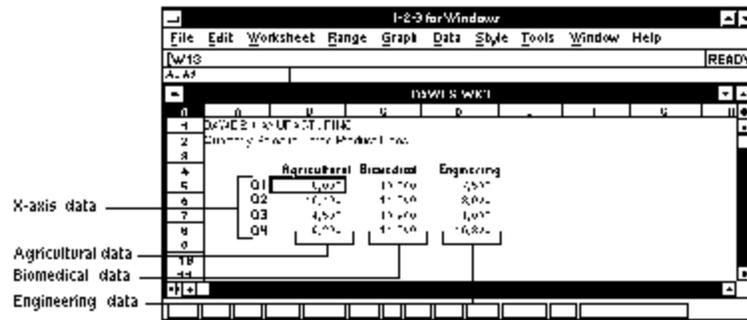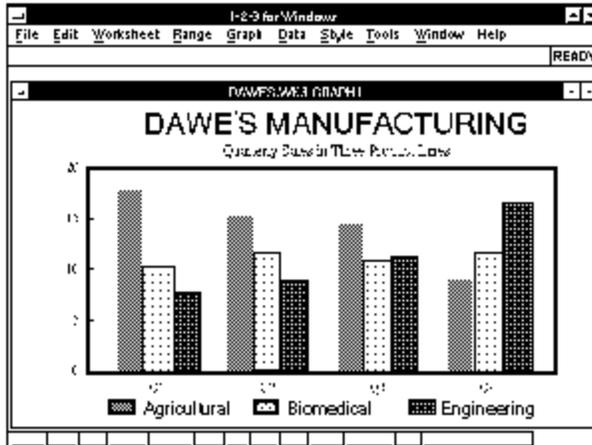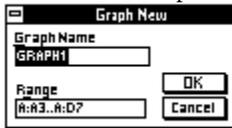

To create a graph from a Worksheet window, use the Graph New command. This command creates a new graph based on the worksheet data. 1-2-3 **links** the worksheet data to the graph, so that if you change the worksheet data, the graph automatically reflects those changes.

To create a graph
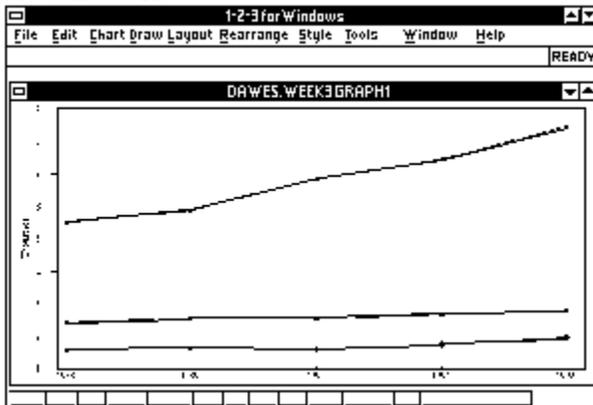
1.   Select the range that contains the data to graph.
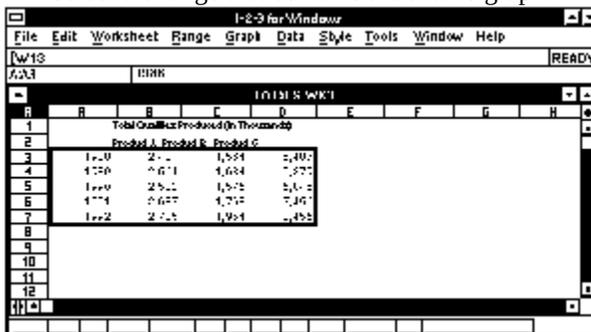
2. Choose Graph New.

3. Specify a name for the graph in the Graph name text box or accept the default name.

4. To change the range displayed in the Range text box, specify a new range.

5. Select OK.

1-2-3 creates a graph of the data in the range, using the first column as x-axis labels. It displays the graph in a Graph window.

1-2-3 attempts to display a graph for any range you specify. To produce a meaningful graph, however, you must specify a valid data range for the graph.

A3..D9 in the next worksheet is a valid data range for a graph. The first column in the range contains x-axis labels, and the second, third, and fourth columns contain the data to be graphed. The data in A16..E19, however, is not organized appropriately for graphing. Although 1-2-3 will display a graph for this range, the graph will be meaningless.

To return to the Worksheet window

1. Make the Worksheet window active:

   Mouse   Click the Worksheet window.

   Keyboard   Press CTRL+F6 to move from one window to the next until the Worksheet window is active.

Changing a graph

When a Graph window is active, you can change the graph in several ways. For example, you may want to change the graph type, add a graph title, or add legends.

> **Note**   You can also enhance a graph by adding text and other objects, such as lines, arrows, and rectangles, and change fonts and colors. For more information, see **Chapter 6**.

To change the graph type

1.   (If necessary) Make a Graph window active.

2.   Choose Chart Type.
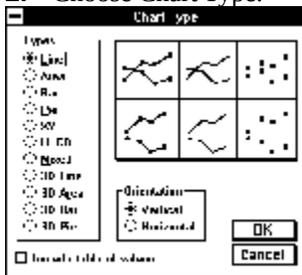
3.   Select the graph type.

Area -- Draws lines between values and fills in the area between lines with different colors or hatch patterns.

Bar -- Draws a bar for each value.

HLCO -- Depicts each set of high, low, close, and open data as one vertical line on the graph.

Line -- Draws a line between values.

Mixed -- Plots one set of data in a bar graph and another set of data in a line graph.

Pie -- Creates a pie slice for each value.

3D Area -- Draws 3-D lines between values and fills in the area between lines with different colors or hatch patterns.

3D Bar -- Draws a 3-D bar for each value.

3D Line -- Draws a 3-D line between values.

3D Pie -- Creates a 3-D pie slice for each value.

XY -- Plots values on both x- and y-axes.

4.   Under Orientation, select one of the following options:

Horizontal -- Displays the x-axis across the bottom of the graph.

Vertical -- Displays the x-axis along the left side of the graph.

5.   (Optional) Select the Include table of values check box to display data values under the graph.

6.   Select one of the options for the graph type.

7.   Select OK.

To add a graph title

1. (If necessary) Make the Graph window active.

2. Choose Chart Headings.
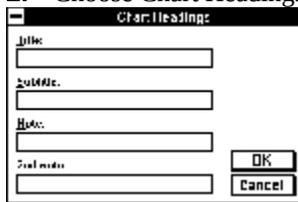
3. Enter the first line of the title in the first Title text box.

**4.** Enter the subtitle in the Subtitle text box.

5. Select OK.

To add a legend

1-2-3 displays each data range in a graph with a different color or shading pattern. To identify what each color or hatch pattern stands for in a graph, you create a legend. 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.

You can set the legend for each data range one at a time or you can set a legend for all of the data ranges at once.

To add a legend to the data ranges one at a time

1. (If necessary) Make the Graph window active.

2. Choose Chart Legend.
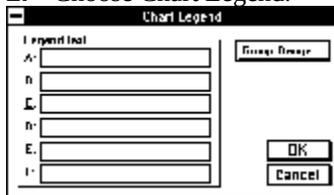
3. In each text box associated with a data range for which you want to display a legend, enter the legend text or the address of the cell that contains the text.

   Note Precede a cell address with a \ (backslash). For example, if cell A2 contains text you want to use as a legend for the B data range, enter \A2 in the B: text box.

4. Select OK.

To set a legend for all of the data ranges at once

1. (If necessary) Make the Graph window active.

2. Choose Chart Legend.

3. Specify the range that contains the legend labels in the Group Range text box.

4. Select OK.

You can include 1-2-3 graphs in a worksheet. When you add a 1-2-3 graph, the graph becomes part of the worksheet file.

> **Note**   You can use Graph Import to add a graphic from a .PIC file or a .CGM file on disk to the current worksheet.

> **Help**   For more information about adding a .PIC file or .CGM file to a worksheet, choose **Graph Import** and press F1 (HELP). If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

To add a graph to a worksheet

1.   (If necessary) Make the Worksheet window active.

2.   Select the range in which you want to place the graph.

3.   Choose Graph Add to Sheet.

4.   Specify the graph to add to the worksheet in the Graph name text box or select the graph from the list box.

5.   To change the range displayed in the Range text box, specify another range.

6.   Select OK.

1-2-3 sizes the graph to fit the specified range and adds the graph to the worksheet. To change the location or size of the graph, use Graph Size.

To print a graph, you add the graph to a worksheet, and then print the worksheet. For information about adding a graph to a worksheet, see **"Adding a graph to a worksheet"**.

To print a graph

1. Make the worksheet that contains the graph the current worksheet.

2. Select the range containing the graph.

3. Choose File Print.

4. Select OK.

For more information about printing a worksheet, see **"Printing a worksheet file"** in Chapter 8.

Saving a graph

Like any changes you make to a worksheet, graphs you create or enhance while working in a file are saved when you save the file. For more information about saving a worksheet file, see **"Saving a worksheet file"** in Chapter 2.

This chapter describes how to add text and other objects to a graph, how to select and rearrange objects in a graph, how to change fonts and colors in a graph, and how to resize a graph.

Why enhance a graph?
Adding text to a graph
Adding an object to a graph
Rearranging objects in a graph
Changing font, color, and line style
Resizing a graph
Saving graph enhancements

This chapter describes how to add text and other objects to a graph, how to select and rearrange objects in a graph, how to change fonts and colors in a graph, and how to resize a graph.

Why enhance a graph?

Although the data points in the graph accurately reflect the values in the worksheet, you may want to add enhancements to the graph that make the visual impact of the data more dramatic. You can enhance a graph with explanatory text, special fonts, colors, drawings, lines, line styles, and arrows.

For information about creating a 1-2-3 for Windows graph and adding it to the worksheet, see **Chapter 5**.

The illustration below shows a bar graph that plots ice cream sales data. This chapter uses this bar graph to demonstrate the effects of adding text, adding objects, and changing fonts, colors, and line styles.
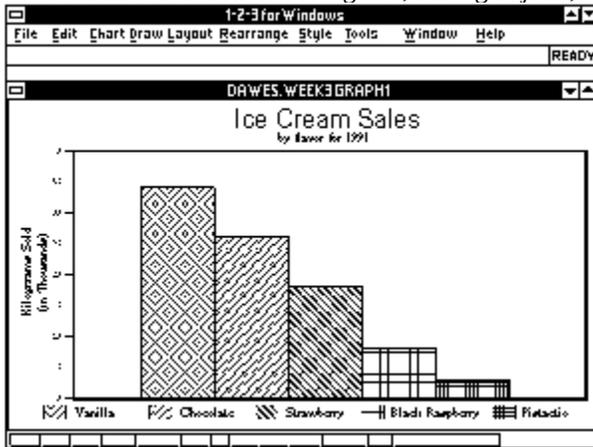
To add text to a graph, you first must display the graph in a Graph window. Then, when the Graph window is active, you can use the Draw commands to add **objects** (text, geometric shapes, arrows, and freehand drawings) to a graph you added to your worksheet.

The instructions below explain how to add explanatory text anywhere in a graph. When the Graph window is active, you can also add titles, legends, labels, and notes with Chart Data Labels, Chart Headings, and Chart Legend. For more information about adding titles and legends to a graph, see **"Changing a graph"** in Chapter 5.

> **Help**   For more information about adding titles, legends, labels, or notes to a graph, make the Graph window active and choose **Chart Data Labels,** **Chart Headings,** or **Chart Legend,** and press F1 (HELP). If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

The sections that follow describe how to display a graph in a Graph window and add explanatory text.

To display a graph in a Graph window

1.   Choose Graph View.
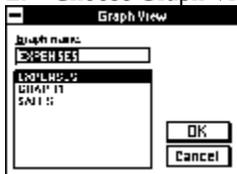
2.   Select the graph you want to display:

> **Mouse**   Click the name of the graph in the Graph name list box.

> **Keyboard**   Enter the name of the graph in the Graph name text box or use or ↓ to highlight the name in the Graph name list box and press ENTER.

3.   Select OK.

To add text to a graph

1.   (If necessary) Make the Graph window active:

> **Mouse**   Click the Graph window.

> **Keyboard**   Press CTRL+F6 to move from one window to the next until the Graph window is active.

2.   Choose Draw Text.

3.   Enter the text in the New text text box.

4.   Select OK.

5.   Position the text:

> **Mouse**   Move the cursor to the location where you want to place the text and click the mouse button.

> **Keyboard**   Use , ↓, →, or ← to move the cursor to the location where you want to place the text and press the space bar.
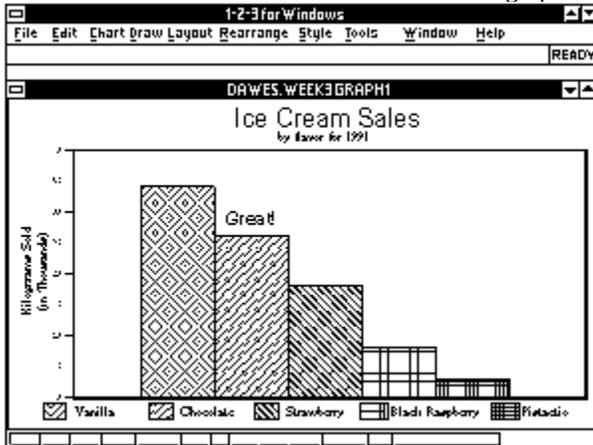
6.   Add the text to the graph:

Mouse   Double-click the mouse button.

Keyboard   Press ENTER.

A small, filled rectangle, called a **handle** (forming part of a bounding box) appears around the text. The text is now a selected object in the graph.

The illustration below shows the ice cream bar graph with the text "Great!" added next to the Vanilla bar.

Adding an object to a graph

In addition to text, you can also add other objects to a graph, including lines, arrows, rectangles, polygons, ellipses, and freehand drawings.

To add an object to a graph

1. Display a graph in the Graph window.

2. (If necessary) Make the Graph window active:

Mouse   Click the Graph window.

Keyboard   Press CTRL+F6 to move from one window to the next until the Graph window is active.

3. Select a command.

Draw Arrow -- Adds a line segment or connected line segments with a filled arrow head at one end to a graph.

Draw Ellipse -- Adds an ellipse or a circle to a graph.

Draw Freehand -- Adds a freehand drawing to a graph.

Draw Line -- Adds a single straight line or connected line segments to a graph.

Draw Polygon -- Adds a multisided object to a graph.

Draw Rectangle -- Adds a rectangle to a graph.

Draw Text -- Adds text to a graph.

4. Anchor the first point of the object:

Mouse   Move the cursor to the location where you want to begin drawing the object and click the mouse button.

Keyboard   Use , ↓, →, or ← to move the cursor to the location where you want to begin drawing the object and press the space bar.

5. Draw the object.

Tip   When you draw a polygon, repeat step 4 to anchor successive line segments. When you draw a rectangle or ellipse, drag the mouse or use , ↓, →, or ← to stretch the bounding box to the size of the object.

6. Complete the object:

Mouse   Double-click the mouse button.

Keyboard   Press ENTER.

The illustration below shows the ice cream bar graph with an ellipse drawn around "Great!".
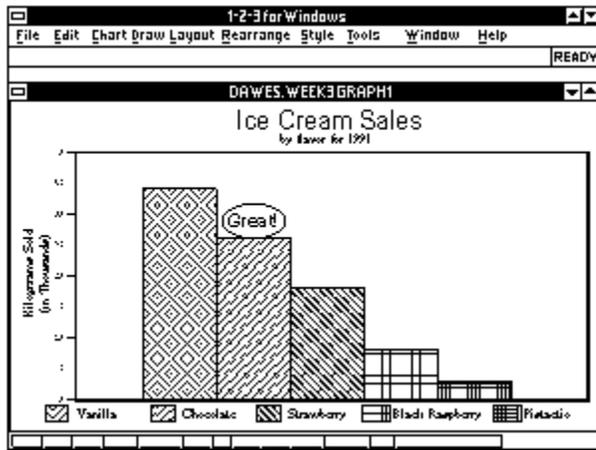
Rearranging objects in a graph

After you have added objects to a graph, you may find you want to move them or rearrange them in other ways, such as turning them, adjusting their size, or changing their skew.

You must **select**, or identify, objects in the Graph window in order to move or rearrange them. You select objects with the Edit Select commands or with the mouse.

To select objects in a graph

Mouse

1. To select a single object, click the object. To select several objects, click the first object and then press and hold SHIFT and click additional objects.

Keyboard

1. Choose Edit Select.

2. Select a command.

   All -- Selects all objects you added to the Graph window but not the underlying graph.

   Chart -- Selects the underlying graph.

   Cycle -- Displays the Edit Select Cycle dialog box. Select Next or Previous to move to an object and Select to select it. Continue selecting objects until you have selected all of the objects you want.

   None -- Deselects all selected objects and the underlying graph.

3. Select OK when you finish selecting objects.

To move an object

Mouse

1. Click an object and drag it to the location you want.

   Note   You cannot move an object with the keyboard.

To rearrange an object

1. Select the object or objects to rearrange.

2. Choose a command.

   Rearrange Clear -- Cancels all Graph Rearrange commands and returns the selected objects to their original states.

   Rearrange Flip -- Turns over the selected object horizontally (backwards) or vertically (upside down).

   Rearrange Quarter-turn -- Rotates the object around its axis at 90-degree increments.

   Rearrange Size -- Changes the size of the object.

   Rearrange Skew -- Adjusts the vertical or horizontal slant of the object.

   Rearrange Turn -- Rotates the object around its axis at any angle.

3. Adjust the object:

   Mouse   Use the mouse to adjust the object and click the mouse button.

Keyboard   Use , ↓, →, or ← to adjust the object and press ENTER.

To change the size of an object

1. Select the object or objects to size.

2. Choose Rearrange Adjust Size.

3. Change the size of the object:

Mouse   Use the mouse to stretch the handles, by pulling or sizing the bounding box to the size you want and click the mouse button.

Keyboard   Use , ↓, →, or ← to stretch the handles, by pulling or sizing the bounding box to the size you want and press ENTER.

Changing font, color, and line style

Fonts, colors, and line styles help to determine the appearance of your graph. A font is the overall design of characters displayed on the screen or printed characters. Fonts come in different sizes (such as 8 point or 14 point). Colors enhance the appearance of areas within the selected object. Line style describes the appearance of lines or the outlines of rectangles, polygons, ellipses, or freehand drawings. If you are not satisfied with the way your graph looks, change these settings to make the graph more visually appealing.

### To change the color of ranges, titles, and indicators

1.   Choose Chart Options Colors.

2.   Select a color for the A, B, C, D, E, or F data range in the drop-down boxes under Data range colors.

   Note   You can use Chart Options Hatch to change the hatch pattern for area, bar, HLCO, and mixed graphs.

3.   Select a color for the graph title in the Chart title drop-down box.

4.   Select a color for the graph subtitle, axis titles, and legend in the Subtitle, axis titles, legend drop-down box.

5.   Select a color for labels, notes, and unit names in the Labels, notes, and name of units drop-down box.

6.   Select OK.

To change the fonts of titles

1.   Choose Chart Options Fonts.
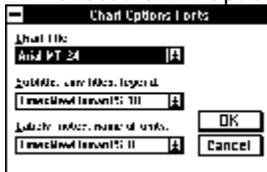
2.   Select a font for the graph title in the Chart title drop-down box.

3.   Select a font for the graph subtitle, axis titles, and legend in the Subtitle, axis titles, legend drop-down box.

4.   Select a font for labels, notes, and unit names in the Labels, notes, and name of units drop-down box.

5.   Select OK.

To change fonts of graph text

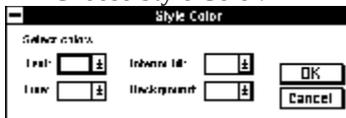**1.**   Select a graph object or objects that include text or numbers.

2. Choose Style Font.
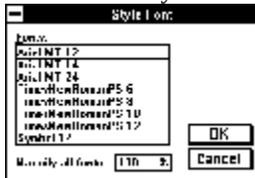
3. Select a font.

4. Select OK.

To change colors of graph objects

1. Select a graph object.

2. Choose Style Color.

3. Select a color for the text of the selected object in the Text drop-down box.

4. Select a color for the interior area of the selected object in the Interior fill drop-down box.

   Tip   If you select a line of text and change the interior color, the interior of the text's handles that form a bounding box, not the text itself, changes color.

5. Select a color for the lines of the selected object in the Line drop-down box.

6. Select a color for the background area of the graph in the Background drop-down box.

7. Select OK.

To change line style

1. Select the lines or objects whose line styles you want to change.

   Note   You cannot use Style Lines to change the style of lines in a line graph.

2. Choose Style Lines.

3. Select a line style in the Line Style drop-down box.

4. Select a line width in the Line Width drop-down box.

5. Select a smoothing pattern, under Smoothing.

   Medium -- Draws an object with maximum smoothing (turns a rectangle into an ellipse, for example).

   None -- Removes smoothing from an object (turns an ellipse into a rectangle, for example).

Tight -- Draws a smooth outline that approximates the original outline of an object.

6. Select one or both of the arrowheads, under Add arrowheads.

End of line -- Adds an arrowhead at the end of the line.

Start of line -- Adds an arrowhead at the beginning of the line.

7. Select OK.

In the illustration below, the chart title is in 24 point Helvetica type and the subtitle, axis titles, and legends are in 10 point Helvetica type. The axis labels and unit name are in 8 point Times type, to differentiate the words "in thousands" from the y-axis title. The line for the ellipse is a wider width.
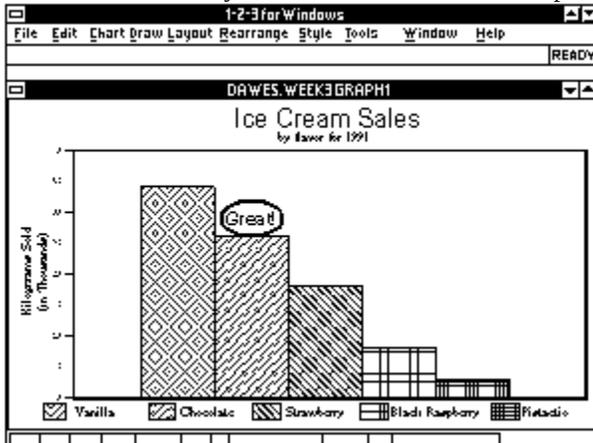
Resizing a graph

You can resize a graph you have added to a worksheet by resizing the range that includes the graph.

To resize a graph

1. Move the cell pointer to a range that contains a graph.

1-2-3 displays the graph name in the format line.

2. Choose Graph Size.
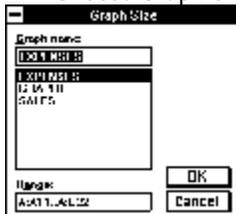
3. Specify a new range for the graph in the Range text box.

4. Select OK.

1-2-3 redraws the graph to fit the new range.

Saving graph enhancements

Like any changes you make to a worksheet, you save enhancements you make to a graph by saving the worksheet file. For more information about saving a worksheet file, see **"Saving a worksheet file"** in Chapter 2.

7   Adding Text to a Worksheet

This chapter describes how to add text to a worksheet, align text in a range, specify fonts and colors for text, and justify a column of text.

[Why add text to a worksheet?](#)
[Adding text to a worksheet](#)
[Formatting text in a worksheet](#)

This chapter describes how to add text to a worksheet, align text in a range, specify fonts and colors for text, and justify a column of text.

Why add text to a worksheet?
Adding text to a worksheet
    To enter text
Formatting text in a worksheet
    To align labels in cells
    To align labels in a range
    To change fonts and attributes
    To set colors
    To justify a column of labels in a range

Why add text to a worksheet?

You use text to describe and document the contents of the worksheet. The Style commands give you control over the appearance of text in your worksheet, both on screen and when printed. You can use the Style commands to do the following:

- Change how labels are aligned

- Emphasize headings in the worksheet with a larger font

- Display data in a range in a different color

You can justify a column of labels with Range Justify.

Adding text to a worksheet

You add text to a worksheet by entering a label in a cell. If the first character you enter is not a number, a currency symbol, nor the start of a formula, 1-2-3 for Windows automatically treats the entry as a label. Also, you can signal a label entry by starting the entry with a label-prefix character. Each of the label-prefix characters produces a different result, as shown in the table below.

Label prefix	Description
'	Left aligns labels
"	Right aligns labels
^	Centers labels
\	Repeats one or more characters across a cell
|	Entered in the first row of a print range, tells 1-2-3 not to print that row of data

Labels, by default, are left-aligned in cells. To change alignment for labels, use Style Alignment or Worksheet Global Settings. See **"To align labels in cells"**.

To enter text

1. Select a cell.

2. Enter text.

As you begin the entry, characters appear in the contents box, the mode indicator changes, and the Cancel and Confirm buttons appear.
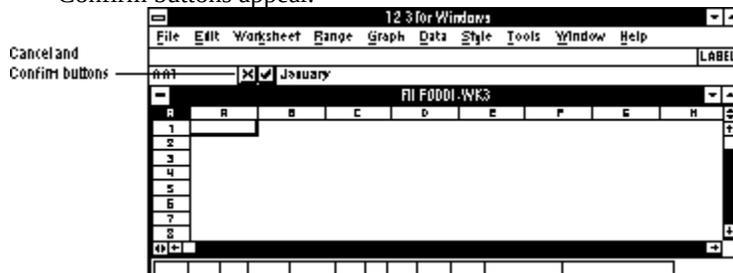
Note   If the text you want to add begins with a number, a currency symbol, or the start of a formula, start the entry with a label-prefix character (' for left-aligned, " for right-aligned, or ^ for centered).

3. Confirm the entry:

Mouse   Click the Confirm button.

Keyboard   Press ENTER or a navigation key.

1-2-3 enters the text as a label in the cell. The mode indicator changes to READY.

Sometimes a label is too long to fit in the cell. 1-2-3 displays the entire label if cells to the right are blank, or displays only what will fit in the cell if the cells to the right contain entries. In both cases, 1-2-3 stores the entire

entry in the cell: it just cannot display it. To make the entire entry appear, you can widen the column, described in **"Changing a column width"** in Chapter 3, or use Range Justify to justify a column of labels, described in **"To justify a column of labels in a range"**.

Formatting text in a worksheet

You use Style Alignment to change the alignment of labels in cells by changing their label prefixes.

You select fonts and colors in a range of labels with Style Font and Style Color, selecting from a list of formatting options you can apply to the text.

You use Range Justify to justify a column of labels so the labels fit within a range. To use this command, global protection must be off for the worksheet that contains the column of labels.

To align labels in cells

1. Select the range that contains the labels you want to align.

2. Choose Style Alignment.

3. Under Align label, select one of the following options:

Center -- Centers labels in cells.

Left -- Positions labels at the left edge of cells.

Right -- Positions labels at the right edge of cells.

4. To change the range displayed in the Range text box, specify a new range.

5. Select OK.

Labels that exceed the width of a column appear left-aligned regardless of the label prefix.

The illustration below shows the labels in column B that are centered within cells.

To align labels in a range

1. Select the range in which you want to align labels.

   Make sure there are only labels in the leftmost column of the range. Labels in other columns of the range are hidden by the labels in the leftmost column when you align labels in a range.

2. Choose Style Alignment.

3. Select the Align over columns check box.

4. Under Align label, select one of the following options:

   Center -- Centers labels in the range.

   Even -- Expands the space between words and between letters in words so as to stretch labels over wider space. Even has no effect on labels that end with a . (period), ! (exclamation point), ? (question mark), or : (colon).

   Left -- Positions labels at the left edge of the range.

   Right -- Positions labels at the right edge of the range.

5. To change the range displayed in the Range text box, specify a new range.

6. Select OK.

   Labels that exceed the width of a range appear left-aligned regardless of the label prefix.

To change fonts and attributes
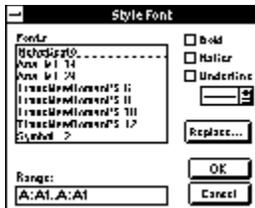
1. Select the range to change.

2. Choose Style Font.

3. Select a font from the Fonts list box.

4. To add boldface, italics, or underlining to the range, select the Bold, Italics, or Underline check box.

5. If you select Underline, choose the line style from the drop-down box.

6. To change the range displayed in the Range text box, specify a new range.

7. Select OK.

   1-2-3 displays the data in the font you select.

To set colors

1. Select the range whose color you want to change.

2. Choose Style Color.

3. To specify a color for the data in a range, select a color from the Cell contents drop-down box.

4. To specify a color for the background of a range, select a color from the Background drop-down box.

5. If you want negative values to appear in red, select the Negative values in red check box.

6. To change the range displayed in the Range text box, specify a new range.

7. Select OK.

   1-2-3 changes the range to the colors you selected.

To justify a column of labels in a range

1. Select a multiple-cell range, beginning with the first cell in the column of labels you want to justify.

2. Choose Range Justify.

   Caution   Using Range Justify on cells whose contents are used in formulas will change or invalidate the results of the formulas.

3. Select OK.

   Tip   If the file is in GROUP mode, Range Justify affects the corresponding range in all worksheets in the file.

Unjustified long labels (A:A1..A:A6)

Justified labels (A:A1..A:A8)
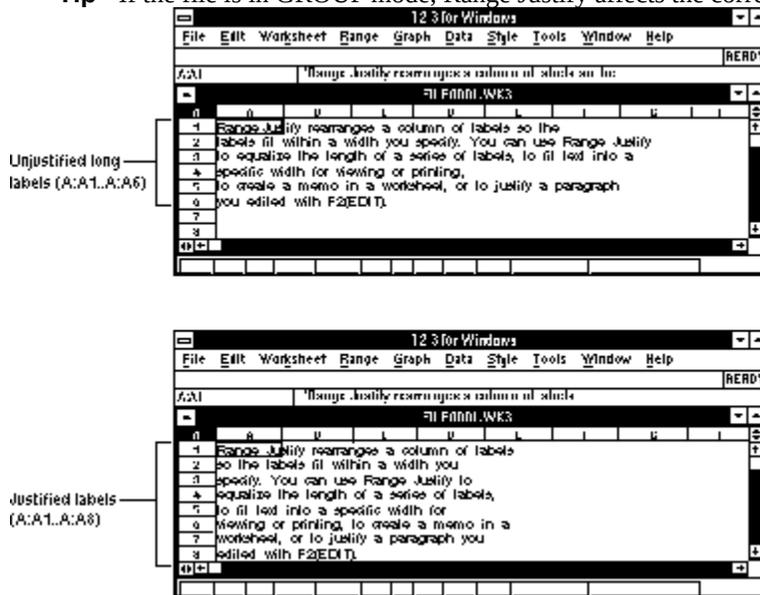
Keep the following in mind when you specify the range:

- The total width of the columns in the range determines the maximum width of the rearranged labels (to a limit of 512 bytes).

- Range Justify justifies text only in the range you specify. It does not place text in rows not included in the specified range.

- If you specify a single-row justify range, 1-2-3 justifies the entire column of labels to fill the width of the justify range, moving any data below the justified labels down.

- If you specify a multiple-row justify range, 1-2-3 limits the justification to the specified range and does not move data below the justify range. Be sure the range is wide and deep enough to hold the entire series of justified labels.

- Range Justify justifies text within paragraphs. It does not move text between paragraphs in the specified range. A blank row, a line that ends with ¶ (end-of-paragraph symbol), and a line that begins with a space specify the beginning of new paragraphs.

- When 1-2-3 justifies the text, it aligns all the labels within the range on the basis of the first label's label prefix. For example, if the first label in the range is preceded by a ^ (caret), 1-2-3 centers all the labels within the range.

- If you specify a three-dimensional (3-D) range, 1-2-3 justifies the column of labels in each worksheet separately.

   Help   For more information about how 1-2-3 justifies text, choose Help Contents, select 1-2-3 Main Menu (under Commands), select Range, and select **Justify.** If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

8 Printing Data

This chapter shows you how to print from a worksheet file and how to preview your worksheet file before you print it.

How do I print a worksheet?
Previewing before you print
Printing a worksheet file
Changing the page setup

8 Printing Data

This chapter shows you how to print from a worksheet file and how to preview your worksheet file before you print it.

How do I print a worksheet?
Previewing before you print
To preview a worksheet file
Printing a worksheet file
To print from a worksheet file
Changing the page setup
To create a header
To change page margins

How do I print a worksheet?

For many worksheets, you need a printed copy for review purposes. When you're ready to create a printed copy of your worksheet file, use File Print.
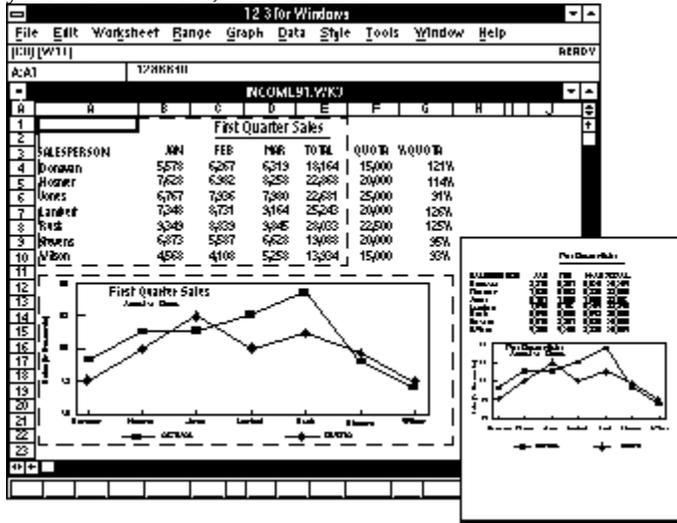
For some work, a printed copy of your current work is all you require. In other cases, however, you'll want to use different fonts, attributes, or formats, or you may want to print a worksheet without the grid lines. You see the fonts, attributes, and formats in the worksheet -- but the worksheet does not look exactly as it will appear when you print it. To see how the printed copy looks before you print it, use File Preview.

> **Note**   Before you print, make sure you installed a printer during the Windows installation procedure. If you are not sure if you installed a printer, choose File Printer Setup and see if 1-2-3 for Windows displays a printer name in the File Printer Setup dialog box. If the File Printer Setup dialog box does not display a printer name, use the Windows Control Panel to install a printer. See *Microsoft Windows User's Guide* for more information.

Generally, printing requires only the default print parameters: the default printer, margins, headings, options, and output formats. You can change page settings, such as headers (text that appears at the top of each page), footers (text that appears at the bottom of each page), or custom margins with the File Page Setup command.

Previewing before you print

When you preview a print job, you see (on the screen) how your data will look when you actually print it. It is more efficient to preview and correct your work than to print the data, examine it, make corrections, and then print it again. Choose File Preview to display the selected ranges; it is the easiest way to see the layout of a large print job before you print.

To preview a worksheet file

1. Specify a range to preview.

The range can include data, text, and graphs you added to the worksheet.

2. Choose File Preview.

3. To change the range to preview, or to preview multiple ranges, specify a new range or ranges in the Range(s) text box.

The print range can include any number of ranges in the current file, and can include graphs you added to the worksheet. For more information about adding graphs to a worksheet, see **"Adding a graph to a worksheet"** in Chapter 5.

To set a single range as the print range, specify the range. For example, specify D:D1..F12 to print the range D1..F12 from worksheet D.

To set multiple ranges as the print range, place an argument separator, such as a , (comma) or ; (semicolon), after each range to separate it from the next range. For example, specify D:D1..F12;SUMMARY;A:A1..C:B5 to print the range D1..F12 from worksheet D, then the range named SUMMARY from the current worksheet, and then the range A1..B5 from worksheets A through C.

If the print range includes a long label, include in the print range the cells the long label overlaps, as well as the cell in which you entered the long label. For example, to print a long label entered in A1 that overlaps B1 and C1, be sure to include cells A1, B1, and C1 in the print range.

4. Select OK.

The first page appears in the Print Preview window. A line outlines the margin settings. The ranges you specified to print, including all graphics, appear within the outline. 1-2-3 also displays layout enhancements such as footers and page numbers.

Print Preview window
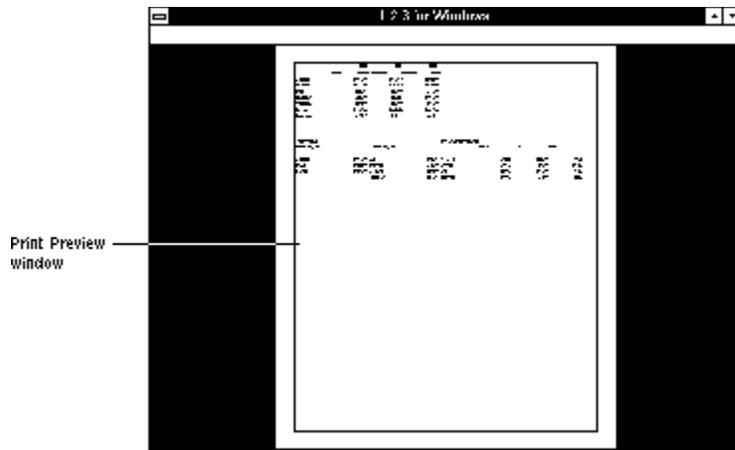
To display the next page, press PG DN or ENTER or position the mouse pointer in the Preview window and click.

To finish previewing pages from any page and redisplay the worksheet, press ESC. To finish previewing the last page and redisplay the worksheet, press ENTER or position the mouse pointer in the Preview window and click. When 1-2-3 redisplays the worksheet, a dotted gray line outlines the print range in the worksheet.

After you preview how your worksheet looks in the Print Preview window and make necessary corrections, you can print your worksheet.

To print from a worksheet file

1. Select a range to print.

The range can include data, text, and graphs you added to the worksheet.

2. Choose File Print.
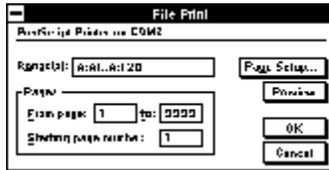
3. To change the range to print, or to print multiple ranges, specify a new range or ranges in the Range(s) text box.

The print range can include any number of ranges in the current file, and can include graphs you added to the worksheet. For more information about adding graphs to a worksheet, see **"Adding a graph to a worksheet"** in Chapter 5.

To set a single range as the print range, specify the range.

To set multiple ranges as the print range, place an argument separator, such as a , (comma) or ; (semicolon), after each range to separate it from the next range. For example, specify D:D1..F12;SUMMARY;A:A1..C:B5 to print the range D1..F12 from worksheet D, then the range named SUMMARY from the current worksheet, and then the range A1..B5 from worksheets A through C.

If the print range includes a long label, include in the print range the cells the long label overlaps, as well as the cell in which you entered the long label. For example, to print a long label entered in A1 that overlaps B1 and C1, be sure to include cells A1, B1, and C1 in the print range.

4. Select OK.

1-2-3 prints the ranges, including all text, data, and graphs.

Changing the page setup

You can change the layout for a printed page, supply page header and footer text, indicate whether to print the worksheet frame and grid lines and whether to print worksheet data or formulas. The sections below describe how to create a header and change page margins.

> **Help**   For more information about changing other printer page layout settings and using named settings, choose **File Page Setup** and press F1 (HELP). If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

To create a header

1.   Choose File Page Setup.
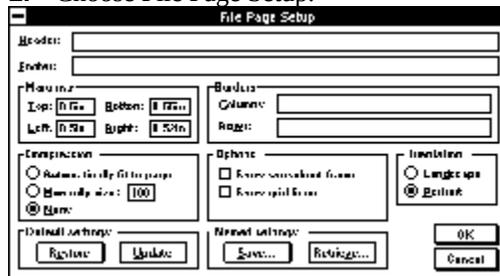
2.   Enter header text in the Header text box.

3.   Select OK.

When you preview or print a range, 1-2-3 displays the header text at the top of each page.

> **Help**   For information about creating and aligning header text, choose File Page Setup, press F1 (HELP), select Header, and select **Specifying Header and Footer Text.** If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

To change page margins

1.   Choose File Page Setup.

2.   Under Margins, enter margin settings in the Top, Bottom, Left, and Right text boxes.

To specify a margin in inches, type in (after you enter the setting). For example, to specify a 1.25 inch top margin, type 1.25in (in the Top text box).

> **Note**   The combined Left and Right margin settings cannot exceed the width of the paper. The combined Top and Bottom margin settings cannot exceed the length of the paper.

3.   Select OK.

When you preview or print a range, 1-2-3 uses the new margins.

9   Protecting Data

This chapter describes how to protect the data in your worksheets, either by hiding the data or preventing others from having access to the data.

Why protect data?
Preventing changes to data
Removing protection
Limiting access to data
Hiding data

9   Protecting Data

This chapter describes how to protect the data in your worksheets, either by hiding the data or preventing others from having access to the data.

Why protect data?

Many worksheets contain some data you do not want others to see or change. For example, you might want to hide sensitive financial data or prevent changes to the labels in a database application.

1-2-3 for Windows offers the following three ways to keep data safe from accidental changes or unauthorized use:

- **Data protection** -- You can globally protect a worksheet file to prevent anyone from writing over data in the file. To change some entries later, you unprotect a range, change the data, and then protect the range again. Global protection lets you (or another user) read data in the worksheet file, but not change it.

- **Password protection** -- Anyone with access to a worksheet file can turn off global protection. To let people access a worksheet file but prevent them from turning global protection off, seal the file. To restrict access to a worksheet file, attach a password to it.

- **Hiding worksheet areas** -- Hide data you do not want others to see or change. Hiding makes data in the hidden areas invisible. It is best to protect hidden areas too, or you might change hidden data accidentally.

Preventing changes to data

Protecting a worksheet file is useful if you create a worksheet for others to use and you want to be sure that important formulas are not changed (for example, if you have a worksheet file that contains sales data). Select Worksheet Global Settings Protection to protect all cells in a worksheet file.

Worksheet Global Settings Protection protects a worksheet from changes to data. Users can read data protected in this way, but they cannot change it.

Anyone who opens the file, however, can remove the protection. Because this protection is relatively easy to remove, global protection is most useful when you restrict data entries to specific areas of the worksheet. When you protect data, it requires a conscious effort and knowledge of 1-2-3 commands to change it.

> **Note** Worksheet Global Settings Protection does not protect cell attributes, such as color, font, and borders. Use File Administration Seal File to prevent changes to cell attributes. For more information about sealing a file, see **"Limiting access to data"**.

If GROUP mode is off, Worksheet Global Settings Protection protects data in the currently selected worksheets, not the entire worksheet file. If GROUP mode is on, Worksheet Global Settings Protection affects all worksheets in the file.

To set global protection

1. Select the worksheets you want to protect.

2. Choose Worksheet Global Settings.

3. Select the Protection check box.

4. Select OK.

The selected worksheets are protected. When the cell pointer is on a protected cell in a worksheet that is globally protected, 1-2-3 displays PR in the format line.

While the worksheet is protected, you cannot use Worksheet Delete, Worksheet Insert Column, Worksheet Insert Row, or Range Justify.

> **Help**   For more information about **Worksheet Global Settings Protection,** choose Worksheet Global Settings, press F1 (HELP), and select Protection. If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

If you try to alter protected data, a message appears.

Removing protection   ≫

≫
≫

You can remove protection from a globally protected worksheet or you can also remove protection from specific cells or ranges only.

For example, if you are using a worksheet that contains sales data, you may have globally protected the worksheet file so none of the data could be inadvertently changed or destroyed. To enter current data in the worksheet file, however, you need a range that is not protected where you can enter updated information. To unprotect that range, you use Range Unprotect.

After you unprotect a range, you may want to protect the range again. For example, you may have unprotected a range that contained a formula so you could change the formula. To protect that range again so the formula cannot be changed, use Range Protect.

To remove protection from a globally protected worksheet

1.   Select the worksheet from which you want to remove global protection.

2.   Choose Worksheet Global Settings.

3.   Remove the check from the Protection check box:

  Mouse   Click the Protection check box.

  Keyboard   Press TAB to move the dotted box to Protection and press space bar to remove the check; or press ALT+P.

1-2-3 turns global protection off for the selected worksheet.

To remove protection from a range

Use Range Unprotect to allow changes to a range when the worksheet or worksheets containing the range are globally protected.

1.   Select the range from which you want to remove protection.

2.   Choose Range Unprotect.

  Note   If the range you selected in step 1 contains one cell, the Range Unprotect dialog box appears. The Range Unprotect dialog box does not appear if the range you selected in step 1 contains more than one cell. If the Range Unprotect dialog box appears, complete the procedure by confirming or changing the range in the Range text box, and selecting OK.

The range is unprotected. The data in the unprotected range appears in a different color. When the cell pointer is on an unprotected cell, 1-2-3 displays U in the format line.

  Tip   Use Window Display Options Unprotected cells to change the color 1-2-3 uses to display unprotected cells.

Help   For more information about **unprotecting ranges,** choose Help Contents, select 1-2-3 Main Menu (under Commands), select Range, and select Unprotect. If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

To protect an unprotected range

Use Range Protect to prevent changes to cells in a range when the worksheet or worksheets the range occupies are globally protected. Use this command only if you previously unprotected cells in the range with Range Unprotect.

1.   Select the range to protect.

2.   Choose Range Protect.

Note   If the range you selected in step 1 contains one cell, the Range Protect dialog box appears. The Range Protect dialog box does not appear if the range you selected in step 1 contains more than one cell. If the Range Protect dialog box appears, complete the procedure by confirming or changing the range in the Range text box, and selecting OK.

The range is protected. 1-2-3 displays PR (Protected) in the format line when the cell pointer is in the range.

You cannot change the data in protected cells, but you can change the formats and attributes.

Help   For more information about **protecting ranges,** choose Help Contents, select 1-2-3 Main Menu (under Commands), select Range, and select Protect. If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

1-2-3 has two types of passwords: file-protection passwords and file-seal passwords. **File-protection passwords**, set with File Save As, require the user to enter a password to open a worksheet file. For example, if you create a file that contains data only certain people should use, such as a payroll file, protect the file with a password when you save it. Only people who know the password can open the file.

File-seal passwords require the user to enter a password to change specified data or attributes within a worksheet file. File Administration Seal File seals the file against all commands that change the appearance of the worksheet or change the protection status. For example, in a database table where you want people to enter data only, not to change the headings or existing entries, use Worksheet Global Settings Protection and Range Unprotect to let you make entries only in certain areas. Then use File Administration Seal File to set a password so the protected areas cannot be unprotected without a password.

Anyone who knows a password can change or remove it. If a password has changed since you last used a file, check with other people who use the file to see if they changed it.

To protect a worksheet file with a password

1. Choose File Save As.
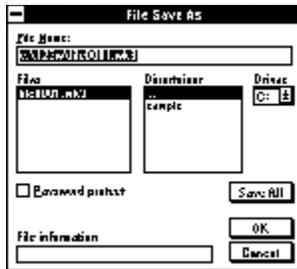
2. Select the file you want to protect with a password.

3. Select the Password protect check box.

4. Select OK.

5. Enter a password in the Password text box.

A password can include 15 characters or less. 1-2-3 displays an * (asterisk) for each character as you enter the password. 1-2-3 is case-sensitive for passwords, so you must remember the exact combination of uppercase or lowercase letters you use when you create the password.

6. Enter the password again in the Verify text box to verify it.

Caution   Remember your password. When you save a file with a password, you can read the file into memory again *only* if you enter the exact password.

7. Select OK.

To seal protected entries in a worksheet file

1. Choose File Administration Seal File.

2. Under Limit changes to, select File and network reservation status.

3. Select OK.

4. Enter a password in the Password text box.

5. Enter the password again in the Verify text box to verify it.

6. Select OK.

File Administration Seal File disables all Worksheet Global Settings commands. In addition, File Administration Seal File disables several Range commands, including Range Format, Range Protect, and Range Unprotect.

If you use a command in a sealed file, a message may state that the file is sealed.

You must remove the seal to change protected entries or worksheet settings.

To remove a file seal

1. Choose File Administration Seal File.

2. Under Limit changes to, select Disable all restrictions.

3. Select OK.

4. Enter the password in the Password text box.

5. Select OK.

There are two ways to hide data in 1-2-3:   You can hide a cell or range so that it appears blank, or you can hide a column or worksheet to make it disappear entirely from the display of the worksheet file.

> **Caution**   Hidden data can be changed. You can edit it, or change settings such as font and color. If you enter new data in a hidden cell, the new entry replaces the old one (but is still hidden). When you redisplay the hidden cell, it will have the data and settings assigned while it was hidden.

Set the Range Format to Hidden to make cells appear blank. If the current cell is a hidden cell, the cell contents appear in the contents box, but the cell appears blank. If you print a range that contains hidden cells, the contents of the hidden cells do not print. To display hidden cell contents, you must change the format back to a visible one.

To hide columns and worksheets, you use Worksheet Hide. If you print a range that contains hidden columns or worksheets, the hidden columns or worksheets do not appear in the printed copy. Whenever 1-2-3 is in POINT mode, it displays hidden columns and worksheets with an asterisk next to the column or worksheet letter. This means you can perform 1-2-3 operations on cells in the hidden columns or worksheets. For example, you can format, unprotect, or copy to or from cells in hidden columns or worksheets. When creating formulas, you can refer to cells in hidden columns or worksheets by entering POINT mode and highlighting those cells. In READY mode, however, the only way to move the cell pointer into a hidden column or worksheet is to redisplay it with Worksheet Unhide.

To hide a cell or range

1.   Select the cell or range to hide.

2.   Choose Range Format.
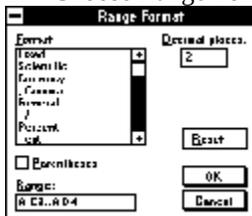
3.   Select Hidden from the Format list box.

4.   To change the range displayed in the Range text box, specify a new range.

5.   Select OK.

The contents of the selected area are no longer visible, though they appear in the contents box when a hidden cell is the current cell.
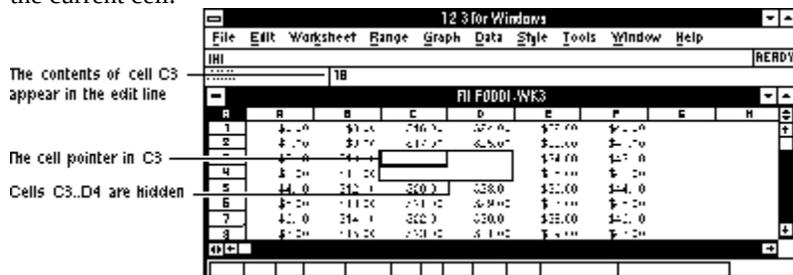
To hide columns or worksheets

1. Select the columns or worksheets to hide.

2. Choose Worksheet Hide.
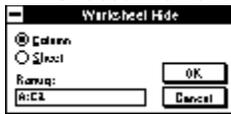
3. Select Column or Sheet.

4. Confirm or change the range in the Range text box if necessary.

5. Select OK.

Tip You can also hide columns by dragging one column border to the left until it overlaps the columns you want to hide.

Range A1..F8 is filled with data

Column C is hidden
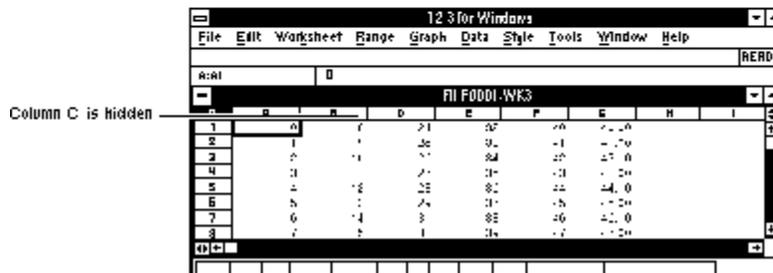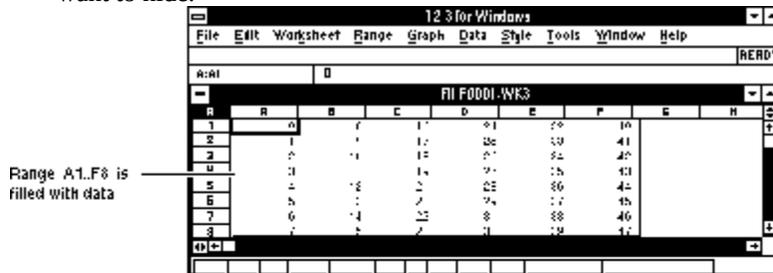
To display hidden columns and worksheets

1. Select the range of columns or worksheets surrounding the columns or worksheets you want to redisplay. For example, to display worksheets B and C, which are currently hidden, select worksheets A and D. To display columns D and E, which are currently hidden, select columns C and F.

2. Choose Worksheet Unhide.
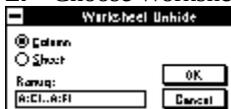
3. Select Column or Sheet.

4. To change the range displayed in the Range text box, specify a new range.

5. Select OK.

10   Using More Than One Worksheet File

This chapter describes how to open and close additional worksheet files, move to another worksheet file, copy and move data between worksheet files, link worksheet files with formulas, combine two worksheets, and extract data from a worksheet file.

Why use more than one worksheet file?
Opening and closing additional worksheet files
Moving to another worksheet file
Selecting in another worksheet file
Copying data between worksheet files
Linking worksheet files with formulas
Combining two worksheet files
Extracting data from a worksheet file

10   Using More Than One Worksheet File

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Why use more than one worksheet file?
Opening and closing additional worksheet files
    To open a second worksheet file
    To close a worksheet file
Moving to another worksheet file
Selecting in another worksheet file
    To select in another worksheet file
Copying data between worksheet files
    To copy data between worksheet files
Linking worksheet files with formulas
    To link worksheet files
Combining two worksheet files
    To combine two worksheet files
Extracting data from a worksheet file
    To extract data from a worksheet file

Why use more than one worksheet file?

A single 1-2-3 for Windows worksheet file can store millions of bytes of data. In some situations, however, opening a new worksheet file for new or additional data is preferable to moving to another worksheet within the same file. For example, if your business has many branch offices across the country, it makes sense to keep information for each branch office in a separate worksheet file. Also, you may be responsible for the budget for your department as well as for the schedule of milestones and deadlines for your group's current project. These tasks are unrelated, so you probably want to store the data in separate files.

Dividing a worksheet file into two or more files also keeps the size of the file manageable, both for the storage medium and for the people using the file. For example, if you give files to other people on disks, you don't want to build a worksheet that is larger than the disk can handle.

When you keep information in separate files, however, you often need to use data from one file in another file. 1-2-3 makes it easy for you to select data in another worksheet file and copy and move data between files. You can also link one file to another through formulas; the links work even if you do not open the other file.

Opening and closing additional worksheet files

When you start 1-2-3, it displays a new, empty worksheet file and displays Untitled in the title bar.

> **Note**   When you save a file with File Save or File Save As, 1-2-3 supplies a default file name unless you specify another file name. The first default file name is FILE0001.WK3, the next default file name is FILE0002.WK3, and so on.

To open another worksheet file and display it in another Worksheet window, use File Open. When you open a worksheet file, it is called an **active file**. The active worksheet file that contains the cell pointer is called the **current file**. In the illustration below, both INCOME89.WK3 and INCOME90.WK3 are active files; INCOME89.WK3 is the current file.
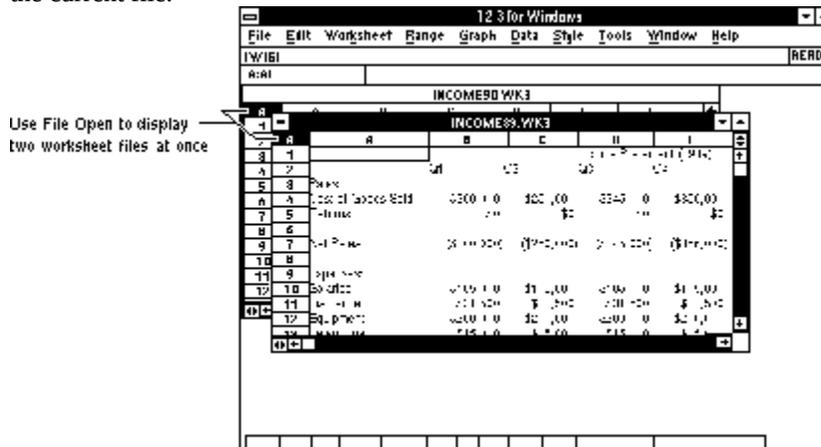
To open a second worksheet file

1.   Choose File Open.
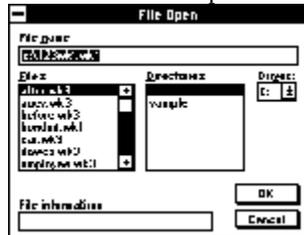
2.   Specify the name of the file you want to open.

You can edit the file name in the File name text box, or you can use the Files and Directories list boxes and the Drives drop-down box to select the file you want.

3.   Select OK.

To create a new blank file, use File New.

1-2-3 displays the new worksheet file in a second window on top of the first one. To see both windows at the same time, move or size them with the mouse or with the Move or Size commands on the Worksheet Control menu. The Minimize and Maximize commands on the Worksheet Control menu also change the size of a window.

To stack windows on top of each other so each title bar is visible, choose Window Cascade. To tile the open windows like floor tiles, choose Window Tile.

For more information about managing windows and using Control menus, see **"Managing windows"** in Chapter 1.

To close a worksheet file

1. Make sure the cell pointer is in the file you want to close and that you choose File Save or File Save As to save the worksheet file before closing it.

For more information, see **"Saving a worksheet file"** in Chapter 2.

2. Choose File Close.

If you change the file but do not save the changes before you choose File Close, 1-2-3 indicates that the file changed and asks whether you want to save the changes and close the file.

Note   You can also close a file by double-clicking the Worksheet Control menu box or by pressing CTRL+F4.

Moving to another worksheet file

After you open two or more files in the 1-2-3 window, use the mouse or keyboard to move the cell pointer between the files.

Mouse

1. Click anywhere in the Worksheet window.

Keyboard

1. Press CTRL+F6 to make the next Worksheet, Graph, or Transcript window active, or use F5 (GOTO) to move to a cell or named range in another active file.

> **Help**   For more information about **F5 (GOTO),** press F5 (GOTO)   and press F1 (HELP). If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

The table below summarizes the keys that move the cell pointer between active Worksheet files.

Key combination	Effect
CTRL+END HOME	Moves the cell pointer to the cell you last highlighted in the first active file.
CTRL+END END	Moves the cell pointer to the cell you last highlighted in the last active file.
CTRL+END CTRL+PG UP	Moves the cell pointer to the cell you last highlighted in the next active file.
CTRL+END CTRL+PG DN	Moves the cell pointer to the cell you last highlighted in the previous active file.

> **Note**   You can also choose Window and select the window name to make another Worksheet window active. For more information, see **"To make a window active"** in Chapter 1.

When using commands or creating formulas with more than one worksheet file, you may want to select data in a worksheet file that is active but is not current. For example, you may want to copy data from an active worksheet file to the current worksheet file (the file containing the cell pointer). To use data from another worksheet file (either during a command or while entering a formula), enter the range address or range name during the command, or select the range.

When you enter the range address or range name from another worksheet file in a command or formula, precede the address or name with the worksheet file name enclosed in << >> (double angle brackets); for example, <<C:\DEPTA\INCOME91.WK3>>A:B2..A:C24.

To select in another worksheet file

Mouse

1. Choose a command and click a range name text box or begin a formula. For example, choose Edit Quick Copy and click the To text box.

2. Click anywhere in the second Worksheet window.

3. Move the mouse pointer to one corner of the range in the second Worksheet window and click and hold the mouse button.

4. Continue to hold the mouse button and drag the mouse pointer to expand the range.

5. Release the mouse button when the entire range is highlighted.

6. Click the Confirm button to return to the dialog box or complete the formula.

   1-2-3 precedes the address of the selection with the file name: for example, <<C:\DEPTA\INCOME91.WK3>>A:A1..A:A10. You can use the selection in many commands and procedures that require a range.

Keyboard

1. Choose a command and press TAB to move to a range name text box or begin a formula. For example, choose Edit Quick Copy and press TAB to move to the To text box.

2. Press CTRL+F6 as many times as necessary to move the cell pointer to the worksheet file you want.

3. Use the navigation keys to move the cell pointer to one corner of the range (the anchor cell).

4. Press . (period) to anchor the cell pointer.

5. Use the navigation keys until you highlight the entire range.

6. Press ENTER to return to the dialog box or complete the formula.

   1-2-3 precedes the address of the selection with the file name: for example, <<C:\DEPTA\INCOME91.WK3>>A:A1..A:A10.

Copying data between worksheet files

Copying data between worksheet files is the same as copying data within a worksheet file, except that you include a file name when you specify either the source or destination. The name of the file comes before the range address or range name and is enclosed in << >> (double angle brackets).

Edit Quick Copy makes a single copy of the data in a range and places that data in the same or a different file. To make multiple copies of the same data for one or more ranges, use the Edit Copy and Edit Paste commands. For more information about using Edit Copy and Edit Paste, see **"To copy data using the Clipboard"** in Chapter 2.

The procedures below show how to copy a range of data using the Edit Quick Copy command.

To copy data between worksheet files

1. Select the range to copy.

2. Choose Edit Quick Copy.

3. To change the range displayed in the From text box, specify a new range.

4. In the To text box, specify the range you want to copy to:

Mouse   Click anywhere in the Worksheet window you want to copy to and select the range.

Keyboard   Press CTRL+F6 as many times as necessary to move the cell pointer to the Worksheet window you want to copy to. Select the range. Press ENTER.

To make one copy of the From range, specify only one cell as the To range. To make more than one copy, specify a range of cells as the To range.

5. (Optional) To copy only formatting, select the Styles only check box.

6. (Optional) To copy values instead of formulas, select the Convert to values check box.

7. Select OK.

1-2-3 copies the data from one worksheet file (for example, SALES.WK3) to the other file (for example, INCOME91.WK3). In the illustration below, worksheet A of INCOME91.WK3 reflects the copied sales numbers.
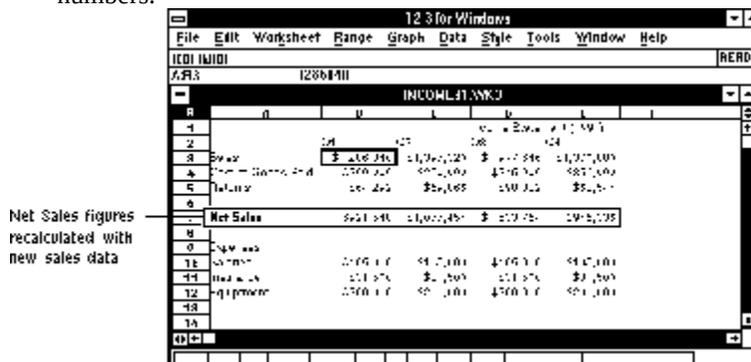
When you copy a formula from one worksheet file to another, 1-2-3 adjusts the formula relative to its new location; for example, the formula +B12*.05 in cell B13 in SALES.WK3 would become +C12*.05 in cell C13 in INCOME91.WK3. 1-2-3 uses the values in INCOME91.WK3 to calculate the value.

Linking worksheet files with formulas

Another way to transfer data from one worksheet file to another is by using formulas. A formula in one worksheet file that refers to cells or range names in another worksheet file links the two files. The calculations and values in the first worksheet file depend on the second worksheet file. A formula can link to an active worksheet file or to a worksheet file on disk.

To link worksheet files

1. Enter the formula, referring to a cell in another worksheet file.

Select the cell with the mouse or keyboard, or type the cell reference using the following format:

+<<*filename*.WK?>>*cell*

where *filename*.WK? is the name of the worksheet file and *cell* is the cell address of the data to link; for example, <<SALES.WK3>>A:B11 in the illustration below.

Note   You can specify the *filename* with or without a path and can link to either .WK3 or .WK1 files.

Formula to enter in cell B3 of INCOME91.WK3
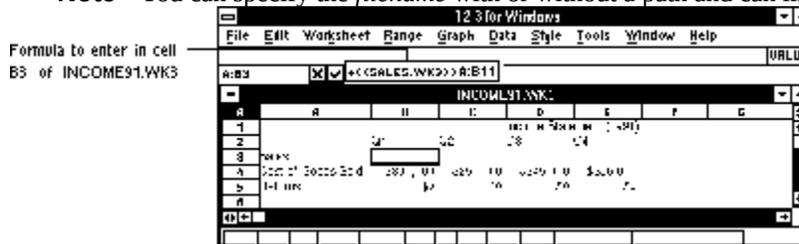
2. Press ENTER.

3. Copy the formula to other cells, if needed.

Use the worksheet file name format as described in step 1 with range or cell addresses in @functions; for example,

@SUM(<<SALES.WK3>>B3..B9)

Any changes you make to the data in the other worksheet file are also automatically reflected in the formula. For example, if the sales value in Q1 for the Atlanta office changes from $145,000 to $140,000, then the value for total sales changes in that worksheet file and in the worksheet file that contains the link formula, as in the next illustrations.

Before

Changing the value in cell B3 of SALES.WK3 to $140,000...

After

... changes values in SALES.WK3...

... and changes values in INCOME91.WK3

Combining two worksheet files

If you need data from a file only once, you will not want to create a link to the file. For example, a business with several stores, each with its own income statements in its own worksheet file, needs to generate an annual report for the entire business. In this case, the business will want to roll up all the total figures from each store into one worksheet file. The annual report needs the figures once and does not need to be updated.

Use File Combine From to take data from another worksheet file and place it in the current worksheet, starting at the current cell. As you take the data from the other file, you can add, subtract, or copy the new data with the values already in the current worksheet file.

Before you use File Combine From, note the following:

- File Combine From can incorporate data from a 1-2-3 Release 1A, 2, or 3 file to the current file.

- To simplify File Combine From, use range names in files that contain data you want to combine. Then, you can specify the range name and do not have to remember the exact cell addresses for the data.

- When you use File Combine From to add or subtract data, the data in the current file and the incoming data should be organized in the same way.

- File Combine From changes cell formats in the current file to reflect those of the incoming data. However, File Combine From does not change column widths or other worksheet settings in the current file, and does not add to or change any of the current file settings.

- File Combine From incorporates data from other files into the current file beginning at the current, cell-pointer location.

- When the incoming data contains blank cells, File Combine From does not change the corresponding cells in the current file.

To combine two worksheet files

1. Move the cell pointer to the top left corner of the range to contain the data from another worksheet file.

2. Choose File Combine From.
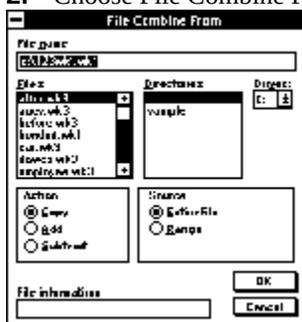
3. In the File name text box, specify the name of the file on disk that contains the data to combine.

   You can edit the file name in the File name text box, or you can use the Files and Directories list boxes and the Drives drop-down box to select the file you want.

4. Under Action, select an option.

   Add -- Adds numeric data from a worksheet file on disk to values or blank cells in the current file, beginning at the current cell.

Copy -- Copies the specified data from a worksheet file on disk to the current file, beginning at the current cell.

Subtract -- Subtracts numeric data in a worksheet file on disk from values or blank cells in the current file, beginning at the current cell.

Caution   File Combine From Copy replaces any data in the current worksheet file without warning.

5.   Under Source, select an option.

Entire file -- Combines all cells in the worksheet file with the current worksheet file.

Range -- Combines the values in the specified range with the values in the current worksheet file, starting at the current cell.

6.   Select OK.

1-2-3 combines the values in the worksheet file you specified with the current worksheet file.

Extracting data from a worksheet file

Use File Extract To to copy data from an active worksheet file and save it in a worksheet file on disk. 1-2-3 places the data in the worksheet file on disk starting with cell A:A1.

If GROUP mode is on, 1-2-3 extracts data from the same range in all worksheets in the file.

To extract data from a worksheet file

1. Select the range to extract data from.

2. Choose File Extract To.

3. In the File name text box, specify the file to extract data to.

You can edit the file name in the File name text box, or you can use the Files and Directories list boxes and the Drives drop-down box to select the file you want.

4. (Optional) To assign a password to the worksheet file when you extract formulas or values, position the insertion point after the file name in the File name text box, press the space bar once to enter a space after the file name and type p.

5. To change the range displayed in the Range text box, specify a new range.

6. Under Save as, select an option.

Formulas -- Extracts data, including formulas, labels, values, and all worksheet settings to a new file.

Text -- Extracts data to a text file.

Values -- Extracts data, labels, values, and all worksheet settings, and converts all formulas into values, to a new file.

7. Select OK.

In step 3, if you specify a file name that already exists, 1-2-3 asks whether you want to cancel saving the new file, replace the data in the existing file with data in the new file, or create a backup of the existing file before replacing data in it.

1-2-3 copies the data in the selected range to the specified worksheet file on disk, starting with cell A:A1. If you extract a range that contains formulas and you choose File Extract To Formulas, be careful to include all data used by the formulas in the range to extract.

11   Using Dynamic Data Exchange (DDE) Links

This chapter describes how to use **Dynamic Data Exchange (DDE)**, which lets you transfer data between 1-2-3 for Windows and other Windows applications and update the information in the destination file when information in the source file changes.

What is a DDE link?
Creating a DDE link
Deleting a link
Updating links

11   Using Dynamic Data Exchange (DDE) Links   »

This chapter describes how to use **Dynamic Data Exchange (DDE)**, which lets you transfer data between 1-2-3 for Windows and other Windows applications and update the information in the destination file when information in the source file changes.

What is a DDE link?
Creating a DDE link
To create a DDE link from another application file to a worksheet file
To create a DDE link from a worksheet file to another application file
Deleting a link
To delete a link
Updating links
To update manual links

What is a DDE link?

A **DDE link** is a connection between a worksheet file and a file created with another Windows application that lets you use data in one file to accomplish tasks in the other. When you use Edit Link Options Create to create a link and the source application or file is not active, 1-2-3 attempts to launch the application and load the file. You create, delete, and update links with the Edit Copy, Edit Paste Link, and Edit Link Options commands.

> **Note**   You can link worksheet files with formulas. A formula in one worksheet file that refers to cells or range names in another worksheet file links the two files. You cannot create or modify a formula link with the Edit Link Options commands. For more information, see **"Linking worksheet files with formulas"** in Chapter 10.

Creating a DDE link

When you create a DDE link to a file, that file is the **destination file**. The destination file can be a worksheet file or any other file created with a Windows application that supports DDE. The **destination range** is the range you want to link to in the current worksheet file.

The **source file** is the file that contains the data you want to use as the source. The source file can be a worksheet file or any other file created with a Windows application that supports DDE. The **source item** is the location of the data in the source file (for example, a range address).
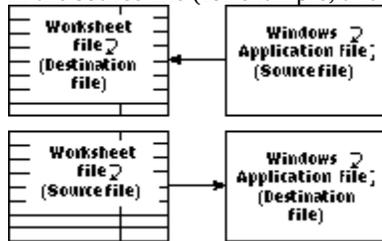
Edit Paste Link and Edit Link Options manage links in the current worksheet file. Use the DDE commands in the other application to manage links that use a worksheet file as the source.

When you first create a DDE link with Edit Paste Link, the link is active. To keep the link active, you must leave both 1-2-3 and the source application active and keep the source and destination files active.

Help   For more information about **creating DDE links,** choose Edit Link Options and press F1 (HELP). If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

To create a DDE link from another application file to a worksheet file

1.   Start the other application and open the source file.

For example, to use an Ami Pro file as the source file, start Ami Pro and open a document file.

2.   Select the source item (the data to link to the worksheet file).

For example, to create a link from an Ami Pro table to a 1-2-3 worksheet file, select the desired cells in the table.

3.   Choose Edit Copy to copy the source item and the link information to the Windows Clipboard.

For example, Ami Pro copies the data in the table, along with the link information, which includes the application name, the file or topic name, and the item name, to the Windows Clipboard.

4.   Start 1-2-3 and open the worksheet file you want to link to.

5.   Select the destination range.

The destination range must be a cell, range address, or range name in the current worksheet file.

6.   Choose Edit Paste Link.

1-2-3 creates a link to the source item and transfers the source data to the destination range.

Note   Some Windows applications do not support creating a DDE link by using Edit Copy and Edit Paste Link. If this is so, you must use Edit Link Options Create to create a DDE link.

When you create a DDE link in a worksheet file, 1-2-3 sets an update mode appropriate for the DDE data format supported by the source application. For example, 1-2-3 sets the update mode to automatic for all links using the text

DDE data format. You change the update mode by selecting Automatic or Manual under Update mode in the Edit Link Options Edit dialog box. When the link is active and the update mode is automatic, any change in the source item is automatically reflected in the destination range. For example, if you change a number in the source, the corresponding number in the destination also changes.

If you close the source application file, the link is no longer active. 1-2-3 saves the link, however, and re-establishes the link when you reopen the source file and update the link. When you save and close the worksheet file, 1-2-3 also saves the link. 1-2-3 re-establishes the link when you reopen the destination file.

You can link a file to more than one source file. If a file has more than one source file, 1-2-3 updates only the link between the destination file and the active source files, though it maintains the links between all files (active or on disk). A link exists until you delete it with Edit Link Options Delete.

> **Note**   If you delete the columns, rows, or sheets that contain the destination range with Worksheet Delete, the link remains intact, but is not associated with a range. You can use Edit Link Options Edit to assign this link to a new range.

To create a DDE link from a worksheet file to another application file

1. Start 1-2-3 and open the worksheet source file.

   Note   If you are working in the "Untitled" worksheet file, save the file before creating the link.

2. Select the source range (the data to link to the destination file).

3. Choose Edit Copy to copy the source range and the link information to the Windows Clipboard.

   For example, 1-2-3 copies the data in the source range, along with the link information, which includes the application name, the file or topic name, and the item name, to the Windows Clipboard.

4. Start the other application and open the destination file (the file you want to link to).

   For example, to use an Ami Pro file as the destination file, start Ami Pro and open a document file.

5. Select the destination for the source range in the destination file.

   Check the documentation for the destination application to determine what types of destinations you can select.

   For example, to create a link from a worksheet file to a table in an Ami Pro file, select the desired cells in the table.

6. Choose Edit Paste Link (or whatever the appropriate command is in the destination application) from the menu for the destination application.

   For example, Ami Pro creates a link from the source range in 1-2-3 to the destination table.

Deleting a link

To remove links from a source file to the current worksheet file, use Edit Link Options Delete. This command is available only if the current worksheet file contains at least one existing link.

To delete a link

1.   Choose Edit Link Options.
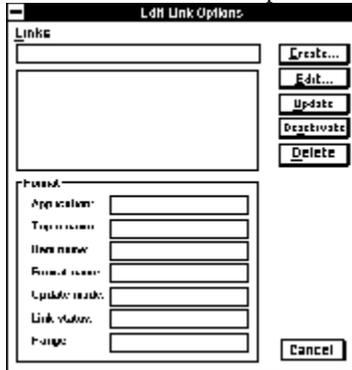
2.   Select the link to delete in the Links list box.

3.   Select Delete.

Updating links

When you create a DDE link, 1-2-3 selects a default update mode based on the format. You change the update mode by selecting Automatic or Manual under Update mode in the Edit Link Options Edit dialog box.

To update manual links to the current worksheet file, use Edit Link Options Update. This command is available only if the current worksheet file contains at least one existing link.

To update manual links

1. Choose Edit Link Options.
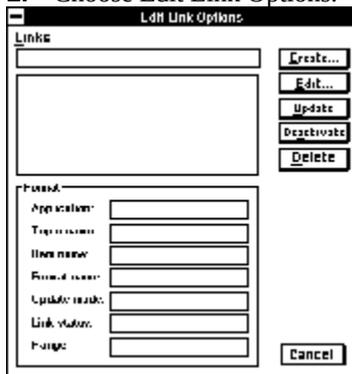
2. Select the link to update from the Links list box.

3. Select Update.

4. Continue using other Edit Link Options commands or select Cancel to close the dialog box.

12   Using a 1-2-3 Database

This chapter describes how to create and modify database tables. You will also learn how to connect to and use tables stored in a database maintained with a database management program other than 1-2-3 for Windows.

What is a 1-2-3 database?
Creating a 1-2-3 database table
Sorting records
Setting up the worksheet for queries
Checking criteria
Extracting records
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Deleting selected records
Eliminating duplicate records
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12   Using a 1-2-3 Database

This chapter describes how to create and modify database tables. You will also learn how to connect to and use tables stored in a database maintained with a database management program other than 1-2-3 for Windows.

What is a 1-2-3 database?   »

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»

A **1-2-3 database** is a collection of data organized into one or more 1-2-3 database tables. A **1-2-3 database table** is a range of related data in columns (fields) and rows (records) in a single worksheet.

A **field** is a column that contains one category of information, such as ID numbers, names, or telephone numbers. The top cell in each column contains a **field name** that identifies the contents of the column. A **record** is a row that contains data for each field in the table, such as the ID number, name, and telephone number of one person in the database.

The tables in a database can be located in different worksheets and in different files. Each table, however, must be in a single worksheet.

The examples in this chapter show an employee database that consists of two related database tables: DIRECTORY and SALES. The SALES table contains the month, the ID, and the total sales for each employee in the sales department. The DIRECTORY table (A:A2..A:F14) contains the telephone number, name, department, location, and ID of each employee. These two tables are shown in the next illustration.

»
»

Before you create a 1-2-3 database table, consider how you will organize the data. For example,

- Are there types of data that are easily grouped together, such as address, city, state, and postal code? If so, include them as fields in one table.

- Have you uniquely identified each record? For example, each person in the employee database illustrated above has a unique ID number, in case two people have the same first and last names.

- Are there groups of unrelated information in the two tables that you may need to join together for a report (such as sales and inventory)? If so, create a field that contains similar entries in both tables. For example, both the DIRECTORY and SALES tables have an ID field that matches employee numbers in each table.

- Do you want to see all the data in a table each time you use it, or only some fields? If you often need only certain fields, consider splitting the data into two tables. Another way to organize data is to place frequently used fields at the beginning of the table, which reduces the need to scroll when moving from one field to the next.

Field names

Field names are the basis for all database tables. They determine how the data is organized and how you will use it. Follow the rules below to create field names.

- Each field name must be a label, not a number or formula. To enter a field name that begins with a number or other nonalphabetic character, precede the name with a label-prefix character ('   " or ^).

- Each field name must be unique within a table.

- Do not use , (comma), . (period), ; (semicolon), spaces, - (hyphen), or # (number sign) in a field name.

- Do not use field names that look like cell addresses, such as P12 or EX100.

The illustration below shows examples of valid field names.

To create a 1-2-3 database table

1. Enter field names in adjacent cells in an empty row in a single worksheet.

   Do not separate the fields with an empty cell or a cell filled with a repeating character.

2. Enter data (text, numbers, @functions, or formulas) for each field in the rows immediately below the row of field names.

   Do not separate the field names from the data with a blank row or a row filled with a repeating character, such as - (hyphen).

   Note   You may also want to format the data with Range Format or align the data with Style Alignment. For information about changing how data appears in a worksheet, see **Chapter 3**.

The illustration below contains a database table, called DIRECTORY TABLE, in worksheet A.

Sorting records

After you create a database table, you often need to change the order of the records, perhaps because you did not enter the data in any particular order or because you need the records in a certain order for a project. For example, you might want to sort records by last name or by ID. Data Sort reorders, or sorts, records in a database table.

> **Tip**   To restore a database table to its original order after a sort, use Data Fill to add a sequence of numbers in a column adjacent to the database table before you use Data Sort. This column defines the pre-sorted order of the records. After sorting for a specific task, use Data Sort again and sort by this column of numbers to restore the database table to its original order.

To sort records

1. Select the range you want to sort.

   Include all of the records in the range, but do not include the field names, as you do not want to sort these with the data. If you created a column of numbers with Data Fill, include this column too.

   Caution   Be careful when you sort ranges that contain formulas. If a cell that contains a formula moves when you sort a range, 1-2-3 adjusts the relative cell addresses in the formulas to reflect the new position of the cell.

2. Choose Data Sort.
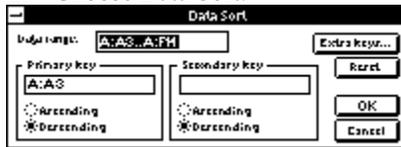
3. To change the range displayed in the Data range text box, specify a new range.

4. Under Primary key, specify the first column to use to sort records.

   Specify the cell address of any cell in the column you want to use to determine the new order for your records.

5. Under Primary key, select the sort order:

   Ascending (A through Z, and smallest number to largest)

   Descending (Z through A, and largest number to smallest)

6. (Optional) Under Secondary key, repeat steps 4 and 5 to specify a secondary sort key. Specify a secondary sort key if two or more records have the same value for the primary sort key.

7. (Optional) Select Extra keys to sort by more than two fields.

8. Select OK.

   Help   For more information about **adding extra sort keys,** choose Data Sort, select Extra keys, and press F1 (HELP). If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

The next illustration shows the DIRECTORY table after sorting by LAST (primary sort key) and FIRST (secondary sort key) in ascending order.

Primary sort key (A:B3) Secondary sort key (A:C3)

1-2-3 sorts data in ascending or descending order according to the collating sequence specified when 1-2-3 was installed. The **collating sequence** is the order 1-2-3 uses for letters, numbers, blank cells, and symbols when you sort. The default collating sequence, Numbers first, sorts as follows:

1. Blank cells

2. Labels beginning with a space

3. Labels beginning with numbers in numerical order

4. Labels beginning with letters in alphabetical order (lowercase letters precede uppercase letters, for example, aAbBcC)

5. Labels beginning with other characters in Lotus Multibyte Character Set (LMBCS) code order

   Note   For more information about LMBCS code order, see **Appendix B**.

6. Values in numerical order

To change the default collating sequence, use the 1-2-3 Install program.

   Help   For more information about **1-2-3 collating sequences,** choose Data Sort, press F1 (HELP), and select Sort Order. If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

As you use database tables, you may need to make changes. To locate records in a specific table, modify records or fields, delete records, and copy records from the current database table to another table or location, use Data Query.

All Data Query commands require an **input range** (the database table or tables to search), and all Data Query commands, except Data Query Modify Insert, require a **criteria** (to tell 1-2-3 which records to select from the input range). The area of the worksheet in which you enter the criteria is called the **criteria range**. To extract (copy) or modify records, you must also have an **output range** (the range that will contain the copied or modified records).

Input range

The input range contains one or more database tables, including field names. Each input range must be a 2-D range (single-sheet range) or an external table.

> **Note**   If you are using Data Query Delete, Data Query Find, or Data Query Modify, you can specify only one table as the input range.

If you specify more than one table for the input range, separate the table addresses or range names with an argument separator. For example:

EMPTABLE,A:A1..A:D30

Use the current argument separator for macros and @functions between table names. The default is comma. Set the argument separator with Tools User Setup International Punctuation.

> **Note**   When you use Data Query Extract or Data Query Modify Extract, 1-2-3 uses data in all the database tables in the input range; you cannot specify multiple database tables in the input range and then work with data in one table only. In addition, you need to enter a special type of formula, called a join formula, in the criteria range when you work with multiple input ranges. For information on joining database tables, see **"Joining database tables"**.

Criteria and the criteria range

The criteria range must contain at least two rows. The first row lists some or all of the field names from the input range (database tables). Subsequent rows in the range list the criteria that define which records 1-2-3 selects from the input range.

Criteria are values, labels, formulas, @functions, or logical or relational expressions. For example, the criteria range in the illustration below tells 1-2-3 to search for records for all employees whose ID numbers are greater than 200 and who are in the SALES department.
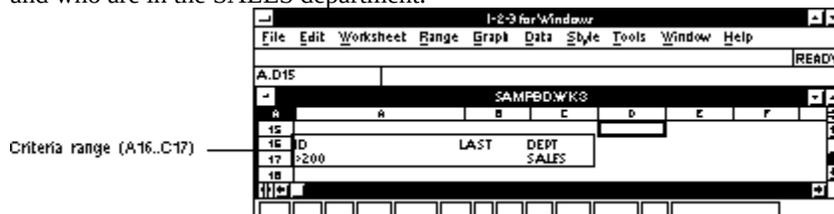
If you enter nothing under a field name in the criteria range, 1-2-3 selects records regardless of their values for the field. In the example, the second field, LAST, has no criterion. 1-2-3 will use only the ID and DEPT fields to select records. If there are no criteria under any field names in the criteria range, 1-2-3 selects all records.

Labels as criteria

You can enter labels exactly as they appear in the input range if you want 1-2-3 to search for records that match the criteria exactly; or you can use wildcard characters to search for records that are similar to the search criteria.

By default, 1-2-3 does not distinguish between uppercase and lowercase letters. For example, the label 'SMITH matches the entries 'Smith or 'smith as well as 'SMITH. To make 1-2-3 recognize these differences, change the program's collating sequence to ASCII. To change the collating sequence, use the 1-2-3 Install program.

> **Help**   For more information about **1-2-3 collating sequences,** choose Data Sort, press F1 (HELP), and select Sort Order. If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

Precede a label with a ~ (tilde) or '<> (not equal to) to search for all labels except that one. For example, ~Smith matches all records with an entry in that field other than Smith.

Precede a label with a label prefix character (' " or ^) followed by a logical operator (=   <   <=   >   >=   and <>) to search for labels that match a specific condition you set. A **logical operator** is an operator you use in a logical formula to evaluate equality or inequality. For example, '>Jo matches all entries that come after Jo in alphabetical order, such as Joan, John, Jonathan, and Kimble.

> **Help**   For more information about **using logical operators,** choose Help Contents, and under Reference, select Formulas. If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

Using wildcard characters in label criteria

To search for records that match some characters in a field, use a label criterion and the **wildcard characters** ? (question mark) and * (asterisk). The ? matches any single character. For example, the label criterion 'Jo?n matches Joan, John, or Jonn. The * matches all characters to the end of the label (up to, and including, the 512-character maximum for a label). For example, the label criterion 'Jo* matches all entries that begin with Jo: Joan Crow, John Hunt, Joanna Williamowski, and so on.

Values as criteria

You can enter values in the criteria range exactly as they appear in the input range if you want 1-2-3 to search for entries that match the criteria exactly; or you can use logical operators to search for values that match a specific condition.

You do not need to format values exactly as they appear in the input range to search for exact matches. For example, 23 matches $23, 23.000, and 2.3E+01.

Precede a value with a label prefix character (' " or ^) followed by a logical operator (=   <   <=   >   >=   and <>) to search for values that match a specific condition you set. For example, '>1500 matches all entries greater than 1500.

Formulas as criteria

1-2-3 also selects records based on formulas or @functions in the criteria range. For example, the formula criterion +ID>200 tells 1-2-3 to find all records with an ID number greater than 200. You enter this criterion under the field name ID in the criteria range.

> **Note**   Some formula criteria may evaluate to ERR when you enter them in the worksheet; however, they are still valid for a Data Query operation. Use Range Format Text to display the formula criteria instead of ERR.

> **Help**   For more information about **entering formulas as criteria,** choose Data Query, press F1 (HELP), select Criteria range, and select Formula criteria. If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

Combining criteria for a field

If you have more than one criterion for a single field, combine two formula criteria in one cell with the logical operator #AND#. For example, to select all ID numbers greater than or equal to 100 and less than or equal to 300, enter

+ID>=100#AND#ID<=300

Similarly, use the #OR# logical operator to select two different sets of values for one field simultaneously. For example, to select records with Dublin or Cambridge in the Location field, enter

+Location="Dublin"#OR#Location="Cambridge"

> **Note** Formula criteria may also use cell addresses to refer to fields. Use the address of the first cell in the field in the formula. For example, if the Location field is in column E and E3 contains the first entry for the Location field, the formula criterion +E3="Dublin" selects all records with a location of Dublin.

Multiple criteria

You can enter criteria in the criteria range in one or more rows and fields to select records that meet more than one condition. If two criteria are in the same row of the criteria range, 1-2-3 selects only those records that meet both criteria. If two criteria are in different rows, however, 1-2-3 selects records that meet either criterion. For example, you might want to see records for sales in May that were greater than $5,000 or you might want to see sales records for May and June.

> **Help** For more information about **entering multiple criteria,** choose Data Query, press F1 (HELP), select Criteria range, and select Multiple Criteria. If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

To set up a criteria range

1. Find an area of the current worksheet or another worksheet for the criteria range.

   The criteria range must not overlap the input or output ranges. In general, it is not a good idea to choose the area below the input range, unless you are certain that you will not be adding records to the input range.

2. Copy some or all of the field names from the input range to the first row of the criteria range.

   You must copy field names exactly as they appear in the input range. You need to copy only the names of the fields you want 1-2-3 to search. Copying all the field names, however, makes it easier to change criteria (using any fields) whenever you want. You can include up to 256 field names in the criteria range.

   If the input range includes more than one named database table, edit the field names in the criteria range so that each begins with the name of the table the field name is in, followed by a . (period). For example, SALES.ID refers to the field ID in the table SALES.

   If two or more database tables in the input range have the same range name, and if duplicate field names appear in these tables, edit these field names in the criteria range so that each begins with a file reference, followed by the name of the table the field name is in and a . (period). For example, <<REGION1.WK3>>SALES.ID refers to the field ID in the table SALES in the file REGION1.WK3.

3. Enter criteria in the row or rows under the field names.

   For information about entering criteria, see **"Criteria and the criteria range"**.

4. (Optional) Use Range Name Create to name the criteria range.

   You may find it easier to use a range name to refer to the criteria range.

Output range

The **output range** is the area to which 1-2-3 copies the results of Data Query Extract or Data Query Modify Extract unique only. The first row of the output range contains copies of the field names you want 1-2-3 to extract. 1-2-3 uses the remaining rows in the output range to copy the selected records. The output range can be a range in the current file or the range name of an external table.

If you exclude a field name in the input range from the first row of the output range, 1-2-3 does not extract data for that field. The field names in the output range are a subset of the field names in the input range. This is a convenient way to create a new database table from a larger table: You enter names of those fields in the existing table that you want in the new table.

Tip Specify a single-row output range that contains only the field names if you want 1-2-3 to determine the number of rows it needs for the output range. 1-2-3 uses as many rows as necessary below the field names for the extracted records and erases any data from the rows below the output range to the bottom of the worksheet (row 8192). Be sure that rows below the output range are blank or contain data that is not important to you.

Using formulas and @functions in the output range

You can use formulas or @functions in the output range to perform calculations as 1-2-3 extracts data from the database table. Enter formulas or @functions in the top row of the output range, as if they were field names. A **computed column** is a column in which 1-2-3 calculates values for a group of records. You create a computed column by entering a formula in the output range.

For example, the illustration below contains the formula +TOTAL_SALES*0.07 in cell C24 of the output range. This formula calculates the commission due each salesperson. Cell C24 is formatted as text so you can see the formula in the cell.

You can use @AVG, @COUNT, @MAX, @MIN, and @SUM to create a special type of computed column called an aggregate column in the output range. An **aggregate column** is a column in which 1-2-3 calculates a statistic for a group of related values.

For example, the illustration below contains the formula @SUM(TOTAL_SALES) in cell B48 of the output range. This formula totals the sales amounts for each month. Cell B48 is formatted as text so you can see the formula in the cell.

Help For detailed information about **using computed and aggregate columns** in the output range, choose Data Query, press F1 (HELP), select Output range, and under Using Formulas, select computed. If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

You can use any type of formula except @@, @CELL, @COLS, @HLOOKUP, @INDEX, @INFO, @IRR, @N, @NPV, @ROWS, @S, @SHEETS, @STD, @STDS, @VAR, @VARS, @VLOOKUP, and the database @functions to create a computed column in the output range.

Note You can also perform database calculations with the database statistical @functions. For more

information about using database statistical @functions, see **"Using database statistical @functions"** in Chapter 13.

Checking criteria

If you set up complex criteria to select records in a database table, check the criteria with Data Query Find to make sure your criteria select the correct records. Data Query Find highlights records in a 1-2-3 database table that meet the criteria. You cannot use an external table or multiple input ranges with Data Query Find.

To find records

1.   Choose Data Query.
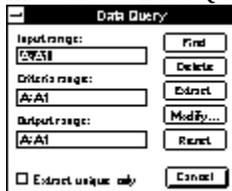
2.   Specify the input range.

Enter the address or range name of the database table, including the field names, or select the range.

3.   Specify a criteria range.

Select the criteria range or enter its address or name.

4.   Select Find.

The mode indicator changes to FIND and 1-2-3 highlights the first record that matches the criteria.

5.   Use the following keys to move among the matching records in the input range:

Key	Action
↑ or ↓	Moves the cell pointer to other records that also meet the criteria.
→ or ←	Moves the cursor from field to field within a highlighted record.
F2 (EDIT)	Lets you edit the field displayed in the current record. Press enter or click the Confirm button to save the changes and continue using Data Query Find; press esc or click the Cancel button to cancel the changes and continue using Data Query Find.
ENTER or ESC	Returns you to the Data Query dialog box.
HOME or END	Moves the cell pointer to the first or last record in the input range that matches the criteria.
F7 (QUERY)	Ends Data Query Find, leaves the cell pointer in the current cell in the current record, and returns 1-2-3 to READY mode.

Extracting records

Extracting records from a database table means copying selected records from the input range to the output range. 1-2-3 selects the records to extract based on criteria you enter in the criteria range. To extract records, use Data Query Extract.

To extract records

1.   Choose Data Query.
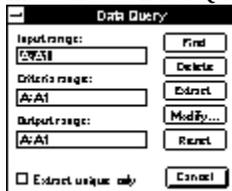
2.   Specify the database table in the Input range text box.

Enter the address or range name of one or more database tables, including the field names.

3.   Specify the criteria range in the Criteria range text box.

Select the criteria range or enter its address or range name.

Note   You need to enter a special type of formula called a join formula in the criteria range when you work with multiple input tables. For information on joining database tables, see **"Joining database tables"**.

4.   Specify the output range in the Output range text box.

Select the single-row range of field names in the output range or the entire output range, including the field names, or enter an address or range name.

Caution   If you specify a single-row of field names as the output range, 1-2-3 uses as many rows as necessary below the field names for the extracted records and erases any data from the rows below the output range to the bottom of the worksheet (row 8192). Rows below the output range must therefore be blank or contain data that is not important to you.

5.   Select Extract.

1-2-3 finds the records that meet the criteria and copies them to the output range.

The illustration below shows the result of extracting records from the DIRECTORY table in which the ID number is greater than 200 and the DEPT is SALES.

As you work with 1-2-3 databases, you may want to use data in two or more database tables simultaneously. For example, you may have data in two tables that you would like to combine in a single report.

To use data in two or more tables, you specify more than one database table in the input range and enter a join formula in the criteria range.

To use more than one database table as the input range, the tables must meet the following conditions:

- The tables must have at least one field that contains similar entries, but the field names can be different.

- The entries in one of the fields must contain no duplicates. The entries in the other field may contain duplicate entries.

For example, in the DIRECTORY and SALES tables, the ID fields contain employee identification numbers. The DIRECTORY table contains one entry for each ID number. The SALES table contains sales data for employees in the DIRECTORY table. Each entry in the SALES table contains an employee ID number that also appears in the DIRECTORY table. The SALES table may contain multiple entries for each employee ID, one for each sale.

If you specify more than one database table as the input range, you must create a criteria range that contains a join formula. A **join formula** tells 1-2-3 where the common data is located in both database tables.

For example, to join the DIRECTORY and SALES tables, you would enter a join formula that equates the DIRECTORY ID field with the SALES ID field, as shown in the criteria range in the illustration below.

In this join formula, DIRECTORY and SALES are range names for the tables. 1-2-3 creates an entry in the output range for each pair of records in the DIRECTORY and SALES tables that have matching ID field entries.

After you create the join formula, add other criteria to the criteria range, as necessary. If you are extracting records, create an output range that contains the names of the fields to extract from both tables. Use Data Query Extract to extract the data and place it in the output range.

> **Note**   You cannot use a join formula to create a union of two or more tables that do not have matching values for common fields. To create a union of two or more tables that have common field names but do not have matching values, append an output range to an input range by using Data Query Modify Insert.

To join tables and extract data

1. Use Range Name Create to give each table a range name. Be sure to include the field names in the ranges.

2. In the first row of the criteria range, enter the name of the field to use to join the tables. If two field names are the same, you must precede the field name with the table name, using the following format:

   table.field

   table is the name of the table and *field* is the name of the field.

   For example, DIRECTORY.ID specifies the ID field in the DIRECTORY table.

3. Enter the join formula criterion in the second row (under the field name), using the following format:

+table1.field1=table2.field2

table1 and *table2* are range names for the two database tables you specified in the input range. *field1* and *field2* are the names of the fields that contain matching entries in both tables.

For example, if SALES contains an ID field and DIRECTORY contains ID, the join formula would be

+SALES.ID=DIRECTORY.ID

Note If you are using . (period) as the argument separator for macros and @functions, you must use a , (comma) or ; (semicolon) to separate the table and field names (for example, SALES,ID). Set the argument separator with Tools User Setup International Punctuation.

4. Choose Data Query.
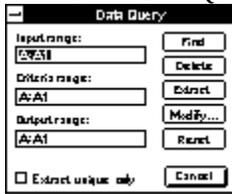
5. Specify two or more database tables in the Input range text box.

Enter the range names of all database tables separated by commas. The database tables can be in active files or in files on disk.

For example, if DIRECTORY and SALES are in the current file, enter the table names as DIRECTORY,SALES.

If the tables are in different files, use the following format:

<<file1.wk3>>table1,<<file2.wk3>>table2

Note Use the current argument separator for macros and @functions between table names. The default is , (comma). Set the argument separator with Tools User Setup International Punctuation.

6. Specify the criteria range in the Criteria range text box.

7. Specify the output range in the Output range text box.

Caution If you specify a single-row of field names as the output range, 1-2-3 uses as many rows as necessary below the field names for the extracted records and erases any data from the rows below the output range to the bottom of the worksheet (row 8192). Rows below the output range must therefore be blank or contain unimportant data.

8. Select Extract.

The illustration below shows the result of extracting records from the SALES and DIRECTORY tables. The criteria range contains the join formula and criteria that select all employees in Cambridge with monthly sales greater than $3,000.
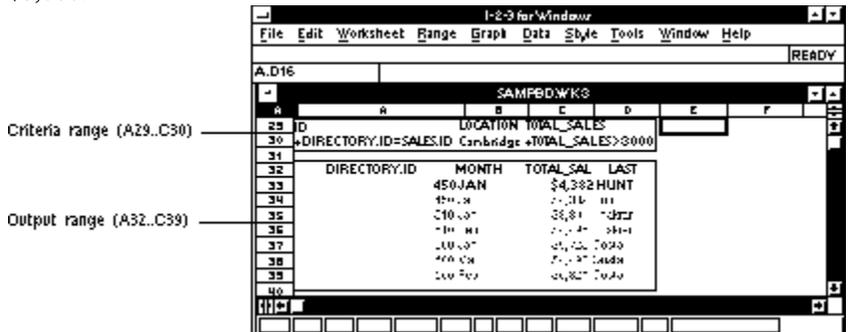
Deleting selected records

Use Data Query Delete to delete unwanted or obsolete records from a database table. Before you use this command, you may want to use Data Query Find to check that the criteria select the correct records.   For more information, see **"Checking criteria"**.

Data Query Delete requires a one-table input range and a criteria range. The input range is the database table; the criteria range selects the records to delete from the table.

To delete records

1.   Choose Data Query.

2.   Specify the input range in the Input range text box.

Specify only one database table as the input range.

3.   Specify the criteria range in the Criteria range text box.

Note   If there are no criteria under any field names, 1-2-3 selects all records.

4.   Select Delete.

1-2-3 displays a message box before it deletes any records.

5.   Select Delete to delete the records in the input range that meet the criteria or select Cancel to cancel the command and return to the Data Query dialog box.

Eliminating duplicate records

Adding records to database tables often introduces duplicates, particularly if several people add to or use the same tables. To eliminate duplicates, select the Extract unique only check box when you use Data Query Extract.

When you extract unique records, 1-2-3 searches the input range (the database tables), uses the criteria range to match the records, and automatically eliminates any duplicates when it copies the records to the output range. The output range should include all the field names from the database tables to ensure that all of the records are unique.

To eliminate duplicate records

1.   Choose Data Query.
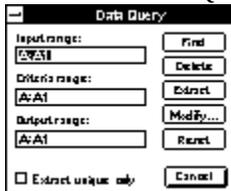
2.   Specify the database table in the Input range text box.

Enter the address or range name of one or more database tables.

3.   Specify the criteria range in the Criteria range text box.

Note   If there are no criteria under any field names, 1-2-3 selects all records.

4.   Specify the output range in the Output range text box.

Select the single-row range of field names in the output range or the entire output range, including the field names.

Caution   If you specify a single-row of field names as the output range, 1-2-3 uses as many rows as necessary below the field names for the extracted records and erases any data from the rows below the output range to the bottom of the worksheet (row 8192). Rows below the output range must therefore be blank or contain unimportant data.

5.   Select the Extract unique only check box.

6.   Select Extract.

1-2-3 copies records that meet the criteria to the output range, eliminating duplicate records from the copy.

Modifying selected records

To make one or two changes to individual records in a database table, edit the entries directly, using either the mouse or F2 (EDIT) to get EDIT mode. To modify many records at the same time or to modify records in an external table, use Data Query Modify Extract and Data Query Modify Replace.

Data Query Modify Extract extracts records from a database table to an output range. You then edit the records in the output range and use Data Query Modify Replace to put them back in the table at their original locations.

For example, to change some ID numbers in the DIRECTORY table, you would create criteria in the criteria range to select the desired records and then select Modify Extract from the Data Query dialog box. After changing the IDs in the output range, you would select Modify Replace from the Data Query dialog box to put the changed records back in the database table.

Data Query Modify Extract requires an input range, a criteria range, and an output range. When you specify these ranges for Data Query Modify Extract, do not change them or use another Data Query command before you use Data Query Modify Replace. 1-2-3 cannot replace records properly if you change the input, criteria, or output ranges or if you use another Data Query command before you use Data Query Modify Replace.

> **Caution**   To avoid writing over formulas in the database table, do not use names of fields that contain formulas in the output range. Data Query Modify Extract copies the results of formulas or @functions to the output range, not the actual formulas or @functions.

To modify records

1.   Choose Data Query.
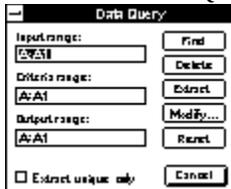
2.   Specify the database table in the Input range text box.

You can specify only one database table as the input range.

3.   Specify the criteria range in the Criteria range text box.

> **Note**   If there are no criteria under any field names, 1-2-3 selects all records.

4.   Specify the output range in the Output range text box.

Select the single-row range of field names in the output range or the entire output range, including the field names, or enter an address or range name.

> **Caution**   If you specify a single-row of field names as the output range, 1-2-3 uses as many rows as necessary below the field names for the extracted records and erases any data from the rows below the output range to the bottom of the worksheet (row 8192). Rows below the output range must therefore be blank or contain unimportant data.

5.   Select Modify.

6.   Select Extract.

7.   Select Cancel to close the Data Query dialog box.

1-2-3 copies records to the output range so you can edit them. Change the records in the output range as necessary, and then use Data Query Modify Replace to replace the original records in the database table with the edited ones.

8. Choose Data Query Modify Replace.

9. Select Cancel to close the Data Query dialog box.

Adding records

You can add records to a 1-2-3 table in one of the following three ways:

- Enter data for each field in the rows immediately below the last record in the table.

- Use Worksheet Insert Row to insert new rows in the table, and then enter the new data in the blank rows.

- Choose Data Query Modify Insert to insert a group of records into the table.

When you add records to a table with Data Query Modify Insert, you specify an input range and an output range. The input range is the database table that will contain the new records. The output range contains the new records to add to the input range. 1-2-3 appends the new records to the bottom of the input range. To avoid writing over formulas in the database table, do not use name of fields that contain formulas in the output range. Data Query Modify Extract copies the results of formulas or @functions to the output range, not the actual formulas or @functions.

> **Caution**   You should not create the output range below the input range if you are planning to use Data Query Modify Insert, because 1-2-3 could write over existing data in the output range.

Using an external database

The 1-2-3 Data Query commands work with external databases as well as with 1-2-3 database tables. An **external database** is a group of related records stored in a file other than a .WK3 file, such as a dBASE IV® .DBF file. Before you use Data Query commands with data in an external database, you must **connect** to the external database and table.

You connect to an external database through DataLens® drivers**.** A **DataLens driver** is a program that gives 1-2-3 access to data in external tables. You need to know the name of the DataLens driver and the database table to connect to the external table.

> **Note**   1-2-3 includes DataLens drivers for Paradox®, dBASE®, and SQL Server. For more information about the DataLens drivers included with 1-2-3, see *__DataLens Drivers for 1-2-3__*. For more information about installing other DataLens drivers, see the documentation for the driver.

Data Connect to External connects to an external database table and assigns a range name to the table. You use this range name as the input range in the Data Query commands, or as the *input* argument to database statistical @functions. You can also use the range name of an external table as the output range with Data Query Extract. For more information about using external database tables, see *__DataLens Drivers for 1-2-3__*.

To connect to an external table

1.   Choose Data Connect to External.

The Data Connect to External dialog box displays the Connect to driver text box and list box.

> **Tip**   If you know the names of the driver, the database, and the external table, you can combine steps 2 through 4 by entering all of these names, separated by spaces, in the Connect to driver text box. For example, if the driver is named dBASE_IV, the database is named C:\123W\SAMPLE and the table is named EMPLOYEE, you can enter the following:

DBASE_IV C:\123W\SAMPLE EMPLOYEE

You will be prompted only for a range name for the table.

2.   Connect to the driver:

Mouse   Double-click a driver name from the list box.

Keyboard   Enter a driver name in the text box.

The Connect to database text box and list box appear.
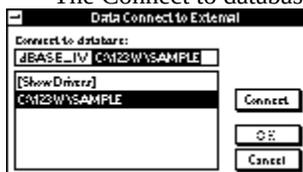
Note   If you connected to the dBASE IV or Paradox driver, the list box lists the worksheet directory as a database. If the list box does not display the directory you want, use Tools User Setup to change the worksheet directory.

3.   Connect to the database:

Mouse   Double-click a database name from the list box. If the list box does not display the name of the database you want, enter the database name in the text box.

Keyboard   Enter a database name in the text box.

The Connect to table text box and list box appear.
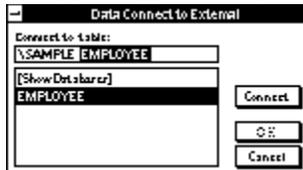
4.   Connect to the table:

Mouse   Double-click a table name from the list box.

Keyboard   Enter a table name in the text box.

If you selected the SQL Server driver and want to use a table created by someone else, you may have to enter an owner name as part of the table name. If so, type the owner name, a space, and the table name, such as BMARTIN EMPLOYEE. (An owner name is usually the user ID of the user who created the table.)

The Enter range name for table text box and list box appear.
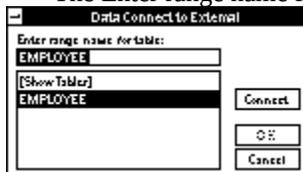
5.   Enter a range name for the table.

The range name is the name you will use in 1-2-3 when you refer to this table in Data Query commands, Data External Options commands, and database @functions.

1-2-3 displays the table name as the default range name. If you already used that range name in the current worksheet, or if you are using the SQL Server driver and the name of the table you specified exceeds 15 characters, 1-2-3 displays ???? (question marks) instead of a default name.

Mouse   Double-click a range name in the list box. If the list box does not contain the name you want to use, enter the name in the text box.

Keyboard   Enter a range name in the text box.

The Connect to table text box and list box appear again. To connect to another table in the same database, repeat steps 4 and 5. To connect to a table in a different database, select Show Databases from the list box and repeat steps 3 through 5.

6.   Select OK.

13 Performing Statistical Analysis

This chapter describes how to use statistical @functions, database @functions, frequency distribution tables, regression analysis, and data matrixes to analyze data.

What is statistical analysis?
Using statistical @functions
Using database statistical @functions
Using financial @functions
Creating frequency distribution tables
Analyzing trends
Analyzing data with matrixes

13 Performing Statistical Analysis

This chapter describes how to use statistical @functions, database @functions, frequency distribution tables, regression analysis, and data matrixes to analyze data.

What is statistical analysis?
Using statistical @functions
    Counting values in a range
    Finding extremes
    Finding averages
    Measuring variation
Using database statistical @functions
Using financial @functions
    Calculating the return on an investment
    Comparing financing options
Creating frequency distribution tables
    To create a frequency distribution table
Analyzing trends
    To find the association between variables
    Making predictions based on regression results
Analyzing data with matrixes
    To invert a matrix
    To multiply matrixes
    Inverting and multiplying 3-D matrixes

What is statistical analysis?

Statistical analysis involves collecting, organizing, and interpreting numeric data. A 1-2-3 for Windows worksheet is useful not only for tracking day-to-day activities, but also for analyzing the statistics of your business over the course of time. 1-2-3 offers several features that simplify statistical analysis. For example

- Statistical @functions and database statistical @functions determine the relationships among sets of data.

- Financial @functions analyze investments.

- Frequency distribution tables consolidate data.

- Regression analysis helps in predicting trends and future performance.

- Data matrixes help find relationships between numbers.

Statistical analysis describes, interprets, and summarizes information, giving you a basis for planning and decision making.

> **Note**   1-2-3 also offers Solver, Backsolver, and what-if tables, a set of tools for analyzing and solving what-if problems. For more information about solving what-if problems with 1-2-3, see **Chapter 14**.

Using statistical @functions

The 1-2-3 @functions include **statistical @functions** that collect and organize data to make interpretation easier. The statistical @functions follow with their results.

- @COUNT counts each nonblank cell in a list of values.

- @MAX finds the highest value in a list of values.

- @MIN finds the lowest value in a list of values.

- @AVG finds the average value of a list of values.

- @STD, @STDS find the standard deviation of a list of values.

- @SUM sums a list of values.

- @SUMPRODUCT sums the products of corresponding elements in multiple ranges.

- @VAR, @VARS find the variance of a list of values.

Each of these @functions, except @SUMPRODUCT, takes an argument that consists of a list of values. The list can include any combination of numbers, numeric formulas, and addresses or names of ranges that contain numbers or numeric formulas. The data can be in one or more worksheets or in one or more worksheet files.

> **Caution**   1-2-3 assigns the value 0 to all labels in a range and includes them in calculations. For example, if you use @AVG to calculate the average of values in a range and the range contains a label, 1-2-3 considers the label to have the value 0 when it calculates the average. Always check for labels in the ranges you use with a statistical @function to guard against unexpected results.

The statistical @functions ignore blank cells in a range. For example, if you use @AVG to average the values in a range that spans eight cells, and the range contains a blank cell, 1-2-3 divides the sum by seven to find the correct average.

> **Help**   For more information about **using @functions,** choose Help Contents and select @Functions (under Reference). If you are not sure how to use Help, see **"Using Help"**.

Counting values in a range

To find how many cells in a range contain values (numbers or formulas that evaluate to numbers) or labels, use @COUNT. For example, in the illustration below, @COUNT(A2..A7) displays the total number of cells in the range A2..A7 that contain values or labels.

Finding extremes

To find the highest value in a range, use @MAX; to find the lowest, use @MIN. For example, in the illustration below, @MAX(C2..C7) displays the highest number of gallons sold in a month. @MIN(C2..C7) displays the lowest number of gallons sold in a month.

Finding averages

To calculate the average, or arithmetic mean, of all entries in a selection, use @AVG. For example, in the illustration below, @AVG(C2..C7) displays the average number of gallons sold.

Measuring variation

To determine how values in a selection deviate, or vary, from the mean, use @STD, @STDS, @VAR, and @VARS. @STD and @STDS measure **standard deviation**, or the degree to which individual values in a sample or population vary from the mean (average) of all values in a sample or population. The lower the standard deviation, the closer the data is grouped around the mean. @STD measures the standard deviation of a complete population. @STDS measures the standard deviation for a sample of the population.

@VAR and @VARS calculate **variance**, another measure of the degree to which individual values in a sample or population vary from the mean of all values in a sample or population. @VAR measures the variance of a complete population; @VARS measures the variance for a sample of the population. The lower the variance, the less individual values vary from the mean and the more reliable the mean.

> **Note** Standard deviation is the square root of variance. Conversely, variance is the square of standard deviation.

For example, in the illustration below, @STDS(C2..C7) calculates the standard deviation of the values listed in the range C2..C7. @VARS(C2..C7) calculates the variance of the range C2..C7.

Tip @STDS and @VARS produce more accurate results than @STD and @VAR when the number of values is small.

Help For more information about how 1-2-3 calculates @STDS, @VARS, @STD, and @VAR, choose Help @Functions, select @Function Index, and select an @function. If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

The database statistical @functions calculate results for a set of data set up as a database table. The data must be listed in columns, and each column must be headed by a label. The data in the columns should be related. For example, you could have names of sales people in column B, and sales figures for each person next to their names in column C. The label at the top of the column is the **field name**.

The database statistical @functions are similar to the statistical @functions in that they calculate a statistic over a range of data. With the database statistical @functions, however, you can select certain data, based on **criteria** you specify. Criteria use field names and relational formulas to describe which values to select from the range.

> **Note**   You can also use database statistical @functions with external database tables. For more information about using external database tables, see **"Using an external database"** in Chapter 12.

For example, if the range for a database statistical @function is B1..C10, the criterion +B2="SMITH" tells 1-2-3 to look for SMITH in column B and use the matching value in column C for the calculation. For more information about criteria, see **Chapter 12**.

 The database statistical @functions follow with their results.

- @DCOUNT counts nonblank cells in a field that meets your criteria.

- @DMAX finds the largest of a set of values that meets your criteria.

- @DMIN finds the smallest of a set of values that meets your criteria.

- @DSUM sums a set of values that meets your criteria.

- @DAVG finds the average of a set of values that meets your criteria.

- @DSTD, @DSTDS find the standard deviation of a set of values that meets your criteria.

- @DVAR, @DVARS find the variance of a set of values that meets your criteria.

  > **Note**   1-2-3 also includes two database @functions that do not calculate database statistics. @DGET finds a value or label in a field of a database table, based on your criteria. @DQUERY sends a command to an external database management program.

These database statistical @functions require three arguments to define the data to analyze. (The arguments appear in an italic font.)

@DFUNCTION (*input, field, criteria*)

@DFUNCTION is the name of the database statistical @function. *input* is the address or name of a range (or ranges) that contains a database table. *input* includes the labels, or field names, that describe the data. *field* is either the field name or offset number of the field, or the address of a cell that contains the field name to analyze. *criteria* is the address or the name of a range you create to specify selection requirements.

The illustration below contains each of the database statistical @functions, using the following values for the arguments:

input = A1..C7
field = "Heating Oil"
criteria = E1..E2

Field ("Heating Oil")   Criteria range (E1..E2)

Input range (A1..C7)

@DCOUNT
@DMIN
@DMAX
@DAVG
@DSTDS
@DVARS
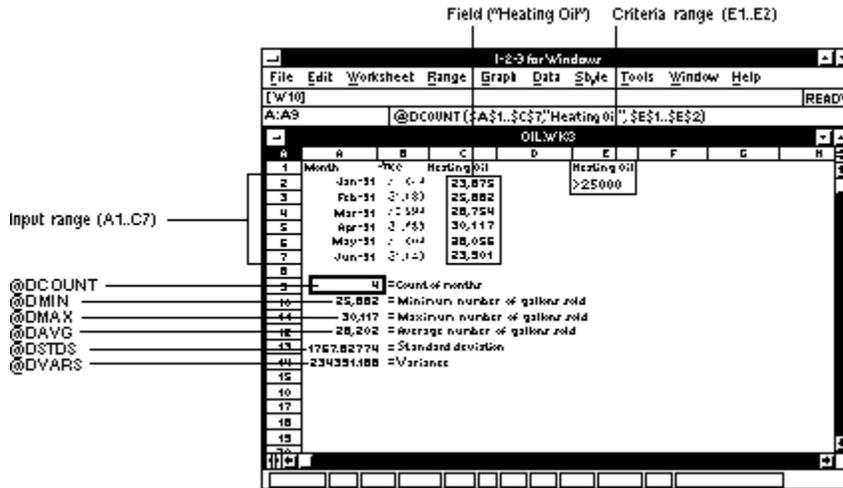
For example, @DAVG(A1..C7,"Heating Oil",E1..E2) calculates the average heating oil usage for February, March, April, and May, the months when usage exceeds 25,000 gallons.

The database statistical @functions find data that matches the criteria you set up and perform the calculations on the matching data, all in one step. To see which rows from the input range the @functions selected, use Data Query Find with the same criteria and input ranges. For more information about the Data Query commands, see **Chapter 12**.

Help   For detailed information on **specifying input and criteria ranges,** choose Data Query and press F1 (HELP). If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

To expand your business, you may need financial help such as a bank loan, or you may want to consider various investment opportunities or calculate a new venture's potential rate of return. The 1-2-3 financial @functions analyze possible financial investments and help you determine the financial strengths and weaknesses of your business.

The financial @functions follow with their results.

- @IRR calculates the internal rate of return for an investment.

- @PMT calculates the periodic payments needed to pay off a loan.

- @PV calculates the present value of an investment, given a series of equal payments.

- @NPV calculates the net present value of a series of future cash-flow values, discounted at a fixed periodic interest rate.

    Help   For information on other **financial @functions,** choose Help @Functions, select @Function Categories, and select Financial. If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

Calculating the return on an investment

To start a new business venture or expand an existing business, you need capital, either from a bank or from other investors. One of the financial @functions, @IRR, determines the potential rate of return your venture could attain. @IRR requires a specific investment amount, estimates of cash flows for the venture, and your initial guess at a reasonable rate of return. The format of @IRR is as follows:

@IRR(*guess,range*)

where *guess* is your best guess at the rate of return, and *range* is the range of cash flows. The first value in *range* is the initial investment, represented as a negative value.

For example, assume you want to calculate the internal rate of return from an initial investment of $100,000 over a seven-year term, starting in January, 1991 and ending in January, 1998. You enter the value -100,000 in cell A3, and the annual series of projected cash flows in cells B3 through H3. You estimate the internal rate of return to be 30%, and enter this value in cell A7.
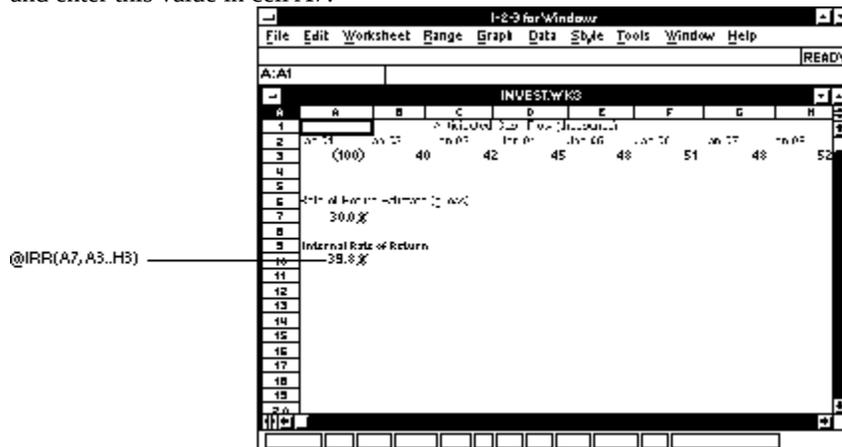
@IRR returns a value of 39.8% in this scenario (.398). This is the potential annual rate of return you expect to realize from the initial investment of $100,000.

Tip For @IRR, enter a guess that you think is reasonable for the internal rate of return. In most cases, your guess should be a percentage between 0 (0%) and 1 (100%). Because more than one solution may be possible, try another guess if the result is less than 0 or greater than 1. If @IRR cannot find an answer based on your guess, it returns ERR.

To evaluate a possible guess value, use @NPV to find the net present value of the cash flows, given your guess value. If @NPV returns a negative value based on your guess and the values in *range,* the guess is too high. If @NPV returns a positive value, the guess is too low. If @NPV returns zero, the guess is accurate. For example, the worksheet below shows @NPV using the guess value of 30%. The result is 19.1363, which means the guess is too low.

Comparing financing options

The @function @PMT calculates the payments on loans or annuity investments. @PV calculates the present value of investments. Using these two @functions, you can examine financial alternatives, such as renegotiating an existing loan.

The format for @PMT is as follows:

@PMT(*principal,interest,term*)

where *principal* is the loan amount, *interest* is the periodic interest rate, and *term* is a specified number of payment periods.

The format for @PV is as follows:

@PV(*payment,interest,term*)

where *payment* is the payment per period, *interest* is the periodic interest rate, and *term* is the number of payment periods.

For example, suppose you have a 10-year business loan for $100,000 at a rate of 12.5%. After 3 years, the bank offers to renegotiate the remainder of the loan over 5 years at a rate of 12%, but wants to add 1% to the principal. The illustration below shows the existing loan payments, using @PMT, and examines the bank's offer, using @PV.

As the example shows, by renegotiating the loan, you realize a cost savings of $12,854.

Note This analysis ignores the reinvestment effect of the different payoff periods.

Creating frequency distribution tables   »

»
»

A frequency distribution table consolidates data into a range of numeric intervals to show how frequently the range contains similar values. For example, for a list of customers and their ages, a frequency distribution table might contain the following intervals:

20 and younger
21 - 30
31 - 40
41 - 50
51 - 60
61 - 70
71 and older

To determine how many customers are in each age group, use Data Distribution.

To use Data Distribution, you must first set up the intervals for the frequency distribution table, called the bin range. The **bin range** is a range in a single worksheet that includes the intervals, or bins. Each bin represents the upper limit of the interval. For example, the interval value 20 represents customers 20 years old or younger; 30 represents customers between 21 and 30 years, and so on. The bin values must be in ascending order.

> **Caution**   Do not include labels or blank cells in the bin range. If you include labels or blank cells in the bin range, you may get unexpected results.

The column to the right of the bin range should be blank. When you choose Data Distribution, 1-2-3 calculates the frequencies and enters them in this column. The frequencies tell you how many values are equal to or less than the bin value to the left. 1-2-3 also counts any values that are larger than the largest bin value and displays that number in the cell just below and to the right of the largest bin value.

The values to count are in the values range. The **values range** is a range in one or more worksheets files, open or on disk. The data it contains must be numeric. The data need not be in any specific order.

The example below distributes a customer base by age group, in 10-year intervals, from 20 and younger to 71 and older.

To create a frequency distribution table

1. Enter the values to analyze.

2. Enter the bin intervals in a single column.

   The column to the right of the bin values should be blank.

3. Select the range that contains the values to analyze.

4. Choose Data Distribution.

5. Specify the Bin range.

   Select the range, or enter the range address or name. The bin range must be a range on a single worksheet.

6. Select OK.

1-2-3 enters the frequency values in the column to the right of the bin range. These numbers represent how many values in the values range are less than or equal to the adjacent value in the bin range, but greater than the preceding value. The last number in the frequencies column is the number of values in the values range that are greater than the last value in the bin range. If there are no values for a bin, 1-2-3 enters 0 next to the bin.
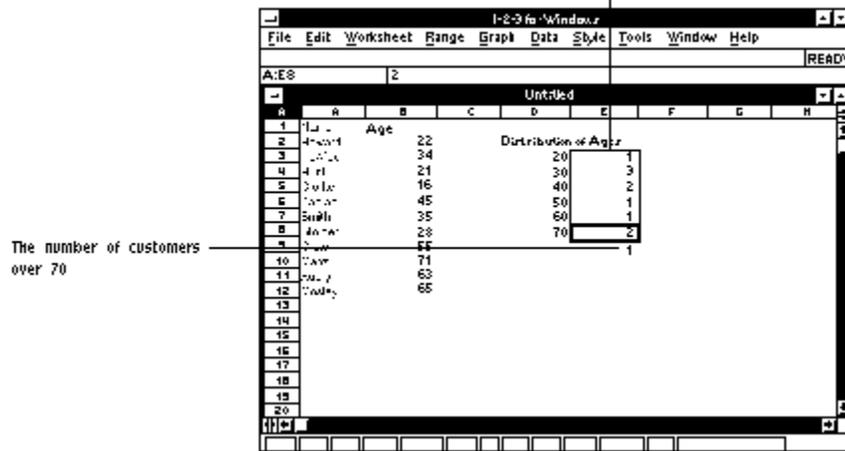
The accuracy and success of financial decisions often depends on the statistical relationships you create and use on your business data. Regression analysis helps you test the relationships you create and make forecasts for future development and growth.

The Data Regression command performs **multiple linear regression analysis**, which predicts a value for a single dependent variable based on the values of one or more independent variables.

Multiple linear regression analysis is suitable when you believe that changes in one set of variables directly cause changes in another variable. It indicates the statistical association between independent and dependent variables and can help you estimate financial data, such as profits or costs, or the results of changes you are planning. In the example used in this section, linear regression analysis could help predict how reducing the price of heating oil affects sales.

Data Regression requires three ranges: the **X range**, or independent variables, the **Y range**, or dependent variable, and the **output range**, which contains the results of the analysis. All these ranges can be in one or more worksheets in a single worksheet file. For example, to predict sales based on the price per gallon of oil, the price of oil per month is the independent variable (X range) and the range of sales for each month is the dependent variable (Y range), as shown in the figure below.
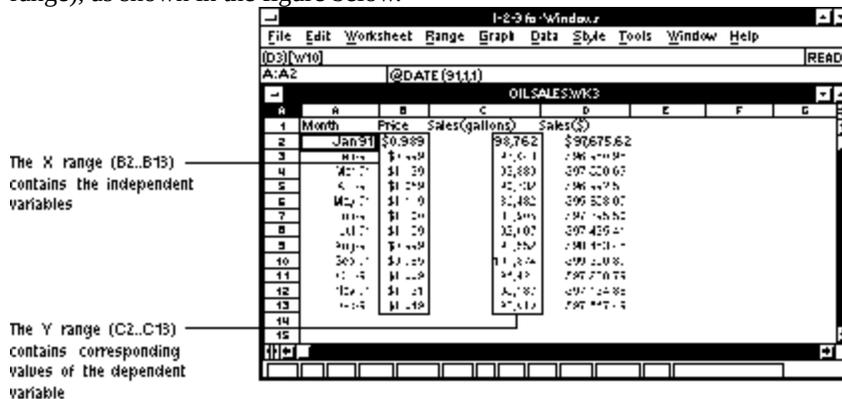
Data Regression analyzes the two sets of data to determine if there is a statistically significant relationship between them, and displays the results in the output range. The output range must be empty, and it must be in a single worksheet.

To find the association between variables

1. Select the X-range to specify the independent variables.

Independent variables are the values you are testing for their effect on the dependent variable. You can specify up to 75 independent variables. The values for each variable must be in a column, and the columns of values must be adjacent. For example, if you have three independent variables, the values for these variables must be in three adjacent columns. You can have up to 8192 values in each column.

2. Choose Data Regression.
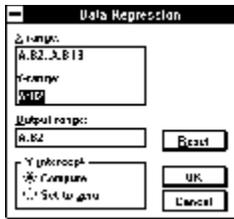
3. Specify the Y range in the Y-range text box to specify the dependent variable.

   The **dependent variable** is the variable for which you have current information, but which you want to predict in the future. The Y range must be a single column and must have the same number of rows as the X range.

4. Specify the output range in the Output range text box.

   Specify a single cell or a range. If you specify a single cell, 1-2-3 enters the regression calculations beginning in that cell when you select OK.

   Caution If you specify a single-cell output range, 1-2-3 writes over data in a rectangular area that is nine rows deep and a minimum of four columns wide, with an additional column for each X variable after the second X variable. Make sure this area is blank or contains data that is not important to you. If you select a multiple-cell range that is too small to contain the regression calculations, 1-2-3 cannot perform the regression and displays an error message when you select OK.

5. Under Y-Intercept, select Compute or Set to zero.

   Compute -- Calculates the value of the dependent variable when the independent variable is zero.

   Set to zero -- Uses zero for the dependent variable value when the independent variable is zero. Select this only if your dependent variable is zero when all the independent variables are zero.

6. Select OK.

To clear all of the text boxes and reset Intercept to Compute, select Reset.

1-2-3 analyzes the relationship between the dependent variable and the independent variables.
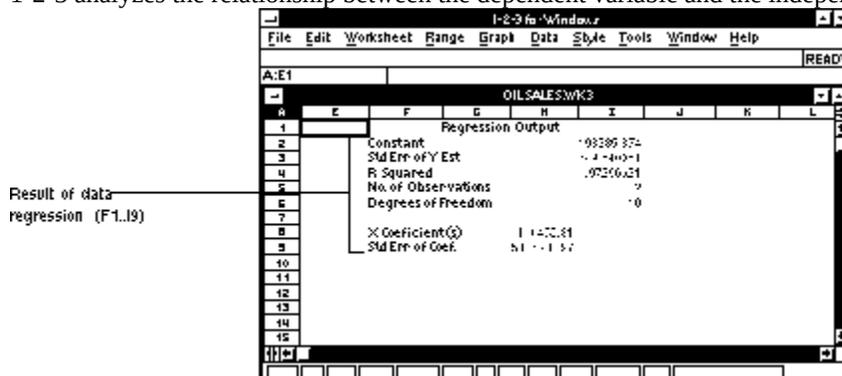
The Data Regression results tell you about the association of the data you used. When you examine the results, one of the first values to look at is **R Squared** (R^2). R^2 tells you how closely associated the independent and dependent variables are, or how much variation in the dependent variable can be explained by the combination of the independent variables. The R^2 value is a value between 0 and 1. The closer the R^2 value is to 1, the more closely the independent variables are related to the dependent variable.

   Note If 1-2-3 displays a value less than zero for R^2, you specified a zero intercept when it was not appropriate to do so. Repeat the Data Regression command, but under Intercept, specify Compute to have 1-2-3 recalculate the regression and adjust the R^2 accordingly.

The **Degrees of Freedom** is based on the **Number of Observations** or the number of values (rows) in the X range. The Degrees of Freedom is calculated as:

Number of Observations minus number of independent variables minus 1

The Degrees of Freedom helps you verify that all the independent variables were used in the regression.

The **Constant** is the y-axis intercept. The Constant is the value of the dependent variable when the independent variables are 0. For example, if you used temperature as the independent variable and barometric pressure as the dependent variable, you would be interested in the value of the barometric pressure when the temperature is at 0 degrees. In the example above, the constant of 198,385 indicates you would expect to sell 198,385 gallons of heating oil if you reduce the price to zero.

You also use the Constant, along with the **Standard Error of the Y Estimate** and the **X Coefficients**, to estimate values of the dependent variable, given values of the independent variable. For example, to estimate the sale of gallons of oil (dependent variable) based on a particular price per gallon, you create a formula using the following syntax:

+*constant*+(*xcoeff**X)

where *constant* is the value of the Constant, *xcoeff* is the X Coefficient value, and X is the price per gallon. After you find an estimate using this equation, use the Standard Error of the Y Estimate to find the minimum and maximum values for the estimate. For example, if the equation yields sales of 5,000 gallons of oil and the Standard Error of the Y Estimate is 100, the sales figure is actually 5,000 plus or minus 100, or between 4,900 and 5,100 gallons.
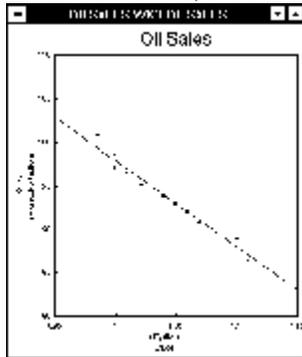
The X Coefficient is the slope of the regression line, or the amount the dependent variable changes for every change in the independent variable. For example, if the price of oil rises by 1 penny per gallon, the X Coefficient tells you how much sales will decrease. Since raising the price causes sales to decrease, the X Coefficient is negative (less than 0).

If you perform regression analysis with more than one independent variable, you add one term to the equation for each independent variable. For example, if there are two independent variables, the equation is

+*constant*+(*xcoeff1**X1)+(*xcoeff2**X2)

Before using the equation with real values, there is one more output result to check: the **Standard Error of the Coefficient**. This value tells you how well the equation describes the association between the independent and dependent variables. In general, if the Standard Error of Coefficient is less than half the value of the X Coefficient, estimates made from the equation tend to be accurate.

Making predictions based on regression results

Using the equation shown in the previous section and the results by using Data Regression for the heating oil example, you can calculate predicted values for oil sales based on the price per gallon of heating oil.

Predicted sales
+$I$2+($H$8*B2)
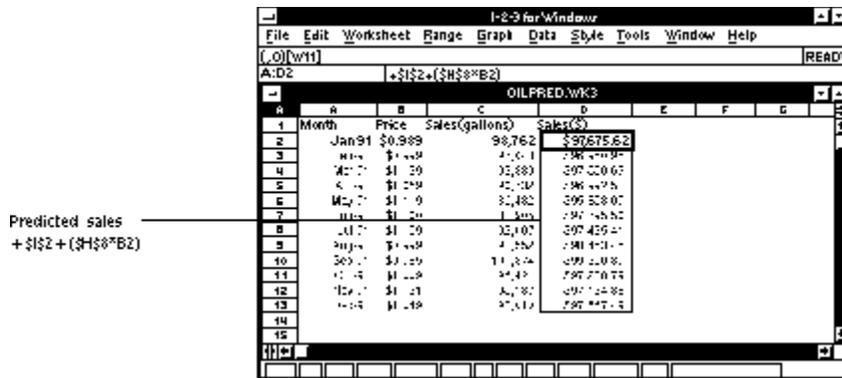
The equation for this example is

Sales = +I2+(H8*Price)

where I2 is the address of the constant, H8 is the address of the X Coefficient, and Price is the price per gallon.

To make a prediction based on this equation, substitute a price in the equation and solve for Sales. For example, to find out total sales, in gallons, when the price per gallon is $1.00, calculate

Sales = +198,385.87+(-100,495.8*1.00)

Sales = 97,890.07 gallons

You then use the Standard Error of the Y Estimate to calculate the range of values for this estimate. Since the Standard Error of the Y Estimate is 749.54, the range of values for estimated sales is 97,889.97 gallons plus or minus 749.54 gallons, or between 97,140.33 and 98,639.51 gallons.

Predictions made with this equation are valid only for values of the independent variable within the range of the data. For example, if the lowest price in the data sample is $0.985 per gallon and the highest price is $1.109 per gallon, you can make valid predictions for prices between $0.985 and $1.109 only.

Finding solutions to problems with many variables requires matrix analysis. A 1-2-3 **matrix** is a two-dimensional (2-D) or three-dimensional (3-D) range that contains a number in each cell. Each number represents a constant in a formula or the coefficient for a variable in a formula.

A matrix is defined by its dimensions, or the number of rows and columns it has. Always define a matrix by the number of rows first, then the number of columns. For example, a 3-by-4 matrix contains three rows and four columns of numbers.

The values in a matrix can be formula results and/or numbers.

Matrix analysis finds the relationship between two or more sets of variables in one or more formulas. You use the relationships to determine which combination of values will produce the desired result for the formulas. For example, suppose a bank has three main sources for its loans: business accounts, house loans, and car loans. The bank also has a venture capital branch that takes money from the bank's total income to provide loans to starting businesses.

By setting up this problem as a series of simultaneous equations, you can use matrix analysis to determine the percentage contribution each income source makes to total venture funds. The following equation represents this relationship:

x%*(Business) + y%*(House) + z%*(Car) = Total venture funds

where *x%*, *y%*, and *z%* are the percentage contributions each of the income sources (Business, House, and Car loans) make to the total venture funds. The x, y, and z percentages are what you want 1-2-3 to find.

> **Help**   For more information on **solving simultaneous equations** with Data Matrix, choose Data Matrix Multiply, press F1 (HELP), and select Solving Simultaneous Equations. If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

To solve this equation, first set up a matrix of values for total income received from each of the three sources, and a corresponding column for the total venture funds received, as shown in the illustration below.

To find the percentages, you use Data Matrix Invert to invert the matrix of income values in the range B4..D6. Then you use Data Matrix Multiply to multiply the inverted matrix by the total venture funds to find the percentage contributions. Any matrix to invert must be square (that is, it must have the same number of rows as columns). Thus, the matrix contains data for three years.

Data Matrix Invert and Data Matrix Multiply treat a 3-D range as a series of 2-D ranges.

To invert a matrix

1. Specify the matrix to invert.

   The matrix must have the same number of columns and rows, and can contain up to 80 columns and 80 rows. The matrix range can be in any file, which is active or on disk.

2. Choose Data Matrix Invert.
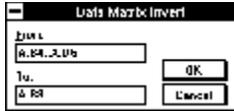
3. Specify the range that will contain the result in the To text box.

   You can specify either the entire range or only the first cell in the range.

   Caution   1-2-3 creates an output range that is the same size as the matrix you are inverting and writes over existing data in that range. Make sure the output range is blank or contains data that is not important to you.

4. Select OK.

The inverted matrix is the same size as the original matrix, as shown in the illustration below.
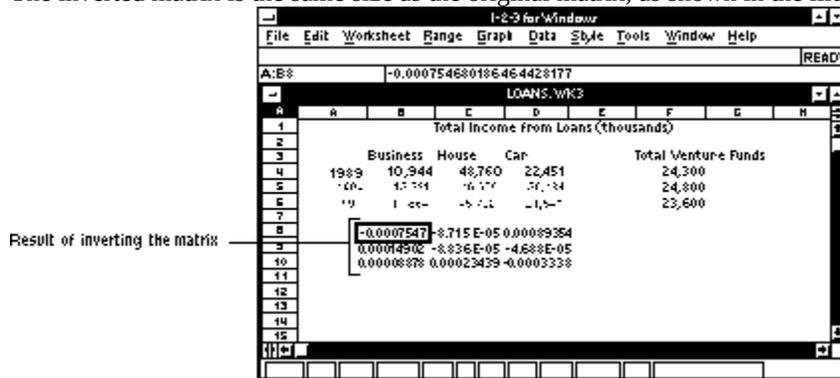
After inverting a matrix, you solve for the percentage contributions of each income source by multiplying the inverted matrix by the total venture funds received in each of those years.

To multiply matrixes

1. Select the range for the first matrix you want to multiply.

   1-2-3 can multiply any matrix of values up to a maximum of 80 rows and 80 columns. The range can be in any file, which is active or on disk.

2. Choose Data Matrix Multiply.

3. Specify the range for the second matrix in the Second matrix text box.

   The matrix can be in any file, which is active or on disk.

4. Specify the range for the output matrix in the Output matrix text box.

Select the matrix or enter its range address or name.

Caution Data Matrix Multiply creates an output range that contains the number of rows in the first matrix and the number of columns in the second matrix and writes over existing data in that range. Make sure the output range is blank or contains data that is not important to you.

5. Select OK.

The result is a single-column matrix that contains the solutions for each variable, as shown in the illustration below.

Venture funds matrix (Second matrix)

Inverted income source matrix (First matrix)

Result of multiplying the venture funds by the inverted matrix (Output matrix)

Inverting and multiplying 3-D matrixes

Data Matrix Invert and Data Matrix Multiply also work with 3-D matrixes, but 1-2-3 treats each 3-D matrix as a group of 2-D matrixes. For Data Matrix Invert, 1-2-3 inverts each 2-D matrix in the 3-D matrix individually. For Data Matrix Multiply, 1-2-3 multiplies each 2-D matrix in the first 3-D matrix by the corresponding 2-D matrix in the second 3-D matrix.

If you invert a 3-D matrix, each of the 2-D matrixes that make up the 3-D matrix must be square, and each produces another 3-D inverted matrix with the same dimensions.

You can multiply one 3-D matrix only by another 3-D matrix. Both matrixes must contain the same number of worksheets.

If you specify a 3-D matrix as the output matrix for either Data Matrix Invert or Data Matrix Multiply, it must occupy the same number of worksheets as the original 3-D matrix (or matrixes). Whether you specify the entire 3-D output matrix or just the first cell, make sure that the result does not replace existing data. The 3-D output matrix must be located in the same worksheet file as the original matrix or matrixes but may be located in the same or different worksheets.

14   Solving What-If Problems

This chapter describes how to solve what-if problems with Backsolver and the Solver, and how to use what-if tables.

What is a what-if problem?
Using Backsolver
Using what-if tables
Using the Solver

14   Solving What-If Problems

This chapter describes how to solve what-if problems with Backsolver and the Solver, and how to use what-if tables.

What is a what-if problem?
Using Backsolver
To use Backsolver
Using what-if tables
Solving a formula by changing one variable
Using Data What-if Table 1-Way with more than one formula
To use Data What-if Table 1-Way
Solving a formula by changing two variables
To use Data What-if Table 2-Way
Solving a formula by changing three variables
To use Data What-if Table 3-Way
Using the Solver
To use the Solver

What is a what-if problem?

A **what-if problem** is a question that requires the analysis of one or more variables to arrive at an answer. The question usually begins with the words "What if...", for example, "What if sales go up by 5%?"   The implied question is "How does a 5% increase in sales affect the outcome of the worksheet?"   This particular what-if problem is easy to solve: You add 5% to the current sales figure and recalculate the worksheet. But what if you want to see the effect when you change two, three, or more variables?   What if the changes are interdependent, for example, if the sales increase is possible only if you hire more sales people or you add another product to the product line?

1-2-3 for Windows offers three ways to analyze both simple and complex what-if problems:

- **Backsolver** calculates a formula to achieve a given value by changing one of the variables that affects the result of the formula.

  Use Backsolver when you have a goal in mind and you want to see what value you need to achieve that goal. For example, you may have a specific profit margin target to achieve, and you need to see what the total sales must be to reach the target.

- **What-if tables** calculate one or more formulas, given a range of values to use in the formulas.

  With what-if tables, you create and evaluate a list of possible solutions for one or more variables in a problem. You determine the best answer for a problem based on your review of the list of answers the what-if table contains. For example, you may want to see a list of possible gross sales figures for a company based on a variable number of sales people hired over a variable number of time periods.

- **The Solver** finds solutions that satisfy a set of constraints for a what-if problem.

  The Solver combines the features of the Backsolver and what-if tables by giving you a number of answers that meet a list of constraints you set for the Solver. With the Solver, you get answers that more closely reflect the actual problem because the Solver knows in advance what other restrictions you have for the solutions. The Solver can also find a single optimal answer that meets all the requirements you have for a problem. For example, the Solver could find the exact mix of products a manufacturing plant must produce to meet a targeted range of inventory figures without exceeding production costs.

  Note   For comprehensive instructions for using the Solver, see _**Solver Guide**_.

Using Backsolver

Backsolver answers what-if problems by changing the value of one variable to make the result of a formula equal to a value you specify. With Backsolver, you pick a target value, or goal, for a formula and then tell Backsolver which variable to change to meet that goal.

For example, the worksheet below uses @PMT to calculate a monthly loan payment based on a total loan amount of $100,000, an interest rate of 12%, and a term of 30 years.
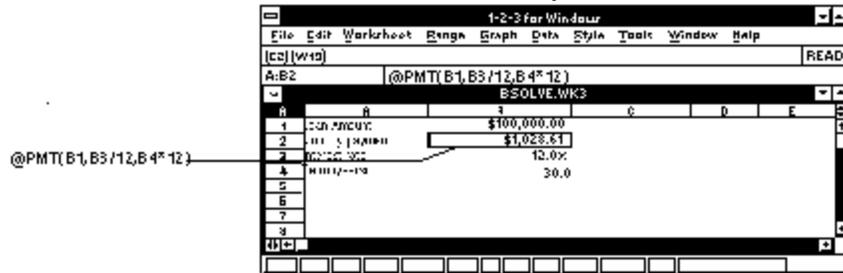
The result of @PMT using these variables is a monthly loan payment of $1,028.61. But suppose you can afford a $1,200.00 monthly payment? How much money could you borrow?

To solve for the loan amount in this problem, Backsolver needs to know the following information:

•   The cell address of a formula to solve (in this case, the @PMT formula in cell B2)

•   The desired value (or goal) for the result of the formula (in this case, $1,200)

•   The cell to adjust (or variable) to reach the goal (in this case, cell B1, which contains the loan amount)

   Help   For more information about **setting up a problem for the Backsolver,** choose Tools Backsolver and press F1 (HELP). If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

To use Backsolver

1.   Enter the formula to be solved by Backsolver in a cell.

   For information about how to enter a formula, see **"Entering formulas"** in Chapter 4.

2.   Decide the desired result of the formula.

3.   Decide which variable to change.

4.   Choose Tools Backsolver.

5.   Specify the address of the cell that contains the formula in the Make cell text box.

6.   Enter the desired value of the formula in the Equal to value text box.

7.   Specify the address of the variable to change in the By changing cell text box.

8.   Select Solve.

Backsolver recalculates @PMT to determine the loan amount that produces a monthly payment of $1,200, and enters the adjusted value in cell B1.

Backsolver found the loan amount that produces a payment of $1,200
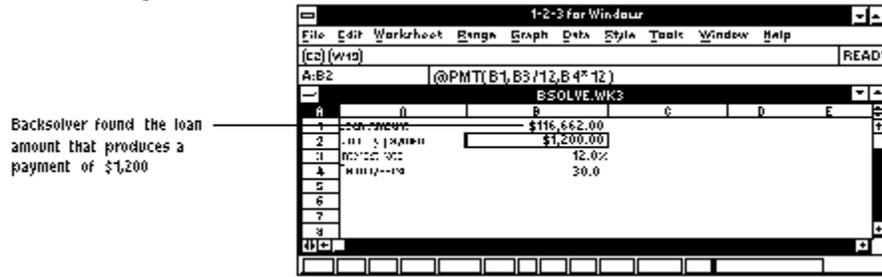
Note If any other formulas depend on the cell that was adjusted, 1-2-3 also recalculates those worksheet cells. To restore the worksheet to its original state after using Backsolver, press ALT+BACKSPACE or choose Edit Undo.

>>
>>

What-if tables solve what-if problems by calculating a formula many times, each time substituting a different value for one or more of the variables in the formula. Each solution to the formula is one value in the table. You use the values in what-if tables to evaluate a set of scenarios for a problem and determine which one gives the best solution.

1-2-3 has three types of what-if tables, called 1-way, 2-way, and 3-way. Each type handles progressively more variables. For example,

- A 1-way table substitutes values for one variable.

- A 2-way table substitutes values for two variables.

- A 3-way table substitutes values for three variables.

Each type of what-if table requires a different layout, defined by the input values and formulas to use.

> **Note**   This section describes how to use what-if tables to perform sensitivity analysis. You can also use what-if tables to cross-tabulate information in a 1-2-3 database table.

> **Help**   For more information about using what-if tables to cross-tabulate information in a 1-2-3 database table, choose **Data What-if Table 1-Way,** **Data What-if Table 2-Way,** or **Data What-if Table 3-Way,** and press F1 (HELP). If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

Solving a formula by changing one variable

In **"Using Backsolver"**, the example determined how much money to borrow given a fixed monthly loan payment. But what if you aren't sure how much you can afford per month and you want to see a range of monthly payments for a given range of loan amounts, for example, between $100,000 and $130,000?   In this case, you want 1-2-3 to recalculate @PMT each time for each loan amount. You have one variable to replace (the loan amount), so you create a 1-way table.

The worksheet below uses Data What-if Table 1-Way to calculate @PMT for the loan amounts $100,000, $110,000, $120,000, and $130,000. The first column (A8..A11) of the what-if table contains values called **input values**, the values to be used in the calculation. The first row of the what-if table contains the formula (B7) to calculate.

The loan amount argument, cell B1, is called the **input cell**, since 1-2-3 will replace it in the formula with the input values listed in the first column of the what-if table. When the command finishes, 1-2-3 places the results of the calculations in the cells below the formula (B8..B11), called the **results area**.

> **Note**   The formula in cell B7 is formatted as Text by using Range Format.

Using Data What-if Table 1-Way with more than one formula

Data What-if Table 1-Way calculates one or more formulas by changing the same variable in each formula. Place additional formulas in the top row of the what-if table, to the right of the first formula. The illustration below shows an additional formula in cell C7 that multiplies the monthly payment by 12 to find the yearly cost of the loan.
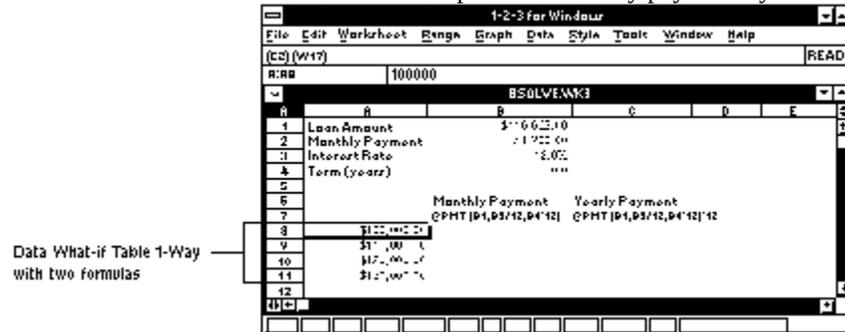
To use Data What-if Table 1-Way

Before you can calculate a 1-way table, you must set up the table range by entering formulas and input values in the worksheet.

To set up a 1-way table

1. Decide on a location for the table range.

2. Decide on a location outside the table range for the input cell and label it to make it easy to locate. A 1-way table needs one input cell. For example, if the input cell is B1 enter a label in A1.

3. Enter one or more formulas in the first row of the table range. Make sure each formula refers to the input cell. For example, if the input cell is B1, the formula must contain a reference to B1.

   The input cell always represents the input values you enter in the first column of the table range.

4. In the first column of the table range, beginning in the second cell, enter the input values you want 1-2-3 to use in the formulas. Leave the cell in the top left corner of the table blank.

To calculate a 1-way table

1. Choose Data What-if Table 1-Way.
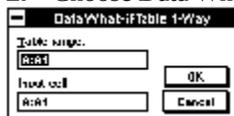
2. Specify the table range (the range that contains all the formulas and all the input values) in the Table range text box. For example, A:A7..A:C11.

   Include only the formulas and input values in the table range. Do not include the input cell.

3. Specify the input cell (the variable to replace in the formula with input values) in the Input cell text box. For example, B1.

   The input cell always refers to the input values you enter in the first column of the 1-way table range.

4. Select OK.

1-2-3 calculates the formulas for each input cell value. For example, in the illustration below, 1-2-3 calculates @PMT for each loan amount.

Data What-if Table 1-Way fills the results area with monthly and yearly payment values
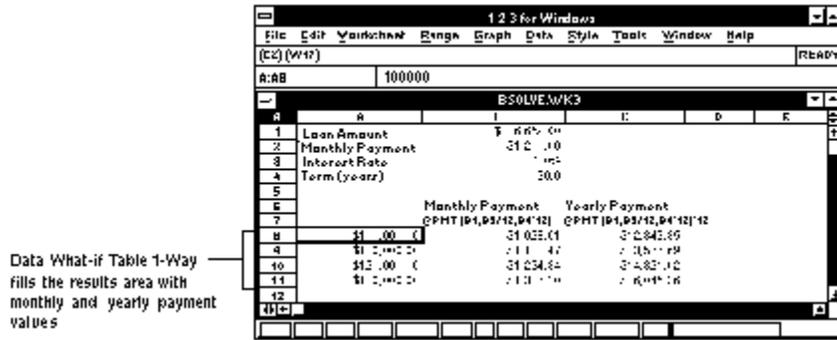
Tip   To change the input values and then recalculate the same what-if table, press F8 (TABLE).

Solving a formula by changing two variables

If you have a problem that involves changing values for two variables, use Data What-if Table 2-Way. For example, suppose you want to find the monthly payment for a loan, given a range of possible loan amounts and a range of interest rates. In this case, you have input values for two variables: loan amount and interest rate.

Help   For more information about **setting up a 2-way table,** choose Data What-if Table 2-Way and press F1 (HELP). If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

The two sets of input values define the length and width of a Data What-if Table 2-Way, as shown in the illustration below. The first column (A:A14..A:A17) of the table contains values for input cell 1 (loan amounts). The first row (A:B13..A:D13) of the table contains the values for input cell 2 (interest rates). The top left corner of the what-if table contains the formula to calculate. Data What-if Table 2-Way calculates one formula only.

Input cell 1 (B1)

Input cell 2 (B3)

Data What-if Table 2-Way (A13..D17)

Formula (A13)

Input values for input cell 1 (A14..A17)

Input values for input cell 2 (B13..D13)
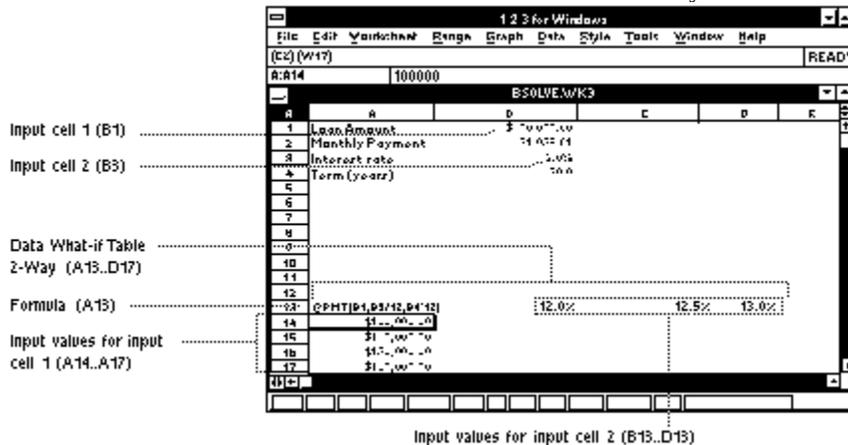
To use Data What-if Table 2-Way

Before you can calculate a 2-way table, you must set up the table range by entering formulas and input values in the worksheet.

To set up a 2-way table

1.   Decide on a location for the table range.

2.   Decide on a location outside the table range for the two input cells and label them to make them easy to locate.

3.   Enter the formula in the top left corner cell of the table range. The formula must refer to both input cells.

4. In the first column of the table range, beginning with the cell under the formula, enter the input values associated with input cell 1.

5. In the cells to the right of the formula, enter the input values associated with input cell 2.

To calculate a 2-way table
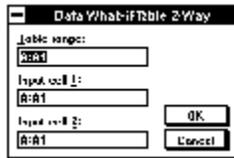
1. Choose Data What-if Table 2-Way.

2. Specify the table range (the range that contains all the formulas and all the input values) in the Table range text box. For example, A:A13..D17.

Include only the formulas and input values in the table range. Do not include the input cells.

3. Specify input cell 1 in the Input cell 1 text box. For example, A:B1.

Input cell 1 always refers to the input values you enter in the first column of the table range.

4. Specify input cell 2 in the Input cell 2 text box. For example, A:B3.

Input cell 2 always refers to the input values you enter in the first row of the table range.

5. Select OK.

1-2-3 places the results of the calculations in each cell at the intersections of the input cell values. For example, in the illustration below, 1-2-3 enters the result of @PMT for each loan amount and interest rate.

Data What-if Table 2-Way
with results (A13..D17)
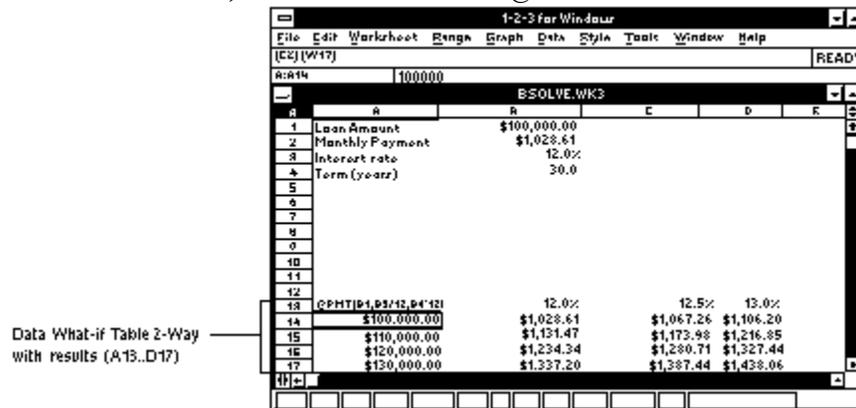
The first result, in cell B14, used $100,000 for the loan amount and 12% for the interest rate. The next result, in cell C14, used $100,000 for the loan amount and 12.5% for the interest rate.

Solving a formula by changing three variables

Because the 1-2-3 worksheet file is three-dimensional (3-D), you can calculate a formula with three changing variables. The layout of a Data What-if Table 3-Way is similar to Data What-if Table 2-Way, but it extends across worksheets and the formula is not in the table range. For example, Data What-if Table 3-Way can find the monthly loan payment for a house for varying loan amounts, interest rates, and terms. The next illustrations show the layout of a Data What-if Table 3-Way that solves this problem, using worksheets A and B.

The top left corner cell of the table range in each worksheet contains a value for input cell 3
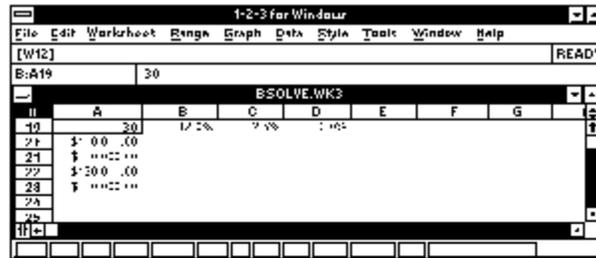
Input cell 1 (A:B1)
Input cell 2 (A:B3)

Input cell 3 (A:B4)
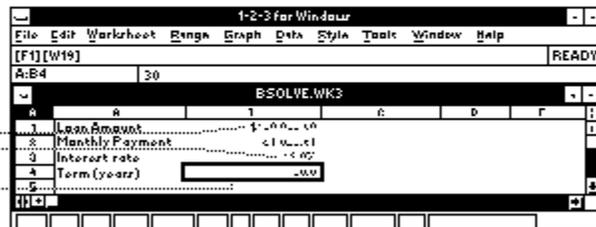
The first row contains the input values for input cell 2

The first column of the table range contains the input
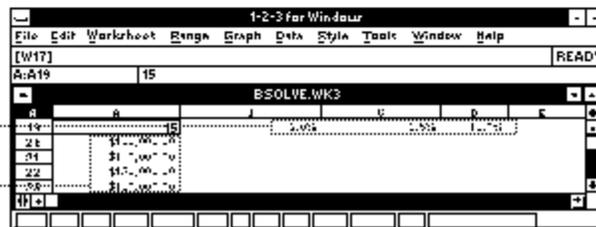
The first column, in the first worksheet, of the table range contains the input values for input cell 1 (loan amounts). The first row, in the first worksheet, contains the input values for input cell 2 (interest rates). The top left corner cell, in each worksheet, of the table range contains the input values for input cell 3 (term).

You do not include the formula to calculate a 3-way table in the table range; instead, you enter it somewhere outside the table range. Repeat the layout of the what-if table in each worksheet for each value of input cell 3. The number of worksheets to use equals the number of values for input cell 3.

> **Help**   For more information about **setting up a 3-way table,** choose Data What-if Table 3-Way and press F1 (HELP). If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

In this example, the loan amounts range from $100,000 to $130,000, the interest rates range from 12% to 13%, and the values for the term are 15 and 30 years.

To use Data What-if Table 3-Way

Before you can calculate a 3-way table, you must set up a 3-D table range by entering one formula and three sets of input values in two or more worksheets. The number of worksheets you use depends on the number of input values you use for the third variable.

To set up a 3-way table

1. Decide on locations for the table range in contiguous worksheets. The table range spans two or more worksheets depending on the number of input values you use for the third variable.

2. Decide on a location outside the table range for the three input cells, and label them to make them easy to locate.

3. In a cell outside of the table range, enter the formula you want to analyze. The formula must refer to all three input cells.

4. In the first column of the table range in the first worksheet, enter the values related to input cell 1. Copy these

values to all worksheets in the table range.

5. In the first row of the table range in the first worksheet, enter the values related to input cell 2. Copy these values to all worksheets in the table range.

6. In each worksheet, enter one input value for input cell 3 in the top left corner cell of the table range.

To calculate a 3-way table

1. Choose Data What-if Table 3-Way.

2. Specify the table range in the Table range text box. For example, A:A19..B:D23.

Do not include the formula or input cells in the table range.

3. Specify the cell that contains the formula for the 3-way table in the Formula cell text box. For example, A:B2.

4. Specify input cell 1 in the Input cell 1 text box. For example, A:B1.

Input cell 1 always represents the input values you enter in the first column of the table range.

5. Specify input cell 2 in the Input cell 2 text box. For example, A:B3.

Input cell 2 always represents the input values you enter in the first row of the table range.

6. Specify input cell 3 in the Input cell 3 text box. For example, A:B4.

Input cell 3 always represents the input values you enter in the top left corner of the table range.

7. Select OK.

1-2-3 calculates the formula for each combination of input cell values. For example, in the next illustration, the what-if table contains a result for the monthly payment for each combination of interest rate, loan amount, and term. The results area (A:B20..B:D23) contains the calculated values.

Data What-if Table
3-Way with results
(A:A19..B:D23)

[»]
[»]

The Solver answers what-if problems by finding values for formulas and other cells in a worksheet using constraints you define. Each such set of values is a Solver answer.

>   **Note**   For comprehensive instructions for using the Solver, see the ***Solver Guide***.

To use the Solver, you must first choose which variables in the worksheet to adjust. These are called **adjustable cells**. The adjustable cells must contain numbers only, not formulas or @functions. Second, you must enter constraints, which must be satisfied by each Solver answer.

Constraint cells contain logical formulas, which evaluate to 1 if satisfied and 0 if not satisfied. Specify constraint cells whose logical formulas use the =, >=, <=, >, or < operators. For example, EXPENSES<500000 specifies that expenses must be less than $500,000. PROFITS>150000 specifies that profits must exceed $150,000. (In these examples, EXPENSES and PROFITS are range names.)

The Solver does not accept compound logical formulas that use #AND#, #NOT#, #OR#, or <> (not equal).

Any answers the Solver finds must use values that satisfy each of the constraints.

You can also specify an optimal cell. An **optimal cell** is a cell for which you want the Solver to find the highest or lowest value.

The example below calculates the remaining principal left on a loan at a specific time during the life of the loan.

The goal is to find the largest possible loan (cell B1), given an interest rate of 12% (cell B3) and a loan term of 25 years (cell B4), while at the same time satisfying the following constraints:

* The monthly payment must be at least $1,000 and no more than $1,500

* Within the first 15 years of the loan, the remaining principal must be reduced to $75,000

Cells B9, B10, B11, and B12 contain the logical formulas that define these constraints. The formula in cell B9, +B2>=1000, requires the monthly payment to be at least $1,000. The formula in cell B10, +B2<=1500, requires the monthly payment to be no more than $1,500. The formual in cell B11, +B7<=75000, requires the remaining loan principal amount to be no more than $75,000. The formula in cell B12, +B6>=10, requires the remaining term of the loan to be at least 10 years. The values that are in the worksheet satisfy the constraint formulas in cells B9, B10, and B12, but do not satisfy the constraint formula in cell B11.

To use the Solver

1. In the worksheet, enter the formulas and constraints that describe the problem to solve.

    In the example, cells B1 through B12 contain the formulas and constraints.

2. Choose Tools Solver.
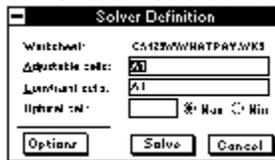
3. Specify the adjustable cells in the Adjustable cells text box:

    Mouse   Select a range of cells or individual cells separated by , (comma).

    Keyboard   Use , ↓, →, or ← to select a range of cells or individual cells separated by , (comma), or enter the cell addresses, separated by , (comma) (for example, b2,b6,b8). You can also enter these cells as a range (for example, b2..b4).

    In the example, the adjustable cells are cells B1 (Loan amount) and B6 (Remaining loan term).

4. Specify the constraint cells in the Constraint cells text box.

    In the example, the constraint cells are cells B9..B12.

5. (Optional) Specify the optimal cell in the Optimal cell text box.

    If you specify an optimal cell, select one of the following options:

    Max -- Finds the highest value for the optimal cell.

    Min -- Finds the lowest value for the optimal cell.

    In the example, the optimal cell is cell B1 (Loan amount).

6. Select Solve.

    While the Solver looks for answers, it reports its progress in solving the problem.

    When the Solver finds answers, it puts the first answer in the worksheet and displays the Solver Answer dialog box. The Solver Answer dialog box tells you how many answers the Solver found. In this example, the Solver found three answers.
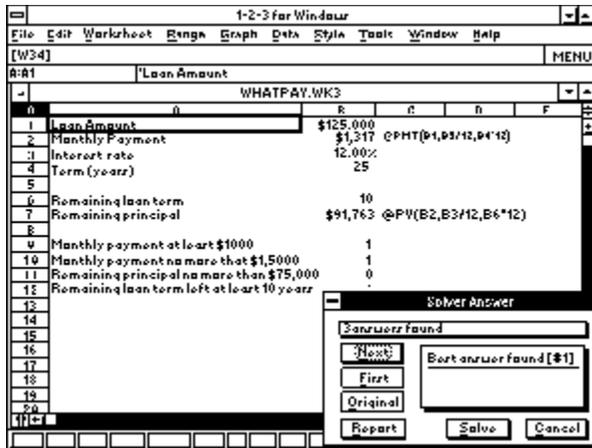
In the example, the first answer is the optimal answer, which shows the largest loan amount that satisfies each of the three constraints.

7. Select Next.

The Solver displays another answer in the worksheet. You can continue to select Next to display each answer that satisfies the constraints.

8. (Optional) To reset the adjustable cells to their original values, select Original in the Solver Answer dialog box.

9. To leave the Solver and return to the worksheet, select Cancel twice.

15   Using Macros to Automate Your Work

This chapter provides basic information on macros: definitions, rules for creating and using them, and descriptions of the types of macros you can create. This chapter also lists the macro key equivalents and the different categories of macro commands.

What is a macro?
Where to enter a macro
Macro format and rules
Argument types
Creating a macro
Naming a macro
Running a macro
Canceling a macro
Using an autoexecute macro
Recalculation during macros
Debugging a macro
Creating a macro with the Transcript window
Macro command categories

15   Using Macros to Automate Your Work

This chapter provides basic information on macros: definitions, rules for creating and using them, and descriptions of the types of macros you can create. This chapter also lists the macro key equivalents and the different categories of macro commands.

What is a macro?

A macro is a series of instructions that speeds up repetitive or complex tasks. For example,

- Macros can automate procedures you normally perform from the keyboard, such as using commands.

- Macros can perform complex tasks and programming procedures, such as for loops and if-then-else statements.

- Macros can guide users who are unfamiliar with 1-2-3 for Windows through tasks and applications that you create and control.

You can use a macro from any open worksheet file (including a macro library file). Macros can consist of keystrokes, macro commands, or both.

Macro definitions

The examples below show the different elements you use when you enter macros.

```
                    Keyword   Arguments

Macro  name ──────────  \a   {LET Q_2,1.5*Q_1}

                            Argument separator


                    Keystrokes  Right brace

Macro  name ──────────  SAVE  {alt}fs
Left brace ──────────         {QUIT}

                            Blank  cell
```
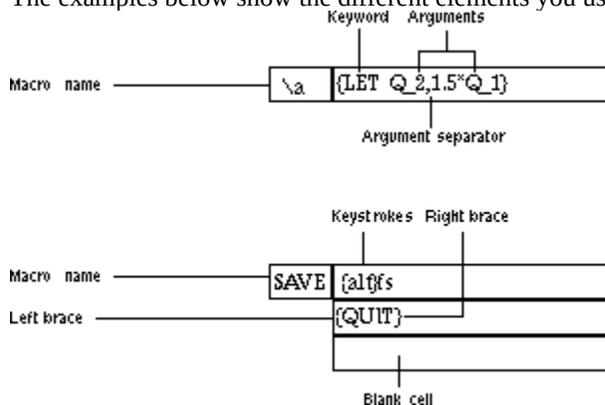
An **argument** is data you provide for many macro commands. There are many argument types, but number, string, location, and condition are the most common. 1-2-3 uses the argument when it runs the macro.

Argument separators separate two or more arguments. 1-2-3 uses three argument separators: , (comma), ; (semicolon), and . (period). A ; (semicolon) is always a valid argument separator. You can set either . (period) or , (comma) as an argument separator with Tools User Setup International, but the argument separator cannot be the same as the decimal separator. Some countries use , (comma) as the decimal separator while others use . (period); you may want to use ; (semicolon) as the argument separator in worksheet files that will be used with varying international settings.

A **blank cell** is a cell that does not contain an entry or a label-prefix character. A blank cell (or a {RETURN} command) indicates the end of a macro or a subroutine.

Braces enclose all macro commands (including arguments) and key names that replace 1-2-3 keys such as F2 (EDIT) or F9 (CALC).

Keystrokes are ordinary 1-2-3 keystroke commands used as part of a macro. For example, {ALT}FS are the keystrokes used to save the current worksheet file without changing the file name, replacing the current version of the file on disk.

A **macro** is a set of instructions that automates tasks in 1-2-3. Macros can include procedures entered from the keyboard and/or macro commands.

A **macro keyword** is the name of a 1-2-3 macro command or key name. For example, {LET} and {DOWN} are

macro keywords.

A **macro name** is the range name you assign to a macro to help you remember what the macro does and to make the macro easier to run.

Mouse actions use their keystroke equivalents. For example, choose File Open with a mouse by clicking File on the main menu and clicking Open on the File pulldown menu. You use the keystroke equivalents, {ALT}FO, in a macro.

Where to enter a macro

Enter all instructions for a single macro as labels in successive cells in the same column (unless the macro uses branches or subroutines). You can enter more than one macro instruction (up to 512 characters) in a cell.

A macro command and its arguments must be entirely in a single cell.
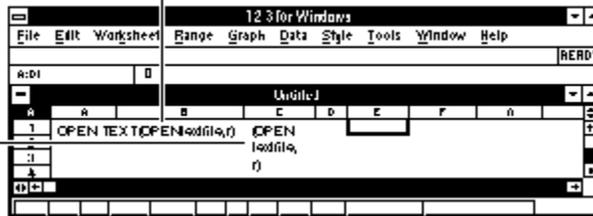
If a sequence of instructions is very long, divide it into several cells in the same column as a series of labels. If space permits, put each instruction or group of related instructions in a single cell. For example, count a macro command (with arguments) or a series of keystrokes that executes a command as a single instruction. This makes the macro easier to read, debug (correct), and edit.

The best place to store macros is in a **macro library file**, a worksheet file dedicated to macro storage. To avoid interfering with data in existing worksheets, or to use the same macros in several different worksheets, create one or more macro library files.

If you store a macro in the same worksheet as the data it affects, enter the macro in an out-of-the-way place in the worksheet, many rows below any existing data. Be sure the macro does not affect any data that already exists; leave enough empty rows or columns between the data and the macro so that if the data grows, or if you insert or delete rows or columns, you won't accidentally alter the macro.

If the macro calls subroutines or branches, put the subroutines or branches near the calling macro on the worksheet so that you can see both at once, if possible. If several macros in different worksheet files use the same subroutine, put the subroutine in the macro library file.

A macro must include instructions for every step of the task or procedure it automates. Before you write a macro, go through the procedure manually, noting the commands and keystrokes you use in each step.

1-2-3 records every action as a keystroke in the Transcript window. Use Tools Macro Show Transcript to display the Transcript window, copy the keystrokes you need, and paste them into the worksheet as a macro. (See **"Creating a macro with the Transcript window,"**.) The simplest sort of macro uses only keystrokes, for example, to save the current worksheet file. Using the Transcript window is the easiest way to create this sort of macro. You can also enter the macro in a single column in the worksheet.

> **Note** 1-2-3 records mouse actions as their keystroke equivalents.

Other macros automate tasks with **macro commands** -- commands you enter in the macro that tell 1-2-3 what to do. Macro commands are an easy-to-use programming language within 1-2-3. When you combine macro commands and keystrokes in a macro, you can create applications that simplify complex tasks or automate time-consuming and repetitive chores. For example, use {FORM} to create a data entry form that prompts the user for specific information, checks the responses, and enters the data in the worksheet; or use {FOR} to repeat a task a specified number of times.

Follow the guidelines below to enter keystrokes and macro commands in a macro.

Keystrokes

Most macros contain keystrokes that replicate procedures, such as entering data or choosing menu commands. These procedures consist of keyboard characters (letters, numbers, and symbols) and command sequences. To enter keystrokes in a macro, enter (as labels) the keystrokes you want 1-2-3 to execute. Enter the keystrokes in a single cell or in adjacent cells in a single column. For example, the macro '{ALT}KIR~'Arthur's Nonfiction Library~ inserts a row and enters the label Arthur's Nonfiction Library in the current cell. (The ~ (tilde) is the keystroke equivalent of ENTER**.**)

A label-prefix character (' ^ or ") is required if the macro instruction begins with / (slash), \ (backslash), a number, or one of the numeric symbols < > = + - @ . (# or $.

Macro commands

Macros may also contain commands similar to those found in programming languages, and key names that represent nonprinting keyboard keys (such as TAB, ↓, and F5 (GOTO)). When you enter these macro commands and key names, use the correct syntax; 1-2-3 cannot execute macros if the syntax is incorrect.

The format for macro commands and key names is

{KEYWORD}
or
{KEYWORD *argument1,argument2,..., argumentn*}

KEYWORD is the verb in the macro command or a key name and is always preceded by { (open brace). Key names and commands that have no arguments must be followed by   } (close brace). The keyword tells 1-2-3 what action to perform. You can enter keywords in uppercase or lowercase letters, but this book refers to macro keywords in uppercase letters. For a list of macro keywords that are used in macro commands, see **"Macro command categories"**.

argument1,argument2,...,argumentn are arguments for the macro command. Arguments provide information 1-2-3 needs to complete the command and perform its task. You can enter arguments in uppercase or lowercase letters, but this book refers to arguments in lowercase italics. Some commands have optional arguments (arguments you can omit); this book shows optional arguments in [ ] (brackets). The last argument must be followed by } (close brace).

Macro command rules

Use the following guidelines when entering macro commands:

- Enter an entire macro command (keyword and arguments, if any) in a single cell. Enclose the entire macro command (including arguments) in { } (braces).

- Enter a space between the keyword and the first argument, but do not enter spaces between arguments.

- Use , (comma) ; (semicolon) or . (period) to separate arguments. You can always use ; (semicolon) as an argument separator, but you can only use , (comma) or . (period) if it is specified as an argument separator with Tools User Setup International Punctuation.

  Help   For more information about **specifying an argument separator,** choose Tools User Setup International, press F1 (HELP), and select Style. If you are not sure how to use Help,   see **"Using Help"** in Chapter 1.

- Enter a valid argument separator to indicate omitted optional arguments. Some macro commands have optional arguments you can omit, but you must enter an argument separator as a placeholder for each omitted argument. For example, the syntax for the {CONTENTS} command is {CONTENTS *target,source,[width],[cell-format]*}. To omit the *[width]* argument, use the following syntax:

  {CONTENTS *target,source,cell-format*}.

- Do not use a , (comma), ; (semicolon), . (period), or } (brace) as part of an argument, unless you enclose the argument in " " (quotation marks).

  Tip   Use F3 (NAME) to enter macro keywords. Type { (open brace) and press F3 (NAME); 1-2-3 displays a list of all macro keywords. Select the keyword you want and 1-2-3 places it in the edit line. Enter all of the necessary arguments, and type } (close brace) to complete the macro command.

Argument types

1-2-3 macro commands accept four types of arguments: condition, location, string, and value. The table below describes each argument.

Type	Description
Condition	An expression that uses a relational or logical operator (< > + = <> >= <= #NOT# #AND# and #OR#), or the range address or name of a cell that contains such an expression. The macro evaluates the condition argument and proceeds according to whether it is true or false. You can also use a formula or @function, a number, or a range name or cell address as a condition argument.
Location	The address or name of a cell or range, or a formula or @function that returns a range address or name. A location argument can refer to a single-cell or multiple-cell range in one or more worksheets in a single worksheet file.
String	Text (any sequence of letters, numbers, and symbols) enclosed in " " (quotation marks), the range address or name of a cell that contains a label, or a formula or @function that returns a label.
Value	A number, the address or name of a cell that contains a number, or a formula or @function that returns a number.

Use range names to ensure that location arguments are correct even if you insert or delete rows, columns, or worksheets in the worksheet file.

Location arguments in **flow-of-control macro commands** refer to the worksheet file in which the macro is currently executing. If the stated location does not exist in the current worksheet file, these commands check for the range name in a macro library file if one is open.

Location arguments in all other macro commands refer to cells or ranges in the current worksheet in the current worksheet file unless you precede the cell or range address with the worksheet letter and file name. To write a macro that uses data in a different worksheet file, include the worksheet file name and worksheet letter in the location argument. For example, the macro {GET <<SALES>>A:A1} waits for the user to press a key and then records the keystroke in cell A:A1 in the worksheet file SALES if SALES is open.

To make sure that 1-2-3 interprets an argument as a string, not a value, add :s or :string to the end of the argument. To make sure that 1-2-3 interprets an argument as a value, add :v or :value to the end of the argument.

Macro commands that require a single cell use the top left corner cell of a multiple-cell range.

When you create a macro, follow the guidelines in the previous sections. Document what a macro does once you create it, so you (or others who use the worksheet) can understand the macro's purpose easily.

To create a macro

1. Perform the procedure the macro automates to determine what keystrokes are necessary.

    If you carry out the procedure, you can use recorded keystrokes by using Tools Macro Show Transcript to enter the recorded keystrokes as macro instructions. See **"Creating a macro with the Transcript window,"**.

2. Move to a worksheet location far away from data.

    See **"Where to enter a macro"**.

3. Enter the macro name in an empty cell.

4. Enter the first macro instruction as a label in the cell to the right of the name. (If the macro is short, enter the entire macro in this cell.)

    To enter keystrokes, enter a label-prefix character if the first keystroke is a number, numeric character, or \ / < > + = <> >= <= #; then enter the keystrokes.

    To enter macro commands, enter the macro keyword using the **macro command syntax**.   You can also use F3 (NAME) to enter macro keywords. Type { (open brace) and press F3 (NAME); 1-2-3 displays a list of all macro keywords. Select the keyword you want, and 1-2-3 places it in the edit line; then complete the arguments and type } (close brace).

5. Enter any subsequent instructions in the cells immediately below the first instruction.

6. Enter subroutines and branch macros as necessary in adjacent columns or below the end of the macro. Enter the name of each subroutine or branch macro in the cell to the left of its top cell.

7. Leave a blank cell after the last line of the macro or enter {QUIT} to end the macro.

8. Name the macro and the subroutines and branch macros.

    See **"Naming a macro"**.

The illustration below shows two macros and a subroutine entered in a single column.
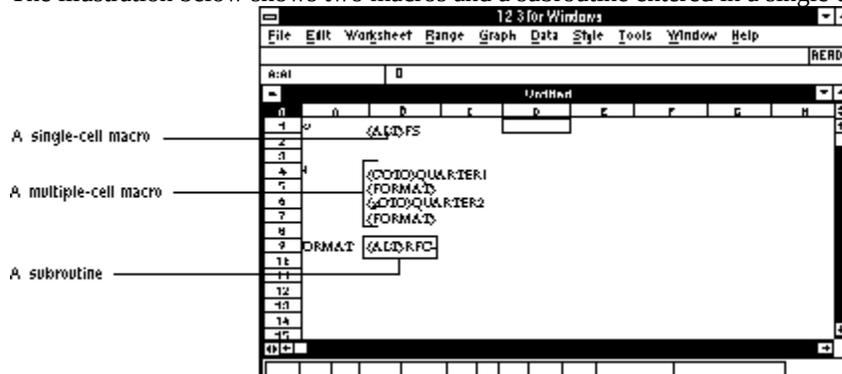
> **Tip**   Use { } (empty braces) as placeholders in a macro. 1-2-3 ignores empty braces during macro execution, without terminating the macro.

Documenting a macro

Use the name you assign a macro to remind you of what the macro does (a descriptive name like SAVE) or to make the macro easy to run (a \ (backslash) name like \A). Naming a macro is the same as naming a range. If you enter the macro's name in the cell to the left of the first cell in the macro, you can then use Range Name Label Create to name the macro. See **"Naming a macro"**.

To document a lengthy or complicated macro, enter comments that describe the steps of the macro in cells to the right of the macro instructions.
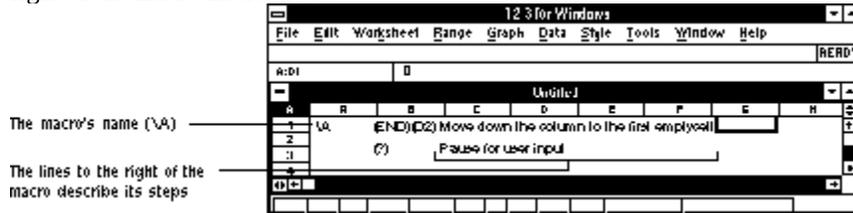
Saving a macro

Save a macro to use it again. To save a macro, save the worksheet file that contains it with File Save. You can use the macro whenever the worksheet file that contains it is open. Use a macro library worksheet file to store macros you use with many worksheet files.

Naming a macro

You name a macro to make it easier to run (backslash names) or to clarify its function (multiple-character names). To name a macro, name the first cell of the macro with Range Name Create or Range Name Label Create. Name subroutines the same way you name macros.

Use Range Name Create or Range Name Label Create to name cell B1
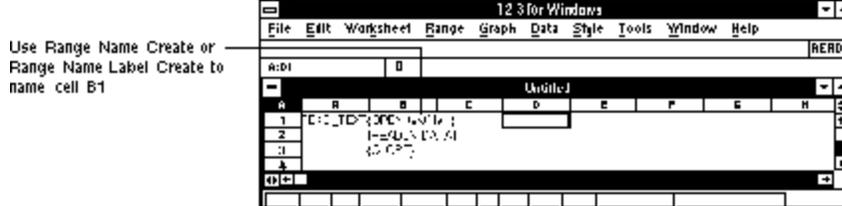
Macro names follow all the rules for range names. For more information about using range names, see **"Naming ranges"** in Chapter 2.

1-2-3 accepts the following two kinds of macro names:

- **Backslash names** consist of a \ (backslash) followed by a single keyboard character, such as \D. This type of name is easy to enter and use since you need only press CTRL and the character to run the macro. If you name a macro \0 (zero), you create an autoexecute macro that executes automatically every time you open or retrieve the worksheet file (for more information, see **"Using an autoexecute macro"**).

- **Multiple-character names** are ordinary range names. This type of name lets you use a name that reminds you of what the macro does and makes it easy to avoid duplicating names, but you can only run this type of macro with RUN (ALT+F3). You cannot use the same name for a range of data and a macro. If two or more open worksheet files contain macros with the same name, 1-2-3 runs the macro in the current worksheet file.

  Tip   Do not use macro keywords as names for ranges, macros, or subroutines. If you name a range with a keyword, the range name takes precedence and the keyword cannot be used in macros.

Running a macro

Running a macro means starting the macro so it carries out the task it automates. For example, you can use a macro to enter data in a dialog box.

Before you run a macro, the worksheet file that contains the macro must be active. If the current worksheet file and another active worksheet file both contain macros with the same name, 1-2-3 executes the macro in the current file, unless you specify a file name.

You can also run a macro by playing back keystrokes from the Transcript window. For more information on the Transcript window, see **"Creating a macro with the Transcript window"**.

> **Note**   Save the worksheet file that contains a macro before you run the macro. If you save the worksheet file and the macro has an unexpected effect, you can restore the worksheet file to its original state. To restore the file, use File Close to close the file without saving the changes caused by the macro and use File Open to open the version of the file you saved before running the macro.

To run a backslash macro

1. Press CTRL and the single-letter name simultaneously.

For example, to run a macro named \A, press CTRL+A. 1-2-3 runs the macro.

> **Note**   You can also run a backslash macro with ALT+F3 (RUN). See the next procedure.

To run a range-name macro or an unnamed macro

1. Press ALT+F3 (RUN) or choose Tools Macro Run.

2. Select the macro name from the Macro name list box or specify the macro name or address in the Macro range text box.

The Macro name list box displays all range names in the current worksheet file and the names of all other active worksheet files. To see the range names from another active file, select the name of the file.

3. Select OK.

1-2-3 runs the macro.

Unless the macro contains a {BREAKOFF} command, you can interrupt a macro while it is running.

To cancel a macro

1. Press CTRL+BREAK to cancel a macro while it is running.

    Unless the macro contains a {BREAKOFF} command, 1-2-3 stops the macro after it completes the current macro instruction.

2. Press ESC or select OK to clear the error message and return to READY mode.

    After you interrupt the macro, you can then resume working with 1-2-3.

See **{BREAKOFF} and {BREAKON}**.

Using an autoexecute macro

An **autoexecute macro** is a macro that 1-2-3 executes automatically when you open the worksheet file that contains it. You create an autoexecute macro by naming the macro \0 (backslash zero). An autoexecute macro is especially useful in custom applications and for worksheet files that you use often.

1-2-3 executes the autoexecute macro whenever you open the file that contains it if the Run autoexecute macros check box in the Tools User Setup dialog box is checked.

> **Help**   For more information about **autoexecute macros,** choose Help Macros, select Summary of Steps for Creating a Macro, and select Naming a Macro. If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

If you run a macro that uses File Open and the opened file contains an autoexecute macro, 1-2-3 runs the autoexecute macro (as a subroutine) if the Run autoexecute macros check box in the Tools User Setup dialog box is checked. If the box is not checked, 1-2-3 continues to execute the original macro.

Recalculation during macros

If the worksheet file's recalculation setting is Automatic, 1-2-3 recalculates during macro execution. To stop automatic recalculation, choose Tools User Setup Recalculation and select Manual. The worksheet recalculates only when 1-2-3 encounters a {CALC}, {RECALC}, or {RECALCCOL} command in a macro, or if you press F9 (CALC). A macro runs faster if you set Tools User Setup Recalculation to Manual, but it may have inaccurate results if the macro changes data and then uses the result of a formula that depends on that data.

When a macro command (such as {LET}) sets the value of a cell and the Tools User Setup Recalculation dialog box is set to Automatic, 1-2-3 defers recalculation until the user or the macro uses a navigation key, a function key, or ENTER (~ in a macro). This behavior lets macros run faster when recalculation is set to Automatic.

Debugging a macro

If the macro does not do what you expect when you run it, it probably contains an incorrect instruction or sequence of instructions, or a format or typing error. You can correct obvious errors by editing the instruction just as you edit any cell entry.

If 1-2-3 cannot run a macro because instructions are wrong or incomplete, it displays an error message when the macro fails. The error message indicates the location and the instruction that 1-2-3 was executing at the time it encountered the error. Go to the cell the message indicates and check for errors, using the list below to help you identify problems:

- Typing or spelling errors, including incorrect spelling of keywords and range names

- Incorrect menu command sequences

- A blank or numeric cell before the end of the macro

- Spaces where they shouldn't be, especially between arguments, or missing spaces between keywords and arguments

- Missing or incorrect arguments or argument separators

- Missing { } (braces), [ ] (brackets), or ( ) (parentheses) instead of { } (braces)

- Incorrect cell or range references, such as undefined or unacceptable range names, or references to ranges in another worksheet file that don't specify the correct file name

- Range names that duplicate keyword names or function key names

     Tip   Do not use macro keywords as names for ranges, macros, or subroutines.

STEP and TRACE modes

Finding an error in a lengthy or complicated macro is sometimes difficult. To help diagnose problems in a macro, use STEP mode and TRACE mode. STEP mode executes a macro one instruction at a time. TRACE mode opens a window that shows the current macro command about to be executed. If the macro fails, the Macro Trace window shows which step failed.

The most effective way to use these features is together, so you can step through a macro and see it as it executes.

To use STEP and TRACE modes

1. Select a macro to step through.

2. Choose Tools Macro Debug.

3. Select the Single step check box to start STEP mode.

4. Select the Trace check box to start TRACE mode.

5. Select OK.

     The STEP indicator appears at the bottom of the window, and 1-2-3 displays the Macro Trace window.
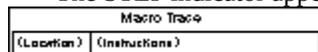
6. Start the macro.

7. Press any key to execute one instruction at a time until you encounter the instruction that caused the error.

The SST indicator replaces the STEP indicator each time 1-2-3 executes a macro instruction in STEP mode. The Macro Trace window shows you the current location and the macro instruction 1-2-3 is currently executing.

Note To use STEP mode without using the Tools Macro Debug dialog box, press ALT+F2 (STEP).

When you find the error, end the macro by pressing CTRL+BREAK and then ESC or ENTER. This does not end STEP or TRACE modes. 1-2-3 still displays the STEP indicator and the Macro Trace window.

You do not need to turn STEP or TRACE modes off before you edit the macro. Edit the cells that contain the macro instructions you want to change. After you edit the macro, run through it again to ensure that there are no other problems.

When you finish debugging and editing the macro, press ALT+F2 (STEP) to turn STEP mode off, or choose Tools Macro Debug, remove the check from the Single step check box, and select OK. To close the Macro Trace window, choose Tools Macro Debug, remove the check from Trace in the Tools Macro Debug dialog box, and select OK.

Creating a macro with the Transcript window   »

»
»

1-2-3 records, in the **Transcript window**, every keystroke you make after you start 1-2-3. To display the Transcript window, choose Tools Macro Show Transcript. You can use the Transcript window to create a macro by copying or cutting and pasting recorded keystrokes into a worksheet, or you can run a macro directly from the Transcript window by playing back recorded keystrokes.
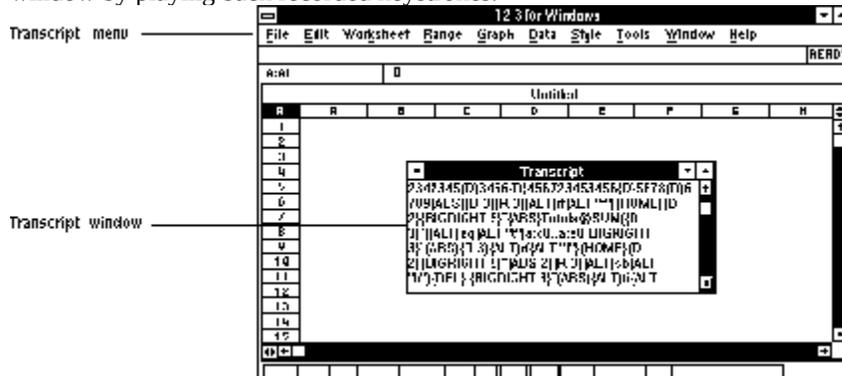
The Transcript window is a storage area that records keystrokes until it is full, then replaces old characters with new ones.

Maximum number of characters

The Transcript window holds up to 512 bytes. Most characters use one byte. Characters include { } (braces), which 1-2-3 adds, as well as spaces you enter. When the window fills up, the Transcript window discards keystrokes from the beginning of the transcript (the earliest keystrokes you made since the last time you erased the transcript) to make room for recent keystrokes. To avoid losing keystrokes, cut and paste them into the worksheet.

Recording format

The Transcript window records most keystrokes in macro-instruction format: nonprinting keystrokes are enclosed in braces (for example, {DEL}), and menu choices are the first letter of the menu item (for example, T for Tools). The Transcript window records mouse actions as their keystroke equivalents.

1-2-3 records keystrokes in macro-instruction format. For example, 1-2-3 records F5 (GOTO), as {GOTO}, not {F5}.

To fit the maximum number of keystrokes in the window, the Transcript window abbreviates keystroke instructions with an abbreviation of the key name (for example, {D} instead of {DOWN}), and a repetition number for duplicate keystrokes (for example {D 2}, instead of {D}{D}).

Macros in the Transcript window

When you use CTRL to start a macro named \A, the Transcript window records the action as {CTRL}A. It does not record keystrokes that the macro plays back.

Excluded keystrokes

The Transcript window does not record ALT+F1 (COMPOSE); instead, it records the composed characters.

Displaying the Transcript window

Choose Tools Macro Show Transcript from the main menu to display the Transcript window.

Transcript window

You can see the recorded keystrokes in the Transcript window and you can monitor keystrokes as they are recorded.

To record keystrokes

1. Choose Tools Macro Show Transcript.

2. Make the Transcript window active.

3. Choose Edit Clear All to clear the Transcript window.

4. Perform the task you want to record: choose commands, enter data, and move around in the worksheet file or between worksheet files and other open windows.

   Note   The Transcript window records mouse actions as their keystroke equivalents.

To edit keystrokes

1. When you finish the task, make the Transcript window active.

2. To correct mistakes, edit the keystrokes.

   You can also edit instructions after you copy them into the worksheet file.

To create a macro by copying keystrokes

1. Make the Transcript window active.

2. Select the recorded keystrokes you want to copy:

   Mouse   Drag across the keystrokes while holding down the mouse button.

   Keyboard   Use , ↓, →, and ← to move the insertion point to the first keystroke you want to select, press and hold SHIFT, and use   , ↓, →, and ← to highlight the keystrokes you want to select.

3. Choose Edit Copy.

   1-2-3 copies the selected keystrokes to the Windows Clipboard.

4. Make a Worksheet window active.

5. Select the worksheet cell in which you want to enter the first keystroke.

6. Choose Edit Paste.

   1-2-3 copies keystrokes into the cells in a single column, beginning with the cell you selected.

7. Name the macro as described in **"Naming a macro"**.

   The keystrokes are displayed as a macro in the worksheet file.

To play back keystrokes

1. Make a Worksheet window active.

2. Move the cell pointer to the cell where you want 1-2-3 to begin the task.

3. Make the Transcript window active.

4. Select the recorded keystrokes you want to play back (to play back all keystrokes, do not select anything).

5. Choose Macro Run.

   1-2-3 plays back the selected keystrokes as a macro. To stop the macro, press CTRL+BREAK.

   Note The macro stops automatically if 1-2-3 encounters an error.

Transcript commands

The table below describes the Transcript commands, which are displayed in the menu bar when the Transcript window is active.

Command	Task
Edit	Cuts, copies, or moves data to and from the Windows Clipboard, and clears the Transcript window.
File	Closes the current file or exits the 1-2-3 session.
Help	Gives information about 1-2-3.
Macro	Controls keystroke recording, helps you debug a macro, and lets you run a macro.
Window	Tiles or cascades the Worksheet, Graph, and Transcript windows; lists open Worksheet, Graph, and Transcript windows.

Macro command categories

1-2-3 macro commands fall into eleven categories. The table below describes each category.

Category	Description
Clipboard	Cuts and copies data to the Windows Clipboard, and pastes data from the Clipboard.
Data manipulation	Enters data, edits existing entries, erases entries, and recalculates formulas.
Dynamic Data Exchange	Manipulates links between 1-2-3 and other Windows applications.
External table control	Commits (finalizes) or rolls back (cancels) pending transactions with external databases.
File manipulation	Works with text files.
Flow-of-control	Directs the path of macro execution, using branches, subroutine calls, loops, and conditional processing.

Interactive	Suspends macro execution for user input, controls macro interruption and the timing of macro execution, and creates custom menus.
Link	Manipulates link-level (high-level) links between 1-2-3 for Windows and other Windows applications.
Macro key names	Replicates actions of the nonprinting keys.
Screen control	Controls different parts of the screen display, including the mode indicator and the Worksheet window, and sounds the computer's bell.
Window control	Moves, sizes, and makes 1-2-3 windows active.

The sections below list macro commands by category.

Macro key names

The table below lists the macro commands that correspond to the 1-2-3 function keys and the standard keyboard keys.

1-2-3 or keyboard key	Macro key name
¯	{DOWN} or {D}
	{UP} or {U}
¬	{LEFT} or {L}
®	{RIGHT} or {R}
~ (tilde)	{ ~ }
/ (slash) or < (less-than symbol)	/, <?, or {MENU}
{　(open brace)	{ { }
}　(close brace)	{ } }
ALT	{ALT}, {MENUBAR}, or {MB}
ALT+F6 (ZOOM)	{ZOOM}
ALT+F7 (APP1)	{APP1}
ALT+F8 (APP2)	{APP2}
ALT+F9 (APP3)	{APP3}
BACKSPACE	{BACKSPACE} or {BS}
CTRL+END	{FILE}
CTRL+END CTRL+ PG DN	{PREVFILE}, {PF}, or {FILE}{PS}
CTRL+END CTRL+PG UP	{NEXTFILE}, {NF}, or {FILE}{NS}
CTRL+END END	{LASTFILE}, {LF}, or {FILE}{END}
CTRL+END HOME	{FIRSTFILE}, {FF}, or {FILE} {HOME}
CTRL+HOME	{FIRSTCELL} or {FC}
CTRL+¬	{BACKTAB} or {BIGLEFT}

CTRL+PG DN	{PREVSHEET} or {PS}
CTRL+PG UP	{NEXTSHEET} or {NS}
CTRL+. (period)	{ANCHOR}
CTRL+ ®	{BIGRIGHT} or {TAB}
DEL	{DELETE} or {DEL}
END	{END}
END CTRL+HOME	{LASTCELL} or {LC}
ESC	{ESCAPE} or {ESC}
F1 (HELP)	{HELP}
F2 (EDIT)	{EDIT}
F3 (NAME)	{NAME}
F4 in READY mode	{ANCHOR}
F4 (ABS) in EDIT, POINT, and VALUE mode	{ABS}
F5 (GOTO)	{GOTO}
F6 (PANE)	{WINDOW}
F7 (QUERY)	{QUERY}
F8 (TABLE)	{TABLE}
F9 (CALC)	{CALC}
F10 (MENU)	{ALT}, {MENUBAR}, or {MB}
HOME	{HOME}
INS	{INSERT} or {INS}
PG DN	{PGDN}
PG UP	{PGUP}
TAB	{TAB}

Note   To specify two or more consecutive uses of the same key, include a number following the key name within the { } (braces). For example, the instructions {RIGHT}{RIGHT} and {RIGHT 2} are equivalent: they tell 1-2-3 to move the cell pointer two cells to the right or traverse a menu two places to the right.

To specify a dialog box option by pressing ALT+a letter, include "*x?*" following ALT within the { } (braces), where *x* represents the underlined letter. For example, the instruction {ALT "F"} tells 1-2-3 to select the dialog box option with the underlined letter F.

The only single-character keystroke instruction that is not identical to the key it represents is the ~ (tilde), which corresponds to ENTER.

1-2-3 does not have macro key names for the following keys: ALT+F1 (COMPOSE), CAPS LOCK, NUM LOCK, PRINT SCREEN, SCROLL LOCK, and SHIFT. Therefore, you cannot use these keystrokes in a macro.

The ENTER keystroke instruction

The only single-character keystroke instruction that is not identical to the key it represents is the ~ (tilde). The ~ (tilde) is the keystroke instruction for ENTER. For example, in the macro instructions {ALT}KIS1~, the ~ (tilde) completes the Worksheet Insert Sheet command.

The {CE} keystroke instruction

{CLEARENTRY} or {CE} represents an internal 1-2-3 keystroke; it does not have a corresponding key on the keyboard.

{CE} clears the current data from the edit line or a text box when 1-2-3 is in EDIT mode.

The {MB} keystroke instruction

{MENUBAR} or {MB} makes the 1-2-3 main menu active. For example, the macro instructions {MB}RFC2~ change the format of a selected range as currency with two decimal places. {MENUBAR} and {MB} are equivalent to {ALT}.

Clipboard

Clipboard commands cut and copy data to the Windows Clipboard, and paste data from the Clipboard.

Macro instruction	Task
{EDIT-CLEAR}	Deletes cell contents from a range permanently, without using the Clipboard.
{EDIT-COPY}	Copies data and related formatting from the worksheet to the Clipboard.
{EDIT-COPY-GRAPH}	Copies the current contents of a Graph window to the Clipboard.
{EDIT-CUT}	Cuts data and related formatting from the worksheet to the Clipboard.
{EDIT-PASTE}	Pastes data and related formatting from the Clipboard into the current file.
{EDIT-PASTE-LINK}	Creates a DDE link between the current worksheet file and the file referred to on the Clipboard.

Data manipulation

The commands below enter, edit, erase, and recalculate data.

Macro instruction	Task
{APPENDBELOW}	Copies data in one range to the bottom of another range, automatically extending the second range to include the copied data.
{APPENDRIGHT}	Copies data in one range to the right of another range, automatically extending the second range to include the copied data.
{BLANK}	Erases a cell or range.
{CONTENTS}	Copies the contents of one cell to another cell as a label.
{LET}	Enters a label or number in a cell.
{PUT}	Enters a label or number in a range.
{RECALC}	Recalculates formulas in a range row by row.

Macro instruction	Task
{RECALCCOL}	Recalculates formulas in a range column by column.

Dynamic Data Exchange

The Dynamic Data Exchange (DDE) commands below manipulate conversation level (low-level) links between 1-2-3 for Windows and other Windows applications.

Macro instruction	Task
{DDE-ADVISE}	Specifies the macro that is executed when data changes in the server application.
{DDE-CLOSE}	Terminates a conversation with a Windows application.
{DDE-EXECUTE}	Sends a command to an application.
{DDE-OPEN}	Initiates a conversation with a Windows application, making that the current conversation.
{DDE-POKE}	Sends data to an application.
{DDE-REQUEST}	Transfers data from an application.
{DDE-UNADVISE}	Terminates the {DDE-ADVISE} instruction.
{DDE-USE}	Selects the current conversation that is used by other DDE macros.

External table control

The commands below control how 1-2-3 handles transactions with external databases.

Macro instruction	Task
{COMMIT}	Commits all pending external database transactions.
{ROLLBACK}	Cancels all pending external database transactions.

File manipulation

The commands below work with text files (also called print files).

Macro instruction	Task
{CLOSE}	Closes the open text file.
{FILESIZE}	Records in a cell the number of bytes in the open text file.
{GETPOS}	Records in a cell the location in the open text

	file at which data is read from or written to.
{OPEN}	Opens a new or existing text file so you can work with that text file using the other file-manipulation commands.
{READ}	Copies a series of bytes from the open text file to a cell.
{READLN}	Copies an entire line from the open text file to a cell.
{SETPOS}	Changes the location in the open text file at which data is read from or written to.
{WRITE}	Writes text to the open text file.
{WRITELN}	Writes text to the open text file and adds an end-of-line sequence.

Flow-of-control

The commands below direct the path of macro execution, using subroutines, branches, calls, for loops, and conditional processing.

Macro instruction	Task
{*subroutine*}	Performs a subroutine call: Executes the subroutine at the specified location before continuing down the current column of commands.
{BRANCH}	Performs a branch: Transfers macro control from the current column of macro commands to another location.
{DEFINE}	Evaluates and stores arguments that you pass to a subroutine in a {*subroutine*} command.
{DISPATCH}	Performs an indirect branch by directing 1-2-3 to a cell that contains the name or address of the branch location.
{FOR}	Creates a for loop**:** Repeats a subroutine or a series of instructions a specified number of times.
{FORBREAK}	Cancels a for loop.
{IF}	Sets up a condition that 1-2-3 evaluates to determine whether to continue with the macro instructions that follow {IF} in the same cell or go directly to the instructions in the next cell.
{LAUNCH}	Starts a Windows application.
{ONERROR}	Performs a branch if an error occurs while a macro is running, so macro execution continues instead of terminating in error.
{QUIT}	Ends a macro, returning control to the user.
{RESTART}	Keeps 1-2-3 from returning to the location from which the subroutine call was issued after

	completing the commands in a subroutine.
{RETURN}	Ends a subroutine and returns control to the instruction following the command that called the subroutine. In a for loop, ends the current repetition immediately and starts the next repetition.
{SYSTEM}	Temporarily suspends the 1-2-3 session and passes a command to the operating system. When the operating system command is completed, automatically resumes the 1-2-3 session and continues the macro.

Interactive

The commands below suspend macro execution for user input, control macro interruption and the timing of macro execution.

Macro instruction	Task
{?}	Suspends macro execution to let you move the cell pointer or enter data.
{BREAKOFF}	Disables CTRL+BREAK while a macro is running, protecting the macro from interruption.
{BREAKON}	Restores the use of CTRL+BREAK, undoing {BREAKOFF}.
{FORM}	Suspends macro execution so you can enter and edit data in a specified range.
{FORMBREAK}	Ends a {FORM} command.
{GET}	Suspends macro execution until you press a key, and then records that key in a cell.
{GETLABEL}	Displays a prompt in the 1-2-3 Classic window, waits for a response, and enters the response as a label in a cell.
{GETNUMBER}	Displays a prompt in the 1-2-3 Classic window, waits for a response, and enters the response as a number in a cell.
{LOOK}	Checks the computer's typeahead buffer (the buffer in which 1-2-3 stores keystrokes during noninteractive parts of a macro) and records the first keystroke (if any) in the buffer in a cell.
{MENUBRANCH}	Displays a customized menu in the 1-2-3 Classic window, waits for you to select a menu item, and then branches to the macro instructions associated with that menu item.
{MENUCALL}	Displays a customized menu in the 1-2-3 Classic window, waits for you to select a menu item, and then performs a subroutine call to the macro instructions associated with that menu item as a subroutine.

{WAIT}	Suspends macro execution and displays the WAIT indicator until the time you specify.

Link

The commands below manipulate link level (high-level) links between 1-2-3 for Windows and other Windows applications.

Macro instruction	Task
{LINK-ASSIGN}	Specifies a destination range for a link.
{LINK-CREATE}	Creates a DDE link to another Windows application.
{LINK-DEACTIVATE}	Turns off specified link.
{LINK-DELETE}	Deletes a DDE link previously created between 1-2-3 for Windows and another Windows application.
{LINK-REMOVE}	Removes the currently used destination range for a link.
{LINK-TABLE}	Creates a table of links.
{LINK-UPDATE}	Refreshes a manual DDE link.

Screen control

These commands control different parts of the screen display, including the mode indicator, and sound the computer's bell.

Macro instruction	Task
{BEEP}	Sounds the computer's bell.
{BREAK}	During data entry or selection of a 1-2-3 command, returns 1-2-3 to READY mode.
{FRAMEOFF}	Turns off display of the worksheet frame.
{FRAMEON}	Restores display of the worksheet frame, undoing {FRAMEOFF}.
{GRAPHOFF}	Removes a graph displayed by {GRAPHON} and redisplays the current worksheet.
{GRAPHON}	Without suspending macro execution, displays a full-screen view of the current graph or makes a named graph the current graph and optionally displays it.
{INDICATE}	Changes the mode indicator to the text you specify or restores the standard mode indicator.
{PANELOFF}	Freezes the control panel and status line either in their current states or after clearing them.
{PANELON}	Unfreezes the control panel and status line,

	undoing {PANELOFF}.
{WINDOWSOFF}	Freezes the Worksheet window.
{WINDOWSON}	Unfreezes the Worksheet window, undoing {WINDOWSOFF}.

Window control

The commands below make active, move, size, and arrange windows.

Macro instruction	Task
{APP-ADJUST}	Moves and changes the size of the 1-2-3 window.
{APP-STATE}	Minimizes, maximizes, or restores the 1-2-3 window.
{WINDOW-ADJUST}	Moves and changes the size of a window.
{WINDOW-SELECT}	Makes a specified window active.
{WINDOW-STATE}	Minimizes, maximizes, or restores a window.

16   A Tutorial: Putting It All Together

This chapter applies the concepts and skills covered in previous chapters to a series of specific lessons. This chapter is divided into nine lessons. In each lesson, you learn skills by experimenting with actual 1-2-3 for Windows worksheets.

Before you start
Lesson 1   Getting started
Lesson 2   Working with ranges
Lesson 3   Changing a worksheet format
Lesson 4   Using a graph with worksheet data
Lesson 5   Printing data
Lesson 6   Using multiple worksheets
Lesson 7   Using more than one worksheet file
Lesson 8   Using a 1-2-3 database
Lesson 9   Creating a 1-2-3 macro

- Lesson 1 teaches you many 1-2-3 basics. It describes how to start 1-2-3, open a file, close and maximize a window, select a cell, and enter and copy data, formulas, and @functions.

- Lesson 2 teaches you how to format data in a range, name a range, and use a named range in a formula.

- Lesson 3 teaches you how to change fonts, add a line and drop shadow to a range, and change colors in a range.

- Lesson 4 teaches you how to create a graph, change the graph type, add titles, labels, legends, and text to a graph, change fonts in a graph, add a graph to a worksheet, and graph multiple data ranges.

- Lesson 5 teaches you how to setup, preview, and print a worksheet.

- Lesson 6 teaches you how to use a multiple-sheet file to produce a consolidated income statement.

- Lesson 7 teaches you how to open a second worksheet file, move from one file to another, and link the files with a formula.

- Lesson 8 teaches you how to use a 1-2-3 worksheet that is arranged as a personnel database to query, find, and extract records.

- Lesson 9 teaches you how to create, run, and debug a 1-2-3 macro.

Because Lesson 1 introduces you to skills you need to perform almost any 1-2-3 task, you must complete it first. After you complete Lesson 1, you can read Lesson 2 and so on, through 9, in any order, to learn about a particular 1-2-3 feature.

All of the lessons have sample worksheet files, which the Install program copies to the SAMPLE directory in the 1-2-3 for Windows program directory. The sample worksheets, filled in as though you had completed previous lessons, let you use this chapter without having to complete the lessons in order.

This chapter applies the concepts and skills covered in previous chapters to a series of specific lessons. This chapter is divided into nine lessons. In each lesson, you learn skills by experimenting with actual 1-2-3 for Windows worksheets.

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- Lesson 3 teaches you how to change fonts, add a line and drop shadow to a range, and change colors in a range.

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All of the lessons have sample worksheet files, which the Install program copies to the SAMPLE directory in the 1-2-3 for Windows program directory. The sample worksheets, filled in as though you had completed previous lessons, let you use this chapter without having to complete the lessons in order.

Before you begin Lesson 1, you must install 1-2-3 on your computer.

The Install program automatically copies the sample files that are used in these lessons to the SAMPLE directory in the 1-2-3 for Windows program directory.

> **Note**   If someone else works with the 1-2-3 sample worksheet files or they were not copied to the hard disk during Install, you should start with new copies of the files. Use Install to copy the contents of the original sample files into the SAMPLE directory in the 1-2-3 for Windows program directory.

Here are some useful things to know while you work through the lessons:

- You can choose Help from the 1-2-3 menu or press F1 (HELP) at any time while you are working with 1-2-3 to open the Help window and get information about what you are doing. For more information about using Help, see **"Using Help"** in Chapter 1.

- You can often get out of trouble by pressing ESC, which cancels entries, edits, and range selections, and closes a dialog box without completing a command.

- You can undo the results of the last operation you performed by choosing Edit Undo or pressing ALT+BACKSPACE.

- You can end 1-2-3 at any point by choosing File Exit or pressing ALT+F4. When 1-2-3 asks you to confirm your selection, select Yes.

Lesson 1   Getting started   ≫

≫
≫

This lesson teaches you many 1-2-3 basics. It describes how to start 1-2-3, open a file, close and maximize a window, select a cell, and enter and copy data, formulas, and @functions.

Starting 1-2-3

You must start 1-2-3 from the Windows 3.0 environment.

1.   Start Windows.

2.   Open Program Manager.

3.   Open the Lotus Applications window (or the group window that contains 1-2-3).

4.   Select the 1-2-3 for Windows application icon (or the name you assigned to it):

Mouse   Double-click the 1-2-3 icon.

Keyboard   Move the highlight with , ↓, →, and ←, and press ENTER.

1-2-3 displays the program title screen briefly and then opens a new worksheet file in the 1-2-3 window.

Opening a file

The File commands open new and existing files. The procedure below describes how to open a file named LESSON1.WK3, which you use in the lessons that follow.

1.   Choose File Open:

Mouse   Click File on the main menu and click Open on the File pulldown menu.

Keyboard   Press ALT or F10 (MENU). Press f to choose File from the main menu and press o to select Open from the File pulldown menu.
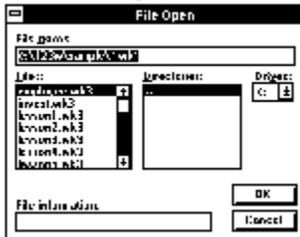
2.   Open LESSON1.WK3:

Mouse   Double-click LESSON1.WK3 in the Files list box. If LESSON1 is not displayed in the Files list box, click the down scroll arrow to display it.

Keyboard   Use ↓ to move the highlight to LESSON1.WK3 in the Files list box and press ENTER.

Note   If the Files list box does not contain LESSON1.WK3, check that the Directories and Drives boxes list the drive and directory that contains the sample files. Install copies the sample files to _X:\1-2-3 program directory_\SAMPLE, where _X_ is the letter of the drive that contains the sample files, _1-2-3 program directory_ is the name of the directory that contains the 1-2-3 program files (usually 123W), and SAMPLE is the directory that contains the sample files.

An income statement worksheet appears. (Q1, Q2, Q3, and Q4 represent four quarters in a year.)

File name
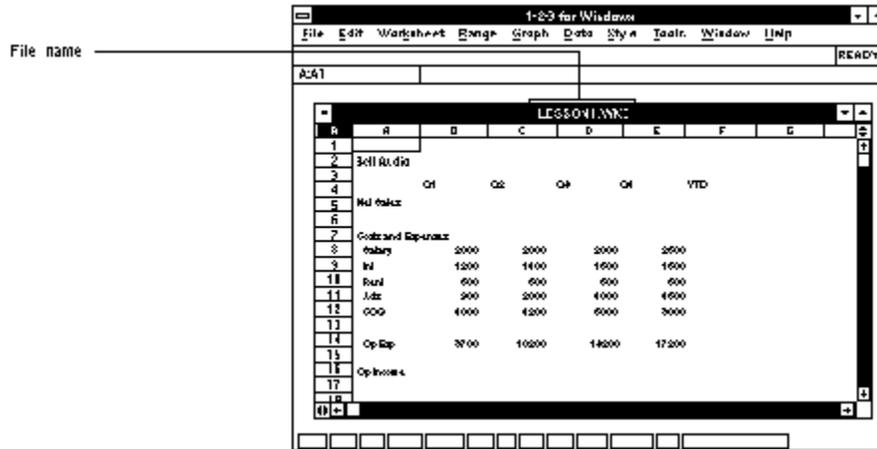
Closing a window

When you open a worksheet file, 1-2-3 opens a new Worksheet window and displays it on top of any existing windows. Before you continue, close any other open windows.

1. Make the window active:

    Mouse   Click the title bar of the window.

    Keyboard   Press CTRL+F6.

2. Close the window:

    Mouse   Double-click the Control menu box of the window.

    Keyboard   Press CTRL+F4.

Maximizing a window

When you are working with one worksheet file, it is helpful to maximize the Worksheet window.

1. Maximize the Worksheet window:

    Mouse   Click the Maximize button.

    Keyboard   Press ALT+ - (hyphen) to display the Control menu. Press x to select Maximize.
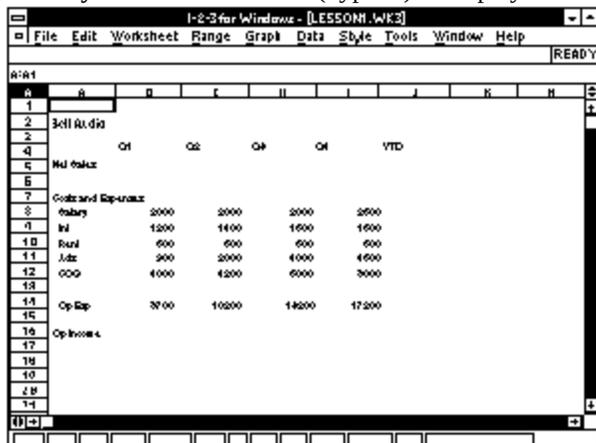
Selecting a cell

Before you can enter data in a cell or perform a command on a cell, you must select the cell.

1. Select a cell:

Mouse   Click the cell. If the cell is not in view, use the scroll bars to move it into view, and then click it. For practice, click cell A5; then, click the down scroll arrow to display cell A50 and click cell A50.

Keyboard   Use , ↓, →, and ←, the navigation keys, such as PG UP and PG DN, or F5 (GOTO) to move the cell pointer. For practice, starting in cell A1, press ↓ four times to move the cell pointer to cell A5; then, press PG DN to display cell A50 and use or ↓ to move the cell pointer to cell A50.

Entering data

The procedures below explain how to enter a title for the worksheet as a label (in cell A1) and how to enter quarterly, net sales figures for the income statement.

To enter a title for the worksheet

1. Select cell A1:

Mouse   (If necessary) Click the up scroll arrow to display cell A1. Click cell A1.

Keyboard   Press HOME.

2. Type Income Statement 1991

As you begin to type, 1-2-3 displays your entry in the contents box.
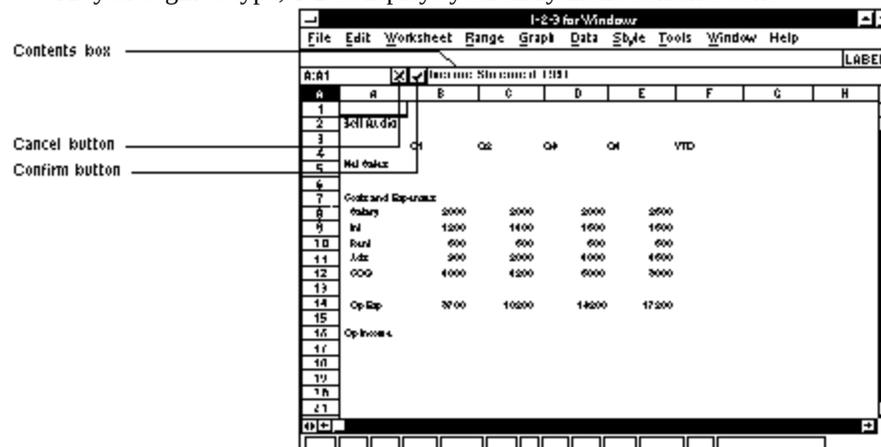
3. Confirm the entry:

Mouse   Click the Confirm button.

Keyboard   Press ENTER.

To enter quarterly Net Sales figures

1. Select cell B5:

Mouse   Click cell B5.

Keyboard   Press ↓ four times and press → once.

2. Type 12000

3. Confirm the entry and select cell C5:

Mouse   Click the Confirm button and click cell C5.

Keyboard   Press →.

4.   Type 19000

5.   Confirm the entry and select cell D5:

Mouse   Click the Confirm button and click cell D5.

Keyboard   Press →.

6.   Type 16000

7.   Confirm the entry and select cell E5:

Mouse   Click the Confirm button and click cell E5.

Keyboard   Press →.

8.   Type 22000

9.   Confirm the entry:

Mouse   Click the Confirm button.

Keyboard   Press ENTER.

Your worksheet should look like the one shown below.

Entering a formula

The procedure below explains how to enter a formula that calculates Q1 operating income. Net sales minus operating expenses equals operating income.

1.   Select cell B16.

2.   Type +

3.   Select cell B5:

Mouse   Click cell B5.

Keyboard   Press 11 times.

4.   Type -

5.   Select cell B14:

Mouse   Click cell B14.

Keyboard   Press twice.

6.   Confirm the entry:

Mouse   Click the Confirm button.

Keyboard   Press ENTER.

1-2-3 displays the result of the formula, 3300, in cell B16.

Copying the formula

Now, copy the formula for Q1 operating income to calculate operating income for Q2, Q3, and Q4 in cells C16, D16, and E16.

1. Leave the cell pointer in cell B16.

2. Choose Edit Quick Copy.

3. Specify A:C16..A:E16 as the To range:

Mouse Click the To text box. Point to cell C16 and drag the cell pointer to cell E16. When you release the mouse button, the dialog box reappears with the range C16..E16 specified in the To text box.

Keyboard Press TAB to move to the To text box. Press →. 1-2-3 removes the dialog box and moves the cell pointer to cell C16. Press . (period) to anchor the cell pointer. Press → twice to expand the highlight to E16. Press ENTER. The dialog box reappears, with A:C16..A:E16 specified in the To text box.

4. Select OK:

Mouse Click OK.

Keyboard Press ENTER.

Your worksheet should look like this.

Using a 1-2-3 @function

An **@function** is a built-in formula in 1-2-3 that performs a calculation automatically. The steps below show how to create the formula @SUM(B8..E8), which calculates the total year-to-date (YTD) salary costs.

1. Select cell F8.

2. Type @sum(

3. Specify the range B8..E8:

Mouse Point to cell B8 and drag the cell pointer to cell E8.

Keyboard Use ← to move the cell pointer to cell B8. Press . (period) to anchor the cell pointer. Use → to move the cell pointer to cell E8.

4. Type)

5. Confirm the entry.

Copying the @function

Now use Edit Quick Copy to copy the @SUM formula in cell F8 to cells F9 through F12 to calculate the YTD figures for the other expense items. Follow the procedure described in **"Copying the formula"**.

After you copy the formula, your worksheet should look like this.

F9..F12 is the range where 1-2-3 copies the contents of F8
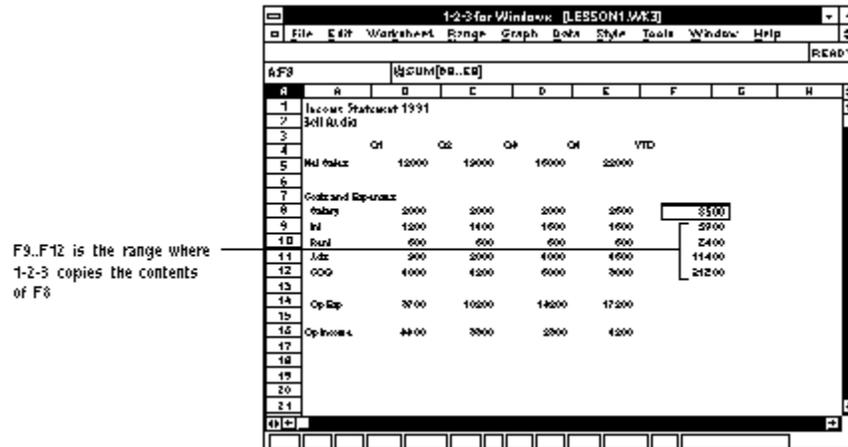
Saving your work and ending 1-2-3

Before you end a 1-2-3 session, you must save your work if you want to keep it. Saving the file under a different name, MYFILE2.WK3, lets you keep a copy of the work and also keep LESSON1.WK3 (the original file) as it was when you opened it at the beginning of the session.

To save the changes you made to LESSON1.WK3 to a new file called MYFILE2.WK3

1. Choose File Save As.

2. Type myfile2

3. Select OK.

To end 1-2-3

1. Choose File Exit.

   If you did not save your work, 1-2-3 asks if you want to save it. Select Yes to save your work. Select No to end 1-2-3 and abandon the work you just did.

Lesson 2   Working with ranges

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This lesson teaches you how to format data in a range, name a range, and use a named range in a formula.

To begin this lesson, start 1-2-3, if necessary, and open LESSON2.WK3.

1.   Choose File Open.

2.   Select LESSON2.WK3.

3.   Select OK.

Close any other open Worksheet windows and maximize the LESSON2 window. For information about closing and maximizing a window, see **"Closing a window"** and **"Maximizing a window"**.

Formatting data in a range

You can format a range to display values and labels in specific ways. For example, you can display some values with one decimal place (65.3) and others with a percent sign (65%).

To add decimal places and dollar signs to values

1.   Select the range B5..F16.

2.   Choose Range Format.

3.   Select Currency from the Format list box:

   Mouse   Click Currency.

   Keyboard   Press c.

4.   Select OK.

The worksheet now looks like this.

Naming a range

You can assign the range name NETSALES to the quarterly net sales values.

To name the range containing the net sales figures

1. Select cells B5, C5, D5, and E5:

   Mouse   Point to cell B5 and drag the cell pointer to cell E5.

   Keyboard   Move the cell pointer to cell B5. Press F4 in READY mode to anchor the cell pointer and switch to POINT mode. Move the cell pointer to cell E5. Press ENTER.

2. Choose Range Name.

3. Choose Create from the cascade menu.

4. Type netsales

5. Select OK.

Using a named range in a formula

You can use the range name you just created as the argument of the @SUM formula to calculate the YTD Net Sales.

To use NETSALES to calculate YTD Net Sales

1. Select cell F5.

2. Type @sum(

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

   Since NETSALES is the only range name in the list, it is selected.
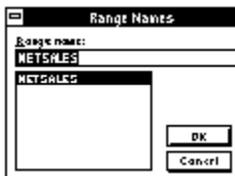
4. Click OK or press ENTER.

5. Type)

6. Confirm the entry.

Copying the YTD formula

Now use Edit Quick Copy to copy the @SUM formula in cell F5 to cells F14 and F16 to calculate the YTD figures for operating expenses and operating income.

1. Leave the cell pointer in cell F5.

2. Choose Edit Quick Copy.

3. Specify F14 as the To range:

   Mouse   Click the To text box. Click cell F14. The dialog box reappears, with A:F14 specified in the To text box.

   Keyboard   Press TAB to move to the To text box. Press ↓. 1-2-3 removes the dialog box and moves the cell pointer to cell F6. Press ↓ to move the cell pointer to F14. Press ENTER. The dialog box reappears, with A:F14 specified in the To text box.

4. Select OK:

   Mouse   Click OK.

   Keyboard   Press ENTER.

5. Repeat steps 1 through 4, but specify F16 as the To range in step 3.

> **Note** 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 formula in F16, you can see how the formula changes.

Your worksheet should look like this.

Ending the work session

When you complete this lesson, you can save your work and end 1-2-3, practice on your own, or continue with other work. For instructions on saving your work and ending 1-2-3, see **"Saving your work and ending 1-2-3"**.

This lesson teaches you how to change fonts, add a line and drop shadow to a range, and change colors in a range.

To begin this lesson, start 1-2-3, if necessary, and open LESSON3.WK3.

1.   Choose File Open.

2.   Select LESSON3.WK3.

3.   Select OK.

Close any other open Worksheet windows and maximize the LESSON3 window. For information about closing and maximizing a window, see **"Closing a window"** and **"Maximizing a window"**.

Changing fonts for selected data

You can change the font used for a range of data. In the sample worksheet, you change the title, Income Statement 1991, to a larger font (Arial MT 14 point).

1.   Select cell A1.

2.   Choose Style Font.

3.   Select Arial MT 14 from the Fonts list box.

4.   Select OK.

   1-2-3 changes the title to Arial MT 14 point. The rest of the worksheet remains in the default font.

Changing data to a bold font

You can emphasize column headings by changing them to a bold font.

1.   Select the range B3..F3.

2.   Choose Style Font.

3.   Select Bold:

   Mouse   Click the Bold check box.

   Keyboard   Press TAB to move to the Bold check box. Press space bar.

   An X appears in the Bold check box when you select it.

4.   Select OK.

   1-2-3 displays the column headings in a bold font.

Applying a bold and italic font to a range

You can change the company name and row headings to bold and italic font.

1.   Select the range A2..A16.

2.   Choose Style Font.

3.   Select Bold.

4.   Select Italics.

5.   Select OK.

1-2-3 displays the row headings in bold and italic fonts.
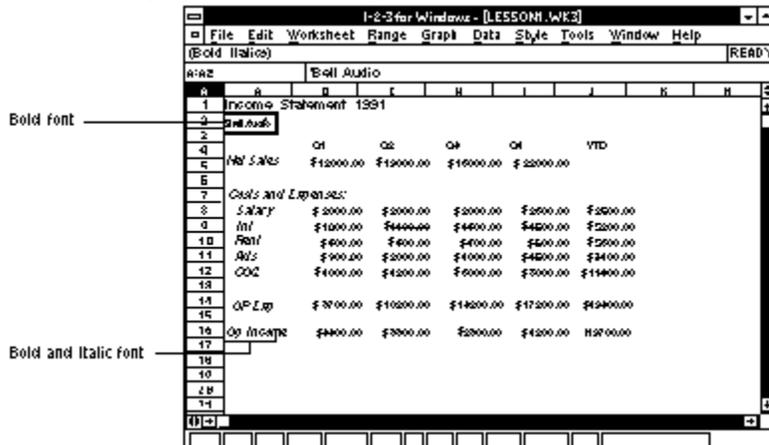
Adding a line and drop shadow to a range

You can add horizontal and vertical lines along the edges of cells in a range. You can also add a drop shadow below and to the right of a range.

To add a line below the column headings

1. Select the range B3..F3.

2. Choose Style Border.

3. Select Bottom.

4. Select OK.

   1-2-3 draws a continuous horizontal line along the bottom edge of the cells in the range.

To add a drop shadow to a range

1. Select the range A1..F17.

2. Choose Style Border.

3. Select Drop Shadow.

4. Select OK.

   1-2-3 draws a drop shadow below and to the right of the specified range.
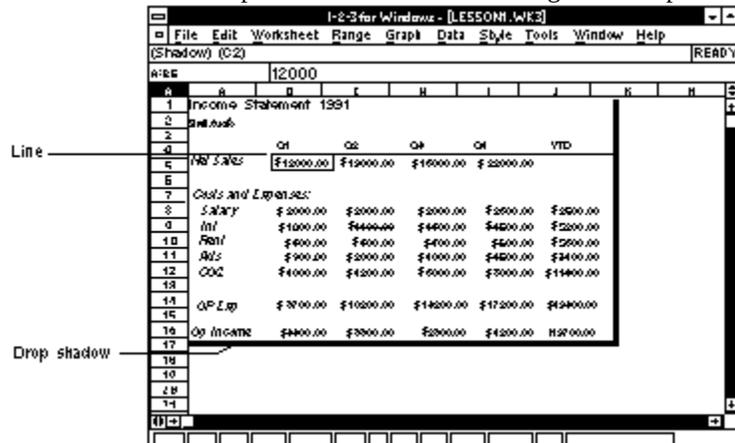
Changing colors

You can change both the color of the cell contents and background color of a range.

1. Select the range A1..F17.

2. Choose Style Color.

3. Select a color, in the Cell contents drop-down box, for the cell's contents:

Mouse   Click the arrow to the right of the Cell contents box to open the drop-down box. Click the color you want.

Keyboard   Press ALT+↓ to open the drop-down box. Use or ↓ to highlight the color you want. Press ALT+↓ to select the highlighted color.

4. Select a color for the background from the Background drop-down box:

Mouse   Click the arrow to the right of the Background box to open the drop-down box. Click the color you want.

Keyboard   Press TAB to move to the Background box. Press ALT+↓ to open the drop-down box. Use or ↓ to highlight the color you want. Press ALT+↓ to select the highlighted color.

5. Select OK.

Ending the work session

When you complete this lesson, you can save your work and end 1-2-3, practice on your own, or continue with other work. For instructions on saving your work and ending 1-2-3, see **"Saving your work and ending 1-2-3"**.

Lesson 4   Using a graph with worksheet data   ≫

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This lesson teaches you how to create a graph, change the graph type, add titles, labels, legends, and text to a graph, change fonts in a graph, add a graph to a worksheet, and graph multiple data ranges.

To begin this lesson, start 1-2-3, if necessary, and open LESSON4.WK3.

1. Choose File Open.

2. Select LESSON4.WK3.

3. Select OK.

Close any other open Worksheet windows. For information about closing a window, see **"Closing a window"**.

Creating a line graph

The line graph you are going to create uses a range of labels and one range of values: the columns that contain the expense categories and the Q1 expense figures (A8..B12).

1. Select the range A8..B12.

2. Choose Graph New.

3. In the Graph name text box, type expensesq1

4. Select OK.
   1-2-3 displays a line graph of the Q1 expense figures in a Graph window. 1-2-3 automatically includes x-axis labels in the graph.
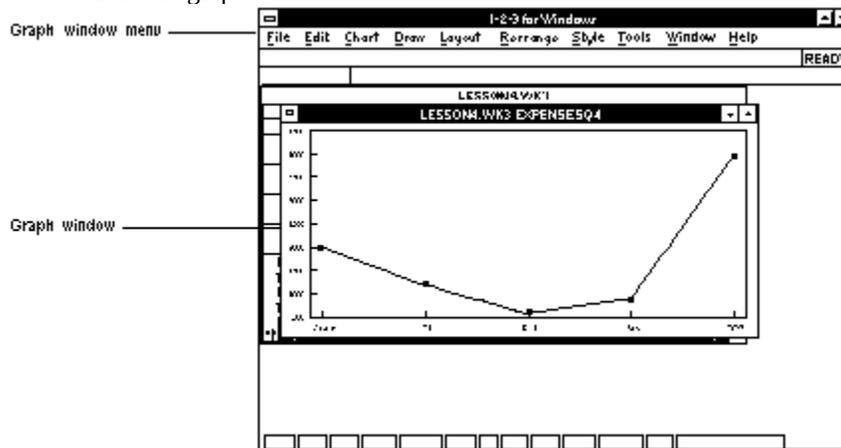
Changing the graph type

After viewing the expense data as a line graph, you might also want to view the data as a 3-D bar graph. You change the graph type, and make other graph enhancements, using commands on the Graph window menu, which appears in the menu bar when a Graph window is active.

1. Choose Chart Type.

2. Select 3D Bar.

3. Select one of the options displayed for the graph type.

4. Select OK.

1-2-3 displays a 3-D bar graph of the expense values in a Graph window.
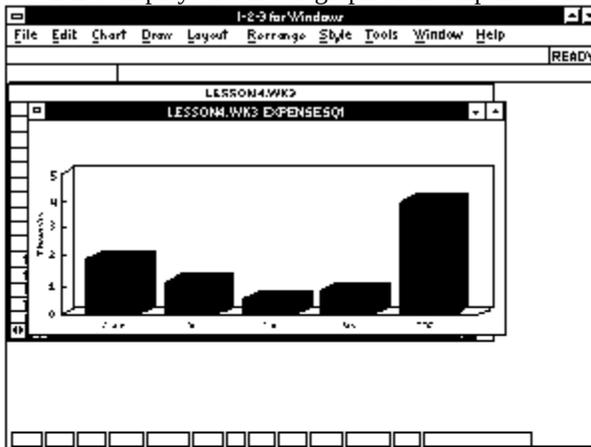
Adding a graph title

You can add a two-line graph title to the Q1 expenses graph.

1. Choose Chart Headings.

2. In the Title text box, type 1991 Q1 Expenses

3. In the Subtitle text box, type Bell Audio

4. Select OK.

1-2-3 adds a title and a subtitle to the 3-D bar graph.
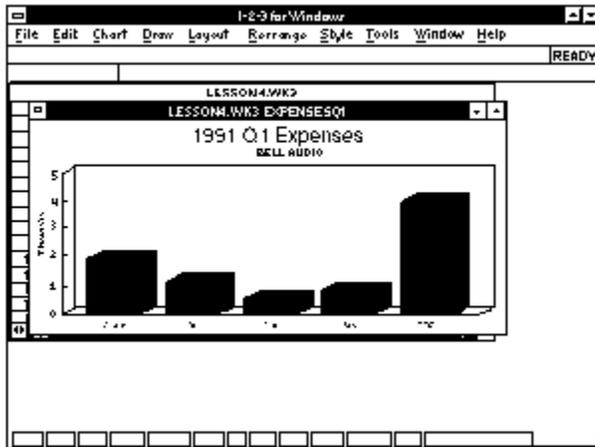
Adding a graph to the worksheet

You can add a graph you created in a Graph window to a range in the worksheet so that it appears with the data it depicts. When you add a graph to a worksheet, it becomes part of the worksheet. The procedure below adds the expensesq1 graph to the range B20..E35.

1. Make the Worksheet window active:

Mouse Click anywhere in the Worksheet window.

Keyboard Press CTRL+F6 to move from one window to the next until the Worksheet window is active.

2. Select the range B20..F35.

3. Choose Graph Add to Sheet.

4. Select OK.

The graph now appears in the worksheet, below the data.
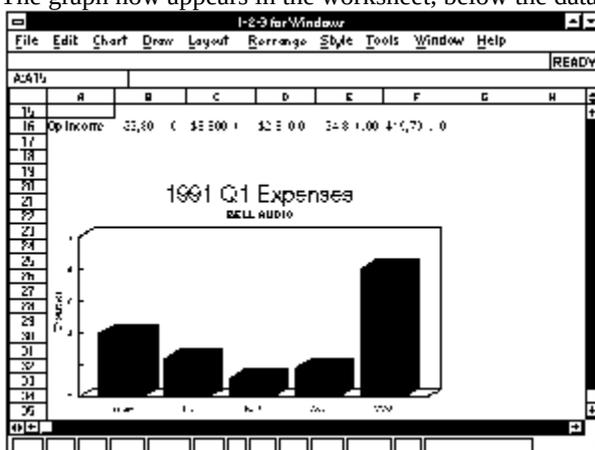
Adding text to the graph

When a Graph window is active, you can use the Draw commands to add objects, such as text, geometric shapes, arrows, and freehand drawings, to a graph that you added to the worksheet.

1. Make the Graph window active:

Mouse   Click the Graph window.

Keyboard   Press CTRL+F6 to move from one window to the next until the Graph window is active.

2.   Choose Draw Text.

3.   Type Too High!

4.   Select OK.

5.   Position the text to the top left of the COG bar:

Mouse   Move the text to the position you want.

Keyboard   Use , ↓, →, and ← to move the text to the position you want.

6.   Place the text:

Mouse   Click.

Keyboard   Press ENTER.

A small, filled rectangle, forming part of a bounding box, appears around the text. The text is now a selected object in the graph.

Adding an arrow

You can add an arrow to point from the text to the top of the COG bar.

1.   Choose Draw Arrow.

2.   Anchor the first point of the arrow to the right of the words Too High!:

Mouse   Move the cursor to the right of Too High! and click.

Keyboard   Use , ↓, →, and ← to move the cursor to the right of Too High! and press space bar.

3.   Stretch the line so that it ends just left of the top of the COG bar:

Mouse   Move the cursor to the top left of the bar.

Keyboard   Use , ↓, →, and ← to move the cursor to the top left of the bar.

4.   Complete the arrow:

Mouse   Double-click.

Keyboard   Press ENTER.

The graph now includes the text Too High! and an arrow pointing to the COG bar.
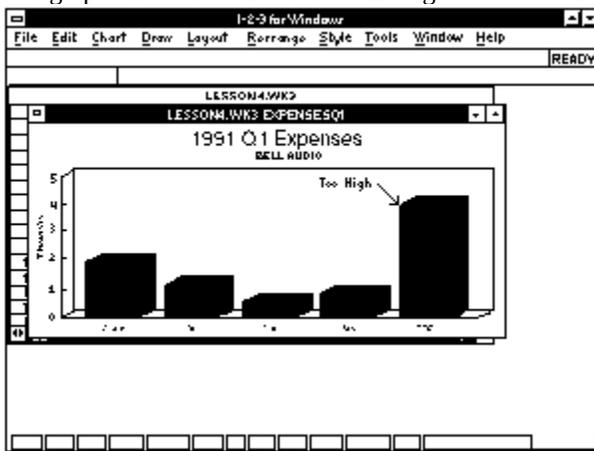
Graphing multiple data ranges

You can graph multiple data ranges in one step. The graph you are going to create now uses five rows of values, the rows that contain the five costs and expenses values for each quarter.

1. Make the Worksheet window active.

2. Select the range A8..E12.

3. Choose Graph New.

4. In the Graph name text box, type costs

5. Select OK.

   1-2-3 displays a line graph of the costs and expenses values in a Graph window.

Now, follow the steps described in **"Changing the graph type"** to display the graph as a 3-D bar graph.

Adding a legend

You can add a legend, which identifies what each color, hatch, or shading pattern stands for in a graph.

1. Make the Worksheet window active.

2. Select the range B3..E3.

3. Make the Graph window active.

4. Choose Chart Legend.

5. Select Group Range.

6. Select OK from the Chart Legend dialog box.

   1-2-3 displays a 3-D bar graph of the costs and expenses in the Graph window. The legend correlates each color, hatch or shading pattern to a data range.
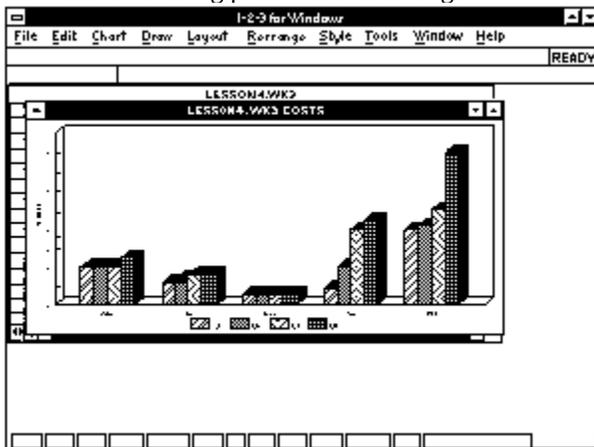
Ending the work session

When you complete this lesson, you can save your work and end 1-2-3, practice on your own, or continue with other work. For instructions on saving your work and ending 1-2-3, see **"Saving your work and ending 1-2-3"**.

Lesson 5   Printing data

This lesson describes how to set up, preview, and print the Bell Audio worksheet.

To begin this lesson, start 1-2-3, if necessary, and open LESSON5.WK3.

1. Choose File Open.

2. Select LESSON5.WK3.

3. Select OK.

Close any other open Worksheet windows and maximize the LESSON5 window. For information about closing and maximizing a window, see **"Closing a window"** and **"Maximizing a window"**.

Setting up the page

The File Page Setup command lets you adjust page margins, include a header or footer for each page, and specify other print and layout settings.

The initial default page margins are .50" for the top, left, and right margins and .55" for the bottom margin. The procedure below describes how to add a header and how to change the page margins to .75" for the left and right margins and 1" for the top and bottom margins.

To add a header and adjust page margins

1. Choose File Page Setup.

2. Enter Bell Audio | 15 September 1991 | Page # in the Header text box.

The | (vertical bar) separates the left, center, and right portions of the header. The # (pound sign) tells 1-2-3 to insert a page number.

Note   The | (vertical bar) may appear as ¦ or | on your keyboard or screen. They both work in the same way.

3. Under Margins, enter 1 in the Top text box.

4. Under Margins, enter .75 in the Left text box.

5. Under Margins, enter 1 in the Bottom text box.

6. Under Margins, enter .75 in the Right text box.

7. Select OK.

Previewing the print job

With File Preview you can preview a worksheet before you print it to see how the worksheet will appear on the printed page.

1. Select the range A1..F35.

2. Choose File Preview.

3. Select OK.

The print range, including the graph, appears in the Print Preview window. 1-2-3 also displays enhancements, such as footers and page numbers.
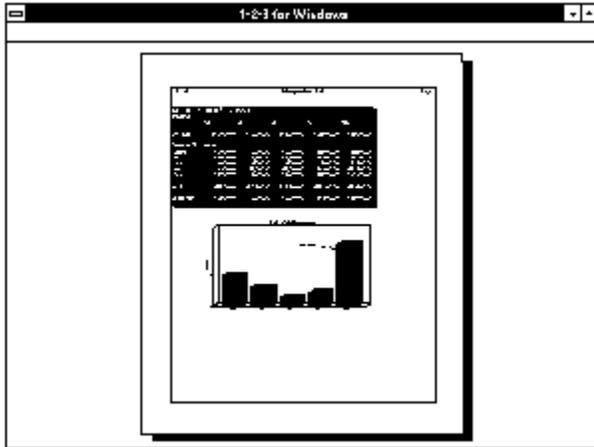
4. Press ESC to clear the Print Preview window.

Printing the worksheet

Before you print, it is a good idea to save your format changes. Use File Save to save the worksheet file and the print format.

> **Note**   You must install a printer with the Windows Control Panel before you can print a worksheet. If you installed more than one printer and want to use a printer other than the default printer, use File Printer Setup to select the printer. For more information about installing and setting up a printer, see *Microsoft Windows User's Guide*.

1. Select the range A1..F35.

2. Choose File Print.

3. Select OK.

1-2-3 prints the worksheet.
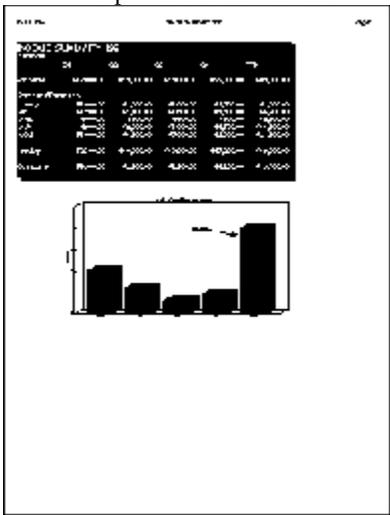
Ending the work session

When you complete this lesson, you can save your work and end 1-2-3, practice on your own, or continue with other

work. For instructions on saving your work and ending 1-2-3, see **["Saving your work and ending 1-2-3"](#)**.

Lesson 6   Using multiple worksheets

This lesson describes how to use a multiple-sheet file that contains an income statement for each store in a chain of stores, as well as consolidated data for the entire chain. 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 or mouse action.

To begin this lesson, start 1-2-3, if necessary, and open LESSON6A.WK3.

1.   Choose File Open.

2.   Select LESSON6A.WK3.

3.   Select OK.

Close any other open Worksheet windows and maximize the LESSON6A window. For information about closing and maximizing a window, see **"Closing a window"** and **"Maximizing a window"**.

The Bell Audio 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 Paris. This means you need to add a projected income statement for the Paris store to the Bell Audio file, as well as an income summary that consolidates the figures for both stores.

Adding new worksheets to the file

Instead of adding the data for Bell Audio's Paris 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 Paris store. In the original worksheet, you consolidate data for both stores.

Before you insert the new worksheets, however, change to perspective view, so you see all three worksheets simultaneously.

To change to perspective view

1.   Choose Window Split.

2.   Select Perspective.

3.   Select OK.

1-2-3 displays three contiguous worksheets that are stacked on each other. Because you have not yet added new

worksheets to the file, 1-2-3 displays only worksheet A. Notice, however, that 1-2-3 displays two empty spaces for the new worksheets.

A:A1 is current cell
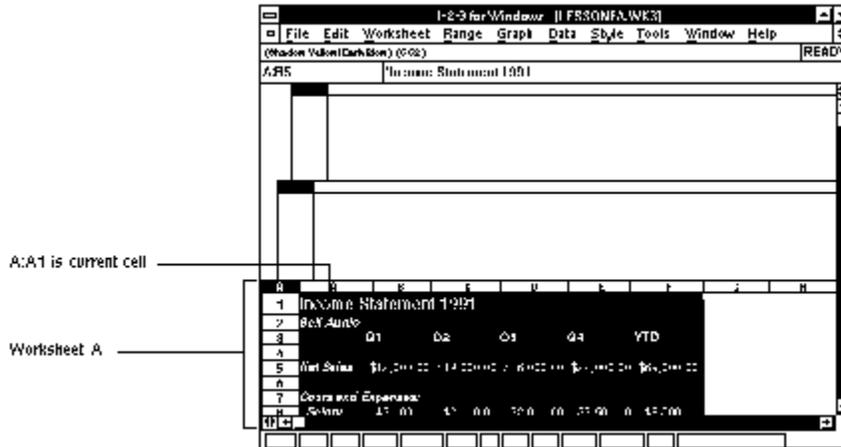
Worksheet A

Note   A single worksheet file can contain up to 256 worksheets, lettered A through IV.

To insert two worksheets after the current worksheet

1. Choose Worksheet Insert.

2. Select Sheet.

3. Enter 2 in the Quantity text box.

4. Select OK.

The file now contains three worksheets, the original Bell Audio 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.

Current worksheet

Worksheet letters

Cell pointer (B:A1)
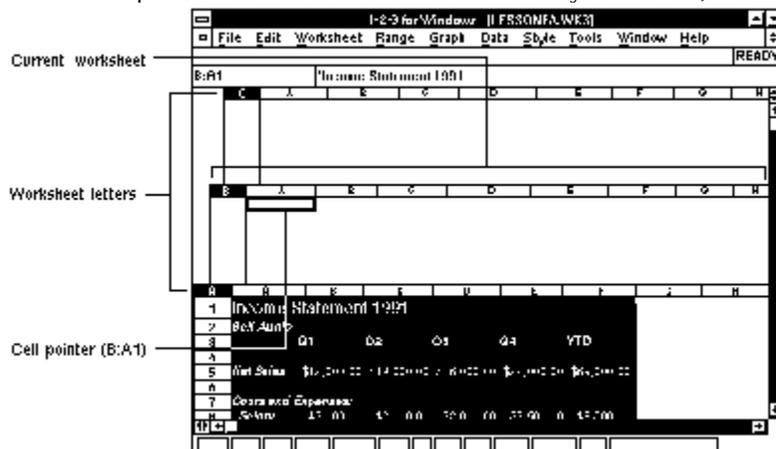
Moving between worksheets

You can move between worksheets either with the keyboard or the mouse.

To move to the previous worksheet (from B to A)

Mouse   Click a cell in worksheet A.

Keyboard   Press CTRL+PG DN.

To move to the next worksheet (from A to B)

Mouse   Click a cell in worksheet B.

Keyboard   Press CTRL+PG UP.

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

Turning on GROUP mode

You can use GROUP mode to change the format of all worksheets in a file to match the format of the current worksheet. In this case, you want to apply the format and styles of worksheet A to worksheets B and C.

1.   Move the cell pointer to worksheet A.

2.   Choose Worksheet Global Settings.

3.   Select the Group mode check box.

1-2-3 displays an X in the check box.

4.   Select OK.

The GROUP indicator appears in the status line.

Although worksheets B and C are still blank, they now have the same global and range format and styles as worksheet A.

GROUP indicator
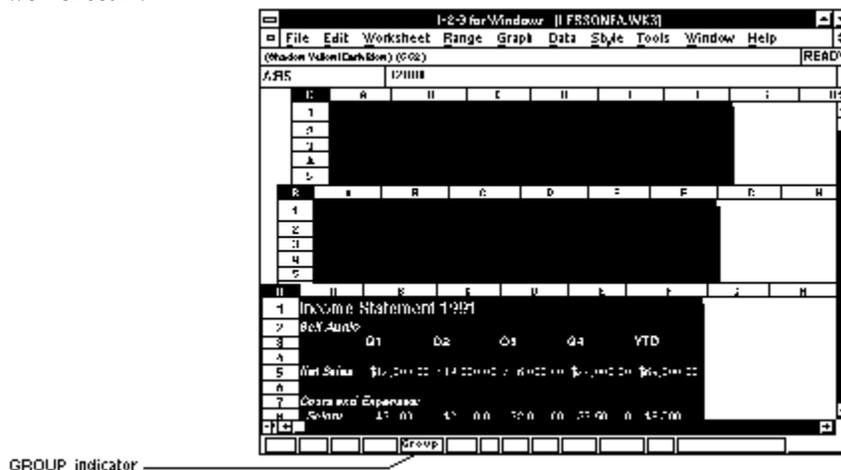
Copying between worksheets

You are going to set up the income statements for Bell Audio's Boston and Paris stores and a consolidated income statement in separate worksheets. You start by copying the formulas and labels from worksheet A to worksheets B and C.

To copy the data in worksheet A to worksheets B and C

1.   Select the range A:A1..A:F17.

2.   Choose Edit Quick Copy.

3.   Specify B:A1..C:A1 as the To range:

Keyboard   Press TAB to move the highlight to the To text box. Press CTRL+PG UP to move the cell pointer to B:A1, press. (period) to anchor the cell pointer, and press CTRL+PG UP to highlight B:A1..C:A1. Press ENTER.

4. Select OK.

Worksheets B and C now contain copies of the Bell Audio income statement worksheet.

Copies of worksheet A
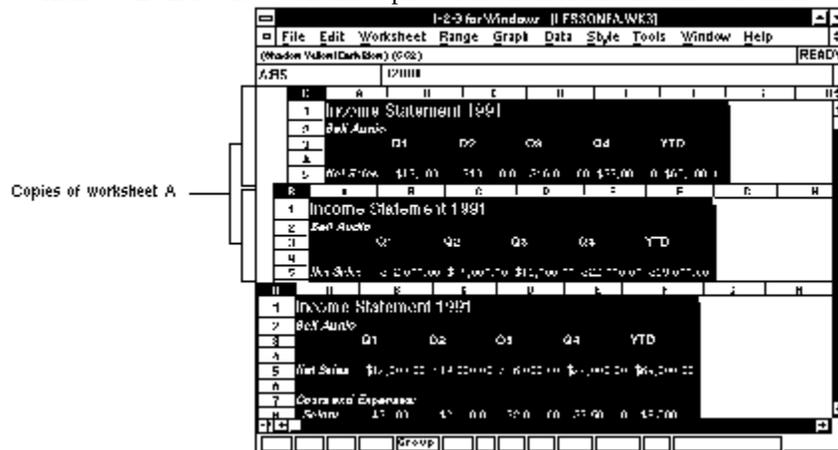
Editing worksheet titles

To identify the contents of each worksheet, edit the titles in the worksheets.

To edit the title of worksheet A

1. Select cell A:A1.

2. Change to EDIT mode:

   Mouse   Move the mouse pointer to the contents box and click.

   Keyboard   Press F2 (EDIT).

3. Replace Statement with Summary:

   Mouse   Highlight Statement, press DEL, and type Summary.

   Keyboard   Use ← or → to move the insertion point to the right of Statement. Press BACKSPACE until you delete Statement, and type Summary.

4. Confirm the entry.

To edit the title of worksheet B

1. Select cell B:A2.

2. Change to EDIT mode.

3. Type , Boston

4. Confirm the entry.

To edit the title of worksheet C

1. Select cell C:A2.

2. Change to EDIT mode.

3. Type , Paris

4. Confirm the entry.

Your worksheets should look like this.

New worksheet titles
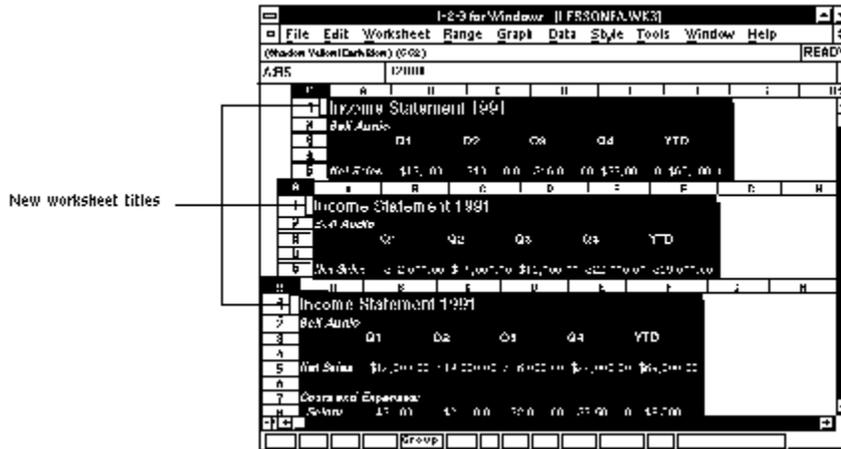
Turning off GROUP mode

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.

1. Choose Worksheet Global Settings.

2. Select the Group mode check box.

1-2-3 removes the X from the Group mode check box.

3. Select OK.

The GROUP indicator disappears from the status line.

Creating a summary worksheet

This section describes how to create a summary worksheet in the Bell Audio file by entering formulas in worksheet A that consolidate figures from worksheets B and C, the income statements for the Boston and Paris stores.

You begin by opening the LESSON6B.WK3 sample file. This file is like the file you created earlier, except that appropriate values for the Paris store were added in worksheet C, and everything but the labels and formulas to calculate operating expenses and operating income were erased from worksheet A.

1. Choose File Open.

2. Select LESSON6B.WK3.

3. Select OK.

Close any other open Worksheet windows and maximize the LESSON6B window. For information about closing and maximizing a window, see **"Closing a window"** and **"Maximizing a window"**.

Enter formulas in blank
cells to create summary
worksheet
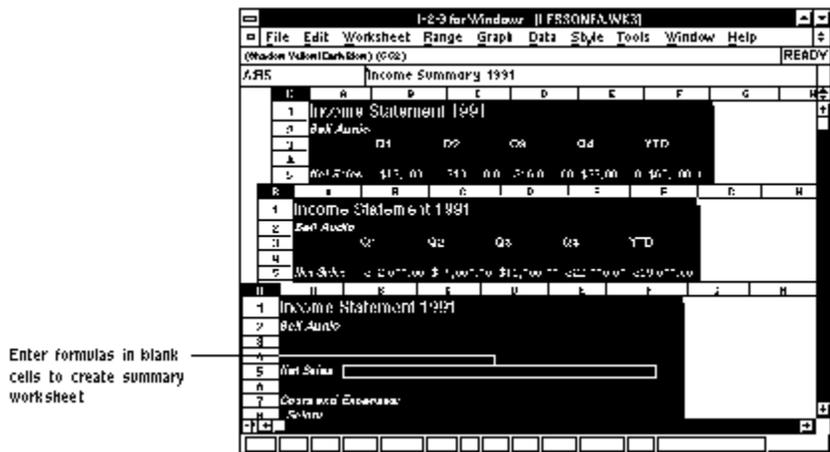
You are going to enter an @SUM formula in cell A:B5 that totals Q1 Net Sales from worksheets B and C (cells B:B5 and C:B5). To do this, you need to specify a three-dimensional (3-D) range as the @SUM argument.

To enter a formula that refers to multiple worksheets

1. Select cell A:B5.

2. Type @sum(

3. Specify the range B:B5..C:B5:

   Keyboard   Press CTRL+PG UP to move to B:B5, press . (period) to anchor the range, and press CTRL+PG UP to highlight B:B5..C:B5.

4. Type)

5. Confirm the entry.

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

Paris Q1 Net Sales

Boston Q1 Net Sales

Q1 Net Sales
for both stores
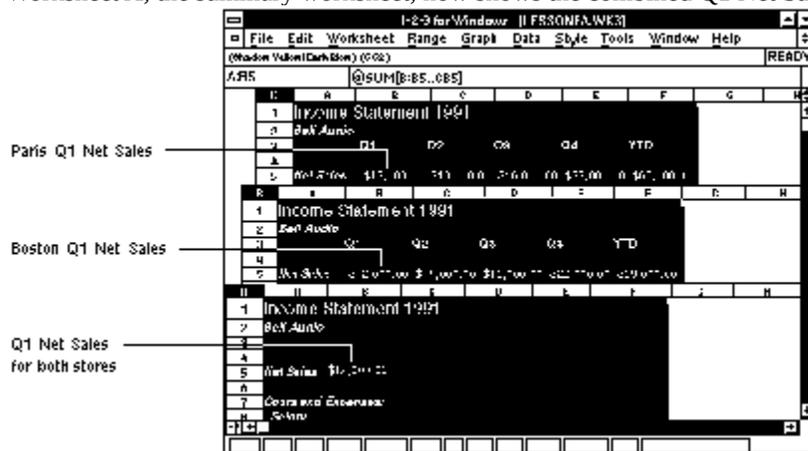
Now use Edit Quick Copy to copy the @SUM formula in cell A:B5 to cells A:C5..A:F5 to calculate the net sales for Q2, Q3, and Q4. Follow the procedure described in **"Copying the formula"**.

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

Consolidated Net Sales figures
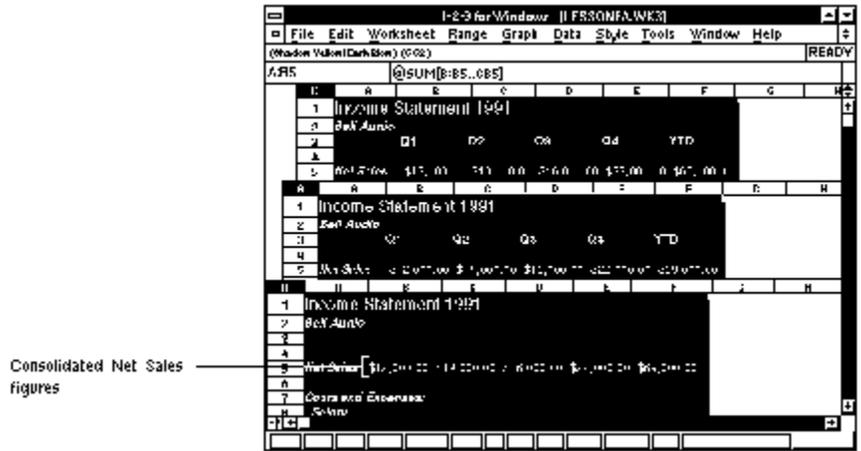
To enter a formula that consolidates Costs and Expenses

1. Select cell A:B8.

2. Type @sum(

3. Specify the range B:B8..C:B8.

4. Type)

5. Confirm the entry.

Now use Edit Quick Copy to copy the @SUM formula in cell A:B8 to cells A:C8..A:F8 and A:B9..A:F12 to calculate consolidated costs and expenses information. Follow the procedure described in **"Copying the formula"**.
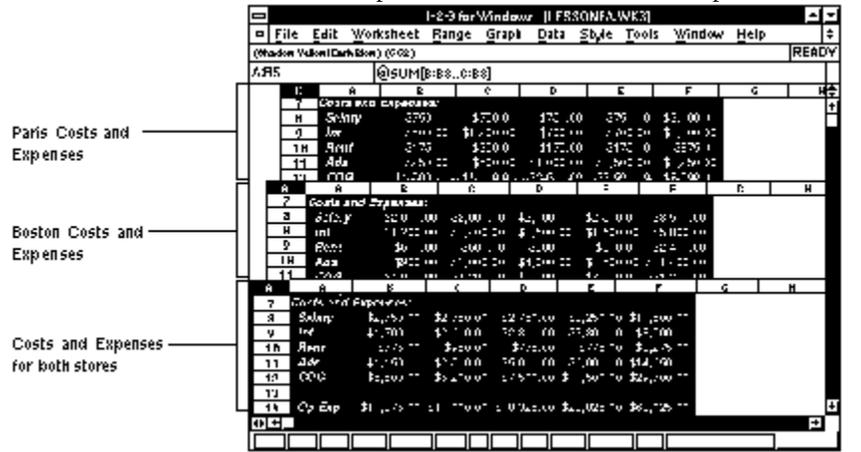
Paris Costs and Expenses

Boston Costs and Expenses

Costs and Expenses for both stores

Ending the work session

When you complete this lesson, you can save your work and end 1-2-3, practice on your own, or continue with other work. For instructions on saving your work and ending 1-2-3, see **"Saving your work and ending 1-2-3"**.

Lesson 7   Using more than one worksheet file   »

»

»

This lesson describes how to compare the 1991 consolidated income summary, stored in one file, with the 1990 income statement, which is stored in a different file. In this lesson, you open a second worksheet file, move from one file to another, and link files by entering formulas in one file that refer to data in another.

> **Note**   You can also link worksheet files to files created in other Windows applications using Dynamic Data Exchange (DDE). For more information about DDE links, see **Chapter 11**.

To begin this lesson, start 1-2-3, if necessary, and open LESSON7A.WK3.

1.   Choose File Open.

2.   Select LESSON7A.WK3.

3.   Select OK.

Close any other open Worksheet windows. For information about closing a window, see **"Closing a window"**.

Opening a second worksheet file

You make a second file active by using File Open to open it and display it in a new Worksheet window. You open the 1990 Bell Audio file, called LESSON7B.WK3.

1.   Choose File Open.

2.   Select LESSON7B.WK3.

3.   Select OK.

The 1-2-3 window now contains two Worksheet windows, one with the 1991 file, the other with the 1990 file.
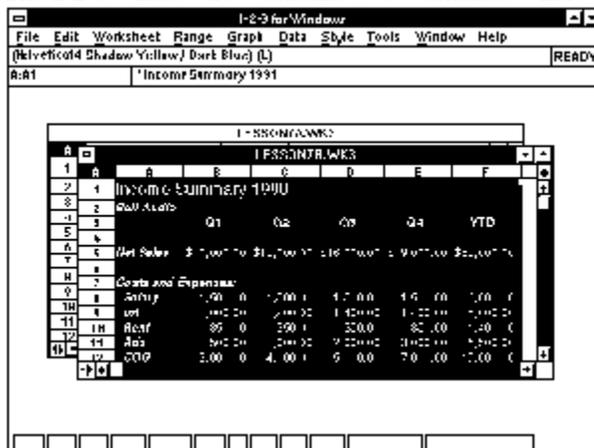
Tiling Worksheet windows

You can use Window Tile to display the two Worksheet windows side by side in the 1-2-3 window.

1.   Choose Window Tile.
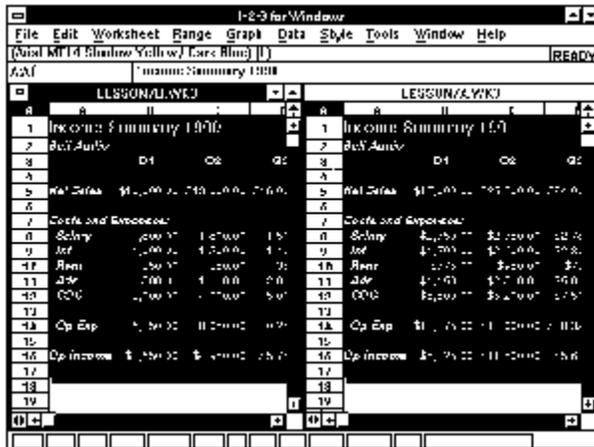
Moving between files

After you open two or more Worksheet windows, use the mouse or keyboard to move the cell pointer between the windows. Each time you move to a Worksheet window, the file displayed in that window becomes the current file.

Mouse Click any cell in the worksheet.

Keyboard Press CTRL+F6 to make the next Worksheet window the active window.

Linking files with formulas

Now that you have two files to compare, you enter formulas that calculate the difference between the 1991 and 1990 YTD operating income. You do this by entering a label in the file with the 1991 data and entering a formula that uses information from both the 1991 and the 1990 files.

To enter a label for the formula

1. Select cell A:A19 in the file LESSON7A.

2. Type Op Inc annual change:

3. Confirm the entry.

To calculate the difference between 1991 and 1990 operating income

1. Make sure that cell A:F16 is visible in the file LESSON7B.WK3 so that you can select it in step 6 below.

2. Select cell A:C19 in the file LESSON7A.WK3.

3. Type +

4. Use ↓ and → to select cell A:F16 in the file LESSON7A.WK3.

5. Type -

6. Select cell A:F16 in the file LESSON7B.WK3.

Mouse Click cell A:F16 in LESSON7B.WK3.

Keyboard Press CTRL+PG UP three times to make LESSON7B.WK3 current and use , ↓, →, and ← to select cell A:F16.

The contents box looks like it does in the illustration below.

Op Income in LESSON7A.WK3   File reference   Op Income in LESSON7B.WK3
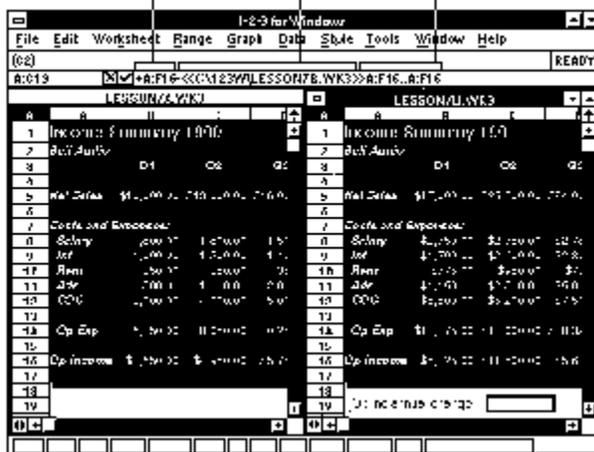
To calculate the difference between 1991 and 1990 operating income, you are subtracting one cell in the 1991 file from another in the 1990 file. The file reference <<C:\123W\SAMPLE\LESSON7B.WK3>> in front of the second A:F16 indicates that the cell is in a file other than the current file.

7. Confirm the entry.

To format the data

1. Select cell A:C19 in the file LESSON7A.WK3.

2. Choose Range Format.

3. Select Currency from the Format list box.

4. Select OK.

The worksheet now looks like this.
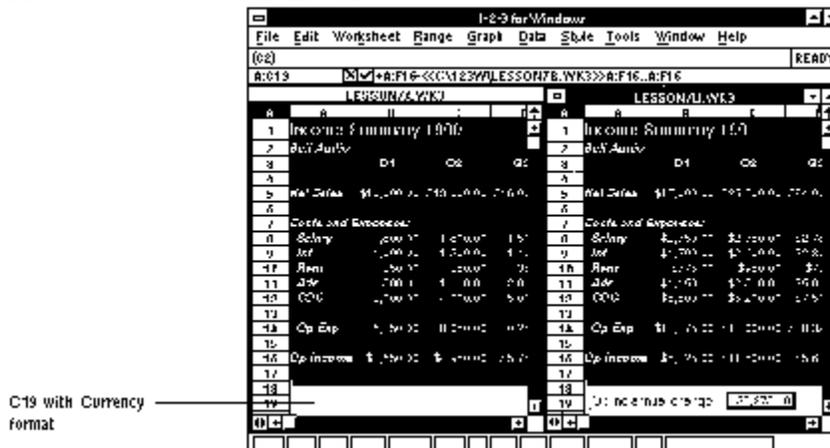
C19 with Currency format

Ending the work session

When you complete this lesson, you can save your work and end 1-2-3, practice on your own, or continue with other work. For instructions on saving your work and ending 1-2-3, see **"Saving your work and ending 1-2-3"**.

Lesson 8   Using a 1-2-3 database

This lesson describes how to use a 1-2-3 worksheet that is arranged as a personnel database table for the records of all employees of Bell Audio. You set up a query, find records that match your requirements, and extract records to a range outside the database table.

To begin this lesson, start 1-2-3, if necessary, and open LESSON8.WK3.

1. Choose File Open.

2. Select LESSON8.WK3.

3. Select OK.

Close any other open Worksheet windows and maximize the LESSON8 window. For information about closing and maximizing a window, see **"Closing a window"** and **"Maximizing a window"**.

Setting up a criteria range

If you want 1-2-3 to query the database table, you need to set up a range that tells 1-2-3 to look for records of employees who are not eligible for profit sharing. The instructions below tell you to set up the criteria range in a separate worksheet. By placing the criteria range in a separate worksheet, you prevent the possibility of writing over it if you add more records or fields to the database table.

The first row of a criteria range must contain an exact copy of the field names in the database table.

To insert a new worksheet after the current worksheet

1. Choose Worksheet Insert.

2. Select Sheet.

3. Select OK.

To see both worksheets at the same time, change to perspective view.

To change to perspective view

1. Choose Window Split.

2. Select Perspective.

3. Select OK.

To make the formats of worksheet B the same as worksheet A

1. Move the cell pointer to worksheet A.

2. Choose Worksheet Global Settings.

3. Select the Group mode check box.

   1-2-3 displays an X in the check box.

4. Select OK.

   The GROUP indicator appears in the status line, and the column widths in worksheet B change to match those of worksheet A.

To copy the field names from worksheet A to worksheet B

1. Select the range A:A3..A:I3.

2. Choose Edit Quick Copy.

3. Specify B:A1 as the To range.

4. Select OK.

The database table includes a field named PROFITSHARING. A Yes in this field indicates the employee is eligible for profit sharing; a No in this field indicates the employee is not eligible for profit sharing.

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.

To enter the criteria

1. Select cell B:I2.

2. Type No

3. Confirm the entry.

Your screen should look like this.
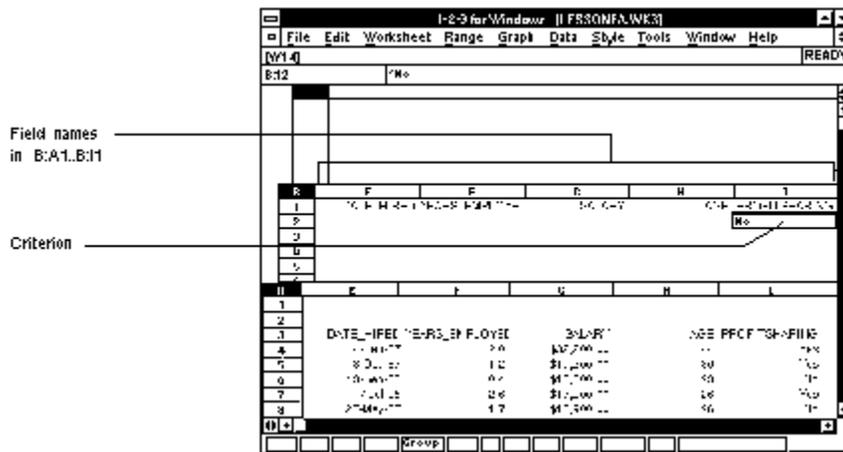
Finding records

1-2-3 can find records that have No in the PROFITSHARING field.

1. Select the range A:A3..A:I33.

2. Choose Data Query.

3. Specify B:A1..B:I2 as the criteria range.

4. Select Find.

The mode indicator changes to FIND, and 1-2-3 highlights the first record in the input range that matches the criterion in the criteria range.

FIND indicator

Matching record is highlighted
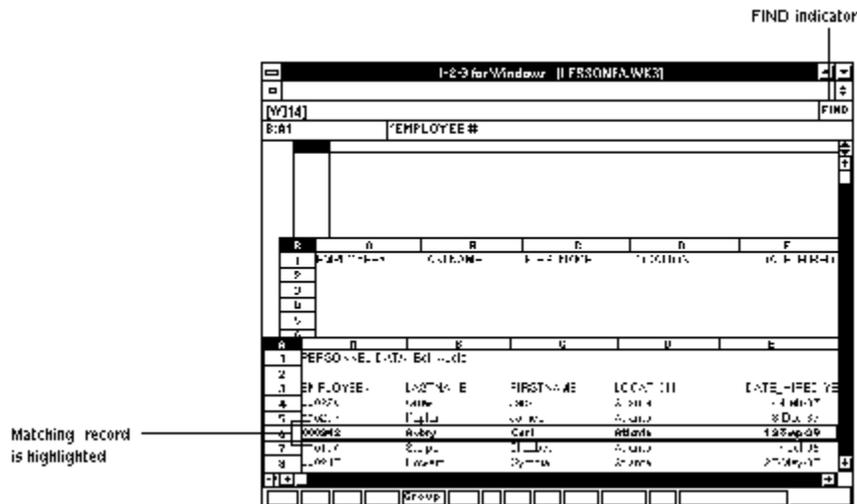
5. Use and ↓ to move to other records that also meet the criterion.

6. Press ESC or ENTER to return to the Data Query dialog box.

7. Select Cancel to close the dialog box.

Extracting records

1-2-3 can also extract, or list, records that meet the criteria you specify. You can use the input range and the criteria range you specified earlier. You must, however, set up an output range to tell 1-2-3 where to list the records.

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

To insert a new worksheet after worksheet B

1. Select cell B:A1.

2. Choose Worksheet Insert.

3. Select Sheet.

4. Select OK.

To copy the field names from worksheet A to worksheet C

1. Select the range A:A3..A:I3.

2. Choose Edit Quick Copy.

3. Specify C:A1 as the To range.

4. Select OK.

To extract records

1. Select the range A:A3..A:I33.

2. Choose Data Query.

3. Specify B:A1..B:I2 as the criteria range.

4. Specify C:A1..C:I1 as the output range.

5. Select Extract.

6. Select Cancel.

1-2-3 places a copy of all the records that match the criteria in the output range.
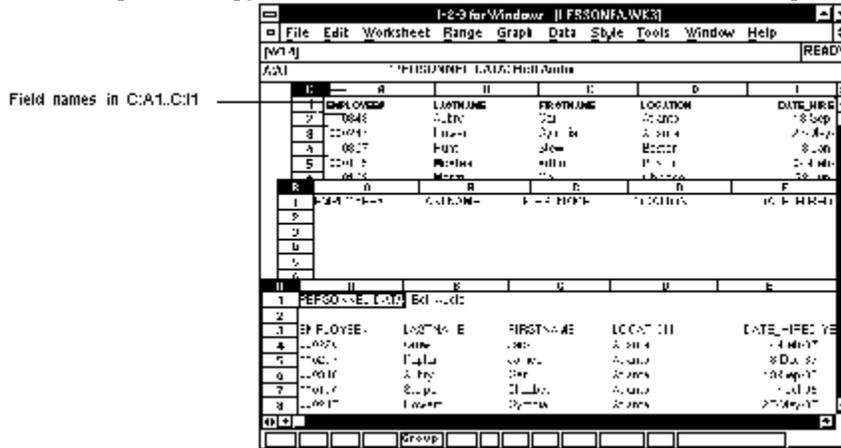
Field names in C:A1..C:I1 ——

Ending the work session

When you complete this lesson, you can save your work and end 1-2-3, practice on your own, or continue with other work. For instructions on saving your work and ending 1-2-3, see **"Saving your work and ending 1-2-3"**.

Lesson 9   Creating a 1-2-3 macro

A **macro** is a series of keystrokes or special commands that perform a 1-2-3 task. In this lesson, you create a macro that enters three labels. Every macro you create requires that you complete the same tasks that follow:

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.

Opening a new file

To begin this lesson, start 1-2-3. Open a new file in an empty Worksheet window.

1. Choose File New.

1-2-3 opens a new file and assigns it a default file name.

2. Choose File Save As.

3. Type lesson9.wk3 in the File name text box.

4. Select OK.

If necessary, close any other open Worksheet windows and maximize the LESSON9 window. For information about closing and maximizing a window, see **"Closing a window"** and **"Maximizing a window"**.

Planning the macro

In this example, you want to create a macro that enters the address for Bell Audio's Boston store. To create this macro, you must know that the task involves these procedures:

• Typing the label Bell Audio.

• Pressing ↓ to enter the label and moving the cell pointer down one cell.

• Typing the label One Emerson Place.

• Pressing ↓ to enter the label and moving the cell pointer down one cell.

• Typing the label Boston, MA 02176.

• Confirming the entry.

Entering the macro in the worksheet

In the following example, you enter the macro instructions by typing them into the worksheet.

1. Select cell B1.

2. Type Bell Audio{down}

3. Select cell B2.

4. Type One Emerson Place{down}

5. Select cell B3.

6. Type Boston, MA 02176

7. Confirm the entry.

Your screen should look like this.

Macro instructions
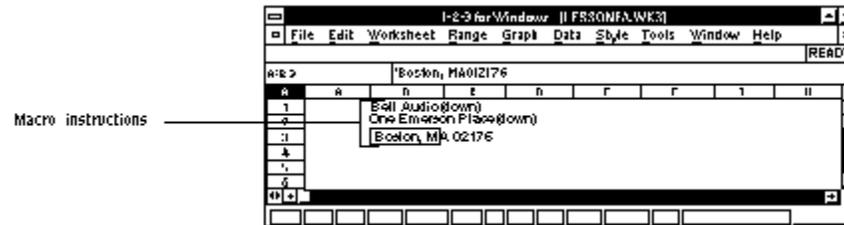
Naming the macro

Move to the range that contains the macro instructions and name the macro.

1. Select cell B1.

2. Choose Range Name Create.

3. Enter \H in the Range name text box.

4. Select OK.

Documenting the macro

After entering and naming a macro, it is good practice to document both the range name you assigned to the macro and the macro instructions. Document the range name you assigned to the macro in A1 and then describe the macro in cells F1, F2, and F3.

To document the range name you assigned to the macro

1. Select cell A1.

2. Type ' \h

3. Confirm the entry.

To document the purpose of the macro

1. Select cell F1.

2. Type Enters the address for

3. Select cell F2.

4. Type Bell Audio's

5. Select cell F3.

6. Type Boston store

7. Confirm the entry.

Your screen should look like this.

Macro range name

Macro instructions

Macro documentation
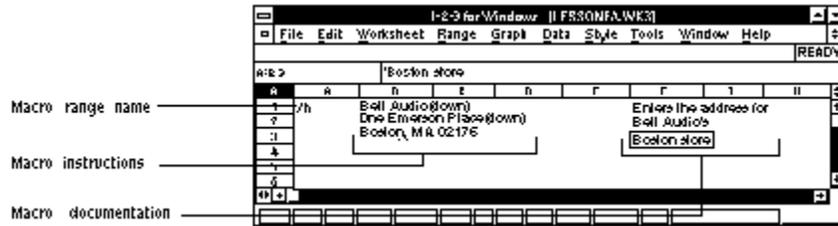
Running the macro

After you create a macro, you should always test your macro to ensure you did not make any errors. You test a macro by running it. The macro you just created contains one small error.

1. Select cell A10.

2. Press CTRL+H.

Your screen should look like this.

Macro error

Debugging and fixing the macro

Using a macro often requires some experimentation, to debug any procedural problems. When you create a macro, it is a good idea to allow time for adjustments. For example, the macro you just created does not contain the confirm instruction in the third line. To fix this, you need to edit the label in B3 by adding a ~ (tilde).

To fix the macro

1. Clear the edit line:

    Mouse   Click the Cancel button.

    Keyboard   Press ESC twice.

2. Select cell B3.

3. Change to EDIT mode.

4. Type ~

5. Confirm the entry.

To run the macro again

1. Select cell A10.

2. Press CTRL+H.

This time, the full address appears in the worksheet.

Ending the work session

When you complete this lesson, you can save your work and end 1-2-3, practice on your own, or continue with other work. For instructions on saving your work and ending 1-2-3, see **"Saving your work and ending 1-2-3"**.

17 Summary of Control Menu Commands ⟫
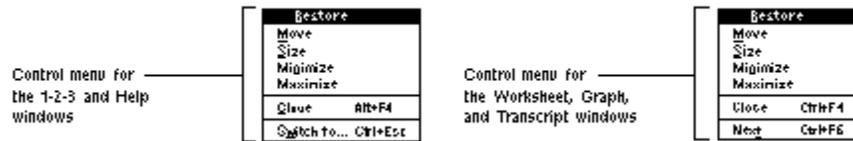
This chapter describes the Control menu commands, which manipulate the size and placement of the 1-2-3 window and windows that appear in the 1-2-3 window, along with the placement of dialog boxes. For more information about 1-2-3 windows, see **"Using 1-2-3 windows"** in Chapter 1.

Why use Control menu commands?
Control menu commands
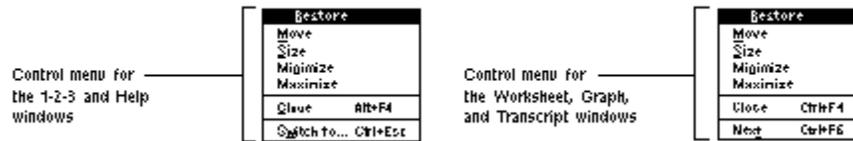
This chapter describes the Control menu commands, which manipulate the size and placement of the 1-2-3 window and windows that appear in the 1-2-3 window, along with the placement of dialog boxes. For more information about 1-2-3 windows, see **"Using 1-2-3 windows"** in Chapter 1.

Why use Control menu commands?
    To display a Control menu
Control menu commands
    Close
    Maximize
    Minimize
    Move
    Next
    Restore
    Size
    Switch To

Why use Control menu commands?

Use the Control menu commands to do the following actions:

Command	Task
Close	Closes a window or dialog box.
Maximize	Enlarges a window to its maximum size.
Minimize	Reduces a window to an icon.
Move	Repositions a window or dialog box.
Next	Makes the next open Worksheet, Graph, or Transcript window the active window. (This command is available only on the Control menu for Worksheet, Graph, or Transcript windows.)
Restore	Returns a minimized or maximized window to its previous size and position.
Size	Adjusts the dimensions of a window.
Switch To	Lets you switch to a different application using the Task List window. (This command is available only on the Control menu for the 1-2-3 window.)

To display a Control menu

Mouse

1.   Click the Control menu box in a window or dialog box, or click a Worksheet or Graph icon.

Keyboard

1.   Press ALT and then press space bar to display the 1-2-3 Control menu or a dialog box Control menu. Make the window active and press ALT+ - (hyphen) to display a window Control menu. Make the icon active and press ALT+ - (hyphen) to display the Control menu for a Worksheet or Graph icon.

Control menu commands

The sections below describe each Control menu command. A Control menu may contain dimmed commands. When a command is dimmed, the command is not available in that window.

Close

1. Choose Close to close   a window or dialog box.

Mouse   Double-clicking the Control menu box is equivalent to choosing Close.

Keyboard   Pressing ALT+F4 is equivalent to choosing Close from the 1-2-3 or Help Control menus; pressing CTRL+F4 is equivalent to choosing Close from the Control menu of a window or dialog box that appears in the 1-2-3 window.

If you change the worksheet file but do not save the changes before you choose Close, 1-2-3 indicates that the file changed and asks whether you want to save the changes and close the file.

Maximize

1. Choose Maximize to enlarge the window.

Mouse   Clicking the Maximize button is equivalent to choosing Maximize.

Before you maximize a window, the Maximize button contains an up arrow. After you maximize a window, the Maximize button changes to the Restore button, which contains both an up arrow and a down arrow.

Minimize

1. Choose Minimize to reduce the window to an icon.

Mouse   Clicking the Minimize button is equivalent to choosing Minimize.

When a window is an icon, it is still open and can also be active. If a minimized window is active, 1-2-3 displays the file name under the icon.

Move

1. Choose Move to reposition a window or dialog box without changing its size.

Mouse   Dragging the window or dialog box title bar into position is equivalent to choosing Move.

Keyboard   When you choose Move, a gray frame appears around the window or dialog box border. Using , ↓, →,   and ← moves the window or dialog box to a new position. Pressing ENTER completes the move.

Next

1. Choose Next to make the next Worksheet, Graph, or Transcript window active.

Mouse   With a mouse, clicking a window makes it active.

Keyboard   Pressing CTRL+F6 is equivalent to choosing Next from a Worksheet Control menu, Graph Control menu, or Transcript Control menu.

Note   Next is only available on the Control menu in the Worksheet, Graph, or Transcript windows.

Restore

1. Choose Restore to return a minimized or maximized window to its previous size and position in the 1-2-3 window.

   Restore does not work after you size a window by using Size.

   Mouse   When a window is maximized, clicking the Restore button is equivalent to choosing Restore. When a window is minimized, double-clicking the window icon is equivalent to choosing Restore.

Size

1. Choose Size to adjust the dimensions of a window.

   Mouse   Dragging the window border is equivalent to choosing Size.

   Keyboard   When you choose Size, a gray frame appears around the window border. Using , ↓, →, and ← selects one side of a window and then moves it. Pressing ENTER completes the size operation.

Switch To

1. Choose Switch To to access Windows Task List and switch to a different application.

   Keyboard   Pressing CTRL+ESC is equivalent to choosing Switch To from the Control menu in the 1-2-3 or Help windows.

   Note   Switch To is only available on the Control menu in the 1-2-3 and Help windows.

18   Summary of 1-2-3 for Windows Commands   »

This chapter describes the 1-2-3 for Windows commands, which include Worksheet window commands, Graph window commands, Help window commands, and Transcript window commands.

Worksheet window commands
Graph window commands
Help window commands
Transcript window commands

18   Summary of 1-2-3 for Windows Commands   »

This chapter describes the 1-2-3 for Windows commands, which include Worksheet window commands, Graph window commands, Help window commands, and Transcript window commands.

Worksheet window commands

    Data commands
    Edit commands
    File commands
    Graph commands
    Help commands
    Range commands
    Style commands
    Tools commands
    Window commands
    Worksheet commands
Graph window commands
Help window commands
Transcript window commands

User's Guide
18   Summary of 1-2-3 for Windows Commands
Worksheet window commands

This section describes the Worksheet window commands, which appear in the menu bar when a Worksheet window is active. The 1-2-3 main menu looks like this.

> **Note**   In a pulldown menu, a command followed by an   arrowhead displays a cascade menu. A command followed by an ... (ellipsis) displays a dialog box.

Data commands

The Data commands manipulate data in 1-2-3 databases and external tables, analyze data, fill a range with data, or break up imported text into cell entries.

Command	Task
Connect to External	Creates a connection between 1-2-3 and an external database table.
Distribution	Creates a frequency distribution by counting the number of values in a range that fall within specified numeric intervals.
External Options	Exchanges data between 1-2-3 and an external database table.
Fill	Enters a sequence of values in a range.
Matrix	Inverts or multiplies matrixes formed by rows and columns of data.
Parse	Separates and converts a single column of long labels into several columns of data.
	Locates and edits selected records in a 1-2-3 database table or an external table based on criteria you specify.
Regression	Performs regression analysis (determines the relationships of up to 75 independent variables to a dependent variable).
Sort	Arranges data in a specified range or records in a database table.
What-if Table	Creates a table that shows how the results of formulas vary when you change the numbers used in the formulas.

Edit commands

The Edit commands copy or move data within 1-2-3 or between Windows applications, create links between 1-2-3 worksheet files and other applications, and undo actions within 1-2-3. Edit Cut, Edit Copy, Edit Paste, Edit Link

Options, and Edit Paste Link all use the Clipboard, a Windows storage area that stores the most recently cut or copied data.

Command	Task
Clear	Deletes data from the worksheet permanently, without using the Clipboard.
Clear Special	Permanently deletes the contents, number format, style, or graph of a range.
Copy	Copies data from the worksheet to the Clipboard.
Cut	Deletes data from the worksheet and places it on the Clipboard.
Find	Finds or replaces specified characters in labels and formulas in a range.
Link Options	Creates, deletes, edits, and updates dynamic links between worksheet files or between worksheet files and files created in another Windows application.
Move Cells	Transfers data to another range in the same worksheet file, without using the Clipboard.
Paste	Copies data from the Clipboard to the worksheet.
Paste Link	Creates a new link to the current worksheet file, using the link reference on the Clipboard.
	Copies data to a range in the same worksheet file or a different worksheet file, without using the Clipboard.
Undo	Reverses the effect of the most recently executed command or action.

File commands

The File commands organize and maintain files, move data between files, and print files.

Command	Task
Administration	Controls reservation settings for worksheet files, creates a table of file information, seals files, and recalculates linked formulas.
Close	Closes the active window.
Combine From	Incorporates data from a worksheet file on disk into the current file.
Exit	Ends the 1-2-3 session.
Extract To	Copies a range of data from any active file and saves it in a worksheet file on disk.
Import From	Reads data from a text file on disk into the current worksheet file.
New	Creates a new blank worksheet file on disk and in memory.

Open	Reads a worksheet file into memory and places it in a window.
Page Setup	Specifies the header, footer, borders, margins, compression, orientation, and other page settings, and lets you create and save named settings.
Preview	Displays the print range as 1-2-3 will format it for printing, page by page, in the Print Preview window.
Print	Prints data.
Printer Setup	Specifies the printer destination.
Save	Saves the worksheet files on disk.
Save As	Saves a worksheet file with a name you specify, or saves all modified files on disk; specifies a password.

Graph commands

The Graph commands open a Graph window and display graphs with default or initial settings. The Graph commands also add and remove graphs to and from a worksheet, and resize graphs.

Command	Task
Add to Sheet	Adds a graph to the current worksheet. After you add a graph to the worksheet, all Graph window commands become available.
Go To	Moves the cell pointer to the range that contains the graph you specify.
Import	Copies a graph from a .PIC file or a .CGM file on disk to the current file.
Name	Deletes graphs that have not been added to a worksheet and lists all graphs in a file.
New	Creates and names a graph for a range of data in the current worksheet.
Refresh	Updates all graphs in the current file to reflect recalculation of graph data ranges.
Size	Resizes a graph added to the current worksheet by resizing the range the graph occupies.
View	Displays a graph created for the current file in a Graph window.

Help commands

The Help commands give you information about 1-2-3 for Windows.

Command	Task
About 1-2-3	Provides information about 1-2-3, including version

	number, copyright notice, and the cell address of a circular reference.
For Upgraders	Displays a table showing the 1-2-3 for Windows command that corresponds to a command in 1-2-3 Release 3.1.
@Functions	Provides information about how to use @functions, and a complete description of each 1-2-3 @function.
How Do I?	Displays a list of common 1-2-3 tasks.
Index	Displays all the categories of Help topics, including commands, terms, tasks, and error messages. You can get to any part of the 1-2-3 Help system from the Help Index.
Keyboard	Provides information about 1-2-3 function keys, accelerator keys, and navigation keys.
Macros	Provides information about how to create and use macros, and a complete description of each 1-2-3 macro command and key name.
Using Help	Provides information about how to use 1-2-3 Help.

Range commands

The Range commands affect ranges of data.

Command	Task
Annotate	Adds an annotation to a range.
Format	Changes the display of data in a range.
Go To	Moves the cell pointer to a cell or named range.
Justify	Rearranges a column of labels to fit within a specified width.
Name	Creates, deletes, undefines, and lists range names.
Protect	Prevents changes to unprotected cells in a range when the worksheet or worksheets are globally protected.
Transpose	Copies a range of data, transposing the layout of the data and converting any formulas to their current values.
Unprotect	Lets you make changes to cells in a range when the worksheet or worksheets are globally protected.

Style commands

The Style commands affect the appearance of worksheets, both on the screen and when printed.

Command	Task
Alignment	Aligns labels either within a cell or across the columns of a range.
Border	Draws horizontal and vertical lines along the edges of cells in a range, outlines around cells and ranges, and drop shadows around ranges.
Color	Displays and prints ranges in color, and makes negative values appear in red.
Font	Specifies fonts and text attributes for ranges and the default font set for a worksheet file, and saves font libraries in files on disk.
Name	Defines the format of a cell as a named style.
1 through 8	Formats a range with the named styles you defined with Style Name.
Shading	Adds light, dark, or solid shading to a range and removes shading from a range.

Tools commands

The Tools commands start Backsolver and Solver, load add-ins, run and debug macros, and let you change global settings.

Command	Task
Add-in	Starts add-in applications, opens and closes add-in files, and creates a table of active add-ins.
Backsolver	Finds a value for one cell that causes a formula in another cell to evaluate to a specified value.
SmartIcons	Positions and customizes the SmartIcons.
Macro	Starts macros, records and plays back keystrokes, and starts STEP and TRACE modes to let you debug a macro.
Solver	Finds answers for what-if problems about worksheet models.
User Setup	Changes settings that affect the display and behavior of 1-2-3 for Windows; changes the 1-2-3 configuration settings.

Window commands

The Window commands control how 1-2-3 displays Worksheet, Graph, and Transcript windows.

Command	Task
Cascade	Sizes all open Worksheet, Graph, and Transcript windows and arranges them in the 1-2-3 window so they appear one on top of the other.

<u>D</u>isplay Options	Controls settings for colors, grid lines, and display of the worksheet frame for the current worksheet.
<u>M</u>ore Windows	If ten or more Worksheet, Graph, and Transcript windows are open in the 1-2-3 window, lists windows 10 through *n*.
<u>S</u>plit	Divides a Worksheet window horizontally or vertically into two panes; displays three contiguous worksheets from the same worksheet file.
<u>T</u>ile	Sizes all open Worksheet, Graph, and Transcript windows and places them side by side in the 1-2-3 window.
<u>1</u> through <u>*n*</u>	Lists up to nine Worksheet, Graph, and Transcript windows that are open in the 1-2-3 window and displays a check mark next to the active window. Use this list to make a window active.

Worksheet commands

The Worksheet commands control the display and organization of your work.

Command	**Task**
<u>C</u>olumn Width	Sets the width of one or more columns in the worksheet, or resets columns to the global column width.
<u>D</u>elete	Deletes one or more columns, rows, or worksheets in the current file, closing up the space left by the deletion.
<u>G</u>lobal Settings	Establishes global settings for worksheets and files.
<u>H</u>ide	Hides columns or worksheets.
<u>I</u>nsert	Inserts blank columns, rows, or worksheets.
<u>P</u>age Break	Inserts or removes horizontal and vertical page breaks in printed worksheets.
<u>R</u>ow Height	Sets the height of one or more rows in the worksheet, or resets rows to the default row height for the current global font.
<u>T</u>itles	Freezes or unfreezes rows and columns at the top and/or left edges of a worksheet.
<u>U</u>nhide	Redisplays columns or worksheets hidden with Worksheet Hide.

Graph window commands   [»]

[»]
[»]

When a Graph window is active, the menu bar displays Graph window commands.

```
┌─────────────────────────────────────────────────────────┐
│ ▭              1-2-3 for Windows                    ▲ ▼  │
├─────────────────────────────────────────────────────────┤
│ File  Edit  Chart  Draw  Layout  Rearrange  Style  Tools  Window  Help │
└─────────────────────────────────────────────────────────┘
```

Graph window commands let you enhance and manipulate the graph that is displayed in a Graph window.

Command	Task
Chart	Sets the graph type, ranges, data labels, headings, legend, borders, and grid lines.
Draw	Lets you add objects, including text, lines, arrows, rectangles, polygons, ellipses, or free-hand drawings to a graph.
Edit	Selects, copies, deletes, replicates, and restores objects in a graph.
File	Closes the current file or exits the 1-2-3 session.
Help	Gives information about 1-2-3.
Layout	Pushes objects forward or back in a graph; locks and unlocks an object in a graph.
Rearrange	Changes the size and orientation of objects in a graph.
Style	Changes the font, color, line-style, alignment, and display options of a graph.
Tools	Positions and customizes the SmartIcons.
Window	Controls the display of the Graph window.

Help window commands

When the Help window is active, the menu bar in the Help window displays the Help window commands.

The Help window commands let you work with bookmarks, files, and the Clipboard, and provide Help on Help.

Command	Task
Bookmark	Places and removes bookmarks in Help topics.
Edit	Copies Help text to the Clipboard and adds annotations to Help text.
File	Opens Help files, prints Help topics, and sets printer options.
Help	Closes 1-2-3 for Windows Help (123W.HLP), opens Using Windows Help (WINHELP.HLP), and displays information about Windows Help.

Transcript window commands

When the Transcript window is active, the menu bar displays Transcript window commands.

The Transcript window commands control keystroke recording, help you debug macros, and let you run macros.

Command	Task
Edit	Cuts, copies, or moves data to and from the Windows Clipboard.
File	Closes the current file or exits the 1-2-3 session.
Help	Gives information about 1-2-3.
Macro	Controls keystroke recording, helps you debug a macro, and lets you run a macro.
Window	Tiles or cascades the Worksheet, Graph, and Transcript windows; lists open Worksheet, Graph, and Transcript windows.

A   The Translate Utility

This appendix describes how to use the Translate utility to convert files from one file format to another. It lists the applications for which translation is available and describes general restrictions that apply when converting files from or to the 1-2-3 for Windows file format. The final section of the appendix describes how to translate at the operating system level.

Why translate files?
Terms you need to know
Available translation
Before you start the Translate utility
Using the Translate utility
Translating restrictions
Translating multiple-sheet files
Using Translate commands from the operating system
Syntax of Translate commands

This appendix describes how to use the Translate utility to convert files from one file format to another. It lists the applications for which translation is available and describes general restrictions that apply when converting files from or to the 1-2-3 for Windows file format. The final section of the appendix describes how to translate at the operating system level.

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    To start the Translate utility
    To Translate files
    To end the Translate utility
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    To enter a Translate command from the operating system
Syntax of Translate commands

Why translate files?

The Translate utility lets you convert .WK3 files (or, in some cases, named ranges in those files) to other file formats for use with other worksheet and database management programs and with previous releases of 1-2-3. It also lets you convert database and worksheet files from other applications to the 1-2-3 file format.

> **Note**   In this appendix, the 1-2-3 file format refers to the format of files created in 1-2-3 for Windows (.WK3 files).

Terms you need to know

The following terms are used with the Translate utility:

- The **source product** is the application from which you want to translate.

- The **target product** is the application to whose file format you want to translate.

- The **source file** is the file or named range you want to translate. It is in the file format of the source product.

- The **target file** is the file you create with Translate. It contains source file data in a new file format.

For example, if you translate a dBASE III® file named PRNT.DBF to a 1-2-3 file named PRNT.WK3, dBASE III is the source product, 1-2-3 is the target product, PRNT.DBF is the source file, and PRNT.WK3 is the target file.

Available translation

You can translate files from the products in the table below to the 1-2-3 file format.

Source product	Extension
dBASE II®, dBASE III, and dBASE III Plus®	.DBF
Products that can create files in DIF® format, such as VisiCalc®	.DIF
Multiplan® Release 1.2	.SLK

> **Note**   1-2-3 for Windows can read files from previous releases of 1-2-3, from all releases of Symphony® through Release 2, and from Microsoft Excel Version 2. You do not need to translate these files. 1-2-3 for Windows converts such files from their original file format to the 1-2-3 for Windows file format when it reads them into memory.

When you read a 1-2-3 Release 1A, Symphony, or Excel file into 1-2-3, 1-2-3 displays the warning 'File and/or extension converted' to inform you that the file has been converted to the 1-2-3 format and given a new extension. You will need to translate these files back to their original file format if you want to use them with their original source products.

You can translate 1-2-3 for Windows files to file formats for the products in the table below.

Target product	Extension
dBASE II, dBASE III, and dBASE III Plus	.DBF
1-2-3 Release 1A	.WKS
1-2-3 Release 2	.WK1
Enable 2.0	.SSF
Multiplan 4.0	.SLK
Products that can read files in DIF format, such as VisiCalc	.DIF
Supercalc®4	.CAL
Symphony Release 1 and 1.01	.WRK
Symphony Release 1.1, 1.2, and 2	.WR1

> **Note**   If a .WK3 file does not include features unique to 1-2-3 Release 3, 3.1, or 1-2-3 for Windows (such as multiple worksheets) you can save it in Release 2 format by giving the file name the .WK1 extension when you use File Save As. A file translation is not necessary. If a .WK3 file does include features or @functions unique to 1-2-3 Release 3, 3.1, and 1-2-3 for Windows, you can use File Save As to save it in Release 2 format, but some information will be lost.

> **Help**   For information about **what information you lose when you save a .WK3 file as a .WK1 file,** choose File Save As, press F1 (HELP), and select Saving Files in 1-2-3 Release 2 (.WK1) Format. If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

If a .WK3 file contains multiple worksheets, you must use the Translate utility to use it with previous releases of 1-2-3 or with Symphony.

Before you start the Translate utility

Before you can start Translate, the Translate files must be on your hard disk. If you specified you wanted the Translate files copied to the 1-2-3 program directory when you used Install, skip to **"Using the Translate utility"**.

To start the DOS prompt, open the Main Group window in the Windows Program Manager and double-click the DOS Prompt icon or use , ↓, →, or ← to move the highlight to the icon and press ENTER.

At the DOS prompt, make the 1-2-3 for Windows program directory the current directory, type dir tran*.* and press ENTER. If your Translate files are in the directory, the operating system displays a list that contains at least 13 files, including TRANS.EXE.

If the Translate files are not in your 1-2-3 for Windows program directory, use the Install program to copy them to your hard disk. Start the Install program and specify that you only want to transfer Translate Utility Files.

Using the Translate utility

To use Translate, you must start the Translate utility; select a source product, a target product, and a source file; and specify the target file name.

> **Note**   If a source file has an extension that is different from the default extension of the source product (listed in **"Available translation"**), you will not be able to translate it. Rename the file so that it has the default source product extension before you use Translate.

To start the Translate utility

1.   Make sure the Translate files are in your 1-2-3 program directory.

2.   Open the Windows Program Manager.

3.   Open the group window that contains 1-2-3.

4.   Select Translate (or the name assigned):

Mouse   Double-click the 1-2-3 Translate icon.

Keyboard   Move the highlight to the 1-2-3 Translate icon with , ↓, →, and ←, and press ENTER.

The Translate menu appears on the screen. The menu displays a list of source products (From) on the left of the screen and target products (To) on the right.

To Translate files

1.   Highlight a source product and press ENTER.

2.   Highlight a target product and press ENTER.

Translate displays screens that provide information about the translation, including restrictions that apply to the file formats you selected. Read these screens before you translate any files.

3.   To leave the screens and specify the source file, press ESC. Translate displays a list of the files in the current directory.

4.   If you want to list source files in a different drive or directory, edit the path and press ENTER.

> **Note**   You cannot change the source file extension.

5.   Highlight the source file you want to translate.

To specify more than one source file, mark each file name by highlighting it and pressing the space bar. When you finish specifying each source file, press ENTER.

If you are translating one file, Translate displays a prompt followed by the default target file name, which it creates by adding the target product extension to the source file name. For example, if you are translating a 1-2-3 file named PRNT.WK3 to DIF format, Translate proposes the name PRNT.DIF. If you are translating more than one file, Translate displays the * (asterisk) wildcard character followed by the target product extension. When it translates each file, Translate substitutes the * (asterisk) with the characters in the file name.

6.   If you want the target file to be in a different directory, edit the directory and press ENTER.

If you are translating one file, you can type a new target file name and press ENTER. If you are translating more than one file, you cannot change the names of the target files. You must use the target product extension in either case.

7.   Translate displays additional prompts specific to certain source and target products and to certain situations, as

follows:

- If a file with a target file name already exists, Translate displays a prompt that asks if you want to write over the existing file. Select Yes to write over the file or No to specify a different target file name.
- If you are translating from a .WK3 file with multiple worksheets, Translate displays a prompt asking if you want to translate all the worksheets in the file or one worksheet in the file.

  All worksheets -- Translates each worksheet of each source file to a separate target file. Translate creates names for the target files created from a multiple-sheet source file, as described in **"Translating multiple-sheet files"**.

  One worksheet -- Requires that you type the appropriate worksheet letter at the prompt and press ENTER. If you are translating more than one file, all of the files must contain a worksheet with the letter you specify. For example, if you are translating two files and specify C as the worksheet letter, both files must contain at least three worksheets.

- If you are translating a .WK3 file to .WK1, Translate displays a prompt that asks if you want to save new @functions as labels or as add-in @functions.

  Add-ins -- Treats the new 1-2-3 @functions and linked files as 1-2-3 for Windows treats such features when you use File Save As to save a single-sheet for a 1-2-3 file in .WK1 format.

  Labels -- Changes @functions and @function arguments new to 1-2-3 Release 3, 3.1, and 1-2-3 for Windows, and formulas containing references to data in other files, to labels in the .WK1 file.

- If you are translating from DIF format, specify the orientation as Rowwise or Columnwise. Rowwise transposes the orientation of a columnwise file. If you are translating more than one file, you must translate all of them to the same orientation.

- If you are translating to dBASE II, dBASE III, or dBASE III Plus format, specify whether you want to translate a named range or an entire file. If you specify Named range, enter the range name at the prompt. The range whose name you enter must be a single-sheet range. If you are translating more than one file, all of the source files must contain a named range with the same name.

  Tip   If you are translating a 1-2-3 file to Symphony, Translate automatically changes new 1-2-3 @functions and @function arguments, and formulas containing references to data in other files, to labels in the Symphony file.

8. Translate displays a prompt that asks if you want to proceed with the translation. Select Yes to translate the file, No to return to the list of source files, or Quit to return to the Translate menu without translating the file.

   When the translation is complete, Translate displays the message 'Translation successful.' If Translate is unable to complete the translation, it displays an error message with information on the cause of the problem.

9. Press ENTER to translate another file from the same source product or ESC to specify a different source product.

To end the Translate utility

1. Press ESC to display the 'Do you want to end Translate?' prompt.
2. Select Yes to end the application or No to return to the Translate menu.

Translating restrictions

Screens that appear after you select a target product describe translation restrictions that relate to file size and structure, and what results during translation when discrepancies exist between a source file and target product.

Sometimes a source product contains a feature or @function that has no equivalent in the target product. Translate may accommodate this by producing a label in the target file in place of the feature or @function. In most cases, Translate produces the result of the formula rather than the formula itself in the translated file.

The amount of memory available in your computer may restrict the size of the files you can translate.

You cannot translate password-protected or sealed 1-2-3 files.

Translate accepts 1-2-3 files created with File Save As. To translate files created with File Extract To, read them into memory with File Open and save them again with File Save As.

Translating multiple-sheet files

When you are translating a multiple-sheet .WK3 file, Translate displays a prompt that asks if you want to translate one worksheet or all worksheets in the file. If you specify All worksheets, Translate converts each worksheet of a multiple-sheet .WK3 file to a separate file.

Translate names each new single-sheet file in the following manner: It appends two characters to the source file name. When translating a worksheet that has a two-character worksheet letter (AA - IV), Translate appends the worksheet letter to the 1-2-3 source file name. When translating a worksheet that has a one-character worksheet letter (A - Z), Translate appends the letter preceded by a zero (0A - 0Z) to the name.

For example, when you translate a 1-2-3 file named SALES that contains two worksheets (A and B), Translate names the new files SALES0A and SALES0B, respectively.

When the source file name has seven or eight characters, Translate creates the target file names by replacing the seventh and eighth characters with the target file's original worksheet letter.

For example, when you translate a 1-2-3 file named BUDGET92 that contains two worksheets (A and B), Translate names the new files BUDGET0A and BUDGET0B, respectively.

> **Caution**   If you translate two files, each with a number of worksheets and each with the same first six characters in the file name, Translate will create duplicate names and write over the first file you translate.

> For example, if the two files BUDGET91 and BUDGET92 each have two worksheets and you translate both, Translate will create BUDGET0A and BUDGET0B from BUDGET91. Then Translate will create BUDGET0A and BUDGET0B from BUDGET92. Rather than four new files, you have two new files.

> If you translate two multiple-sheet files and the first six characters of the file names are identical, rename the files before you translate them so the first six characters create a unique file name.

Using Translate commands from the operating system

Translate provides seven commands that let you translate files at the operating system level without using the Translate menu. Six of the seven commands are product-specific. One command, trandif, translates files between the 1-2-3 file format and any product that can read and save files in the .DIF file format. Four of the commands translate files both to and from the 1-2-3 file format. The transylk, tranena2, and transup4 commands translate files to 1-2-3 file format only.

Because the commands work at the operating system level, you can automate the translation process by setting up a batch file with the names of the files you translate routinely. Refer to your operating system manual for information on creating batch files.

The table below lists the Translate commands you can use at the operating system level and shows the products whose files the commands work on.

Command	Product
trandb2	dBASE II
trandb3	dBASE III and dBASE III Plus
trandif	Products that can read and save files in the .DIF format, such as VisiCalc
tranena2	Enable 2.0
transup4	Supercalc4
transylk	Multiplan Release 1 and 2
tranwks	1-2-3 Release 1A, 2, 2.01 and Symphony Release 1, 1.01, 1.1, 1.2, and 2

Note   The Translate commands, in the table above, identify a file by its extension. If the name of a file you want to translate does not include the default source product extension, you must rename the file to include the default extension before translating it.

To enter a Translate command from the operating system

1. Choose the DOS prompt icon:

Mouse   Open the Main Group window in Windows Program Manager and double-click the DOS Prompt icon.

Keyboard   Open the Main Group window in Windows Program Manager, use , ↓, →, or ← to move the highlight to the icon, and press ENTER.

2. At the DOS prompt, type the Translate command and press ENTER. When you type the command, use the syntax described in **"Syntax of Translate commands."**

Syntax of Translate commands

The syntax of the Translate commands is

command source-file target-file flags

Replace variables as follows:

- *command* is one of the Translate commands.

- *source-file* is the source file you want to translate.

- *target-file* is the name you give to the target file.

- *flags* are options that can include the following:

  -a -- Translates new 1-2-3 @functions and new @function arguments as add-in @functions, and formulas containing links to other files as @@ functions when translating to .WK1, .WRK, or .WR1 format. If you do not use -a, these @functions and formulas are translated as labels.

  -lx -- Translates one worksheet in a multiple-sheet file, where x is the letter of the worksheet to be translated.

  -o -- Writes over an existing file with the same name.

  -r -- When used with trandif, specifies rows rather than columns as the orientation for translating files from DIF format. Columns is the default.

  -r*name* -- When used with trandb2 or trandb3, translates a named range in a .WK3 file to a file in .DBF format, where *name* is the name of the range to be translated.

  Tip   For more information about the variables that are valid for a particular Translate command, enter tranxxxx at a DOS prompt. Substitute for xxxx the file type you want to translate. For example, enter tranwks at a DOS prompt to display information about the tranwks Translate command.

  You can use the standard wildcard characters -- * (asterisk) and ? (question mark) -- to translate a group of files with similar names. (When you do so, you must use the target product extension.)

  Help   For more information about **using wildcard characters,** choose Help Contents, select Glossary, select W, and select wildcard character. If you are not sure how to use Help, see **"Using Help"** in Chapter 1.

You can use either uppercase or lowercase letters when typing a Translate command.

Examples

The example below translates a 1-2-3 file to a Release 2 file of the same name with a different extension. For example,

tranwks income1.wk3 income1.wk1

The next example translates a range named COSTS in a 1-2-3 file to an existing dBASE II file. Because the target file already exists, you use the -o flag to write over the existing file. To translate a named range, you use the -r flag followed by the range name. For example,

trandb2 plan89.wk3 alldiv.dbf -o -rcosts

The next example translates a file in DIF format to a 1-2-3 file. Use the -r flag to transpose the original orientation of the data from columns into rows. For example,

trandif oldprod.dif oldprod.wk3 -r

The last example translates Multiplan files to 1-2-3 files of the same name. The * (asterisk) means that all files with the .SLK extension are translated. The -o flag writes over existing .WK3 files with the same names. For example,

transylk *.slk *.wk3 -o

B   The Lotus Multibyte Character Set (LMBCS)   ≫

1-2-3 for Windows uses the American National Standards Institute (ANSI) character set to display and print characters and LMBCS to store characters. You can use LMBCS codes to produce characters that are not on your keyboard.

The tables that follow list the LMBCS codes for 1-2-3 and the characters they produce.

LMBCS codes are divided into a number of different groups. LMBCS codes 32 through 255 comprise Group 0 and are listed in the first table below. These characters represent Code Page 850 characters 32 to 255.

LMBCS codes 256 through 511 comprise Group 1 and produce characters previously available in the Lotus International Character Set (LICS) as well as other characters available in the IBM code page supported by the country driver. The second table below lists the first 127 of these; the remaining Group 1 LMBCS codes duplicate Group 0 codes.

LMBCS codes 512 and above comprise other groups of characters not displayable or printable in 1-2-3.

Displaying characters
LMBCS Tables

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LMBCS codes 512 and above comprise other groups of characters not displayable or printable in 1-2-3.

Displaying characters
   Compose sequences
LMBCS Tables
   Group 0
   Group 1

Displaying characters

You can produce any LMBCS character with @CHAR and the LMBCS code for the character. For example, to produce an , you would find the LMBCS code for the , 280, in the Group 1 table, and enter @CHAR(280) in your worksheet. You can also produce characters using compose sequences or extended compose, as described below.

Compose sequences

A **compose sequence** is a series of keystrokes you use to enter a character that is not on your keyboard. The tables below list the compose sequences for the characters that have them.

You can enter these characters by pressing ALT+F1 (COMPOSE) and the appropriate keystrokes. For example, to enter the character £, you can press ALT+F1 (COMPOSE) and type L=. Most of the compose sequences are not order-sensitive; however, you must enter those that appear in bold in the order in which they are presented.

Extended Compose

You can use extended compose to produce any LMBCS character. The exact sequence of keystrokes you use for extended compose depends on the character's group number.

To use extended compose with characters listed in the Group 0 table, press ALT+F1 (COMPOSE) twice, 0 (the character's group number), - (hyphen), and a three-digit LMBCS code. If the LMBCS code for that character has only two digits, precede it with a 0.

To use extended compose to produce characters listed in the Group 1 table, press ALT+F1 (COMPOSE) twice, 1 (the character's group number), - (hyphen), and the three-digit key code for that character, listed in the second column in the table. For example, to enter an ellipsis, which is in Group 1 and has a key code of 040, press ALT+F1 (COMPOSE) 1-040.

> **Note**   If Windows cannot represent a LMBCS character, a fallback character will appear. See the *Microsoft Windows User's Guide* for more information about what characters Windows can represent.

LMBCS Tables

The tables for Group 0 LMBCS characters and Group 1 LMBCS characters appear below.

Group 0

This section defines the Group 0 LMBCS characters.

> **Note**   Codes 1 through 31 are not LMBCS codes. Using @CHAR with the numbers 1 through 31 will produce the characters for LMBCS codes 257 through 287, listed in the **Group 1 table.**

LMBCS code	Compose sequence	Description	Character
32		Space	Space
33		Exclamation point	!
34		Double quotes	"
35	+ +	Pound sign	#
36		Dollar sign	$
37		Percent	%
38		Ampersand	&
39		Close single quote	'
40		Open parenthesis	(
41		Close parenthesis	)
42		Asterisk	*
43		Plus sign	+
44		Comma	,
45		Minus sign	-
46		Period	.
47		Slash	/
48		Zero	0
49		One	1
50		Two	2
51		Three	3
52		Four	4
53		Five	5
54		Six	6
55		Seven	7
56		Eight	8
57		Nine	9
58		Colon	:
59		Semicolon	;
60		Less than	<
61		Equal sign	=
62		Greater than	>

LMBCS code	Compose sequence	Description	Character
63		Question mark	?
64	a a or A A	At sign	@
65		A, uppercase	A
66		B, uppercase	B
67		C, uppercase	C
68		D, uppercase	D
69		E, uppercase	E
70		F, uppercase	F
71		G, uppercase	G
72		H, uppercase	H
73		I, uppercase	I
74		J, uppercase	J
75		K, uppercase	K
76		L, uppercase	L
77		M, uppercase	M
78		N, uppercase	N
79		O, uppercase	O
80		P, uppercase	P
81		Q, uppercase	Q
82		R, uppercase	R
83		S, uppercase	S
84		T, uppercase	T
85		U, uppercase	U
86		V, uppercase	V
87		W, uppercase	W
88		X, uppercase	X
89		Y, uppercase	Y
90		Z, uppercase	Z
91	((	Open bracket	[
92	/ /	Backslash	\
93	))	Close bracket	]

LMBCS code	Compose sequence	Description	Character
94	v v	Caret	^
95		Underscore	__
96		Open single quote	'
97		a, lowercase	a
98		b, lowercase	b
99		c, lowercase	c
100		d, lowercase	d
101		e, lowercase	e
102		f, lowercase	f
103		g, lowercase	g
104		h, lowercase	h
105		i, lowercase	i
106		j, lowercase	j
107		k, lowercase	k
108		l, lowercase	l
109		m, lowercase	m
110		n, lowercase	n
111		o, lowercase	o
112		p, lowercase	p
113		q, lowercase	q
114		r, lowercase	r
115		s, lowercase	s
116		t, lowercase	t
117		u, lowercase	u
118		v, lowercase	v
119		w, lowercase	w
120		x, lowercase	x
121		y, lowercase	y
122		z, lowercase	z
123	(-	Open brace	{
124	^ /	Bar		

LMBCS code	Compose sequence	Description	Character
125	) -	Close brace	}
126	- -	Tilde	~
127		Delete	△
128	C ,	C cedilla, uppercase	Ç
129	u "	u umlaut, lowercase	ü
130	e '	e acute, lowercase	é
131	a ^	a circumflex, lowercase	â
132	a "	a umlaut, lowercase	ä
133	a '	a grave, lowercase	à
134	a ×	a ring, lowercase	å
135	c ,	c cedilla, lowercase	ç
136	e ^	e circumflex, lowercase	ê
137	e "	e umlaut, lowercase	ë
138	e '	e grave, lowercase	è
139	i "	i umlaut, lowercase	ï
140	i ^	i circumflex, lowercase	î
141	i '	i grave, lowercase	ì
142	A "	A umlaut, uppercase	Ä
143	A ×	A ring, uppercase	Å
144	E '	E acute, uppercase	É
145	ae	ae diphthong, lowercase	æ
146	A E	AE diphthong, uppercase	Æ
147	o ^	o circumflex, lowercase	ô
148	o "	o umlaut, lowercase	ö
149	o '	o grave, lowercase	ò
150	u ^	u circumflex, lowercase	û
151	u '	u grave, lowercase	ù
152	y "	y umlaut, lowercase	ÿ
153	O "	O umlaut, uppercase	Ö
154	U "	U umlaut, uppercase	Ü

LMBCS code	Compose sequence	Description	Character
155	o /	o slash, lowercase	ø
156	**L = l = L- or l-**	British pound sterling symbol	£
157	O /	O slash, uppercase	Ø
158	x x or X X	Multiplication sign	×
159	f f	Guilder	ƒ
160	a '	a acute, lowercase	á
161	i '	i acute, lowercase	í
162	o '	o acute, lowercase	ó
163	u '	u acute, lowercase	ú
164	n ~	n tilde, lowercase	ñ
165	N ~	N tilde, uppercase	Ñ
166	a _ or A _	Feminine ordinal indicator	ª
167	O _ or o _	Masculine ordinal indicator	º
168	? ?	Question mark, inverted	¿
169	RO ro R0 or r0	Registered trademark symbol	®
170	-]	End of line symbol/Logical NOT	¬
171	**1 2**	One half	$^1/_2$
172	**1 4**	One quarter	$^1/_4$
173	! !	Exclamation point, inverted	¡
174	< <	Left angle quotes	«
175	> >	Right angle quotes	»
176		Solid fill character, light	░
177		Solid fill character, medium	▒
178		Solid fill character, heavy	█
179		Center vertical box bar	│

LMBCS code	Compose sequence	Description	Character
180		Right box side	┤
181	A '	A acute, uppercase	Á
182	A ^	A circumflex, uppercase	Â
183	A `	A grave, uppercase	À
184	CO co C0 or c0	Copyright symbol	©
185		Right box side, double	╡
186		Center vertical box bar, double	║
187		Top right box corner, double	╗
188		Bottom right box corner, double	╝
189	c | c / C | or c /	Cent sign	¢
190	Y = y = Y - or y -	Yen sign	¥
191		Top right box corner	┐
192		Bottom left box corner	└
193		Bottom box side	┴
194		Top box side	┬
195		Left box side	├
196		Center horizontal box bar	─
197		Center box intersection	┼
198	a ~	a tilde, lowercase	ã
199	A ~	A tilde, uppercase	Ã
200		Bottom left box corner, double	╚
201		Top left box corner, double	╔
202		Bottom box side, double	╩
203		Top box side, double	╦

LMBCS code	Compose sequence	Description	Character
204		Left box side, double	╞
205		Center horizontal box bar, double	═
206		Center box intersection, double	╬
207	XO xo X0 or x0	International currency sign	¤
208	d -	Icelandic eth, lowercase	ð
209	D -	Icelandic eth, uppercase	Ð
210	E ^	E circumflex, uppercase	Ê
211	E ''	E umlaut, uppercase	Ë
212	E '	E grave, uppercase	È
213	i <space>	i without dot (lowercase)	ı
214	I '	I acute, uppercase	Í
215	I ^	I circumflex, uppercase	Î
216	I ''	I umlaut, uppercase	Ï
217		Bottom right box corner	┘
218		Top left box corner	┌
219		Solid fill character	█
220		Solid fill character, lower half	▄
221	/ <space>	Vertical line, broken	¦
222	I '	I grave, uppercase	Ì
223		Solid fill character, upper half	▀
224	O '	O acute, uppercase	Ó
225	s s	German sharp (lowercase)	ß
226	O ^	O circumflex, uppercase	Ô
227	O '	O grave, uppercase	Ò
228	o ~	o tilde, lowercase	õ
229	O ~	O tilde, uppercase	Õ

LMBCS code	Compose sequence	Description	Character
230	/ u	Greek mu, lowercase	μ
231	p -	Icelandic thorn, lowercase	þ
232	P -	Icelandic thorn, uppercase	Þ
233	U '	U acute, uppercase	Ú
234	U ^	U circumflex, uppercase	Û
235	U '	U grave, uppercase	Ù
236	y '	y acute, lowercase	ý
237	Y '	Y acute, uppercase	Ý
238	^ -	Overline character	‾
239		Acute accent	´
240	- =	Hyphenation symbol	-
241	+ -	Plus or minus sign	±
242	- - or ==	Double underscore	=
243	3 4	Three quarters sign	3/4
244		Paragraph symbol	¶
245		Section symbol	§
246	: -	Division sign	÷
247	, ,	Cedilla accent	¸
248	^ 0	Degree symbol	°
249		Umlaut accent	¨
250	^ .	Center dot	·
251	^ 1	One superscript	1
252	^ 3	Three superscript	3
253	^ 2	Two superscript	2
254		Square bullet	■
255		Null	

Group 1

This section defines the Group 1 LMBCS characters.

LMBCS code	Key code	Compose sequence	Description	Character
256	(000)		Null	
257	(001)		Smiling face	☺
258	(002)		Smiling face, reversed	☻
259	(003)		Heart suit symbol	♥
260	(004)		Diamond suit symbol	♦
261	(005)		Club suit symbol	♣
262	(006)		Spade suit symbol	♠
263	(007)		Bullet	●
264	(008)		Bullet, reversed	◘
265	(009)		Open circle	○
266	(010)		Open circle, reversed	◙
267	(011)		Male symbol	♂
268	(012)		Female symbol	♀
269	(013)		Musical note	♪
270	(014)		Double musical note	♫
271	(015)		Sun symbol	☼
272	(016)		Forward arrow indicator	►
273	(017)		Back arrow indicator	◄
274	(018)		Up-down arrow	↕

LMBCS code	Key code	Compose sequence	Description	Character
275	(019)		Double exclamation points	‼
276	(020)	!p or !P	Paragraph symbol	¶
277	(021)	SO so S0 or s0	Section symbol	§
278	(022)		Solid horizontal rectangle	▬
279	(023)		Up-down arrow, perpendicular	↨
280	(024)		Up arrow	↑
281	(025)		Down arrow	↓
282	(026)		Right arrow	→
283	(027)	m g	Left arrow	←
284	(028)		Right angle symbol	∟
285	(029)		Left-right symbol	↔
286	(030)	b a	Solid triangle	▲
287	(031)	e a	Solid triangle inverted	▼
288	(032)	" \<space\>	Umlaut accent, uppercase	¨
289	(033)	~ \<space\>	Tilde accent, uppercase	~
290	(034)		Ring accent, uppercase	°
291	(035)	^ \<space\>	Circumflex accent, uppercase	^
292	(036)	' \<space\>	Grave accent, uppercase	`

LMBCS code	Key code	Compose sequence	Description	Character
293	(037)	' <space>	Acute accent, uppercase	'
294	(038)	" ^	High double quotes, opening	"
295	(039)		High single quote, straight	'
296	(040)		Ellipsis	...
297	(041)		En mark	–
298	(042)		Em mark	—
299	(043)		Null	
300	(044)		Null	
301	(045)		Null	
302	(046)		Left angle parenthesis	<
303	(047)		Right angle parenthesis	>
304	(048)	<space> "	Umlaut accent, lowercase	..
305	(049)	<space> ~	Tilde accent, lowercase	~
306	(050)		Ring accent, lowercase	°
307	(051)	<space> ^	Circumflex accent, lowercase	^
308	(052)	<space> `	Grave accent, lowercase	`
309	(053)	<space> '	Acute accent, lowercase	'
310	(054)	" v	Low double quotes, closing	"
311	(055)		Low single quote, closing	,

LMBCS code	Key code	Compose sequence	Description	Character
312	(056)		High double quotes, closing	˝
313	(057)	_ \<space\>	Underscore, heavy	—
314	(058)		Null	
315	(059)		Null	
316	(060)		Null	
317	(061)		Null	
318	(062)		Null	
319	(063)		Null	
320	(064)	O E	OE ligature, uppercase	Œ
321	(065)	o e	oe ligature, lowercase	œ
322	(066)	Y "	Y umlaut, uppercase	Ÿ
323	(067)		Null	
324	(068)		Null	
325	(069)		Null	
326	(070)		Left box side, double joins single	╞
327	(071)		Left box side, single joins double	╟
328	(072)		Solid fill character, left half	▌
329	(073)		Solid fill character, right half	▐
330	(074)		Null	
331	(075)		Null	
332	(076)		Null	

LMBCS code	Key code	Compose sequence	Description	Character
333	(077)		Null	
334	(078)		Null	
335	(079)		Null	
336	(080)		Bottom box side, double joins single	⊥
337	(081)		Top box side, single joins double	╤
338	(082)		Top box side, double joins single	╥
339	(083)		Bottom single left double box corner	╙
340	(084)		Bottom double left single box corner	╘
341	(085)		Top double left single box corner	╒
342	(086)		Top single left double box corner	╓
343	(087)		Center box intersection, vertical double	╫
344	(088)		Center box intersection, horizontal double	╪
345	(089)		Right box side, double joins single	╡

LMBCS code	Key code	Compose sequence	Description	Character
346	(090)		Right box side, single joins double	⊣‖
347	(091)		Top single right double box corner	╖
348	(092)		Top double right single box corner	╕
349	(093)		Bottom single right double box corner	╜
350	(094)		Bottom double right single box corner	╛
351	(095)		Bottom box side, single joins double	⊥
352	(096)	i j	ij ligature, lowercase	ij
353	(097)	I J	IJ ligature, uppercase	IJ
354	(098)	f i	fi ligature, lowercase	fi
355	(099)	f l	Fl ligature, lowercase	fl
356	(100)	' n	n comma, lowercase	'n
357	(101)	l .	l bullet, lowercase	l·
358	(102)	L .	L bullet, uppercase	L·
359	(103)		Null	
360	(104)		Null	
361	(105)		Null	
362	(106)		Null	

LMBCS code	Key code	Compose sequence	Description	Character
363	(107)		Null	
364	(108)		Null	
365	(109)		Null	
366	(110)		Null	
367	(111)		Null	
368	(112)		Single dagger symbol	†
369	(113)		Double dagger symbol	‡
370	(114)		Null	
371	(115)		Null	
372	(116)		Null	
373	(117)		Null	
374	(118)	TM Tm or tm	Trademark symbol	™
375	(119)	lx	Liter symbol	ℓ
376	(120)		Null	
377	(121)		Null	
378	(122)		Null	
379	(123)		Null	
380	(124)	KR Kx or kx	Krone sign	Kr
381	(125)	- [	Start of line symbol	⌐
382	(126)	LI Lix or li	Lira sign	£
383	(127)	PT Pt or pt	Peseta sign	Pt

Note LMBCS codes 384 through 511 duplicate LMBCS codes 128 through 255, for use with code groups of other countries. Refer to LMBCS codes 128 through 255 in the **Group 0 table** for a list of these characters.

This appendix provides some basic information about how to efficiently use memory with 1-2-3 for Windows.

Many factors affect the amount of memory available to 1-2-3 and the amount of memory 1-2-3 uses. Among them are the type and amount of memory you have on your system, how you configure your system's memory for Windows, the other programs you have in memory, the type of data you enter in your worksheet files, and the structure of your worksheet files.

Note   For information about how to configure your system's memory for Windows, see your Windows documentation.

How 1-2-3 allocates memory for data
Regaining memory
If you are out of memory
Hard disk storage

This appendix provides some basic information about how to efficiently use memory with 1-2-3 for Windows.

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How 1-2-3 allocates memory for data
Regaining memory
    Structuring your worksheets for efficiency
    Eliminating blocks of unusable memory
    Finding and removing unneeded entries and settings
    Consolidating worksheets and worksheet files
    Removing unneeded formulas
    Turning off undo
    Closing files you are not working in directly
If you are out of memory
Hard disk storage

How 1-2-3 allocates memory for data

When you enter data in a worksheet file, 1-2-3 uses memory to track certain information about the worksheet file. For example, 1-2-3 keeps track of the cells that contain data in each worksheet where you enter data. Knowing how this memory is allocated will help you use memory efficiently.

To make processing faster and more efficient, 1-2-3 divides each column in the worksheet into groups of 8 cells. When you make an entry in any of the 8 cells in a group, 1-2-3 prepares each of the cells in that group to receive an entry. For instance, if you make an entry in C4, 1-2-3 prepares C1..C8 to receive entries. Preparing a cell to receive an entry is called **opening** the cell and uses 4 bytes of memory per cell and 2 extra bytes for each group of 8 cells. Subsequent entries in cells C1..C8 use only the number of bytes for the entries themselves, not that additional 4 bytes to open the cells.

1-2-3 also divides columns into larger sections of 512 cells each. Within each section, 1-2-3 opens the cells between the top and bottom entries. For example, if you make entries in A1 and A512, 1-2-3 opens A1..A512. If you make entries in A9 and A256, 1-2-3 opens A9..A256. If you make entries in A1 and A513, however, 1-2-3 opens only A1..A8 and A513..A520, not the cells in between, because A1 and A513 are in different 512-cell sections.

> **Note**   In some cases, opening cells may take more memory than stated above. For instance, the first entry you make in a worksheet takes approximately 30 extra bytes because 1-2-3 creates a table to track future entries.

When you start to run out of memory on your computer, processing slows down noticeably and the low memory indicator (MEM) will eventually appear in the status line. To speed up processing and avoid this situation, you can do the following:

- Structure your worksheet files for efficiency.
- Eliminate blocks of unusable memory.
- Find and remove unneeded entries and settings.
- Consolidate worksheets and worksheet files.
- Remove unneeded formulas.
- Remove other programs from memory.
- Turn off undo.
- Close any files you are not directly working in.

If these prevention measures fail and the MEM indicator appears, see **"If you are out of memory"**.

Structuring your worksheet files for efficiency

You can do one or more of the following things to structure your files to minimize memory use:

- Because 1-2-3 allocates memory in vertical blocks, it is often more efficient to use additional rows rather than additional columns when adding sections of data to your worksheets.
- Keep sections of data as close together as possible. Entering data in cells A1 and A512 uses more memory than entering the same data in cells A1 and A2. When you do spread sections of data into different areas of the worksheet, remember that 1-2-3 allocates memory in sections of 512 cells.
- Use fewer worksheets. When you add data to a worksheet file, enter it in blank columns of existing worksheets. Entering data on additional worksheets uses more memory.

Eliminating blocks of unusable memory

As you build worksheet files, unused memory can become divided into small blocks that are surrounded by large blocks of used memory. Sometimes the blocks of unused memory are too small for 1-2-3 to use.

To regain the use of this memory, use File Save As to save your worksheet file, close the file, and then use File Open to read it back into memory. When you read a worksheet file into memory, 1-2-3 places the entire file in one large block of memory, if possible, eliminating the smaller blocks of unusable memory.

Finding and removing unneeded entries and settings

Cells that contain unnecessary data or formulas, or have settings you don't need use a significant amount of memory. You can restore this memory by finding and removing the data or settings.

To find unneeded data or settings, first find the active area of each worksheet (the rectangular area between the top left entry and the bottom right entry) by pressing END HOME. If the active area is significantly bigger than you expected, it probably contains unneeded data or settings. You can use END CTRL+HOME to find the active area of an entire file that contains more than one worksheet.

The list below shows the methods for eliminating unneeded data and settings:

- Use Edit Clear Special to eliminate unneeded data, cell formats, styles, or graphs.

- If entire columns, rows, or worksheets contain unneeded data or settings, use Worksheet Delete Column, Worksheet Delete Row, or Worksheet Delete Sheet to eliminate them.

- Use File Save As to save the file, close the file, and then use File Open to read the file back into memory.

- If you have cells containing unneeded data or settings in several areas of the file, use File Extract To to create a new file that contains only the data you need.

Consolidating worksheets and worksheet files

Every worksheet that contains data requires memory. If you need more memory, condense your data into fewer worksheets with Worksheet Delete Sheet.

Open windows use a substantial amount of memory, even if the windows are reduced to icons. To conserve memory, close the windows you are not using.

Removing unneeded formulas

Formulas use more memory than their results. If your worksheet file includes formulas and you need only the results of the formulas, you can save memory by changing the formulas to values. To eliminate formulas and leave only the results, use Edit Quick Copy and select Convert to Values.

Caution   Make sure you do not eliminate formulas that are part of a chain of formulas. The formulas that rely on the formula you deleted will no longer change when the underlying data changes.

Turning off undo

When undo is turned on, the amount of memory available can vary significantly after each command you use. If you erase a large range, for example, undo stores the erased range, which uses a large amount of memory.

If you are running out of memory, you can turn undo off with Tools User Setup.

Closing files you are not working in directly

You will have more memory available if you open only those files that you need to work in directly. If you are using a file as a reference only, it can reside on disk.

For example, suppose you have linked two worksheet files with a formula. That formula reference will work whether or not the worksheet files are open.

If you are out of memory

If the MEM indicator appears, your computer may not have enough memory to complete the last command or entry.

If there are important files you want to save, close other open windows first and try to save them. You can also try to save your worksheet files to a disk or a different partition on your hard disk. After you have done this, end the 1-2-3 work session and then restart 1-2-3.

Hard disk storage

Another constraint on 1-2-3 is the amount of space available on your hard disk. Insufficient space problems can occur if you put too many files on your hard disk. If you try to write data to a filled hard disk, Windows returns a message stating that the disk is full and to choose another disk drive for the file, either a disk drive or another hard disk partition. In addition, Windows uses space on the hard disk for a **swap file**, a hidden file that reserves space on the hard disk that Windows uses when it gets low on memory. For more information about configuring your Windows swap file, see your Windows documentation.

To avoid frequently running out of hard disk space, use the Windows File Manager to delete files you no longer need from the hard disk. Obsolete files on the hard disk take up space that can be used to store current files. If you want to keep obsolete files, copy the files to disks before you delete them.