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CHAPTER 1: INTRODUCTION

Welcome to JSheet Builder, a sophisticated spreadsheet application that fulfills a wide variety of requirements. Whether your needs are simple spreadsheet templates, dynamic data analysis, or comprehensive analytical applications for enterprise-wide deployment, JSheet Builder is the answer.

This manual provides a complete reference to the functionality of JSheet Builder. Information is grouped and presented by topic. Step-by-step procedures are provided for performing specific tasks.

To most efficiently use this manual, you should be familiar with the basic functionality of JSheet Builder. In most instances, this book provides easy-to-follow instructions that step you through the procedures you need to do to accomplish your task in JSheet Builder.

About this Manual

Chapter 1, Introduction contains information about the contents of each chapter and the documentation conventions used throughout the JSheet Builder documentation set.

Chapter 2, The JSheet Builder Environment provides an overview of the worksheet components, worksheet navigation methods, and the use of on-line help.

Chapter 3, JSheet Builder File Actions provides information about creating, opening, closing, and saving documents.

Chapter 4, Printing Documents, discusses the JSheet Builder printing tools. Information about setting page breaks, defining page setup, and formatting a report is provided.

Chapter 5, Entering Data, addresses the basic knowledge required to select cells and enter data in your worksheet. Filling ranges with data and linking worksheets is also discussed.

Chapter 6, Creating Formulas, discusses formulas and formula components. Information is provided about creating and using formulas and using the built-in functions.

Chapter 7, Calculating Data, addresses setting up your worksheet for calculating data. Information about specialized data calculation for tables, matrix mathematics, and frequency distributions is also included.

Chapter 8, Formatting Data, explains how to define the appearance of data in your worksheet. Applying fonts, text colors, number formats, and number attributes are discussed.

Chapter 9, Moving and Copying Data, explains how to move and copy data using both basic and advanced commands.

Chapter 10, Auditing Workbooks, discusses how to search for and select specific items and data in your worksheet.

Chapter 11, Modifying the Worksheet Window, provides information about selecting and formatting worksheet elements, showing and hiding worksheet elements, arranging windows, and resizing rows and columns.

Chapter 12, Creating Charts presents information about creating, formatting, and manipulating charts. Information about the predefined JSheet Builder chart types is presented.

Chapter 13, Boundin Functions explains the structure and composition of boundin tools and the functions they contain. Examples of the required sections and a complete boundin tool are also provided.

Chapter 14, Privileges identifies the various categories of workbook, worksheet, and cell range privileges. This chapter also explains how to assign, change, and delete privileges.

Chapter 15, Importing Files provides information about the different file formats that can be opened in a JSheet Builder workbook.

Documentation Conventions

Recognizing the following JSheet Builder documentation conventions will help you understand and use your documentation:

- Book, chapter, and section titles are shown in italics (e.g., *JSheet Functions* or *Chapter 2: The JSheet Builder Environment*).

- Entities that can be located on the screen are shown in boldface type (e.g., the **File** menu, the **Accept Entry** button, or the **OK** button).

- File names are shown in proper case, boldface type (e.g., **Chap4.jss**). Your environment may display file names in a different case.

- Menu commands are shown in boldface type with the menu, submenu, and command names separated by a slash (e.g., **File/New** or **Window/Display Settings**). Menu names are listed first, followed by submenu names and then command names.

- Keys are denoted in all uppercase, condensed type (e.g., RETURN, BACKSPACE, CONTROL, or SHIFT).

- Steps required to perform a task are numbered.

- Function keywords appear in uppercase, condensed type (DAYNAME or SUM). This convention is used to help you recognize functions and their syntax. Functions are not case-sensitive.

- Function arguments are shown in lowercase type (expressions, string1, or price).

- Tip paragraphs offer additional details about the functionality being described.

- Important paragraphs contain vital instructions, cautions, or other significant information about the feature or operation being described.

Identifying Dialog Box Types

JSheet Builder allows you to modify the environmental features of dialog box types by choosing between modal and modeless dialog boxes.

A modal dialog box closes after you apply its settings. It normally features an **OK** button and a **Cancel** button. The **OK** button applies settings and closes the dialog box, while the **Cancel** button closes the dialog box without applying setting changes.

A modeless dialog box remains on your screen even after you apply or reset its settings. It normally features an **Apply** button and a **Reset** button. The **Apply** button applies settings, while the **Reset** button discards any changes made in the dialog box and redisplays the current or default settings in the dialog box. If you double-click the **Apply** or **Reset** buttons, the action of the button is performed and the dialog box is closed.

A modeless dialog box can be used to interactively experiment with a variety of settings. For example, you might use the modeless Text dialog

box to test different fonts, sizes, and colors for worksheet data. You can move the modeless dialog box to any location on your screen to provide a clear view of your data. Then, you can format the data until you obtain the desired results. Once you have obtained the desired results, you can close the dialog box.

A modeless dialog box remains on screen until you close it. If another window becomes current, the modeless dialog box is unselected, but remains open. By allowing one or more frequently used dialog boxes to remain open, you can rapidly perform many tasks. You need only reselect the desired dialog box (using the method appropriate for your windowing environment) and click **Reset** to display the current settings for the selected items. Then, apply new settings.

Important: The step-by-step procedures included in this manual are based on the use of modal dialog boxes. If you are using modeless dialog boxes, use the **Apply** button whenever the **OK** button is specified by the procedures. In addition, the procedures do not address closing modeless dialog boxes.

To choose a dialog box type:

1. Choose **Administration/Preferences** to display the **Preferences** dialog box.

2. Select the **Environment** tab.

3. Select **Modeless** or **Modal** from the **Dialog Style** popup menu and click **OK**.

Using Vague State Dialog Boxes

Several JSheet Builder dialog boxes contain controls that can assume a vague state. If a control is in vague state, the title of the control is displayed in italics. When the settings of a dialog box are applied,

controls that are in vague state do not pass information to the items being formatted.

Only controls that are in active state pass information to the items being formatted. The title of a control that is in active state is displayed in bold, non-italicized type.

For example, the **Cells** dialog box contains controls that can assume a vague state. If you enter a point size in the **Size** number wheel, it changes to active state. The **Color** popup remains in vague state. When you apply settings from the dialog box, the **Size** setting is applied while the **Color** setting is not.

If multiple items are selected when a vague state dialog box is displayed (for example, a range of cells or multiple objects), all controls are in vague state. When you make a selection from or enter information in a vague state control, it changes to active state.

Figure 1-1
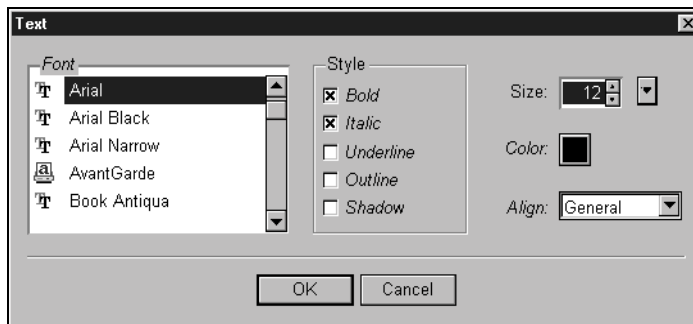
CHAPTER 2: THE JSHEET BUILDER ENVIRONMENT

After JSheet Builder is launched, the JSheet Builder environment is displayed on your screen. All the work you do to enter and manipulate data is performed in this environment. The JSheet Builder environment includes a menu bar, toolbar, and workbook window.

This chapter introduces you to each of the components of the JSheet Builder environment. Read this chapter to learn how to:

- use the JSheet Builder Toolbar.

- navigate within the worksheet grid.

- use the Entry Bar components.

- customize the display and performance of JSheet Builder to meet your needs.

Using the Menu Bar

The JSheet Builder Menu Bar contains menus, submenus, and commands. While working in JSheet Builder, you use the menu bar to perform tasks and initiate actions. The Menu Bar contains ten menus. The content of each menu is described below:

- The **File** menu provides the command you need to manage and work with files. The commands you need to create, open, close, save, and print worksheets, and to exit JSheet Builder are in the **File** menu.

- The commands you use to edit data are contained in the **Edit** menu. Use these commands to undo actions; cut, copy, paste, and clear data; and insert or delete entire rows, columns, or ranges of data. In addition, the **Edit** menu contains specialized copy, paste, and clear commands.

- The **Select** menu contains the commands you need to seek and select specific locations on your worksheet. Use **Select** commands to perform find and replace actions, go to or select specific locations in your worksheet, audit your workbook, and name ranges.

- The **Format** menu provides the commands you use to format data and worksheets. Use **Format** commands to specify fonts and font attributes for text and numbers, define page breaks, and specify row and column sizes.

- The commands that you use to manipulate and calculate data in worksheets are provided in the **Sheet** menu. Use the commands on this menu to recalculate a worksheet, fill cells with data, sort data, manipulate linked worksheets, convert linear data to columnar data, define and manipulate your data as a database, perform mathematical analysis and matrix operations, and protect your worksheet.

- The **Chart** menu contains commands that you use to edit charts, manipulate the elements of a chart, and select from predefined JSheet Builder chart types.

- Commands that are used to create, record, compile, and run scripts are contained in the **Script** menu.

- The **Administration** menu contains commands to administer users, groups, license configurations, and change preference settings.

- The **Window** menu provides commands that enable you to define the display of the JSheet Builder environment.

- The **Help** menu provides access to on-line help and information about the version of JSheet Builder that you are using.

Using the Toolbar

The JSheet Builder Toolbar is a free-floating palette. It can be moved to any location on your screen. The Toolbar works with any open workbook. Because the Toolbar is free-floating, it can be closed independently of other windows on the screen.

You can specify the default position for the Toolbar in **Preferences**. Refer to *Setting JSheet Builder Preferences* later in this chapter for information about setting this option. Use the mechanism for closing windows that is provided by your windowing environment to close the JSheet Builder Toolbar.

You can also choose **Window/Toolbar/Hide** to hide the Toolbar. To redisplay the Toolbar, choose **Window/Toolbar/Show**.

The following table describes the tools in the JSheet Builder Toolbar.

⊞	Open Workbook	Used to open existing workbooks.
⊡	Save Workbook	Used to save an existing workbook.
✄	Cut	Used to cut the selected data from worksheet cells.
▯	Copy	Used to copy the selected data.
▣	Paste	Used to paste data held in the clipboard buffer.
6/6.0	Format Numbers	Used to apply precision to decimal values.
a/*a*	Format Text	Used to format text and apply font attributes.
B	Bold Text	Used to bold the selected data.
I	Italicize Text	Used to italicize the selected data.
U	Underscore	Used to underline the selected data.
≡	Align Left	Used to left justify selected data.
≡	Align Center	Used to center the selected data.
≡	Align Right	Used to right justify selected data.
⤵	Format Colors & Lines	Used to specify colors and line properties.

Introducing the Workbook Window

The workbook window contains the worksheet grid and the Entry Bar. The worksheet grid contains rows and columns that intersect to form cells. All data is stored in the cells. The Entry Bar, located above the worksheet grid, is used to enter and edit all the data stored in the cells. By default, each workbook has three worksheets. You can add or delete worksheets by using the options available in the **Sheet** menu. The following illustration shows a workbook window.

Figure 2-1

Entry Bar

Worksheet Grid

Use the Tab Scrolling Buttons to move from one worksheet to the next in a workbook.
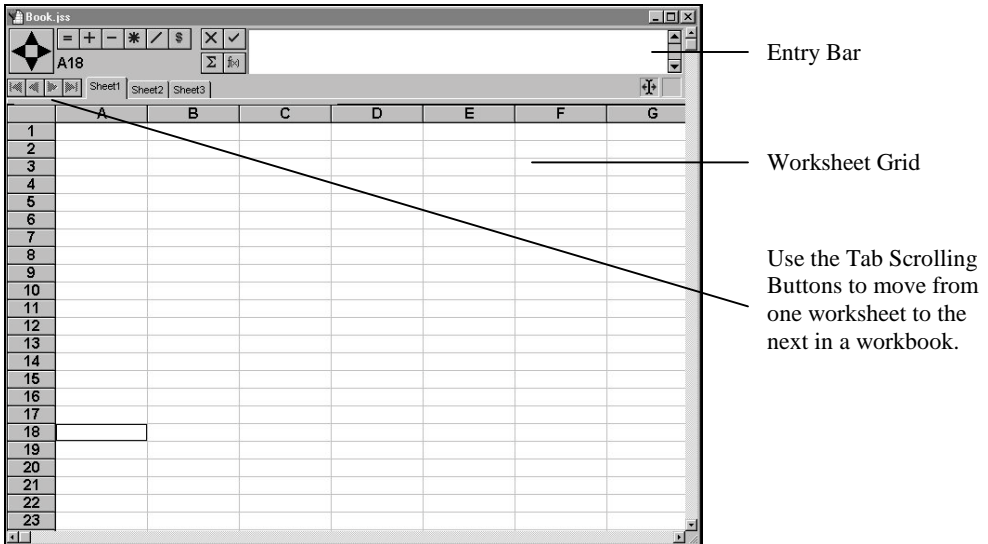
Using the Worksheet Grid

Each row and column in the worksheet grid is labeled with a heading. Rows are always labeled with numbers; columns can be labeled with letters or numbers. Column headings are defined in the **Display Settings** dialog box.

To change the method for labeling columns:

1. Choose **Window/Display Settings**.

2. In the **Sheet Headings** popup menu, select **R1C1** to label columns and rows with numbers, or select **A1** to label columns with letters and rows with numbers.

3. Click **OK**.
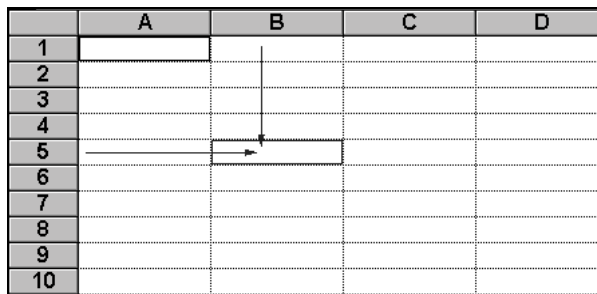
Important: The remainder of this book assumes that your worksheet columns are labeled with letters. All cell and range references use this method for identifying locations on the worksheet.

Each cell in the worksheet is given an address based on the headings of the column and row that intersect to form the cell. The following illustration highlights a cell and its respective address in the worksheet grid. Column B and Row 5 intersect to form cell **B5**. Cell **B5** is the current cell.

Figure 2-2

When a cell is selected, it is current. The current cell is outlined with a border. The current cell receives the data you type and enter. Refer to *Chapter 5, Entering Data* for information about how to select cells and enter data.

If more than one contiguous cell is selected at a time, the selected cells are referred to as a range. A range is referenced using the addresses of the first and last cells in the range (the "anchor" cells). The following illustration shows a worksheet grid with a range selected. The address for the selected range is **B3..C5**. The current cell in the range is **B3**. Input in a selected range goes to the current cell. The first anchor cell of the selected range is **B3** and the last anchor cell is **C5.**

Figure 2-3

Navigating Within the Worksheet

You can use keystrokes, scroll bars, or the **Navigator** to move around in a worksheet. Keystrokes provide shortcuts for moving around; scroll bars scroll the worksheet left, right, up, or down; the **Navigator** moves between data ranges and locates the boundaries of a worksheet.

Navigating with Keyboard Shortcuts

Use the following keyboard shortcuts to navigate through a worksheet.

Keystroke	Scrolling Action
PAGE UP	Scrolls the worksheet up one screen.
PAGE DOWN	Scrolls the worksheet down one screen.
CONTROL PAGE UP	Scrolls the worksheet left one screen.
CONTROL PAGE DOWN	Scrolls the worksheet right one screen.
UP ARROW ($\uparrow$)	Moves the current cell up one row.
DOWN ARROW ($\downarrow$)	Moves the current cell down one row.
LEFT ARROW ($\leftarrow$)	Moves the current cell left one column.
RIGHT ARROW ($\rightarrow$)	Moves the current cell right one column.
CONTROL UP ARROW ($\uparrow$)	Moves the current cell up one screen and scrolls the worksheet.
CONTROL DOWN ARROW ($\downarrow$)	Moves the current cell down one screen and scrolls the worksheet.
CONTROL LEFT ARROW ($\leftarrow$)	Moves the current cell left one screen and scrolls the worksheet.
CONTROL RIGHT ARROW ($\rightarrow$)	Moves the current cell right one screen and scrolls the worksheet.

Navigating with Scroll Bars and Locator Boxes

In addition to standard scroll bar operations for your windowing environment, JSheet Builder provides a locator box when you navigate with a scroll bar. When you drag the scroll box in a scroll bar, a locator box appears on your worksheet to indicate the row or column to which the worksheet is scrolled if the mouse button is released. The following illustration shows a vertical and a horizontal scroll bar locator box.

Figure 2-4
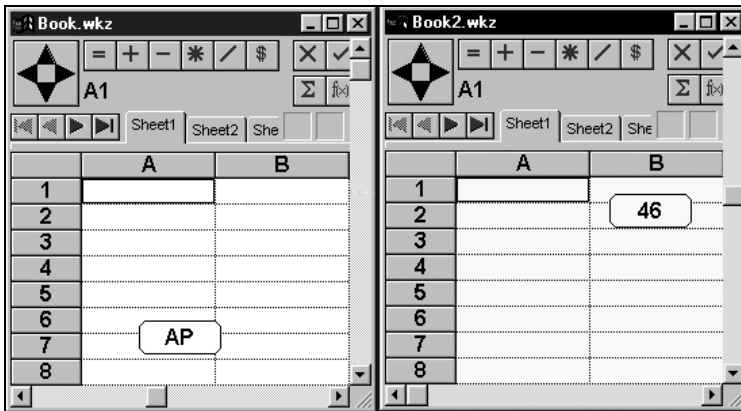
Navigating with the Navigator

The **Navigator** is located in the entry bar and contains four arrow-shaped buttons that you use to move between distinct data ranges and locate the boundaries of a worksheet.

If you assume that the current cell is located in a range that contains data, click an arrow in the **Navigator** to move the current cell selection in the direction of the arrow to the last cell of the current range. Click the same directional button again to move the current selection to the first cell of

the next range, if another range exists. If an additional range is not located, the current cell is advanced in the appropriate direction to the edge of the worksheet.

The following illustration shows the use of the **Navigator**. The worksheet contains two distinct ranges of data. The current cell is **B1.** As shown in the figure, click the down arrow in the **Navigator** to advance the current cell to **B6**, the last cell that contains data in that range. Click the same arrow a second time to advance the current cell to **B10**, the first cell in the next data range. Click the down arrow again to move the current cell to **B13.** Click the arrow a fourth time to move the current cell to **B32768**, the last cell in column **B.**

Figure 2-5

	A	B	C	D
1	Original cell address	►625.42	2256.31	
2		281.21	728.62	
3		541.24	2361.82	
4		592.99	1692.81	
5		1618.15	2144.38	
6	Current cell after first down arrow click	►1175.44	511.80	
7				
8				
9				
10	Current cell after second click.	► 219.22	310.35	
11		1882.75	1035.56	
12		2989.48	2245.22	
13	Current cell after third click	► 62.96	659.86	
14				

	A	B	C	D
32766				
32767				
32768	Cell B32768 becomes the current cell after the fourth click.			

Introducing the Entry Bar

Every worksheet contains an Entry Bar. The Entry Bar contains controls that allow you to enter and edit worksheet data, add cell contents, paste functions, and navigate the worksheet. The following illustration identifies some of the elements of the Entry Bar.

Figure 2-6

Navigator   Operators   Cancel Entry   Accept Entry   Entry Field
                          Button   Button
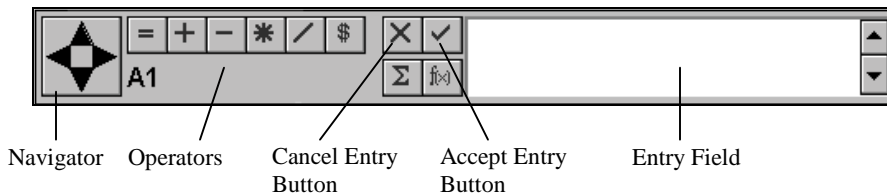
Using the Cell Entry Controls

You use the Entry Field, together with the **Accept Entry** and **Cancel Entry** buttons, to enter and edit data in a cell. To enter data in a cell, select a cell and begin typing. As you type, the characters are displayed in the Entry Field. To enter the information into the selected cell, click the **Accept Entry** button. To discard the data you typed in the Entry Field, click the **Cancel Entry** button. For information about how to enter data, refer to *Chapter 5, Entering Data*.

Tip: The **Cancel Entry** button only discards data if it is not already entered in a cell. If data is entered in a cell, you must press BACKSPACE or choose **Edit/Clear** to delete the existing data.

Using the Operator Buttons

Use the Operator buttons, shown in the illustration below, to paste the corresponding arithmetic symbols into formulas in the Entry Field (=, +, -, *, /), and specify relative, absolute, or combination range references

($). For information about range reference types, refer to *Chapter 6, Creating Formulas*.

Figure 2-7

Tip: The equal sign (=), when typed or pasted as the first character in the Entry Field, indicates that the entry is a formula. For more information about how to enter formulas in the Entry Field, refer to *Chapter 6, Creating Formulas*.

Using the Sheet Navigator Buttons

Use the Sheet Navigator buttons, shown in the illustration below, to select the first sheet, previous sheet, next sheet, or last sheet in the current book. The sheet tabs can be selected to jump directly to a specific sheet.

Figure 2-8

Sheet Navigator Buttons   Sheet Tabs
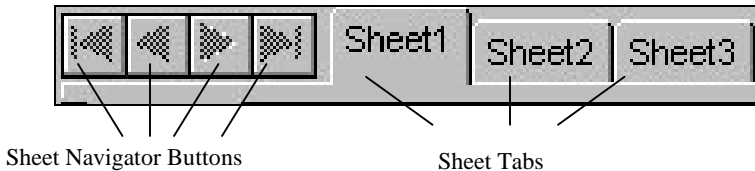
Setting JSheet Builder Preferences

A comprehensive set of JSheet Builder preferences enable you to customize the display and performance of JSheet Builder to meet your needs. The preferences you select are used each time you launch JSheet Builder.

To set the JSheet Builder preferences:

1. Choose Administration/Preferences to display the Preferences dialog box.

2. There are several types of preferences you can set. Click one of the tabs to select the type of preference you want to set.

3. Enter the desired settings for the preference type you selected.

4. Click **OK** to apply all the preference settings.

Format Preferences

The **Format** tab of the **Preferences** dialog box contains the options that control the appearance of the data in your worksheets. Use the **Font Name, Font Size, Font Color, Font Alignment, Font Bold, Font Italic,** and **Font Underline** settings to specify the font name, size, color, alignment, and style for all of the textual data you enter in your worksheets. The text defaults also are used for row and column headings, text in the entry bar, and text in the current cell address.

Use the **Number Format, Precision, Hide Zero, Show Commas, Show Parenthesis**, and **Negative Color** settings to specify the number format, attributes, precision, and negative number color for the numeric data you enter in your worksheets.

Workbook Preferences

Workbook preferences specify some workbook display options. In addition, settings for automatic saving, calculation mode, and display mode are entered here.

- **Public Read, Public Write, Public Save.** Use these options to specify the default public workbook permissions.

- **Number of Sheets**. Use this option to specify how many worksheets will be available in a workbook. A workbook can contain a maximum of 256 sheets. Use the Tab Scrolling buttons (located below the Navigator) to scroll through multiple worksheets.

- **Rollover Year**. Select the start date for two-digit year entry. For example, if the rollover year is set to 1950, then years entered as 50-99 will be interpreted as 1950-1999, respectively and years entered as 00-49 will be interpreted as 2000-2049, respectively.

Paths Preferences

Paths preferences allow you to customize where program files are located.

- **Server Workbook Directory.** Set this preference to the location where all user workbooks are located.

- **Configuration Directory.** This option specifies where the configuration files are to be stored.

- **Help File Location**. After installing the on-line documentation, you can specify where the on-line documentation is to be installed on your system.

Environment Preferences

Environment preferences allow you to customize the display and behavior of the JSheet Builder environment.

- **Create New Workbook On Startup.** Select this preference to request that a new workbook is created each time you launch JSheet Builder.

- **Default Book User.** Select this preference to set the default user.

- **Show File Paths**. This option allows you to display the full path of your file in the title bar of the workbook. The workbook must be saved before the full path is displayed in the title bar.

- **Headings**. Select whether column headings should be labeled with numbers or letters. The options are **A1** (column heading letters) and **R1C1** (column heading numbers).

- **Delete Key.** This option configures the behavior of the DELETE key. The key can be configured to clear only formats, clear only formulas, clear only data, or clear all of the cell contents, including the formatting, formulas, and data.

- **Advance on Numeric Keypad Enter**. This option configures the behavior of the ENTER key located on the 10-key pad. (The 10-key pad is located on the right side of most keyboards.) The key can be configured to enter data and not advance the position of the current cell, or it can enter data and advance the current cell to the next position.

- **Edit Keys**. When this option is disabled during cell editing, you can use the LEFT, RIGHT, UP, and DOWN arrow keys to move from cell to cell and enter information in a worksheet. If this option is enabled, you can move the cursor back and forth in the entry bar without entering text in a cell. Use the F3 key to enable or disable edit keys.

- **Dialog Style.** Select the type of dialog box to be used when you choose commands that invoke dialog boxes. Your choices are **Modeless** or **Modal**. Modeless dialog boxes remain on the screen when you click the dialog default button (usually **OK** or

Apply). Modal dialog boxes are removed from the screen when you click the dialog default button.

- **Show Quick Keys.** Select whether the keyboard shortcut quick keys should appear on the JSheet Builder menus.

- **Toolbar Location.** Select whether the toolbar should appear to the left, on top, to the right, below, or centered on the workbook window. The entire toolbar can also be hidden.

- **Save And Restore Desktop**. This option allows JSheet Builder to remember the placement of windows on your desktop between sessions. Each time a window is displayed, it is placed in the same position and at the same size as when it was closed. Files that were open prior to exiting are opened on the desktop. This option is executed when you select **File/Exit** to quit the application. If you double-click the system menu to quit the application, the desktop information is not saved.

Chart Preferences

Chart preferences assign default attributes to new charts.

- **Chart Type**. Select the type of chart to be used when you create a chart on a worksheet. You can choose from any of the JSheet Builder chart types except combination charts.

- **Chart Parsing**. Select whether columnar data or row data should be used to draw the series of your chart. You can also select **Automatic** to allow JSheet Builder to use the default data source for your chart series.

- **Color Set**. Select the color set for painting series when you create a chart.

- **Borders**. Select whether a border surrounds the charts you create. Select from a variety of border styles, including no line, single line, double line, thick inner line, and thick outer line.

Delimiter Preferences

Delimiter preferences allow you to specify the export separator and the end-of-line separator.

- **Text Export Separator**. Use this option to specify how your text is delimited for exported files. The default setting is **Tab.**

- **End of Line Separator**. This option determines the end-of-line format. The default setting is a carriage return.

Real-time Preferences

Real-time preferences allow you to assign default attributes to real-time worksheets.

- **Highlight Duration.** Enter, in seconds, the length of time that a cell remains highlighted when it is updated due to a real-time value change.

CHAPTER 3: JSHEET BUILDER FILE ACTIONS

JSheet Builder file actions allow you to create, open, close, and save workbooks that contain worksheets. You can also import documents from other applications, save workbooks in foreign formats, export selections from a workbook, and revert to a previously saved version of your workbook.

All the file actions discussed in this chapter are performed in the JSheet Builder environment using commands in the **File** menu. Your system, through the windowing environment or directly from the file system, may provide alternate methods for creating, opening, and closing files. These methods are not discussed in this chapter.

Creating New Workbooks

You can create new workbooks at any time while working in JSheet Builder. To create a new workbook, choose **File/New/Workbook**. A blank workbook that contains three worksheets is displayed on the screen. This workbook becomes the current window. You can select **Administration/Preferences** to change the default setting for the number of worksheets displayed in a workbook.

You can set your preferences to display a new workbook any time you enter JSheet Builder by selecting **Administration/Preferences** and choosing the **Create New Workbook On Startup** option from the **Environment** tab.

A new workbook is given the name **Book.jss**. If you create additional workbooks, they are numbered according to the order of their creation (for example, **Book2.jss**, **Book3.jss**, **Book4.jss**, and so on). The number of workbooks you can have open is dependent on your system's available memory. The maximum number of worksheets you can have in one workbook is 256.

Opening Saved Workbooks

Workbooks saved on your system can be opened at any time while you work in JSheet Builder. You do not have to close a workbook to open another workbook.

To open a saved workbook:

1. Choose **File/Open/Workbook** and select and open the directory in which the file is stored.

2. Click the **Files of Types** popup menu to select the type of file to be displayed in the dialog box. By default, all JSheet Builder files are displayed in the **Open** dialog box. You can also open text files and DIF, SYLK, Excel, and Lotus 123 worksheets.

3. Select the file you want to open.

4. Click **Open**.

Importing Files Created in Other Programs

JSheet Builder can open files created in other programs and saved in formats other than the JSheet Builder workbook format. The following table describes the file formats JSheet Builder recognizes. Refer to *Chapter 15: Importing Files* for more information about importing files.

File Type	File Information
Wingz	Files created with Wingz are opened with all numbers, text, formatting, formulas, objects, and attached scripts intact.
DIF	Files created in this format are opened with numbers and text intact.
SYLK	Files created in this format are opened with numbers and text intact. All formulas are retained except for those not supported by JSheet Builder. Formulas that are unsupported by JSheet Builder appear as text.
Excel	Files created with Excel are opened with all numbers and text intact. Number and text formats are also retained. All formulas are retained except for those not supported by JSheet Builder. Formulas that are unsupported by JSheet Builder appear as text.
Lotus 123-1a	Files created with Lotus 1-2-3, version 1a, are opened with all numbers and text intact. Number and text formats are also retained. All formulas are retained except for those not supported by JSheet Builder. Formulas that are unsupported by JSheet Builder appear as text.
Lotus 123-2.0	Files created with Lotus 1-2-3, version 2.0, are opened with all numbers, text, and their formats intact. All formulas are retained except for those not supported by JSheet Builder. Unsupported formulas are read as text.
Text	Text files retain all numbers and text. Use the Text dialog box to enter the delimiter you want to use.
HTML	HTML files are opened and tables are converted to cell entries.
Wingz Backup	Backup Wingz files are opened with all numbers, text, formatting, formulas, objects, and attached scripts intact.

Spreadsheet programs use various methods to maintain and store dates. To assure that dates stored in foreign workbooks or worksheets are interpreted correctly when opened in JSheet Builder, refer to *Chapter 15*.

Saving Workbooks

When you save a workbook, any worksheet contained in that book is saved and written to a file on your system. You specify where the workbook is saved, the name it is given, and the file format used. When you save a workbook, all worksheets, text, numbers, formulas, formatting, charts, passwords, and attached scripts are saved with the file.

When you initially save a workbook, the Save dialog box appears, and you are prompted to specify where and how the file is to be saved.

To initially save a workbook:

1. Make the workbook you want to save the current window.

2. Choose **File/Save** or **File/Save As**.

3. Select and open the directory in which you want to save the file.

4. Enter the name with which the file is to be saved.

5. Click the **Save as type** popup menu to select the format with which the file is to be saved.

6. Click **Save**.

After you initially save a workbook, choose **File/Save** periodically to save changes you have made to the file. When you resave a file, the file on your system is overwritten with the updated version on your screen.

To save the workbook with a different name, choose **File/Save As**. You can also save the workbook in a different directory and select a different format in which to save the file.

Saving Workbooks in Foreign Formats

When you save a workbook, by default it is saved in JSheet Builder format. If you want to export your workbook so it can be used in other programs, you can select a different file format. The following table describes the formats available for saving your workbook.

Tip: Chart types and chart elements (such as, titles, footnotes, or axis titles) added to a chart with the Workbook Builder interface take advantage of new charting features. Because these features were not available in Wingz 1.1 and Wingz 2.0, these chart elements are not saved when you save a worksheet as a Wingz 1.1 or Wingz 2.0 worksheet (using **Save As/Wingz 1.1** or **Save As/Wingz 2.0**).

Format Type	Format Information
JSheet	Files saved in this format retain all JSheet supported workbooks, numbers, text, formats, and formulas. Only the current workbook is saved.
JSheet Template	Files saved in this format retain all JSheet supported workbooks, numbers, text, formats, and formulas. Only the current workbook is saved.
Wingz 1.1	Files saved in this format retain all Wingz 1.1 supported workbooks, numbers, text, formats, and formulas. Only the current workbook is saved.
Wingz 2.0	Files saved in this format retain all Wing 2.0 supported workbooks, numbers, text, formats, and formulas. Only the current workbook is saved.
Wingz 3.0	Files saved in this format retain all Wingz 3 supported workbooks, worksheets, numbers, text, formats, and formulas.
DIF	Files saved in this format retain only workbook text and numbers. Only the current workbook is saved.
SYLK	Files saved in this format retain all numbers and text, as well as supported formatting and formulas. Only the current workbook is saved.
Excel 97	Files saved in this format retain all numbers, workbooks, text, and supported functions. Supported formatting and formulas are also retained. Charts and objects are not saved. All worksheets in the current workbook are saved.

123-1a	Files saved in this format retain worksheet numbers, text, and Lotus 123 supported formats. Formulas supported by this version of Lotus 123 are also retained. Only the current worksheet is saved.
123-2.0	Files saved in this format retain worksheet numbers, text, and Lotus 123 supported formats. Formulas supported by this version of Lotus 123 are also retained. Only the current worksheet is saved.
HTML	Files saved in this format retain all numbers, text, and most formats.
Text	Files saved in this format retain only worksheet text and numbers.

Exporting Selections from a Workbook

Objects and workbook data can be selected and exported to your system as files. Once exported and saved, the files can be imported by other programs. This saving capability allows you to harness the data manipulation and presentation abilities of JSheet Builder for use in word processing programs, drawing and painting programs, and presentation programs.

To save a selection:

1. Select the items on a worksheet that you want to save. You can select any combination of ranges, objects, and charts to be exported from a single worksheet.

2. Choose **File/Save Selection As**.

3. Click the **Save as type** popup menu to select the format in which the file is to be saved.

4. Click **Save**.

Tip: If several objects are selected, the worksheet area between the objects, including the worksheet grid, is saved with the selected objects. To prevent the worksheet grid and data in the accompanying cells from being exported with the selections, hide the worksheet before saving the selection. Choose **Window/Display Settings** to hide the worksheet.

The file formats in which you can save selections are Encapsulated PostScript (EPS), Encapsulated PostScript Interchange (EPSI), FrameMaker Inset (MIF), Graphic Interchange Format (GIF), HTML, XML, or text files. When you save a selection, a snapshot of the area that contains the selected objects and ranges is created and saved in the file and format you specify.

Tip: In the Windows environment, you can save selections only in the GIF, HTML, XML, and text formats; EPS, EPSI, and MIF formats are not available.

You cannot save objects and charts as text files. Only worksheet data and text from text fields can be saved as text files. If an object or chart is selected with worksheet or text field data when you attempt to save the selection as a text file, a dialog box appears warning you that the objects cannot be saved in text format. You can either save only the selections that can be saved in text format or cancel the action.

Reverting to the Last Saved Workbook

If the changes you have made to a workbook since it was last saved are unwanted, you can revert to the last saved version of your workbook. Reverting to the last saved version discards any changes you have made since the last save, displays the workbook as it was last saved, and allows you to continue working in the workbook.

To revert to the last saved workbook:

1. Choose **File/Revert to Saved**. A dialog box appears that prompts you to confirm that you want to discard the changes made since the last save.

2. Click **OK** to discard the changes and display the last saved version of the workbook. Click **Cancel** to return to the workbook and keep the changes.

Closing Workbooks

Closing a workbook removes the workbook from your screen. You should close workbooks in which you are not working to save memory and to prevent unwanted changes from being made to the workbooks.

To close a workbook:

1. Make the workbook you want to close the current window.

2. Choose **File/Close**.

If no changes have been made to a workbook since the last time it was saved, the workbook closes. If changes have been made since the last save, a dialog box appears that prompts you to save or discard the changes before the workbook is closed.

To save the changes, click **Yes**. To discard the changes, click **No**. To abort the close command and continue working in the workbook, click **Cancel**.

Exiting JSheet Builder

When you are finished working in JSheet Builder, you can choose **File/Exit** to exit the application. Upon exiting, all workbooks, scripts, and dialog boxes are closed and the JSheet Builder environment is removed from your screen. If you have any workbooks or scripts that have unsaved changes, you are prompted to save the changes in each window before that window is closed. You are then returned to the point in your windowing environment from which you launched JSheet Builder or to another application running on your system.

CHAPTER 4: PRINTING DOCUMENTS

Once you have created a workbook, you can print worksheets contained in that workbook in many different ways. You can print a simple worksheet or you can print a fully formatted report complete with headers, footers, borders, and shadows. In addition, JSheet Builder provides the flexibility to select the parts of your worksheet that you want to print. You can also print an entire workbook that includes all active worksheets.

This chapter explains how to:

- define page setup options.

- insert and delete page breaks.

- preview and print your JSheet Builder workbooks.

- define report layouts, including margin settings, scale percentage, and body, header, and footer characteristics.

- use and edit your report layouts.

Defining Page Setup

An important part of printing a worksheet is defining the page setup. Choose **File/Page Setup** to define the page setup for your worksheet.

The following items can be defined in the **Page Setup** dialog box on most systems:

- **Paper.** This option defines the size of page to print and the source from which the paper will print. Most systems identify paper types by name (such as, Letter, Legal, and A4).

- **Orientation**. This option defines the direction your print job is placed on the page. The options are portrait (print job placed vertically on the page) and landscape (print job placed horizontally on the page).

- **Printer**. This option allows you to select the printer to which your print job is sent. The printer must be defined on your system according to the requirements of your environment. When you print the entire workbook, all worksheets must be printed to the same destination.

The **Page Setup** dialog box in your environment may also contain controls for selecting the resolution, the scale percentage of printed output, and the method of printing text and graphics.

Inserting Page Breaks

As you enter data on your worksheet, you can manually define the location of page breaks in your worksheet. JSheet Builder automatically places page breaks in your worksheet according to the currently defined page size. You can manually insert page breaks to separate blocks of data and objects onto different printed pages. Manually placed page breaks override automatic page breaks.

Page breaks are always placed along the cell grid in a worksheet, and are denoted on your worksheet by dashed lines. The following illustration shows a page break in a worksheet. Cell **B7** was the current cell when this page break was set. When you define a page break, vertical and horizontal dashed lines denote the defined page break.

Figure 4-1

	A	B	C	D
2				
3				
4				
5				
6				
7				
8				
9				
10				

To insert a page break, select the cell to adjoin the page break, and choose **Format/Add Page Break**. The page break is placed along the right and bottom edges of the selected cell. The page break extends the width and height of the worksheet.

Removing Page Breaks

Manually inserted page breaks can be removed from your worksheet. You can remove a single page break or all of the manually inserted page breaks.

To remove a manually inserted page break:

1. Select a cell where the right or bottom edges of the cell adjoin the page break you want to remove. To remove a horizontal page break, select a cell where the bottom edge of the cell adjoins the page break you want to remove. To remove a vertical page break, select a cell where the right edge of the cell adjoins the page break. To remove both horizontal and vertical page breaks, select a cell where both the bottom and right edges adjoin the page breaks.

2. Choose **Format/Remove Page Break**.

Tip: **Format/Remove Page Break** is a toggle command. If the current cell does not adjoin a page break along the right or bottom edge of the cell, **Format/Add Page Break** appears. If **Format/Add Page Break** is still present, you have not selected the correct cell to remove a page break. Select the correct cell and repeat step 2.

To remove all of the manually inserted page breaks, choose **Format/Remove All Page Breaks**. All of the manually inserted page breaks are removed from your worksheet. JSheet Builder automatically paginates the worksheet based on the currently defined page size.

Printing a Workbook

A workbook or worksheet can be printed from JSheet Builder using the **File/Print** command. When you print a workbook or worksheet, JSheet Builder uses your system's printing software and configuration. Therefore, the dialog box displayed when you execute **File/Print** is dependent upon your system. As a result, the options you can select and set in the print dialog box vary according to your environment.

The number of pages required to print a workbook or a worksheet is dependent on the contents of your workbook or worksheet and the page setup. By default, JSheet Builder sends to the printer only the number of pages required to print all the objects and data contained in a workbook or worksheet. Also by default, JSheet Builder prints the worksheets in a workbook exactly as they are displayed on your screen.

However, you can alter the printed output by entering a layout definition and report specifications. Report specifications include information for the report body, header, and footer. Layout definitions and report specifications are entered in the Page Preview dialog box.

Previewing a Print Job

Before you print a worksheet, you can preview what JSheet Builder is sending to the printer. The **Page Preview** dialog box allows you to view each page of your print job exactly as it is to be printed.

To preview a print job:

1. Choose **File/Page Preview** to display the **Page Preview** dialog box. The first page of your print job is displayed.

2. If your print job contains more than one page, click **Next** to view the next page of the current worksheet. Click **Previous** to display the previous page of the current worksheet in the print job.

3. To go to a specific page in the print job, click **Goto** and select the page you want to view.

4. Click **Print** to issue the print command and print your workbook or worksheet. On most systems, a dialog box appears when you issue the print command, which allows you to select printing options specific to your system. Enter the necessary information in this dialog box if it is displayed on your screen.

5. Click **Close**. The **Page Preview** dialog box is closed and you are returned to the worksheet.

In the **Page Preview** dialog box, use the **Setup** button to access the **Page Setup** dialog box. Click the **Printer** button to access Printer options. To create or select a layout and to set layout options, click **Options**.

In the following illustration, the print job is shown with the current layout in the page area of the dialog box. This sample print job can

include a header and a footer. The currently defined page margins are shown as grey blocks at the outer edges of the page area.

Figure 4-2
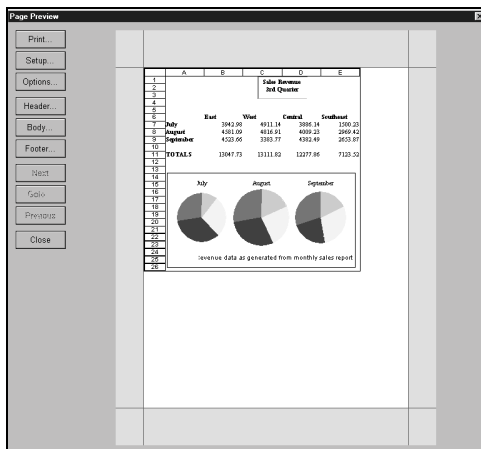
Defining Report Layouts

Report layouts allow you to define and save specifications for printing worksheet data. A layout definition includes specifications for the page margins, color printing, print scale percentage, and the report body, header, and footer. You can define multiple layouts for a worksheet.

Report layouts are defined in the **Layout Options** dialog box. This dialog box, accessed from the **Page Preview** dialog box, allows you to define new layouts, delete old layouts, and select a layout to use for your print job.

To select a layout:

1. Choose **File/Page Preview** to display the **Page Preview** dialog box.

2. Click **Options** to display the **Layout Options** dialog box.

3. Click the **Current Layout** popup menu and select the layout you want to use. If you want to create a new layout, select **New Layout**.

If you choose to create a new layout, a dialog box appears and prompts you to name the layout. The new layout then becomes the current layout.

All JSheet Builder worksheets provide a default layout, named **WYSIWYG**, that can be edited, but not deleted. In **WYSIWYG** mode, worksheets are printed as they appear on the screen. The body of the **WYSIWYG** layout is defined as the active worksheet range. This layout does not initially contain a header or footer.

You are not limited to working with the **WYSIWYG** layout. You can create, format, and preview additional report layouts for the current worksheet. Each layout can contain a unique body, header, and footer. All layouts are saved with the workbook. However, you cannot cross-reference a layout from one workbook to another. Layouts are unique to the individual workbook in which they are contained.

Using and Editing the Current Layout

When a layout is selected, it becomes the current layout for the selected worksheet. The current layout is automatically applied to your print job. Your print job with the applied layout is shown in the **Page Preview** dialog box.

Any changes you make in the **Layout Options** dialog box are automatically saved and used with the current layout. In addition, when you define a report body, header, and footer, these items are saved with the current layout.

Important: If you select the **WYSIWYG** layout, any changes you make to the display options (e.g., hiding or showing the cell grid or titles) for the layout are also reflected in the current worksheet. However, if you make changes to the display options of a custom layout (a layout you create), these changes are not reflected in the current worksheet.

Setting Layout Options

When the **Layout Options** dialog box is open, you can set the page margins, color printing option, and print scale percentage for the current layout.

To set layout options:

1. If the **Layout Options** dialog box is not open, click **Options** in the **Page Preview** dialog box to open it.

2. Click the **Units Of Measure** popup menu to select the units for measuring the page margins.

3. Enter margin values in the page margin number wheels.

4. Click the **Print In Color** check box to enable color printing. If **Print In Color** is not selected, your print job is printed in black and white. If you enable color printing but your printer does not have color printing abilities, the document is printed in greyscale.

5. Enter the percentage at which your print job should be scaled in the **Scale %** number wheel. You can also click the popup menu to the right of the number wheel to select a print scale percentage.

6. Click **Close**. The **Layout Options** dialog box is closed and you are returned to the **Page Preview** dialog box.

Defining the Report Body

The body of a report contains the elements of your worksheet that you want to print including charts and worksheet data. When defining the report body, you specify its content, the position where it is to be placed on the page, and the options for displaying the worksheet elements. You can also format the border of the body with border styles, colors, patterns, and shadows.

To define the report body:

1. Choose **File/Page Preview** to display the **Page Preview** dialog box.

2. Click **Body** to display the **Report Body** dialog box.

3. Click the popup menu at the top of the dialog box to select the option you want to define. Each option of the report body is defined in a separate section of the dialog box. When you select an option to define, the appropriate section of the dialog appears. The options are **Contents**, **Position**, **Border**, **Shadow**, and **Display Options**.

4. Select and enter specifications for each option you want to define for the report body.

5. Click **OK** to apply changes from all of the sections of the dialog box.

Defining the Report Body Contents

The **Contents** section of the **Report Body** dialog box allows you to define the range from your worksheet to be included in the body. This range is referred to as the print range.

You can enter a range in the **Print Range** field or select a range from the popup menu to the right of the field. The following ranges can be selected from the popup menu:

- **Defined Print Range.** This option selects the currently defined print range. If a print range has not been defined, the **Print Range** field displays the range address of the active cells in your worksheet. The range you enter in the **Print Range** field is defined as the new print range. If you select another range option in this popup menu, select this option to return to the range you manually entered in the **Print Range** field.

- **Currently Selected Range**. This option makes the range currently selected on your worksheet the print range.

- **Active Range**. This option makes the range that contains all of the active cells on your worksheet the print range. The active range includes any cells that contain data. If your worksheet contains data in multiple ranges, the blank cells between the ranges are included in the active range.

- **Named Range**. This option allows you to select a named range from your worksheet to be the print range. When you select this option, a dialog box appears from which you can select one of your worksheet's named ranges.

When you select a range from the **Print Range** popup menu, the address of the selected range is automatically placed in the **Print Range** field.

Defining the Report Body Position

The report body can be placed in one of nine positions on the report page. The **Position** section of the **Report Body** dialog box allows you to place the body in three vertical and three horizontal positions.

To position the report body:

1. Display the **Position** section of the **Report Body** dialog box.

2. Click one of the vertical position radio buttons to select the vertical placement of the report body. The body can be placed at the top margin, in the center, or at the bottom margin of the report page.

3. Click one of the horizontal position radio buttons to select the horizontal placement of the body. The body can be placed at the left margin, in the center, or at the right margin of the report page.

The diagram adjacent to the radio buttons shows the position of the body on the report page using the horizontal and vertical positions specified.

Formatting the Report Body Border

The border of the report body can be formatted with a border style, color, pattern, and line width. You can also apply a 2D or 3D shadow to the body border. These options are formatted in the **Border** and **Shadow** sections of the **Report Body** dialog box.

Selecting the Report Body Display Options

To further customize your report layout, you can choose the elements of the worksheet that you want to display in your report. You can show or hide the following worksheet elements: worksheets, headings, titles, formula text, cell grid, heading grid, title grid, and notes.

You can also specify whether columns are labeled with letters or numbers in the report.

Defining the Report Header and Footer

The report header and footer accompany the report body and provide additional information for your report. The report header is placed at the top of the body; the report footer is placed at the bottom of the body.

When defining a report header or footer, you define its contents, specify the position where it is to be placed on the report page, and format the text. You can also format headers and footers with shadows, fill colors and patterns, and border styles, colors, and patterns.

To define a report header or footer:

1. If you are defining a report header, click **Header** in the **Page Preview** dialog box. If you are defining a report footer, click **Footer**. The **Report Header** dialog box or the **Report Footer** dialog box is displayed.

2. Click **More Choices** to display the **Options** popup menu and additional sections of the dialog box.

3. Click the **Options** popup menu at the top of the dialog boxes to select the option you want to define. Each option of the report header or footer is defined in a separate section of the dialog box. When you select an option to define, the appropriate section of the dialog box is displayed. You can format the header or footer position, text, fill color, border, and shadow.

4. Select and enter specifications for each option you want to define for the report header or footer.

5. Click **OK** to apply the changes from all the sections of the dialog box.

Defining Report Header and Footer Text

Text for a header is entered in the **Header** field of the **Report Header** dialog box; text for a footer is entered in the **Footer** field of the **Report Footer** dialog box. You can type the text to appear in the header and footer, or you can enter the address of a cell or range containing the desired text. The text in the cells you reference becomes the header or footer text.

You can also click the popup menus to the right of the field to select a range for the header or footer text. The following items can be selected from the popup menu:

- **Defined Header** or **Defined Footer**. The text you enter in the **Header** field is referred to as the defined header; the text you enter in the **Footer** field is referred to as the defined footer. If you selected a range option in this popup menu for the header or footer text, select this option to return to the text you entered in the **Header** or **Footer** field.

- **Currently Selected Range**. This option makes the text in the range currently selected on your worksheet the header or footer text.

- **Named Range**. This option allows you to use text from a named range in your worksheet for the header or footer text. When you select this option, a dialog box appears, allowing you to select one of your worksheet's named ranges.

If the range you select for the header or footer text contains more than one cell, the text from each cell creates a separate line in the header or footer.

Tip: To include the current page number in the footer or header, include **&p** in the footer or header definition.

Referencing a Report Header or Footer

You can define one header or footer for all the worksheets in your workbook, or you can define individual headers and footers for each worksheet in your workbook.

To define the same header for all worksheets:

1. Determine which cell in which worksheet contains the information you want to display in the header.

2. Select **Header** to display the **Header** dialog box.

3. In the **Header** text field, enter the name of the sheet, followed by an exclamation point and the location of the cell that contains the header. For example, if cell **B4** in **Sheet 1** contains the header text you want to display on all of the worksheets in your workbook, then in the **Header** text field, enter **Sheet1!B4**. All of the worksheets in the workbook now display the header defined in cell **B4** of **Sheet 1**.

4. Click **OK**.

To define one footnote that appears on all worksheets, select the **Footer** option in the **Page Preview** dialog box and follow the steps above.

To define a different header for each worksheet:

1. Determine which cell in your worksheet contains the information you want to display in the header.

2. Select **Header** to display the **Header** dialog box.

3. In the **Header** text field, enter the name of the cell that contains the header, without the sheet reference (e.g., **B4**).

4. Click **OK**.

To define unique footnotes for each worksheet in your workbook, select the **Footer** option in the **Page Preview** dialog box and follow the steps above.

Defining the Report Header and Footer Positions

Headers and footers can be placed at the left margin, in the middle, or at the right margin of the report page. The **Position** section of the **Report Header** or **Report Footer** dialog box allows you to position the header or footer. Alternatively, you can choose to hide the header or footer.

To position a header or footer:

1. Display the **Position** section of the **Report Header** or **Report Footer** dialog box.

2. Click the appropriate button to position or hide the header or footer.

The picture on each button indicates the position of the header or footer when that button is selected.

Formatting Report Header and Footer Text

Tip: The formatting options in the **Text** section of the header and footer dialog boxes are available only if you enter the header or footer text directly in the dialog box. If you reference a worksheet range for the header or footer text, the text must be formatted in the worksheet.

After defining the contents of a header or footer, you can format the contents in the **Text** section of the header or footer dialog box. The following items are formatted in this section:

- **Font**. Select the font for the text from the **Font** list box. Click the scroll bar to the right of the list box to scroll through the list of fonts available on your system.

- **Style**. Click the **Style** check boxes to apply font styles to the header or footer text.

- **Size**. Enter the point size of the header or footer text in the **Size** number wheel. Click the popup menu to the right of the number wheel to select a point size.

- **Color**. Click the **Color** popup menu to select a color for the header or footer text.

Formatting Header and Footer Colors

A report header or footer can be formatted like an object on your worksheet. You can apply fill and border colors and patterns, select line widths for the border, select border and corner styles, and format 2D and 3D shadows. These options are available in the **Fill Color**, **Border**, and **Shadow** sections of the **Report Header** and **Report Footer** dialog boxes.

CHAPTER 5: ENTERING DATA

Once you have become familiar with the JSheet Builder environment, you are ready to enter data, the first step in creating a worksheet. There are several types of data that can be entered in a worksheet including numbers, text, and formulas. This chapter discusses the procedures for entering and editing all types of data. Some basic rules that must be followed when entering data are also discussed.

To facilitate data entry, this chapter presents the various methods you can use to select the cells and ranges in which you want to enter data. In addition, information about how to enter data by filling ranges and how to create external references is explained.

Selecting Cells for Data Entry

Before you can enter data, you must select the cells in which you want to enter the data. You can select a single cell, a range of cells, or multiple ranges. Choose the **Worksheet** tool to select cells and ranges.

Selecting a Single Cell

To select a single cell, choose the **Worksheet** tool, and click the cell in which you want to enter data. When a cell is selected, it is the current cell. The address of the selected cell is displayed in the Current Cell Address (**A5**). The selected cell is outlined with a border.

Figure 5-1
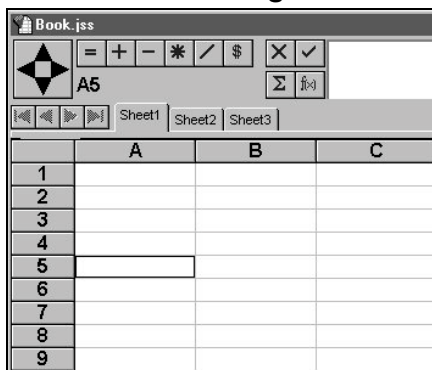
Selecting a Range

You can select a range using the mouse or the keyboard. Use the method that is easiest for you. When you select a range, all of the cells included in the range are highlighted except the first cell in the range. The outlined cell in a selected range is the current cell. All of the other cells in the selected range are highlighted.

Figure 5-2
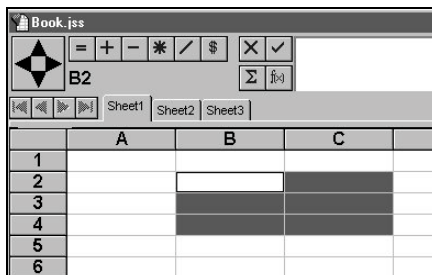
To select a range using the mouse:

1. Choose the **Worksheet** tool.

2. Position the pointer in the cell that is to be the first cell in your range.

3. Click and drag in the direction you want the range to extend. You can drag the mouse in any direction to select the range. As you drag the mouse, cells included in the range are highlighted.

4. Release the mouse button when the cells you want included in the range are highlighted.

The selected range is unselected if you click on any cell or press the UP, DOWN, LEFT, or RIGHT arrow while not pressing SHIFT.

To select a range using the keyboard:

1. Press the UP, DOWN, LEFT, or RIGHT arrow to move the current cell to the position where you want to begin selecting the range.

2. Press SHIFT and the UP, DOWN, LEFT, or RIGHT arrow to begin selecting the range. The range is selected in the direction of the arrow key you press. As you press the UP, DOWN, LEFT, or RIGHT arrow, cells included in the range are highlighted.

3. Continue pressing SHIFT and repeat pressing the UP, DOWN, LEFT, or RIGHT arrow to extend the range.

4. Release SHIFT when the cells you want included in the range are highlighted.

The selected range is unselected if you click on any cell or press UP, DOWN, LEFT, or RIGHT arrow while not pressing SHIFT.

To select a range using the mouse and keyboard (shift-clicking):

1. Choose the **Worksheet** tool.

2. Select the cell you want to be the first cell in the range.

3. Position the pointer in the cell where the range is to end.

4. Press SHIFT and click the mouse button.

All of the cells between the first cell and the cell you clicked are selected.

Selecting Multiple Ranges

When you select multiple ranges, the method of range selection is referred to as control-clicking. The ranges can be adjacent or noncontiguous.

To select multiple ranges:

1. Choose the **Worksheet** tool.

2. Position the pointer in the cell that is to be the first cell of the first range.

3. Click and drag in the direction the first range is to extend.

4. Position the pointer over the cell that is to be the first cell of the next range.

5. Press CONTROL and click and drag in the direction the next range is to extend.

6. Repeat steps 4 and 5 for each additional range to be selected.

You can scroll the worksheet or use the **Navigator** to display other parts of the worksheet if the additional ranges you want to select are not currently displayed on your screen. Scrolling through a worksheet does not unselect ranges.

Entering Data in Cells

After selecting a cell or range, you can enter data in the cells. Data can be entered manually, by filling ranges, or by linking cells to cells in other worksheets.

Manually Entering Data in a Cell

Because a selected cell is also the current cell, it is ready for data input. The data can be text, numbers, or formulas.

To enter data in a cell, type the data you want to place in the cell. The data you type appears in the entry field, not in the selected cell. Click the **Accept Entry** button to enter the data in the cell.

If you make an error while entering data, use BACKSPACE in the entry field to move the insertion point backward and delete characters from the entry field. Or, position the pointer on the entry field data and click to reposition the insertion point at the point where the error was made.

Important: If edit keys are enabled, you can use the LEFT, RIGHT, UP, and DOWN arrows to enter data in the worksheet and move the current cell. To enable or disable edit keys, select **Administration/Preferences**.

Choose the **Environment** tab in the **Preferences** dialog box. Click the **Edit Keys** option and enable or disable the check box.

When you use the **Accept Entry** button to enter data in a cell, the selected cell remains the current cell. There are several keystroke methods for entering data in a cell. However, these methods advance the current cell to another cell. The following table describes the keystrokes that can be used to enter data in a cell.

Keystroke	Edit Keys	Result
RETURN	Enabled	The data is entered into the cell and the current cell is moved down one cell in the column.
DOWN arrow	Enabled	Moves the cursor to the end of the text in the entry bar.
UP arrow	Enabled	Moves the cursor to the beginning of the text in the entry bar.
TAB	Enabled	The data is entered into the cell and the current cell is moved right one cell in the row.
DOWN arrow	Disabled	The data is entered into the cell and the current cell is moved down one cell in the column.
UP arrow	Disabled	The entry is accepted and the current cell is moved up one cell in the column.
RIGHT arrow	Disabled	The entry is accepted and the current cell is moved right one cell in the row.
LEFT arrow	Disabled	The entry is accepted and the current cell is moved left one cell in the row.

Tip: You can also use ENTER on the 10-key pad to enter data in a cell. However, whether the current cell is advanced or not is determined by how you configure the ENTER key in **Preferences**. Choose **Window/Preferences** to set this option.

Manually Entering Data in a Range

Because a range is a group of cells, entering data in a range is similar to entering data in a cell. However, when entering data in a range, you need to move the current cell to each cell in the range so data can be entered throughout the range. Moving the current cell through a range is referred to as stepping through the range.

Stepping Through a Range

If you use RETURN to accept data, you step through a range by column from top to bottom, working through each column in the range from left to right. When the current cell reaches the cell in the lower right corner of the range, it returns to the first cell in the upper left corner of the range.

If you use TAB to accept data, you step through a range by rows from left to right. SHIFT TAB steps you through a range by rows from right to left, and SHIFT RETURN steps you through a range by columns from bottom to top.

Important: If you have typed in data and want to advance to the next cell, using the arrow keys (UP, DOWN, LEFT, or RIGHT) will not step you through a range regardless of whether **Edit Keys** are enabled or disabled. If the edit keys are disabled, using the arrow keys advanced the current cell, but unselects the range. If **Edit Keys** are enabled, once you type data into a cell, the arrow key moves the cursor within the text in the entry bar but does not advance you to any cell. If multiple ranges are selected, you step through the ranges in the order they were selected, beginning with the range containing the current cell.

Positioning the Current Cell

When you enter data in a range, the current cell receives data first. If the current cell is not where you want to begin to enter data in the range,

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press RETURN, TAB, SHIFT RETURN, or SHIFT TAB, to move the position of the current cell to the point where you want to enter data.

Entering Range Data

To enter data in a range, type the data you want to place in the first cell. The data you type appears in the entry field, not in the current cell. Press RETURN, TAB, SHIFT RETURN, or SHIFT TAB to enter the data in the range and move the current cell to the next cell in the range. When data is entered in all of the cells in the range in consecutive order, the current cell returns to the first cell in which you entered data.

Editing Worksheet Data

After you enter data in a worksheet, you can replace the data in a cell or edit parts of the data. Worksheet data is edited using the entry field.

To edit data in a cell:

1. Select the cell that contains the data you want to edit.

2. Position the pointer in the entry field at the point where you want to begin to edit. The pointer appears as an I-beam when positioned in the entry field.

3. Click to place an insertion point in the entry field. Or, click and drag to highlight the section of the entry field you want to edit. You can use BACKSPACE or DELETE to delete text adjacent to the insertion point. Or, you can type to insert text at the insertion point. If you select a section of data, the entire section of data is deleted if you press BACKSPACE or DELETE, or begin typing.

4. Enter your changes in the entry field.

5. Click the **Accept Entry** button to enter the edited data in the worksheet. If you do not want to enter the edited data in the worksheet, click the **Cancel Entry** button.

You can also enter the edited data in the worksheet when you press any of the keystrokes for entering data discussed earlier in this chapter.

Defining Data Types

Text and numbers are the basic types of worksheet data. Data that includes letters, punctuation marks, or symbols is considered text. Data that includes only numeric characters is considered a number. Data that includes numeric characters and letters, punctuation marks, or symbols is considered text.

A third type of worksheet data is a formula. Formulas combine text and numbers and perform some type of calculation or evaluation. Formulas are always preceded by an equal sign (=). For information about formulas, refer to *Chapter 6*.

Entering Text

Text can be entered at any location on your worksheet. Most often, text is used as a label for a column or row of numeric data. Sometimes numbers are used as text. To enter a string of numeric characters as text, precede the characters with a double quotation mark (").

Entering Numbers

JSheet Builder recognizes both positive and negative numbers. To enter a positive number, enter only the string of numeric characters. You can precede the number with a plus sign (+), but this is not necessary.

However, to enter a negative number, you must precede the string of numeric characters with a minus sign (–).

Important: When you enter a number, do not include currency symbols or thousands separators. This causes the data to be considered as text. The only character other than numeric characters that can accompany a number is the decimal separator. The default decimal separator is the period (.) Currency symbols and thousands separators are added to a number when it is formatted.

The number appears in the worksheet according to the default number format specified in **Preferences**. You can change the format used to display the numbers in your worksheet in the **Numbers** dialog box, displayed by choosing **Format/Numbers**.

Refer to *Chapter 8* for information about how to format numbers and how to use the **Numbers** dialog box.

Entering Dates

Dates are a type of number. There are several methods for entering a date. JSheet Builder recognizes abbreviations of months and years, and numeric representation of months. You can also use hyphens (-), periods (.), and slashes (/) as separators. For example, to enter the date September 11, 1999, you can enter **9/11/99**, **9-11-99**, **9.11.99**, **September 11, 1999**, or **11-September-99**.

You can change the format used to display dates in your worksheet in the **Numbers** dialog box.

Entering Times

Time is also a type of number. You can enter time with hours, minutes, and seconds. JSheet Builder recognizes only the colon (:) as a separator for time entries.

Time can be entered with an AM or PM designation following the time (for example, 10:45AM or 10:45PM) or it can be entered using the 24-hour format. For example, 10:45 PM also can be entered as **22:45**.

Tip: Do not use periods when you enter AM and PM (for example, a.m. or A.M.). When you use periods with an AM or PM designation, the time is read as a text string rather than as a number.

Filling a Range

Filling a range allows you to automatically enter data in a range. You can fill a range with numbers, dates, months, quarters, days of the week, and time. Two methods of filling can be used: the Quick Fill method and the Definable Fill method.

Using the Quick Fill Method

The **Sheet/Quick Fill** commands are used to fill a range based on the data in the first and last cell of the selected range. The following types of data can be placed in a worksheet using the Quick Fill method:

- **Numbers.** If you use the Quick Fill method on an empty range, the range is filled with numbers. The fill begins with 1 and increments by 1 until all of the cells in the range are filled. To begin the fill with a specific number, enter that number in the first cell. The fill begins with the number you enter and increments by 1 until all of the cells in the range are filled. If you want the fill to begin and end with specific numbers, enter the beginning number in the first cell and the ending number in the last cell. The difference between the numbers in the first cell and the last cell is divided by the number of cells in the range to determine the increment of the fill.

- **Dates.** If you want to fill a range with dates, enter the starting date in the first cell. The fill begins with the date you enter and

increments by one day until all of the cells in the range are filled. If you want the fill to begin and end with specific dates, enter the beginning date in the first cell and the ending date in the last cell. The number of days between the first date and the last date is divided by the number of cells in the range to determine the increment of the fill.

- **Days of the Week.** To fill a range with the days of the week, enter the starting day in the first cell. The fill begins with the day you enter and increments by one day until all of the cells are filled. If there are more than seven cells in the selected range, the fill repeats its cycle through the days of the week.

- **Months.** To fill a range with the months of the year, enter the starting month in the first cell. The fill begins with the month you enter and increments by one month until all of the cells are filled. If there are more than twelve cells in the selected range, the fill repeats its cycle through the months.

- **Quarters.** To fill a range with quarters, enter the starting quarter in the first cell. You must enter **1st Quarter, 2nd Quarter, 3rd Quarter**, or **4th Quarter**. The fill begins with the quarter you specify and increments by one quarter until all of the cells are filled. If there are more than four cells in the selected range, the fill repeats its cycle through the quarters.

To Quick Fill a range:

1. Select the range you want to fill. The cells in the selected range can be in a single column, a single row, or several rows and columns.

2. In the first cell of the range, enter the type of data with which you want to fill the range. If no data is entered, the range is filled with numbers.

3. If you are filling the range with numbers or dates, enter a value in the last cell of the range to increment the fill by a value other than **1**.

4. Choose **Sheet/Quick Fill**.

Using the Definable Fill Method

The Definable Fill method provides more flexibility for filling ranges with numbers and dates than the Quick Fill method provides. In addition, you can use the Definable Fill method to fill a range with time values. This method does not require data be entered in the first cell of the selected range. The following types of data can be placed in a worksheet using the Definable Fill method:

- **Linear**. This data type fills the range with numbers. The increment value is added to the starting value and to each subsequent cell until all of the cells in the range are filled.

- **Growth**. This data type fills the range with numbers. The value for each cell in the range is determined by multiplying the value of the previous cell by the incremental value.

- **Date**. A range filled with dates can be incremented by days, weekdays, months, or years. A range incremented by weekdays does not count days that fall on Saturday or Sunday.

- **Time**. A range can be filled with 12-hour or 24-hour time values. Ranges filled with 12-hour time values include AM and PM labels. A range filled with times can be incremented by hours, minutes, and seconds.

To fill a range:

1. Select the range you want to fill.

2. Choose **Sheet/Fill** to display the **Fill Range** dialog box.

3. Click the **Fill Direction** popup menu to select the direction of the fill. You can select whether values should be filled down columns or across rows.

4. Click the **Using** popup menu to select the type of data to be placed in the range.

5. Enter the starting value for the fill.

6. Enter the value by which the fill is to increment. (**Step By**).

7. If you fill the range with dates or times, select the unit of time by which the fill is to increment. After you select the data type, start value, and increment value, the ending value for the fill is calculated and displayed in the **Stops At** field.

8. Click **Fill**.

Linking Worksheets

A cell in your worksheet can reference a cell in any worksheet in that workbook. A reference to a cell in another worksheet is called an external reference. Worksheets that contain external references are called linked worksheets.

A cell with an external reference displays the data from the external worksheet it references. When a cell with an external reference is the current cell, the entry field displays the name of the workbook, worksheet, and cell to which it is linked.

Using Point-and-Click Linking

The easier method of linking worksheets is to use point-and-click linking.

To link worksheets:

1. Open the workbook that contains the worksheets you want to link.

2. Select the cell in which you want to place the external reference.

3. Enter an equal sign (=).

4. Make the worksheet to which you want to link the current worksheet. The linked cell pointer appears as you position the pointer in the worksheet.

5. Click the cell to which you want to link. The linked information, which includes the workbook name, worksheet name, and cell, where the external reference is being placed appears in the Current Cell Address of the linked worksheet. In addition, the entry field displays the text of the external reference.

6. Make the original worksheet the current worksheet.

7. Click the **Accept Entry** button to enter the external reference.

Figure 5-3
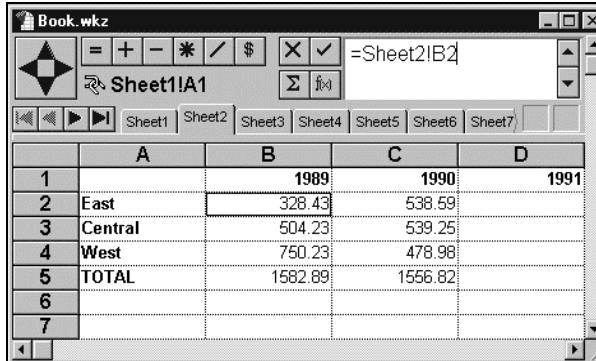
In the illustration above, the Link icon in the Current Cell address shows point-and-click linking is being performed. The workbook, worksheet, and cell where an external reference is being placed is displayed. The linked cell pointer is displayed when the pointer is in the worksheet to which you are linking.

Manually Linking Worksheets

As an alternative to point-and-click linking, you can enter external references manually.

To manually link worksheets:

1. Open the workbook that contains the worksheets you want to link.

2. Select the cell in which you want to place the external reference.

3. In the entry field, enter the full name of the worksheet and cell to which you want to link, preceded by an equal sign (=).

4. Click the **Accept Entry** button to enter the external reference.

Saving Related Workbooks

After you finish linking worksheets, you must save the workbook to establish the link structure between the worksheets.

Important: You must save the workbook BEFORE you close any of the related worksheets. If you fail to do this, you may encounter problems when you refresh or update data in related worksheets.

Linking Multiple Cells and Worksheets

An external reference can refer to data from multiple cells or worksheets. Any calculations you perform or formulas you create in a single worksheet can be created using cells from multiple worksheets in an external reference.

The following steps provide an example of a formula that totals cell data from several linked worksheets.

To link cells from multiple worksheets:

1. Open the workbook that contains the worksheets you want to link.

2. Select the cell in which you want to place the external reference.

3. Enter an equal sign (=).

4. Make the worksheet to which you want to link the current worksheet.

5. Click on the cell to which you want to link.

6. Repeat steps 4 and 5 for each additional worksheet you want to be included in the external reference.

7. Make the original worksheet the current worksheet.

8. Click the **Accept Entry** button to enter the external reference.

Tip: When you link multiple cells, plus signs are placed between each cell reference by default. If you use another numeric operator (for example, –, *, or /) between cell references, the operator you used is placed between subsequent cell references as you complete the formula.

Updating External References

When the data on which an external reference is dependent changes, the reference is updated automatically if all of the related worksheets are open and automatic calculation is enabled. However, if manual calculation is enabled or the related worksheets are closed, you must manually update external references. If the related worksheets are open and manual calculation is enabled, choose **Sheet/Recalc** to update the external references.

Tip: Functions within worksheet cells that reference controls (such as, CTSTRING, CTVALUE, and CONTROLINFO) return **ERR 74** (Control name was not found), or return **ERR 75** (Control number was not found) when a dependent worksheet is targeted and a recalculation occurs. When the worksheet that contains the control function is targeted and recalculated, the correct control information displays in the worksheet cells.

Editing External References

When you edit formulas that contain external references, it is important to have all related worksheets open. This includes changing the cell or range to which an external reference refers and deleting external references from cells.

If related worksheets are not open when you edit external references, the links may not update correctly, causing the external references to produce unexpected results.

Renaming and Moving Linked Worksheets

Special attention should be given to renaming and moving linked worksheets to ensure the relationship between the linked worksheets is maintained. The following steps allow you to rename or move a related worksheet without breaking the links.

To move or rename linked worksheets:

1. Open all of the related worksheets.

2. Make the worksheet to be renamed or moved the current worksheet.

3. Choose **File/Save As** to display the **Save** dialog box.

4. If you rename a worksheet, enter the new worksheet name. If you move a worksheet, select the directory in which you want to save the worksheet.

5. Click **Save**.

6. Save and close the related worksheets.

7. Close all of the workbooks.

After completing these steps, use your environment's file management system to delete the original worksheet that you renamed or saved in a new location.

Storing Data from Linked Workbooks

Data referenced by external references can be stored with and remembered by the current worksheet. A copy of the data referenced by external references is saved with the worksheet.

When you enable the **Remember & Store Linked Data** option in the **Workbook Links** dialog box, a copy of the external data is stored with the worksheet that contains the external reference. As a result, the external worksheet can be closed and the referenced data can still be used. When this option is disabled and the external worksheet is closed, access to the referenced data is not available and ERR13 is placed in cells that contain external references. The **Workbook Links** dialog box is shown in the following illustration.

Figure 5-4
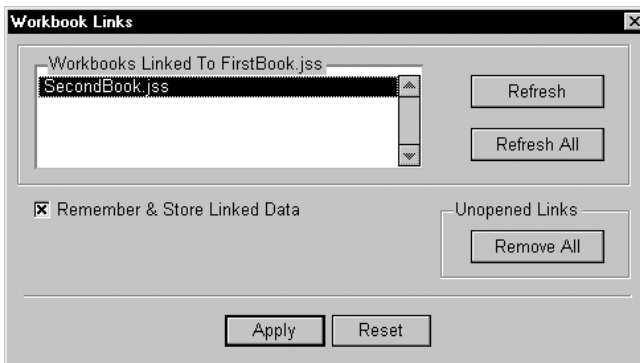
To store linked data with the current worksheet:

1. Make the worksheet with which you want to store linked data the current worksheet.

2. Choose **Sheet/Links** to display the **Workbook Links** dialog box.

3. Click the **Remember & Store Linked Data** check box.

4. Click **Apply**.

The **Workbook Links** dialog box also contains buttons that allow you to update the status of your linked data. Click **Refresh** to update specific links. Click **Refresh All** to update all of the links at the same time. The **Workbook Links** dialog box also contains a **Remove All** button. Click this button to remove all of the references to unopened links in your workbook.

Protecting Data

After data is entered in a cell, you can protect the data by locking the cell in which it is located. Locking a cell prevents any editing or formatting to be applied to the data in the cell.

To protect a range of data, select the range that contains the data you want to protect, and then choose **Sheet/Protection/Protect Cells**. The cells in the selected range are locked and the data contained in the cells is protected.

To return the cells to normal status, you can unprotect the range. To unprotect a range of data, select the range that contains the data you want to unprotect, and then choose **Sheet/Protection/Unprotect Cells**. The cells in the selected range are unlocked and the data contained in the cells is unprotected.

To edit several ranges of protected cells, you can disable cell protection for the entire worksheet. When you disable cell protection, all of the locked cells are unlocked.

To unprotect an entire worksheet, choose **Sheet/Protection/Disable Cell Protection**.

After you have edited the worksheet data, you can re-protect any protected data by choosing **Sheet/Protection/Enable Cell Protection**. All previously protected cells are locked again.

CHAPTER 6: CREATING FORMULAS

In addition to providing the ability to create and store data and graphical information, formulas allow you to put that data and information to work quickly and efficiently.

This chapter teaches you how to use formulas, the keys that unlock the power of your JSheet Builder worksheets. Read this chapter to learn how to:

- identify the various components of a JSheet Builder formula.

- include functions in your formulas.

- use numbers, strings, and worksheet ranges as arguments.

- use the JSheet Builder operators.

- enter formulas in worksheets and text fields.

- determine formula evaluation orders.

Introducing Formulas

A formula is composed of one or more functions, numbers, strings, ranges, operators, or any combination of these components. A formula performs a calculation on data and provides the result of that calculation.

The data is evaluated and calculated in the order of precedence defined by JSheet Builder. The result of the calculation is then placed in the worksheet cell where the formula is entered.

The following table describes the components of a formula.

Component	Description
Function	Built-in JSheet Builder functions are used to calculate mathematical operations and evaluate worksheet information.
Number	This component provides the numeric data on which formulas perform calculations.
String	This component provides the textual data on which formulas perform calculations.
Range	This component references ranges of worksheet cells that contain data used in formula calculations.
Array	This component references a range of worksheet cells that contain data.

Using Functions in a Formula

JSheet Builder provides a set of built-in worksheet functions. These functions can be used alone or in combination with other data in a formula. Functions provide a variety of mathematical uses that range from simple summing and averaging tasks to complex scientific calculations.

Function Arguments

Each function has a unique name and set of data on which it performs calculations. This data is referred to as an argument. Arguments can be numbers, strings, ranges, or arrays.

Arguments are enclosed in parentheses. A function that requires no arguments must be followed by a set of empty parentheses. When multiple arguments are required, each item in the argument list must be separated by the argument separator. The default argument separator is the comma.

Functions can be entered in either uppercase or lowercase letters. In this manual, functions are shown in uppercase and arguments are shown in lowercase.

Pasting Functions in a Formula

Instead of typing functions in your worksheet cells, you can paste functions in cells using the Function Glossary dialog box.

To paste a function:

1. Choose **Edit/Function Glossary**. The **Function Glossary** dialog box provides a list of the JSheet workbook functions grouped by type.

2. Select a function type from the **Function Groups** list box to display a list of functions in the **Function Name** list box.

3. Click on a function name to select that function. Click the scroll bar to the right of the list box to scroll through the functions. When you select a function, a description of the selected function is displayed in the text field below the list box. Click the scroll bar to the right of the text field to scroll through the description.

4. Click **Paste Function** to paste the selected function into the current cell in your worksheet. When you paste the function from the **Function Glossary** dialog box, the arguments are highlighted, as shown in the following illustration. Replace the arguments with the data you want the function to calculate.

Figure 6-1
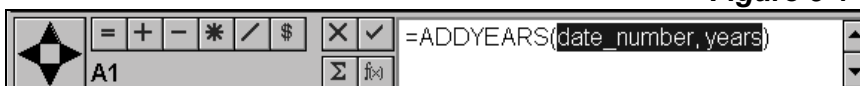
Using Numbers in Formula Arguments

A number in a formula argument can be any numeric value (such as, 5, 400000, or -3482). The number is calculated according to the operators and functions in the formula.

Dates and times are also considered numbers. JSheet Builder uses a special type of number, called a serial date number, to represent dates and times. The serial date number is the number of days that have passed since December 30, 1899, and can be any number from 0 (December 30, 1899) to 401768 (December 31, 2999). A negative serial date number is evaluated as a date prior to December 30, 1899.

Time is represented by the fractional portion of a serial date number. For example, 0 represents midnight, .5 represents noon, .75 represents 6:00 p.m., and .875 represents 9:00 p.m. Therefore, the date number 34764.65 represents 3:36 p.m. on March 6, 1995.

Using Strings in Formula Arguments

Strings in formula arguments are surrounded by a set of double quotation marks (" "). Although strings are usually comprised of alphabetic characters, they can also be numbers or combinations of alphabetic and numeric characters.

When a number is surrounded by a set of double quotation marks, JSheet Builder does not recognize its numeric value, but considers it a string. Examples of numbers often entered as strings are zip codes, social security numbers, and telephone numbers.

Using Ranges in Formula Arguments

Ranges in formula arguments refer to worksheet cells that contain data to be used in a formula. A range can contain multiple worksheet cells (such as **D3..F11**) or a single worksheet cell (such as **A1**, **B5**, or **C9**).

For example, if the value in **A1** is **6**, the value in **B1** is **8**, and the value in **C1** is **2**, the formula **=(A1 + B1)/C1** returns the number **7**. The formula is calculated and the result is a numeric value.

Identifying Types of Range References

References to ranges can be relative (for example, **C2** or **A1..D4**), absolute (for example, **C2** or **A1..D4**), or combined (**C$2** or **$A1..$D4**). If a formula containing a relative range is copied and pasted, the range is modified to preserve the cell relationships. If a formula containing an absolute range is cut or copied and pasted, the range does not change. If a formula containing a combined reference is cut or copied and pasted, only the column or row that is absolute does not change.

Tip: When you enter a range in a formula, it is entered as a relative range. To change a relative range to an absolute or combined range, select the range reference in the formula and click the **Absolute Reference** button in the entry bar. Each click on the **Absolute Reference** button cycles the range through the reference options: relative, absolute, column only absolute, and row only absolute. You can refer to a range using any of these options.

You can also refer to a range by a name you have assigned using **Select/Named Ranges**. Names with spaces must be enclosed in a set of single quotation marks (for example, **'January Sales'**). Named ranges behave as absolute ranges, even if they are stored as relative ranges.

You can enter a range in a formula by typing the reference or by selecting the range in the worksheet.

To select a range reference from the worksheet:

1. Enter your formula up to, but not including, the range reference. The point at which you stop typing becomes the insertion point for the range reference.

2. Choose the **Worksheet** tool.

3. Click and drag to select the range you want to reference in the formula. The range reference is automatically placed in the entry field at the insertion point.

4. Enter the remainder of the formula.

5. Click the **Accept Entry** button to enter the formula in the worksheet.

Using Ranges on Linked Worksheets

Ranges from other sheets can be included in formulas. These references are called external references. You can reference a range in any other sheet in the current workbook. The external reference can be entered manually or you can link worksheets by point-and-click linking.

Using Operators in a Formula

The operator you use in a formula defines the type of calculation or evaluation to be performed by the formula. Additionally, the operator determines the amount of numbers, ranges, or strings required by the formula. The five types of JSheet Builder operators are described in the following table.

Operator	Definition
Numeric	These operators perform arithmetic operations on numbers. The numeric operators are: Addition (+), Subtraction (-), Multiplication (*), Division (/), and Exponentiation (^).
Logical	These operators evaluate a formula and return 1 if the evaluation is true and 0 if the evaluation is false. The logical operators are: AND - Requires values on both sides of the operator. Returns 1 only if both values are true. OR - Requires values on both sides of the operator. Returns 1 if either value is true. NOT - Requires only one value. Returns 1 only when the comparison is false.
Text	This operator concatenates strings. The ampersand (&) is the concatenation operator.
Measurement	These operators convert numbers to twips (1/1440th of an inch or 1/20th of a point), the standard JSheet Builder measurement. The measurement operators are: INCH(ES) — Converts inches to twips. MIL(S) — Converts 1/1000th of an inch to twips. POINT(S) — Converts 1/72nd of an inch to twips. DECIPOINT(S) — Converts 1/10th of a point to twips. MILLIMETER(S) — Converts millimeters to twips.
Relational	These operators evaluate two numbers, ranges, or strings to determine whether they meet the criteria of the given operator. If the criteria is met, 1 (true) is returned. If the criteria is not met, 0 (false) is returned. The relational operators are: Equal to (=), Greater than (>), Greater than or equal to (>=), Less than (<), Less than or equal to (<=), and Not equal to (<>).

The following examples demonstrate how the JSheet Builder operators can be used in your worksheet.

Numeric Examples	Definition
45 + 183	Adds **45** and **183**.
A4 – D7	Subtracts the contents of cell **D7** from the contents of cell **A4**.
23 / A4	Divides 23 by the contents of cell A4.
C5 ^ 4	Calculates the contents of cell **C5** to the fourth exponential power.

Logical Examples	Definition
B2 > 4 AND C4 < 12	Returns 1 (true) if the contents of cell B2 is greater than 4 and the contents of cell C4 is less than 12; returns 0 (false) if either portion of the formula is not true.
C7 = B12 OR A2<10	Returns 1 (true) if the contents of cell C7 equals the contents of cell B12 or the contents of cell A2 is less than 10; returns 0 (false) if both portions of the formula are not true.
NOT B1>3	Returns 1 (true) if the contents of cell B1 is less than or equal to 3, returns 0 (false) if the contents of cell B1 is greater than 3.

Text Examples	Definition
"Overland Park, "&"Kan"	Concatenates the two strings in the example to produce the string **"Overland Park, Kan"**.
"Stock No. "&A2	Concatenates the string **"Stock No. "** and the contents of cell A2.

Measurement Examples	Definition
1 INCH + 3 POINTS	Converts 1 inch to 1440 twips and converts 3 points to 60 twips; the results are added together.
10 MILS + B2	Converts 10 milli-inches to 14.40 twips. The result is added to the value in cell **B2**.

| Relational Examples	Definition
34 + 24 > B2	Returns **1** (true) if the sum of **34** and **24** is greater than the value in cell **B2**; returns **0** (false) if the sum of **34** and **24** is less than or equal to the value in cell **B2**.
E5 < > A2 + C4	Returns **1** (true) if the value of cell **E5** is not equal to the sum of the values in cells **A1** and **C4**; returns **0** (false) if the value of cell **E5** is equal to the sum of the values in cells **A2** and **C4**.

Entering Formulas

You can enter formulas directly in a worksheet cell or text field. As discussed previously, formulas are composed of one or more functions, numbers, strings, ranges, operators, or any combination of these components.

Entering Formulas in Worksheets

You can enter a formula in any cell in a worksheet. A formula is entered in a worksheet using the entry field. When entering a formula, the formula is preceded by an equal sign (=), as shown in the following illustration. This formula adds the values in cells A1 through A9 and places the total in the cell containing the formula.

Figure 6-2
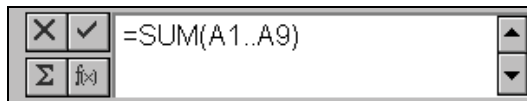
Using the Sum Button

The **Sum** button enters the SUM function in the current cell of your worksheet and automatically enters the arguments for the function. The SUM function allows you to calculate the total of a list of values. The values are the arguments for the function and can be entered as numbers or as references to cells in your worksheet.

When you refer to cells in your worksheet, the values in those cells are added to determine the result of the function. The **Sum** button assumes that you want to calculate the total value of the data in the cells adjacent to the current cell.

To use the Sum button:

1. Select the cell in which you want to place the SUM function.

2. Click the **Sum** button in the entry bar. The SUM function is placed in the current cell and the cells that are used as arguments for the function are highlighted by a marquee box. If data is contained in the current

row to the left of the current cell, the cells that contain data are highlighted and used as arguments for the function. If data is contained in the current column above the current cell, those cells are highlighted and used. If the cells referenced by the function are not the cells you want to total, you can change the range reference before entering the function in the worksheet.

3. Click the **Accept Entry** button to enter the function in the worksheet.

Combining Components in Formulas

Combining components in formulas allows you to produce more complex calculations and evaluations. These formulas allow the various operators, functions, and data to interact to provide specific information for your worksheet.

When you combine components in a formula, it is important to make certain the components interact to produce the type of data needed to complete the formula calculation. For example, built-in functions return specific types of data (such as, numbers, strings, or ranges). The type of data returned must be appropriate to the formula calculation.

The following examples illustrate the uses of functions in formulas.

Example

=ADDYEARS(30936, 19)

This example shows the most basic use of a function. The ADDYEARS function is shown with numbers used for its two arguments. The first number (30936) is a serial date number representing the date September 11, 1984. The second number is the number of years (19) to be added to that date.

Example

=ADDYEARS(DATEVALUE("September 11, 1984"), 19)

This example uses a function as an argument for another function. DATEVALUE is used for the first argument of the ADDYEARS function. DATEVALUE converts the string "September 11, 1984" to a serial date number. ADDYEARS then adds 19 years to this number, as specified by the second argument.

Example

=(ADDYEARS(DATEVALUE("September 11, 1984"), 19)) >= 33832

This example performs the same calculation as the previous example and evaluates the result against another number through the use of a relational operator (>=). The result of the ADDYEARS calculation is 37875. The formula evaluates this result to determine if it is greater than or equal to (>=) the serial date number 33832.

The following illustration shows a variety of components used in a formula. The formula contains a string, a text operator, and a function. The VLOOKUP function uses relative and absolute ranges for two of its arguments. The string is surrounded by a set of double quotation marks. The text operator concatenates the previous string and the data returned by VLOOKUP.

Figure 6-3

="Central"&VLOOKUP(A3,A18..G27,1)
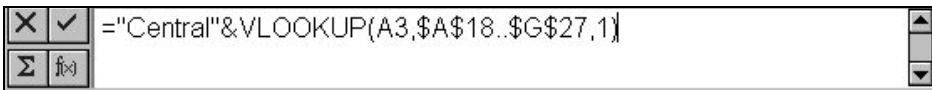
Evaluation Order in Formulas

When you use more than one component in a formula, JSheet Builder evaluates and calculates the formula in an order of precedence. This order is defined in the following table.

Order of Precedence	Description
1 Parentheses	Items surrounded by parentheses are given highest precedence. If parentheses are nested within our parentheses, the inner level receives the higher precedence.
2 Measurement operators	Numbers with measurement operators (INCH(ES), MIL(S), POINT(S), DECIPOINT(S), OR MILLIMETER(S)) are converted to twips.
3 Exponentiation	Exponential numbers are calculated.
4 Negative/Positive	The negative or positive state of numbers is considered.
5 Multiplication/ Division	Numeric operations involving multiplication (*) or division (/) are calculated.
6 Addition/ Subtraction	Numeric operations involving addition (+) or subtraction (-) are calculated.
7 Relational Evaluation	Evaluations involving relational operators (=, >, >=, <, <=, <>) are performed.
8 Unary Logical	Evaluations involving the logical operator NOT are performed.
9 String or Logical	String concatenation (&) or logical evaluation involving the logical operators AND and OR are performed.

It is important to understand the order of evaluation when combining components in formulas. The order of precedence can easily change the order of formula evaluation, and ultimately, the formula's result.

Understanding Error Messages

Formulas that cannot be calculated or evaluated return errors. Errors can be caused by using the incorrect syntax for a function, providing incorrect data for a formula, or using an incorrect operator. When a formula returns an error, the error (**ERR number**) appears in the cell where the formula was entered. **Number** refers to a particular error message in the JSheet Builder error message list. For a listing of these messages, refer to the *JSheet Error Messages* manual.

CHAPTER 7: CALCULATING DATA

A fundamental purpose of a worksheet is to calculate data. JSheet Builder provides quick and efficient worksheet calculation. You can specify when a worksheet is to be calculated, the order in which it is calculated, and how circular references are to be calculated.

This chapter teaches you how to perform numerous types of JSheet Builder calculations. Read this chapter to learn how to set your calculation mode and order, and calculate circular references.

Calculating a Worksheet

Data is calculated when it is entered in the worksheet. If a change is made to the calculated data or to data on which the calculated data is dependent, the calculated data needs to be recalculated. By default, JSheet Builder recalculates the data whenever a change is made.

Automatic recalculation works well for simple worksheets. But, automatic recalculation can make managing and updating a worksheet cumbersome if the worksheet contains many complex or dependent formulas. In these cases, you can configure the worksheet to recalculate manually.

IMPORTANT: Manual recalculation mode should not be used for workbooks that will be used on JSServer.

To set the recalculation mode:

1. Choose **Sheet/Recalc Options** to display the **Recalc Options** dialog box. The radio buttons in the top section of the dialog box set the recalculation mode.

2. To set your worksheet for manual recalculation, select **Calculate Only On Command**. To set your worksheet for automatic recalculation, select **Calculate When Data Changes**.

3. Click **OK**.

If you choose manual recalculation, you must choose **Sheet/Recalc** to calculate the worksheet.

Setting Calculation Order

When a worksheet is recalculated, cells are calculated in an order to resolve formula dependencies. Cells containing formulas on which other formulas are dependent are calculated first. JSheet Builder determines the calculation order automatically.

Some worksheets may contain formulas in which you want to control the order they are calculated. Worksheets containing dynamic models, financial models, or formulas with circular references are examples of worksheets in which you might want to control the order of calculation. In these special instances, you can choose to calculate a worksheet by row or by column.

In row calculation, cell **A1** is calculated first, followed by all the cells containing formulas in the first row from left to right. Calculation

continues with each subsequent row until all the rows with cells containing formulas have been calculated.

In column calculation, cell **A1** is calculated first, followed by all the cells containing formulas in the first column from top to bottom. Calculation continues with each subsequent column until all the columns with cells containing formulas have been calculated.

To set the calculation order:

1. Choose **Sheet/Recalc Options** to display the **Recalc Options** dialog box.

2. Click **More Choices**. The radio button options in the second section of the dialog box set the calculation order.

3. To set your worksheet for natural calculation order, select **Calculate Using Natural Order**. To set your worksheet for column calculation order, select **Calculate Workbook Column By Column**. To set your worksheet for row calculation order, select **Calculate Workbook Row By Row**.

4. Click **OK**.

Calculating Circular References

A circular reference occurs when a cell in a worksheet contains a formula that includes itself as a dependent value. For example, if cell **B2** contains the formula **=AVG(B1..B9)**, the formula creates a circular reference because the cell containing the formula is a part of the formula.

If your worksheet contains formulas with circular references, you can define the number of times the cells with these formulas are calculated.

When defining the calculation of circular references, you specify a cell containing a circular reference as a test cell. You also specify a change value at which calculation is to stop and the maximum number of times the worksheet is to be calculated.

As the worksheet is calculated, the result of the formula in the test cell is evaluated to determine the amount of change between calculations. If the amount of change is less than the change value you specified, calculation stops. However, if the worksheet reaches the maximum number of calculations, calculation stops regardless of the amount the test cell value changes.

To define circular reference calculation:

1. Choose **Sheet/Recalc Options** to display the **Recalc Options** dialog box.

2. Click **More Choices**. The bottom section of the dialog box defines the calculation of circular references.

3. In the first field in the section, enter the cell containing a circular reference formula to serve as the test cell.

4. In the second field, enter the change value at which calculation is to stop.

5. In the third field, enter the maximum number of times the worksheet is to be calculated.

6. Click **OK**.

CHAPTER 8: FORMATTING DATA

The appearance of the data in your worksheet is controlled by the formatting you apply to that data. Formatting refers to all of the elements used to define the display of numbers, including number formats, number attributes, precision, and negative number color. Formatting also refers to the text font, style, size, and color applied to numbers and text, the alignment of the data in the cells, and the hiding of specified worksheet data.

This chapter explains the various formats that can be used to enhance your JSheet Builder worksheets. Read this chapter to learn how to:

- display your worksheet data using the predefined formats and attributes.

- apply different fonts and text styles to your worksheet data.

- select the display mode for your workbooks.

Defining Font Formats

Defining font formats for data in your worksheet not only refers to specifying the text font, but also defining the text style, size, color, and

alignment. Even though these items are referred to as text attributes, they are applied to both text and numeric characters.

JSheet Builder allows you to preformat a range of cells with text formats. However, you are not allowed to preformat an entire row, column, or worksheet.

To define font formats:

1. Select the cells that contain the data you want to format.

2. Choose **Format/C**ells to display the **Format Cells** dialog box. Click the **Font** tab.

3. Click a font name in the **Font** list box to select the font you want to apply to your data. Click the scroll bar to the right of the list box to scroll through the list of fonts.

4. Click the check boxes in the **Style** section to select the font styles to apply to your data.

5. Enter the point size of the text in the **Size** number wheel. You can also click the **Size** popup menu to the right of the number wheel to select a point size.

6. Click the **Color** popup to select the color to apply to your data.

7. Click the Underline popup to select the type of data underlining that is displayed. The choices available are: none, single, double, single accounting, and double accounting.

8. Click **Apply**.

The font formats are applied to the currently selected range. You can set default font formats for your worksheet in **Preferences**.

Using Alien Fonts

A font is considered alien if your system does not recognize the font because it is not available on the system. Text formatted with alien fonts is displayed in a default font generated by your system. However, the text retains its formatting information, including the use of the alien font.

If the currently selected text is formatted with an alien font, the font is displayed in the **Font** list box with the **Alien Font** icon. A worksheet may contain alien fonts if it was created in a different environment and then opened on your system.

Selecting a Display Mode

Fonts are displayed according to the display mode set for your workbook. You can select printer display mode or screen display mode. This option produces varying effects depending on your windowing environment:

- When in printer display mode, JSheet Builder uses scalable Type 1 screen fonts to display text in the worksheet and determine line breaks in text fields. This display mode provides the best WYSIWYG display output.

- When in screen display mode, JSheet Builder uses your system's X fonts to display text in the worksheet and determine line breaks in text fields. This display mode provides the fastest display output.

In the Windows environment, both display modes produce WYSIWYG output, and there is little variation in display speed. However, when using screen display mode, fractional character widths are employed

when rendering fonts. Fractional character widths improve the proportional spacing of characters in most fonts.

To set the display mode:

1. Choose **Window/Display Settings**.

2. Click the **Book Display Mode** popup menu to select the display mode.

3. Choose **Printer Fonts (WYSIWYG)** for printer display mode. Choose **Screen Fonts (Speed)** for screen display mode.

4. Click **Apply**.

The display mode you select applies to only the current workbook. You can set the default display mode in **Preferences**. The default display mode is applied to all new workbooks.

Aligning Data

Alignment specifies the position at which the data is placed in a cell. You can align text horizontally or vertically. You can shrink the text to fit, wrap text, or indent. For more specific alignment, there is also an option to align by degree. General alignment aligns text to the left and numbers to the right.

To align your data:

1. Select the cells to which you want to apply an alignment.

2. Choose **Format/Cells** to display the **Format Cells** dialog box and click the **Alignment** tab.

3.   Select how you want the text aligned.

4.   Click **Apply**.

Understanding Number Formats

Numbers entered in your worksheet are displayed according to the number format applied to the data. JSheet Builder provides 14 predefined formats for displaying numbers. The following table describes each format and shows how the number 12345.678 is displayed with each format.

NOTE: The predefined number formats shown below are specific to the United States version of the software. If you are using a version of the software other than the U.S. version, your predefined formats may appear differently than those shown here.

Format	Example	Description
General	12345.678	The number is displayed with the same number of significant digits with which it was entered, to a maximum of 10 significant digits. This format ignores the defined precision.
Fixed	12345.68	This format displays a number with a fixed number of decimal positions, as determined by the defined precision. The precision is set to 2 for this example.
Currency	$12345.68	The number is displayed with the currency symbol defined in **Preferences**. The placement of the currency symbol is also defined in **Preferences**. The decimal positions are displayed according to the defined precision.
Percent	1234567.80%	This format displays the number as a percentage, with the percent sign as a trailing character. The number is multiplied by 100 and displayed with the defined decimal precision.
Scientific	1.23E+04	Numbers are displayed in scientific notation. The defined decimal precision is applied to the mantissa of the displayed value.

D-MON-YY	11-SEP-84	This format is the **Date 1** format. The number is displayed as a date with a one or two-digit day, three-letter abbreviation for the month, and two-digit abbreviation for the year.
D-MON	11-SEP	The **Date 2** format displays the number as a date with a one or two-digit day and a three-letter abbreviation for the month.
MON-YY	SEP-84	The **Date 3** format displays the number as a date with a three-letter abbreviation for the month and a two-digit abbreviation for the year.
MM-DD-YY	09-11-84	The **Date 4** format displays the number as a date with a two-digit abbreviation for the month, two-digit day, and two-digit abbreviation for the year. When you enter a date, this is the default setting.
MM-YY	09-84	The **Date 5** format displays the number as a date with a two-digit abbreviation for the month and a two-digit abbreviation for the year.
HR:MN:SCam	04:16:19PM	This is the **Time 1** format. The number is displayed as a time with hours, minutes, seconds, and a trailing AM or PM designator.
HR:MNam	04:16PM	The **Time 2** format displays the number with hours, minutes, and a trailing AM or PM designator.
HH:MN:SC	16:16:19	The **Time 3** format displays the number with hours, minutes, and seconds in a 24-hour format.
HH:MN	16:16	The **Time 4** format displays the number with hours and minutes in a 24-hour format.
D-MON-YYYY	11-SEP-1984	The **Date 6** format displays the number as a date with a one or two-digit day, three-letter abbreviation for the month, and four-digit year.
MM-DD	09-11	The **Date 7** format displays the number as a date with a two-digit abbreviation for the month and a two-digit day.
MON-YYYY	SEP-1984	The **Date 8** format displays the number as a date with a three-letter abbreviation for the month and a four-digit year.
MM-DD-YYYY	09-11-1984	The **Date 9** format displays the number as a date with a two-digit abbreviation for the month, two-digit day, and a four-digit year.
MM-YYYY	09-1984	The **Date 10** format displays the number as a date with a two-digit abbreviation for the month and a four-digit year.

Number formats can be applied to a single cell or a range and are selected on the **Numbers** tab in the **Format Cells** dialog box. The default number format applied to cells in your worksheet is set in **Preferences**.

Using Number Attributes

In addition to number formats, number attributes are also applied. However, an attribute is displayed only when data meets the criterion for that attribute. More than one attribute can be applied to a cell. The following list describes the number attributes:

- **Hide Zero**. This attribute causes any numbers that equal zero (0) to be hidden. The value is not removed from the cell; only the display is hidden. The value is displayed in the entry bar when the cell is selected.

- **Commas**. This attribute displays the thousands separator on numbers greater than 999. You define the character to be used as the thousands separator in **Preferences**.

- **Parenthesis**. Negative numbers are displayed with parentheses when this attribute is enabled.

- **Hidden**. This attribute causes all of the data, including numbers and text, to be hidden. The value is not removed from the cell; only the display is hidden. The data is displayed in the entry bar when the cell is selected.

Attributes are enabled and disabled on the **Numbers** tab in the **Format Cells** dialog box. The default number attributes applied to cells in your worksheet are set in **Preferences**.

Setting Number Precision

Precision defines the number of decimal positions displayed for a number. A positive precision defines the number of digits displayed to the right of the decimal point. A negative precision defines the number of digits to the left of the decimal point to which the number is rounded.

Important: The precision applied does not change the value stored in the selected cell. Only the display of the number is affected, even when a number is rounded.

The following table shows how the number 1234.5678 is displayed with precisions ranging from -4 to 4.

Precision	Number Display	Precision	Number Display
4	1234.5678	-1	1230
3	1234.568	-2	1200
2	1234.57	-3	1000
1	1234.6	-4	0
0	1235		

The decimal precision is set on the **Numbers** tab in the **Format Cells** dialog box. The default decimal precision applied to cells in your worksheet is set in **Preferences**.

Applying Colors to Negative Numbers

Negative numbers can be displayed in a color different than the color used to display other data. Applying a color to negative numbers makes them easier to locate on your worksheet. When you enter a negative number in your worksheet, it is automatically displayed in the negative number color you select.

The negative number color is set in the **Numbers** tab in the **Format Cells** dialog box. The default negative number color applied to cells in your worksheet is set in **Preferences**.

Setting the Date Separator

The date separator is used to change the separator in date-formatted cells. The choices are: default, slash, period, and dash. The date separator is set on the **Numbers** tab in the **Format Cells** dialog box.

Applying Number Formats and Attributes

JSheet Builder allows you to preformat a range of cells with number formats. However, you are not allowed to preformat an entire row, column, or worksheet.

To format a number:

1. Select the cells that contain the numbers you want to format. You can also select blank cells and preformat them with number formats. Numbers entered in these cells are displayed with the formatting you apply.

2. Choose **Format/Cells** to display the **Format Cells** dialog box. Click the **Numbers** tab.

3. Click a format in the **Formats** list box to choose a number format for the selected cells. Click the scroll bar to the right of the list box to scroll through the list of formats.

4. Click the check boxes in the **Attributes** section of the dialog box to select the attributes to be applied to the selected cells.

5. Enter the decimal precision in the **Precision** number wheel. Valid precision entries are from 15 to -15.

6. Click the **Negatives** color popup to select the negative number color.

7. Click **Apply**.

Introducing Custom Number Formats

In addition to applying a predefined number format, you can define and apply custom formats to the data in your worksheets. A custom format defines how positive numbers, negative numbers, numbers equaling zero, and text are displayed. The custom format definition contains a picture of how each type of data is to be displayed. When a custom format is applied to a cell, JSheet Builder automatically applies the appropriate piece of the custom format definition to the data in the cell.

Custom number formats make it easier to enter data with special characters. For example, if you want to enter a list of telephone numbers that require parentheses around the area code and a hyphen separating the prefix from the last four digits of the number, a custom number format allows you to enter only the digits of the telephone number. A custom format with a definition string of (000)000-0000 automatically displays the special characters in the appropriate locations with the numbers you enter. With this custom format, a number entered as 9135553498 is displayed as (913)555-3498.

Creating Custom Format Definitions

A custom format definition specifies how to display a number to which the custom format is applied. The definition consists of a string of characters that defines how many characters and the type of characters to be displayed in the formatted number.

Characters used in definition strings are numeric, text, date, and time characters. The tables in this section list and describe the purpose of the characters used in custom format definitions.

The following characters are numeric characters used in custom format definition strings.

Numeric Character	Purpose
0	This character is a numeric placeholder. If the number being formatted does not contain a significant digit in the location of this character, a zero is displayed in that position. If there are more digits left of the decimal point in the number being formatted than there are zeros left of the decimal point in the definition string, the digits in the number are displayed. Digits to the right of the decimal point in the number being formatted are rounded to the number of zeros to the right of the decimal point in the definition string.
#	This character is a numeric placeholder. Only the significant digits left of the decimal point in the number being formatted are displayed. Placeholding zeros are not added. Digits to the right of the decimal point in the number being formatted are rounded to the number of # characters to the right of the decimal point in the definition string.
.	This character serves as a decimal point.
,	This character serves as the thousands separator in numbers and as a comma in dates.
%	This character displays the number being formatted as a percentage. The number is multiplied by 100 and the percent sign (%) is added wherever it is placed in the custom format.
e- E-	These characters display the number being formatted in scientific notation with a lowercase letter if you use e-, or an uppercase letter if you use E-. The number of # or 0 characters to the right of these characters determines the number of digits in the exponent. If the value is negative, a minus sign is displayed; if the value is positive, no sign is displayed.
e+ E+	These characters display the number being formatted in scientific notation with a lowercase letter if you use e+, or an uppercase letter if you use E+. The number of # or 0 characters to the right of these characters determines the number of digits in the exponent. If the value is negative, a minus sign is displayed; if the value is positive, a plus sign is displayed.
$	This character displays the number being formatted as currency.
-	This character is a minus sign.
+	This character is a plus sign.
( )	These characters are parentheses and are displayed around negative numbers.

Important: The characters you specify in a custom format definition for the thousands separator, decimal separator, and currency symbol are used when you format a number regardless of the settings for those symbols in **Preferences**. Data is always displayed in the worksheet according to the custom format definition.

The characters in the following table are text characters used in custom format definition strings.

Text Character	Purpose
space	A blank space inserts a space in the number being formatted.
" "	A set of double quotation marks encloses a string of text to be placed in the cell with the data being formatted.
@	This character indicates where the characters from the data being formatted are to be placed with a text string from the custom format definition.
\	The backslash indicates the next character in the definition string is a text character and is to be displayed in the data being formatted. A backslash can be used as an alternative to enclosing a single character in a set of double quotation marks.
*	The character that follows an asterisk in a definition string is repeated to fill the remaining space in the cell.

The characters in the following table are date characters used in custom format definition strings.

Date Character	Purpose
d	This character displays the day of the month as a one- or two-digit number.
dd	These characters display the day of the month as a two-digit number.
ddd	These characters display an abbreviated version of the day's name (for example, **Sat** or **Sun**).
dddd	These characters display an unabbreviated version of the day's name (for example, **Saturday** or **Sunday**).
m	This character displays the month of the year as a one- or two-digit number.
mm	These characters display the month of the year as a two-digit number.
mmm	These characters display an abbreviated version of the month's name (for example, **Aug** or **Sep**).

mmmm	These characters display an unabbreviated version of the month's name (for example, **August** or **September**).
yy	These characters display the year as a two-digit number.
yyyy	These characters display the year as a four-digit number.
/	This character serves as a date separator and is placed between month, day, and year characters.

The characters in the following table are time characters used in custom format definition strings.

Time Character	Purpose
h	This character displays the hour of the day as a one- or two-digit number.
hh	These characters display the hour of the day as a two-digit number.
m	This character displays the minutes of the hour as a one- or two-digit number. This character must follow an h or hh character in a definition string. Otherwise, a month is displayed instead of minutes.
mm	These characters display the minutes of the hour as a two-digit number. These characters must follow an h or hh character in a definition string. Otherwise, a month is displayed instead of minutes.
s	This character displays the seconds of the minute as a one- or two-digit number.
ss	These characters display the seconds of the minute as a two-digit number.
a/p	These characters cause hours to be displayed in 12-hour format. An a or p is placed after the number indicating whether the hour is am or pm.
A/P	These characters cause hours to be displayed in 12-hour format. An A or P is placed after the number indicating whether the hour is am or pm.
am/pm	These characters cause hours to be displayed in 12-hour format. An am or pm is placed after the number indicating whether the hour is am or pm.
AM/PM	These characters cause hours to be displayed in 12-hour format. An AM or PM is placed after the number indicating whether the hour is am or pm.
:	This character serves as a time separator and is placed between hour, minute, and second characters.

Important: If an am/pm designator is not included with a custom format time definition string, hours are displayed in a 24-hour format.

To define a custom number format:

1. Select the cells to which you want to apply a custom format.

2. Choose **Format/Cells** to display the **Format Cells** dialog box. Select the **Numbers** tab.

3. Click **Define Custom** to display the **Define Custom Number Formats** dialog box. By default, the fields in the dialog box are blank so you can enter a new custom format. The dialog box contains four fields for entering the definition strings for how positive numbers, negative numbers, zeroes, and text are to be displayed. When you choose to create a new custom format, the fields are blank, allowing you to enter new definition strings.

4. Enter the definition string for positive numbers in the **Positive** field. You can enter the definition string characters in the fields manually, or you can click the **Numeric**, **Text**, **Date**, and **Time** popup menus below the fields to select commonly used characters to enter. When you select a character from a popup menu, it is placed at the current insertion point.

5. Enter definition strings in the **Negative**, **Zero**, and **Text** fields. You are not required to enter a definition string for each type of data. However, if you apply a custom format to a cell that contains data for which a definition string has not been specified, the data is not displayed.

6. Click the **Example** popup menu to select a number or string to test your definition strings. The **Example** popup menu contains a list of every type of data you can enter in your worksheet. When you select a number from the popup menu, the appropriate

definition string from the currently selected custom format is used to display the number in the **Example** line of the dialog box.

7. Click **Apply**.

The custom format is applied to the currently selected range. The custom format overrides all other number formats and attributes, including the decimal precision.

The defined custom format is saved and can be applied to other cells in your worksheet. The custom format is displayed in the **Formats** list box in the Numbers dialog box. After a custom format is defined, it can be selected and applied in the same manner as a predefined number format.

Tip: You can click the **Custom Formats** popup menu to select a previously defined custom format to use as a pattern as you define a new custom format.

Deleting Custom Number Formats

If a custom format is no longer needed, it can be deleted from the list of formats. A custom format cannot be deleted if cells in your workbook use the custom format you are attempting to delete. The format must be removed from the cells before you can delete the format.

To delete a custom format:

1. Choose **Format/Cells** to display the **Format Cells** dialog box. Click the **Numbers** tab.

2. Click **Define Custom** to display the **Define Custom Number Formats** dialog box.

3. Click the **Custom Formats** popup menu and select the format you want to delete.

4. Click **Delete** to delete the currently selected format.

Examples of Custom Formatting

The following table shows how examples of worksheet data are displayed when formatted with a custom format. It is assumed that the sample definition strings are entered in the **Positive** field in the **Define Custom Number Formats** dialog box.

Worksheet Data	Custom Format	Displayed Value
123456780	000-00-0000	123-45-6780
23456.70	$###,##0.00	$23,456.70
4560000.00	0.00E+00	4.56E+06
0.005	0.00%	0.50%
23218.00	"Total Sales: "$##,##0.00	Total Sales: $23,218.00
34764	mm dd yyyy	03 06 1995
34991	mmmm d, yyyy	October 19, 1995
34991	mm/dd/yy	10/19/95
0.6878	hhmmss	163025
0.6878	hh mm ss A/P	04 30 25 P
0.6878	h:m:s am/pm	4:30:25 pm

Adding Cell Borders

Cell borders allow you to highlight a selected cell or range by placing a border along any edge of the cell or range. You can also outline a selected cell or range with a cell border. Cell borders are displayed even when the worksheet grid is hidden. The display of cell borders is controlled via the **Border** tab of the **Format Cells** dialog box, shown in the illustration below.

Figure 8-1

Click the line style that you
want to use for the cell
border.

Click these buttons to
indicate where you want the
cell borders displayed.
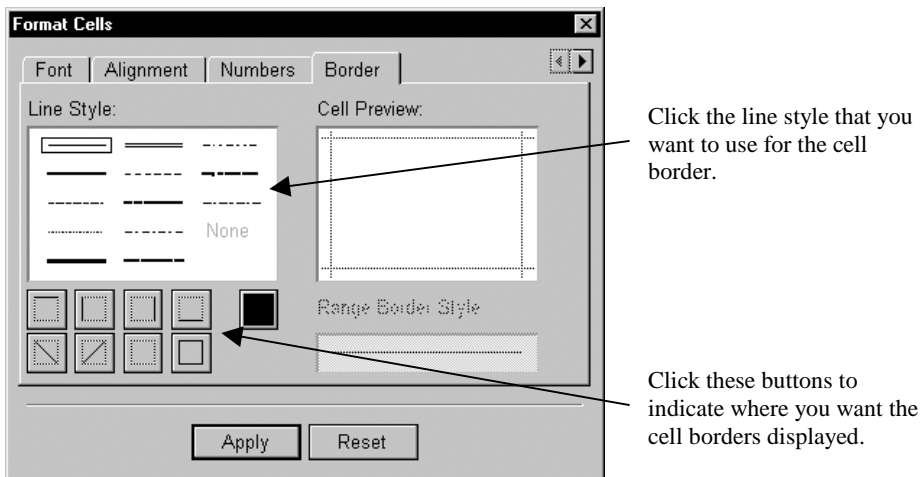
To add a cell border:

1. Select the cell or range you want to highlight with cell
   borders.

2. Choose **Format/Cells** to display the **Format Cells**
   dialog box. Click the **Border** tab.

3. Click the buttons in the lower left area of the dialog box
   to choose where to place the cell borders.

4. Select the line style that you want to use for the cell
   borders from the **Line Style** selection box.

5. When the **Cell Preview** appears as you want your cell
   borders to appear, click **Apply**.

Formatting the Worksheet Grid

The worksheet grid consists of the lines that mark the borders of the columns and rows and define the location of each cell. You can format the color, pattern, and width of the lines in the worksheet grid. By default, lines in the worksheet grid are 0.25 points wide and have a dotted pattern with black foreground and white background colors.

To format the worksheet grid:

1. Select a cell, range, row, or column. Or, click once at the intersection of the row and column headings in the upper left corner of the worksheet grid.

2. Choose **Format/Cells** to display the **Format Cells** dialog box. Click the **Colors & Lines** tab.

3. Click the **Line** button to display the line section of the dialog box.

4. Click the **Color** popups to select the foreground and background line colors.

5. Click the **Pattern** popup to select the line pattern.

6. Click the **Line Width** popup to select the line width.

7. Click **Apply**.

The formatting is applied to the entire worksheet grid.

CHAPTER 9: MOVING AND COPYING DATA

JSheet Builder provides multiple methods for moving and copying data in your worksheets. You can perform simple cut, copy, and paste tasks, or more complex tasks that involve clearing and pasting individual elements of your data. You can also insert or delete rows and columns of data, or move data between worksheets.

Moving Worksheet Data

A range of worksheet data can be moved using a combination of cut and paste or copy and paste commands. You can move a single piece of data or a range of data.

- Use the cut and paste combination if you want to remove data from its original location and place it in another location in your worksheet.

- Use the copy and paste combination if you want to leave data in its original location and place a copy of the data in another location in your worksheet.

Cutting Data

To cut data, select the range containing the data that you want to cut, and choose **Edit/Cut**. Data from the selected range is removed from the worksheet and placed on the clipboard. The range that contained the cut data is now empty. The formatting associated with the data is also removed.

Copying Data

To copy data, select the range containing the data that you want to copy and choose **Edit/Copy**. A copy of the data from the selected range is placed on the clipboard. The selected data remains in the worksheet, along with the formatting associated with the data.

Pasting Data

To paste data, select the range in which you want to place the data that is on the clipboard. You can select a single cell or a range of cells for pasting the data. Then, choose **Edit/Paste**.

The data you cut or copied to the clipboard is placed in the worksheet range you selected. You can repeat this procedure as many times as you need to paste multiple copies of the data from the clipboard. The data remains on the clipboard until you cut or copy another range of data or an object.

How data from the clipboard is pasted into the worksheet depends on the size of the range into which you are pasting the data. The following illustrations show how data is pasted if you select a single cell, a range larger than the clipboard data range, and a range smaller than the clipboard data range.

In the first illustration, the range **A1..C4**, is selected and copied to the clipboard for the examples in this illustration. In the second illustration, cell **A8** is selected when the clipboard data is pasted. When a single cell is selected, data is pasted into as many cells as needed, with the selected cell serving as the top left cell of the range. Any data in these cells is overwritten by the pasted data.

Figure 9-1

	A	B	C	
1	1.00	5.00	9.00	
2	2.00	6.00	10.00	
3	3.00	7.00	11.00	
4	4.00	8.00	12.00	
5				
6				

Figure 9-2

	A	B	C	
7				
8	1.00	5.00	9.00	
9	2.00	6.00	10.00	
10	3.00	7.00	11.00	
11	4.00	8.00	12.00	
12				

In the next illustration, the range **A8..C9** was selected when the clipboard data was pasted. When the selected range is smaller than the data range, the pasted data is truncated to fit the selected range.

Figure 9-3

	A	B	C	
7				
8	1.00	5.00	9.00	
9	2.00	6.00	10.00	
10				
11				

In the following illustration, the range **A8..C13** was selected when the data was pasted. When the selected range is larger than the clipboard data range, the pasted data is repeated until the selected range is filled.

Figure 9-4

	A	B	C	
7				
8	1.00	5.00	9.00	
9	2.00	6.00	10.00	
10	3.00	7.00	11.00	
11	4.00	8.00	12.00	
12	1.00	5.00	9.00	
13	2.00	6.00	10.00	
14				

Pasting Data Between Worksheets

Data that has been cut or copied from one worksheet can be pasted into another worksheet. After cutting or copying the data from the original worksheet, make the worksheet into which you want to paste the data the current worksheet. Select the cell or range into which you want to paste the data and choose **Edit/Paste**.

Pasting Selected Data Elements

When data is pasted from the clipboard into a cell in your worksheet, the clipboard data's value or text, plus any associated formatting, is pasted. However, if you want to just paste the value or just paste the formatting from the clipboard data, you can use the **Paste Special** commands.

If the clipboard data contains numbers, you can also use **Paste Special** commands to add, subtract, multiply, or divide the clipboard data values with numbers in your worksheet.

To use Paste Special:

1. Select the range that contains the data on which you want to perform a special paste.

2. Choose **Edit/Paste Special** to display a submenu that contains the **Paste Special** commands.

3. Select the **Paste Special** command you want to execute.

The following commands are available in the **Paste Special** submenu:

- **Format Only**. This command pastes only the formatting from the clipboard data into the selected range. The values in the selected range are unchanged. Formats are applied only to cells that contain data or formatting.

- **Without Formula**. This command pastes values from the clipboard data into the selected range. If the clipboard data contains formulas, only the results of the formulas are pasted. The formatting from the clipboard data is also pasted.

- **Value Only.** This command pastes only the values from the clipboard data into the selected range. Any formats that are applied to the clipboard data are disregarded for the pasted data.

- **All Except Borders.** This command pastes all of the clipboard data into the selected range. However, if any of the clipboard data has been formatted to contain cell borders, the cell borders are not included in the paste operation.

- **Add To Cell Values**. This command adds the values from the clipboard data to the values in the selected range. For example, if the value in the clipboard is 5 and the value in the selected cell is 10, the value in the selected cell becomes 15. The data in the clipboard and the selected range must be numbers.

- **Subtract From Cell Values**. This command subtracts the values of the clipboard data from the values in the selected range. For example, if the value in the clipboard is 5 and the value in the selected cell is 10, the value in the selected cell becomes 5. The data in the clipboard and the selected range must be numbers.

- **Multiply With Cell Values**. This command multiplies the values from the clipboard data with the values in the selected range. For example, if the value in the clipboard is 5 and the value in the selected cell is 10, the value in the selected cell becomes 50. The data in the clipboard and the selected range must be numbers.

- **Divide Into Cell Values**. This command divides the values from the clipboard data into the values in the selected range. For example, if the value in the clipboard is 5 and the value in the selected cell is 10, the value in the selected cell becomes 2. The data in the clipboard and the selected range must be numbers.

- **From**. This command allows you to select data from another worksheet or text file to paste into the selected range. An **Open** dialog box is displayed, allowing you to specify the file from which you want to paste.

This command also allows you to import picture files created in other graphical applications, such as painting and drawing packages.

Copying Data Across Ranges

Copying data across a range allows you to duplicate data from the top row or left column of a selected range and copy it across the range.

To copy data across a range:

1. Select the range across which you want to copy data.

2. Choose **Edit/Copy Right** to copy the data in the left column across the selected range.

3. Choose **Edit/Copy Down** to copy the data in the top row down the selected range.

If the data you are copying contains formulas with relative references, the references are updated as the formulas are copied. If the range across which data in the top row or left column is being copied contains other data, the other data is overwritten by the copied data.

The following illustrations show the effect of copying data across a selected range. The first worksheet shows a selected range before **Edit/Copy Right** is executed. The second worksheet shows the result of the action.

Figure 9-5

Figure 9-6

	A	B	C	
1	1.00	1.00	1.00	
2	2.00	2.00	2.00	
3	3.00	3.00	3.00	
4	4.00	4.00	4.00	
5	5.00	5.00	5.00	
6	6.00	6.00	6.00	
7				

The next two illustrations show the effect of using the **Edit/Copy Down** option. The first worksheet shows a selected range before the copy option is used. The second worksheet shows how the data in the top row of the selected range is copied down the range.

Figure 9-7

	A	B	C	
1	1.00	2.00	3.00	
2				
3				
4				
5				
6				
7				

Figure 9-8

	A	B	C	
1	1.00	2.00	3.00	
2	1.00	2.00	3.00	
3	1.00	2.00	3.00	
4	1.00	2.00	3.00	
5	1.00	2.00	3.00	
6	1.00	2.00	3.00	
7				

Removing Worksheet Data

If you want to remove data from your worksheet and do not want to paste the data in another location, you can use the **Clear** commands. Unlike **Edit/Cut**, which removes data from your worksheet and places it on the clipboard, the **Clear** commands only remove the data.

To remove data from a worksheet, select the data to be removed, and then choose **Edit/Clear**. (You can also clear a selected range of data by pressing BACKSPACE.) The selected data and any associated formatting are removed from your worksheet.

Removing Selected Elements of Data

The **Clear Special** commands allow you to remove selected elements of your data including formatting, formulas, and data.

To remove selected elements of data:

1. Select the data to be removed.

2. Choose **Edit/Clear Special** to display a submenu that contains the **Clear Special** commands.

3. Select the **Clear Special** command you want to execute.

The following commands are available in the **Clear Special** submenu:

- **Format Only**. This command clears only the format of the data in the selected range. The data remains in the range and reverts to the default formatting defined for your worksheet.

- **Formula Only**. This command clears any formulas in the selected range. The results of the formulas replace the formulas as the worksheet data.

- **Data Only**. This command clears only the data from the selected range. Any formatting applied to the range is retained.

Inserting and Deleting Ranges

Inserting and deleting ranges shifts the data in your worksheet. Inserting a range allows you to shift the data to provide blank cells for entering additional data. Deleting a range allows you to remove data from the worksheet and shift adjacent data into the cells vacated by the deleted data. You can also insert and delete entire rows and columns.

To insert a range:

1. Select the range containing the data you want to shift. The range of data you select should be as large as the range of blank cells you want to insert.

2. Choose **Edit/Insert** to display the **Insert Cells** dialog box.

3. Click either the **Shift Down** button or the **Shift Right** button. If you select the **Shift Down** button, the data in the selected range is moved down the worksheet to accommodate the inserted cells. If you select the **Shift Right** button, the data in the selected range is moved across the worksheet to accommodate the inserted cells.

4. Click **Insert**.

The selected range is shifted in the direction you specified. The following illustrations show a range shifted right and shifted down. In the

first illustration, the worksheet shows range **A1..B5** before a range is inserted. The selected range, **A3..B5**, contains the data to be shifted to make room for the inserted cells. The second worksheet shows the selected range of data shifted to the right. Blank cells are inserted in the range vacated by the shifted data. In the third example, the selected range of data is shifted down and to the left. Again, blank cells are inserted in the range vacated by the shifted data.

Figure 9-9

	A	B	C	D	
1	1.00	6.00			
2	2.00	7.00			
3	3.00	8.00			
4	4.00	9.00			
5	5.00	10.00			
6					
7					
8					

Figure 9-10

	A	B	C	D	
1	1.00	6.00			
2	2.00	7.00			
3			3.00	8.00	
4			4.00	9.00	
5			5.00	10.00	
6					
7					
8					

Figure 9-11

	A	B	C	D	
1	1.00	6.00			
2	2.00	7.00			
3					
4					
5					
6	3.00	8.00			
7	4.00	9.00			
8	5.00	10.00			
9					

To delete a range:

1. Select the range containing the data you want to delete.

2. Choose **Edit/Delete** to display the **Delete Cells** dialog box.

3. Click either the **Shift Up** button or the **Shift Left** button. If you select the **Shift Up** button, the selected range is deleted and the data below the deleted range is shifted up to fill the vacated range. If you select the **Shift Left** button, the selected range is deleted and the data to the right of the deleted range is shifted left to fill the vacated range.

4. Click **Delete**.

The selected range is deleted and all other data is shifted in the direction you specified. The following illustrations show an example of a deleted range with adjacent data shifted left and shifted up. The first illustration shows range **A1..D8** before a range is deleted. The selected range, **A1..B5**, contains the data to be deleted. The second illustration shows that the selected range is deleted and the data in the range to the right of the deleted range is shifted left to occupy the vacated range. In the third illustration, the selected range is deleted and the data in the range below the deleted range is shifted up to occupy the vacated range.

Figure 9-12

	A	B	C	D	
1	1.00	9.00	17.00	25.00	
2	2.00	10.00	18.00	26.00	
3	3.00	11.00	19.00	27.00	
4	4.00	12.00	20.00	28.00	
5	5.00	13.00	21.00	29.00	
6	6.00	14.00	22.00	30.00	
7	7.00	15.00	23.00	31.00	
8	8.00	16.00	24.00	32.00	
9					

Figure 9-13

	A	B	C	D	
1	17.00	25.00			
2	18.00	26.00			
3	19.00	27.00			
4	20.00	28.00			
5	21.00	29.00			
6	6.00	14.00	22.00	30.00	
7	7.00	15.00	23.00	31.00	
8	8.00	16.00	24.00	32.00	
9					

Figure 9-14

	A	B	C	D	
1	6.00	14.00	17.00	25.00	
2	7.00	15.00	18.00	26.00	
3	8.00	16.00	19.00	27.00	
4			20.00	28.00	
5			21.00	29.00	
6			22.00	30.00	
7			23.00	31.00	
8			24.00	32.00	
9					

Inserting and Deleting Rows and Columns

In addition to inserting and deleting ranges, you can select entire rows and columns to insert or delete. You can insert and delete a single row or column or multiple rows or columns.

To insert a row or column:

1. Click the row or column heading where you want to insert a row or column.

   To insert multiple rows or columns, click and drag across the headings to select the number of rows or columns you want to insert.

If you are inserting a column, the data in the column you selected and all of the data to the right of the column are shifted right one column. A column of blank cells is inserted in the selected column. If you are inserting multiple columns, the data in the selected columns and all of the data to the right of the columns is shifted the same number of columns as are selected.

If you are inserting a row, the data in the row you selected and all of the data below the row are shifted down one row. A row of blank cells is inserted in the selected row. If you are inserting multiple rows, the data in the selected rows and all of the data below the rows is shifted the number of rows selected.

2. Choose **Edit/Insert**.

The rows or columns are inserted; the **Insert Cells** dialog box is not displayed.

To delete a row or column, click on the heading of the row or column that you want to delete. If you want to delete multiple rows or columns, click and drag across the headings to select the rows or columns you want to delete. Then, choose **Edit/Delete**.

If you are deleting columns, the data in the selected columns is deleted and the data to the right of the selected columns is shifted left to fill the vacated columns. If you are deleting rows, the data in the selected rows is deleted and the data below the selected rows is shifted up to fill the vacated rows.

Reversing Move and Delete Commands

Any of the cut, paste, clear, insert, and delete commands described in the previous sections can be reversed. Reversing these commands allows you

to correct any data manipulation mistakes you might make. To reverse a data manipulation command, choose **Edit/Undo**.

Important: **Edit/Undo** can reverse a command only if it is executed immediately after the data manipulation command. **Undo** only reverses the most recent command or action in your worksheet.

Sorting Worksheet Data

A range of worksheet data can be rearranged by sorting the data. You can specify the order of the sort, as well as whether the data is sorted by columns or rows.

Data is sorted according to sort keys. A sort key defines which column of data to sort when you are sorting by rows, or which row of data to sort when you are sorting by columns. You can define up to 255 sort keys for a single sort.

To sort a range of data:

1. Enter the data to be sorted.

2. Choose **Sheet/Sort** to display the **Sort** dialog box.

3. Enter the address of the range to be sorted in the **Sort Range** field, or choose a range from the ranges listed in the **Sort Range** popup menu. The range address you enter should include only cells that contain data. If your data includes titles, the titles should not be included in the sort range. Titles included in a sort range are sorted with the data.

4. Click the **Sort By** popup menu to select whether the data is to be sorted by columns or rows. If you choose to sort by rows, each row in your sort range is considered a sort record. If you choose to sort by

columns, each column in your sort range is considered a sort record. When a sort is performed, all of the data associated with a record is sorted together.

5. Click the **Key 1** popups and select the row or column by which you want to sort. If you are sorting by rows, select the row where you want the sort to begin. If you are sorting by columns, select the column where you want the sort to begin. Select additional columns or rows from the subsequent key popups. Any additional sort keys are secondary to the primary sort key. Secondary keys are considered in the order they are entered.

6. Click the **Ascending** or **Descending** radio buttons on all of the defined sort keys to specify the type of sort to be performed with each key. In an ascending sort, text data is sorted alphabetically from A to Z. Numeric data is sorted from the smallest value to the largest value. In a descending sort, text data is sorted from Z to A. Numeric data is sorted from the largest to the smallest value.

7. Click **Sort** to execute the defined sort.

The following illustrations show a range of data before and after it is sorted. In the first illustration, **A2..E11** is defined as the sort range and a row sort is defined. The column of zip codes is defined as the primary sort key and the column of company names is defined as a secondary key.

The second illustration shows the result of a sort. The row records are sorted in descending order by zip code. Because three records have the same zip code, the secondary key is used to sort these records.

Figure 9-15

	A	B	C	D	E
1	Company	Address	City	State	Zip Code
2	Tri-State Supply	12045 W. 95th Street	Lenexa	KS	66219
3	Smith Hardware	4135 Elmwood	Kansas City	MO	64102
4	Midlands Hardware Supply	8101 Admiral	Kansas City	KS	64104
5	American Fittings	2387 Hillside	Wichita	KS	67208
6	TJL Supply, Inc.	14891 201 Hwy.	Liberty	MO	64068
7	John Stevenson Co.	1803 Gateway	Kansas City	MO	64102
8	Thermal Products	5491 Rainbow Rd.	Topeka	KS	66615
9	Johnson Supply	184 East Ave.	St. Louis	MO	63103
10	Industrial Lumber	2182 Park	Manhattan	KS	66502
11	Missouri Lumber Supply	9273 E. Hardly	Kansas City	MO	64102

	A	B	C	D	E
1	Company	Address	City	State	Zip Code
2	American Fittings	2387 Hillside	Wichita	KS	67208
3	Thermal Products	5491 Rainbow Rd.	Topeka	KS	66615
4	Industrial Lumber	2182 Park	Manhattan	KS	66502
5	Tri-State Supply	12045 W. 95th Street	Lenexa	KS	66219
6	Midlands Hardware Supply	8101 Admiral	Kansas City	KS	64104
7	John Stevenson Co.	1803 Gateway	Kansas City	MO	64102
8	Missouri Lumber Supply	9273 E. Hardly	Kansas City	MO	64102
9	Smith Hardware	4135 Elmwood	Kansas City	MO	64102
10	TJL Supply, Inc.	14891 201 Hwy.	Liberty	MO	64068
11	Johnson Supply	184 East Ave.	St. Louis	MO	63103

Listing Sort Keys

The **Sort** dialog box provides two methods for displaying the sort keys. When opened, the dialog box lists the keys in edit mode. This mode allows you to specify the key range and key type. You can also display the keys in list mode, rearrage the order of the sort keys, or delete a sort key. List mode displays the keys in the order they are considered.

To list sort keys:

1. Click the **List Keys** tab. The **Sort** dialog box changes to list mode and displays the sort keys you entered in edit mode.

2. Click a sort key in the list box to select a key. Click the scroll bar to the right of the list box to scroll through the list of sort keys. When a sort key is selected, it is highlighted. Only one sort key can be selected at a time.

3. Click **Promote** to move the selected sort key higher in the sort order. Click **Demote** to move the selected sort key lower in the sort order. When performing a sort, sort keys are considered in the order they are listed in the list box. The first sort key is considered the primary sort key.

4. Click **Delete** to delete the selected sort key.

Converting Linear Data to Columnar Data

When data is imported from a database, from another spreadsheet program, or from a text file, often it is imported as linear data and placed in a single cell or in a column of cells. To manipulate the data in JSheet Builder, you must convert the data to columnar or tabular data.

Linear data from a cell can be converted to columnar data using **Sheet/ Text to Table**. When linear data is converted to columnar data, data is shifted to the next column of the current row at every break point. You select the items to serve as break points in the **Text to Table** dialog box.

To convert linear data:

1. Select the cell or column of cells that contains the data you want to convert.

2. Choose **Sheet/Text to Table** to display the **Text to Table** dialog box.

3. Click the radio buttons to specify the break points to be used in converting the selected data.

4. Click **Convert**.

Important: When you convert linear data, the item used as the break point is deleted and not included in the columnar data.

The following items can be defined as break points when converting linear data to columnar data:

- **Tab**. Break points are inserted at each tab in the linear data.

- **Comma**. Break points are inserted at each comma (,) in the data.

- **Semicolon**. Break points are inserted at each semicolon (;) in the data.

- **Vertical Bar**. Break points are inserted at each vertical bar (|) in the data.

- **Special Character**. You can define the character after which break points are to be inserted. Enter the character in the field to the right of this option.

- **Character Interval**. Break points are inserted at regular intervals in the linear data. You define the number of characters between each break point in the number wheel to the right of this option.

- **Variable Space**. Break points are inserted at each variable space in the linear data. A variable space is the created when you press SPACEBAR.

- **At Specific Character Location**. In the field below this option, you can specify the locations in the linear data where break points are inserted. Data from the first selected cell is placed in the field as a sample data string. Insert square brackets ([ ]) to indicate the break points. Each block of data should be surrounded by a set of brackets.

Tip: Use the **At Specific Character Location** option for data imported from a database that is not delineated by regular tabs, characters, or spaces. Place the brackets in the sample data string to denote each field of data. Make certain you allow for the largest number of characters that can be held in each field.

The following illustrations show a column of cells containing linear data before and after it is converted to columnar data. In the first illustration, linear data is contained in each cell of the range **A1..A8**. The data was imported from a text file.

In the second illustration, the linear data is converted to columnar data with semicolons used as the break points. Data is shifted right to the next column at each break point. The semicolons are removed as the data is converted.

Figure 9-16

	A	B	C	D
1	Stock Number; Manu Code; Description; Quantity			
2	58-38672; ANZ; baseball gloves; 202			
3	78-2887; HSK; basketballs; 72			
4	88-4829; HRN; tennis balls; 298 cases			
5	11-9283; HRN; tennis racquets; 59			
6	45-7890; BAJ; golf balls; 149 cases			
7	49-3826; ANZ; baseball bats; 153			
8	61-3978; SNT; volleyball nets; 29			

	A	B	C	D
1	Stock Number	Manu Code	Description	Quantity
2	58-38672	ANZ	baseball gloves	202
3	78-2887	HSK	basketballs	72
4	88-4829	HRN	tennis balls	298 cases
5	11-9283	HRN	tennis racquets	59
6	45-7890	BAJ	golf balls	149 cases
7	49-3826	ANZ	baseball bats	153
8	61-3978	SNT	volleyball nets	29

CHAPTER 10: AUDITING WORKBOOKS

JSheet Builder allows you to audit and search your worksheets. The auditing features make it easy to locate and track data, especially in large and complex worksheets.

Complementing the auditing features is the ability to search for specific pieces of data in a worksheet. In addition, a range that is often selected or referenced in a formula can be named to make selecting and referencing that range easier.

In this chapter, you learn how to:

- select cells in your worksheet based on predefined criteria.

- select cells in your worksheet based on the types of entries contained in the cells.

- name ranges.

- search your worksheets for specified text, numbers, or formulas.

Selecting Cells by Criteria

A worksheet can be audited by selecting cells according to predefined criteria. Several groups of criteria are provided. Cells can be selected according to their contents, status, or formula references.

To audit a worksheet:

1. Choose Select/Audit Worksheet to display the Audit Worksheet dialog box.

2. Click the **Select By** popup menu to select the desired group criterion for selecting cells.

3. Click a radio button to select the individual criterion to use for selecting cells.

4. Click **Select**.

The criteria groups and the individual criterion are described in the following lists.

The **Cell Contents** criteria allow you to select cells based on the data entered in the cells.

- **Cells Containing Text**. All of the cells that contain text are selected. Cells with numbers entered as text are also selected.

- **Cells Containing Values.** All of the cells that contain numeric data are selected. Cells with formulas that return a numeric value are not selected.

- **Cells Containing Formulas**. All of the cells that contain formulas and cells with formulas that return errors are selected.

- **Cells Containing Errors**. Only the cells with formulas that return errors are selected.

The **Cell Status** criteria allow you to select cells based on the status of cells.

- **Locked Cells**. All of the protected cells are selected. To protect a cell, select the cell and choose **Sheet/Protection/Protect Cells**.

- **Blank Cells**. All of the blank cells are selected. A cell is considered blank if formatting has been applied but the cell does not contain data.

- **Unreferenced Cells**. All of the cells that contain data that are not referenced by a formula are selected.

The **Formula References** criteria allow you to select cells based on references to and references by the formula in the currently selected cell.

- **All Precedents**. All of the cells that contain a precedent to the formula in the current cell are selected. A precedent cell is any cell that contains data on which the formula in the current cell is dependent for calculation. A cell that is a direct precedent to the current cell may have cells that are precedents to it. These cells are indirect precedents of the current cell and are also selected.

- **All Dependents**. All of the cells that contain a dependent of the formula in the current cell are selected. A dependent cell is any cell dependent on the formula in the current cell to determine its value. A cell that is directly dependent on the current cell may have cells that are dependent on it. These cells are indirect dependents of the current cell and are also selected.

- **Direct Precedents**. All of the cells that contain a direct precedent to the formula in the current cell are selected. A direct precedent cell is a cell referenced by the formula in the current

cell. The value in the cell referenced by the formula must be resolved to calculate the formula. Therefore, the referenced cell is a direct precedent to the formula cell.

- **Direct Dependents**. All of the cells that contain a direct dependent to the formula in the current cell are selected. A direct dependent cell is a cell that contains a formula that references the current cell. The formula in the dependent cell cannot be calculated until the value in the current cell is resolved. Therefore, the cell referencing the current cell is directly dependent on the current cell.

- **All Cells Referencing Blank Cells**. All of the cells that contain formulas that reference blank cells are selected.

The following illustration shows examples of precedent and dependent cells. Formula text is displayed in this worksheet example.

The formula in **D2** references data in **B2** and **C2**. Therefore, **D2** is a direct dependent of **B2** and **C2**. In addition, both **B2** and **C2** are direct precedents of **D2**. The formula in **D6** references data in **D2**, **D3**, **D4**, and **D5**. Because these cells reference other cells, **D6** is an indirect dependent of the cells referenced by **D2**, **D3**, **D4**, and **D5**. In addition, the cells that are referenced by these cells are indirect precedents of **D6**.

Figure 10-1

	A	B	C	D
1		Sales	Expenses	Profit
2	North	21420.10	17345.35	=B2-C2
3	Southeast	12074.00	8876.20	=B3-C3
4	West	19183.30	8838.35	=B4-C4
5	Central	20166.60	7074.85	=B5-C5
6	Total	=sum(B2..B5)	=sum(C2..C5)	=sum(D2..D5)
7				
8	Average	=avg(B6/4)	=avg(C6/4)	=avg(D6/4)

Selecting Items by Type

All of the items in a worksheet that are of a particular type can be selected. For example, you can select all of the active cells in a worksheet or all of the titles you have defined in a worksheet. You can select a single type of item or multiple types.

To select items by type:

1. Choose **Select/Select By Type** to display the **Select By Type** dialog box.

2. Click the check boxes of the types of items you want to select.

3. Click **Select**.

The following types of items can be selected:

- **All Cells**. All of the cells and headings in your worksheet are selected.

- **Active Cells**. A range is selected that begins with A1 and extends to encompass all of the active cells in your worksheet. An active cell contains data, formatting, or an object. Because blank cells contain formatting, they are considered to be active cells.

- **Graphics**. All of the charts on your worksheet are selected.

- **Headings**. The row and column headings on your worksheet are selected.

- **Titles**. The titles you have defined are selected.

Selecting All Items

Everything on your worksheet can be selected simultaneously by choosing the single command **Select/Select All**. All items, including charts, cells, and headings are selected.

Naming Ranges

A range that is selected frequently or referenced frequently in formulas can be named to make selecting and referencing easier. When naming a range, you can name a single range or multiple ranges if the data in your worksheet is arranged like a table.

To name a single range:

1. Choose **Select/Named Ranges** to display the **Named Ranges** dialog box.

2. Click the **Single Range** tab.

3. Enter the name of the range in the **New Name** field. The name should begin with a letter and can contain alphabetic and numeric characters.

4. Enter the address of the range in the **Range** field. The address of the currently selected range is entered in the **Range** field by default. You can use this address or enter the address of a different range.

5. Click **Add** to include the new named range in the list of named ranges for your worksheet. The **Names** popup menu displays a list of the named ranges in your worksheet and their corresponding range addresses.

6. Click **Close** to exit the dialog box.

Naming Table Ranges

If the data in your worksheet is arranged similar to a table, with labels for each row and column of data, you can name the ranges in this table. Each row and column of a table can be defined as a named range with the row and column labels used as the names of the ranges.

You can also name the entire range occupied by a table. Text in the top left cell of the table is used as the range name.

The following options are available from the **Name Source** popup menu when naming a table's ranges:

- **Using Top Row**. This option uses the text in the top row of the table as the range names. Each column of the table is defined as a named range.

- **Using Left Column**. This option uses the text in the left column of the table as the range names. Each row of the table is defined as a named range.

- **Using Top Row & Left Column**. This option uses the text in the top row and the left column of the table as the range names. Each column and each row of the table are defined as named ranges. In addition, the range occupied by the table is defined as a named range with the text from the top left cell used as the range name.

To name a table's ranges:

1. Choose **Select/Named Ranges** to display the **Named Ranges** dialog box.

2. Click the **Table Ranges** tab.

3. Enter the address of the table range in the **of Range** field. The address of the currently selected range is entered in the **Range** field by default. You can use this address or enter the address of a different range.

4. Click the **Name Source** popup menu to select the ranges to be named and the source of the names.

5. Click **Create Names** to name the ranges you specified.

6. Click **Close** to exit the dialog box.

Editing a Named Range

You can change the address of a named range or remove a named range using the **Name Ranges** dialog box.

To edit a named range:

1. Choose **Select/Named Ranges**.

2. Click the **Single Range** radio button.

3. Select the desired range name from the **Names** list box.

4. Modify the range displayed in the **Range** text field.

5. Click **Add** when modifications are finished. The selected range name is updated with the new address.

6. Click **Close** to exit the dialog box.

Tip: When you modify the name of a range, a new range is added to the list of named ranges instead of updating the currently selected range.

To remove a named range:

1. Choose **Select/Named Ranges**.

2. In the **Names** list box, of the **Single Range** tab, select the named range to be removed.

3. Click **Remove**. The currently selected range name is removed from the list of named ranges.

4. Click **Close** to exit the dialog box.

Important: You cannot remove a named range that is currently referenced by a formula in your worksheet.

After a range is named, selecting the named range is easy.

To select a named range:

1. Choose **Select/Go To** to display a list of named ranges in the list box.

2. Select the **Named Range** radio button.

3. If necessary, click on the scroll bar on the right side of the list box to scroll through the list of named ranges.

4. Double-click the name of the range you want to select, or click **Go**.

Searching for Data

Search operations allow you to find and select cells that match a string of characters you enter. You can search for text, numbers, or formulas.

To search for data:

1. Choose **Select/Find & Replace** to display the **Sheet Find & Replace** dialog box.

2. In the **Find What** field, enter the string of characters for which you want to search. Because the worksheet search is not case-sensitive, the search string you enter does not have to match the uppercase and lowercase pattern of the data for which you are searching. The search string you enter can match the cell data in its entirety or only a portion of the data.

3. Click the **Search In** popup menu to select the type of data for which you want to search.

4. Click **Find**. The search begins with the current cell and proceeds to the right to the end of the row. The search continues from left to right on each subsequent row. The search stops when the first cell is found with data matching the search string. The cell is selected and displayed on your screen.

5. To find additional occurrences of the search string, click **Find** again.

6. Repeat step 5 until you have found all of the occurrences of the search string.

Tip: The search moves from the current cell down the worksheet through each row until the end of the worksheet is reached. The search does not continue to the beginning of the worksheet. Before beginning a search, make certain the current cell is at a point in your worksheet where you can find all of the desired occurrences of the search string.

If you execute a search and dismiss the Sheet Find & Replace dialog box, you do not have to redisplay the dialog box to find the next occurrence of the search string. Simply choose **Select/Find Again** to find the next occurrence.

Searching for and Replacing Data

In addition to searching for data, you can replace the data for which you search. You have the option of searching for and replacing one item at a time, or performing a global replace.

To search for and replace individual items:

1. Choose **Select/Find & Replace** to display the **Sheet Find & Replace** dialog box.

2. Click the **Replace** tab.

3. In the **Find what** field, enter the string of characters for which you want to search.

4. In the **Replace with** field, enter the string of characters with which you want to replace the search characters.

5. Click the **Search In** popup menu to select the type of data for which you want to perform the search and replace.

6. Click **Find** to locate the first occurrence of the search string is found.

7. If you want to replace this occurrence of the search string, click **Replace**. If you want to find the next occurrence of the search string, click **Find**. When you click **Replace**, the replace string is substituted for the found data. After replacing the found data, JSheet

Builder automatically searches for the next occurrence of the search string.

8. Repeat step 6 until you have found all of the occurrences of the search string. If no additional occurrences are found, a dialog box appears and you are notified that the search was unsuccessful.

To search for and replace all items:

1. Choose **Select/Find & Replace** to display the **Sheet Find & Replace** dialog box.

2. In the **Find** field, enter the string of characters for which you want to search.

3. In the **Replace With** field, enter the string of characters with which you want to replace the search characters.

4. Click the **Search In** popup menu to select the type of data for which you want to perform the search and replace.

5. Click **Replace All**. All occurrences of the search string are replaced with the replace string.

Performing Special Data Searches

A special data search allows you to find a cell that contains numeric data that occurs within a range of values you specify. The special search finds cells with numbers and cells with formulas that return numbers.

To perform a special search:

1. Choose **Select/Find Special** to display the **Find Special** dialog box. The dialog box contains two check boxes for activating items in the dialog box. The popup menus contain criteria with which the special search is defined. To activate the popup menus, click the check box next to either one. You can activate one or both popup menus, depending on the type of search you want to perform.

2. Click the top check box to activate the **Greater Than** popup menu.

3. Click the popup menu to select the criterion by which the special search is to be performed. The **Greater Than** popup menu allows you to search for a number that is greater than, greater than or equal to, equal to, or not equal to the value you enter in the **Greater Than** field to the right of the popup menu.

4. Enter a number in the field to the right of the **Greater Than** popup menu to which the criteria in the popup menu applies.

5. Click the bottom check box to activate the **Less Than** popup menu.

6. Click the popup menu to select the criterion by which the special search is to be performed. The **Less Than** popup menu allows you to search for a number that is less than, less than or equal to, equal to, or not equal to the value you enter in the field to the right of the **Less Than** of the popup menu.

7. Enter a number in the field to the right of the **Less Than** popup menu to which the criteria in the popup menu applies.

8. If you activate both the **Greater Than** and **Less Than** popup menus, click the **And/Or** popup menu to specify how the criteria are to be applied. If you select **And**, data in the worksheet must satisfy both the **Greater Than** and **Less Than** criteria to be selected. If you select **Or**, data in the worksheet can satisfy either of the selected criteria.

9. Click **Find**. The special search is executed using the same search pattern as a regular data search. When a value is found that matches the criteria you specified in the Find Special dialog box, the cell that contains the value is selected and displayed on your screen.

10. Repeat step 9 to find additional occurrences of the search value. If no additional occurrences are found, a dialog box is displayed telling you the search was unsuccessful.

Searching for Items

While the Find dialog boxes allow you to search for data, the **Go To** dialog box allows you to search for items in your worksheet. You can choose to find and display cells and ranges, pages of your worksheet, or boundaries of the worksheet. When an item is located, it is selected and displayed on your screen.

To search for items:

1. Choose **Select/Go To** to display the **Go To** dialog box.

2. Click a radio button to select the type of item you want to find and display.

3. If you are searching for cells and ranges, enter the address of the range you want to select and display. You can also click the **Named Range** popup menu to the right of the entry field to select a named range to find.

4. To display a page of your worksheet, enter the number of the page you want to display in the **Page Number** number wheel.

5. To display a boundary of the worksheet, click one of the arrows of the **Boundary** button to designate the boundary to display.

6. To go to a specific sheet, select a sheet from the list box.

7. Click **Go**, or double-click on your selection in the list box. The item for which you searched is selected and displayed, and positioned in the top left corner of the worksheet window as long as it is appropriate for the selection that is specified.

CHAPTER 11: MODIFYING THE WORKSHEET WINDOW

Customizing the display of the worksheet window can help you work more efficiently in JSheet Builder. You can select the elements of the window you want to display and then format the appearance of those elements. In addition, you can display multiple copies of a workbook and arrange the display of those windows.

This chapter teaches you how to:

- customize your worksheets by displaying only the components you want.

- resize the rows and columns of your worksheets.

- format the appearance of the worksheet grid.

- set titles for your worksheets.

- display multiple windows.

Showing and Hiding Worksheet Elements

Worksheets can be customized to display only the elements you select. By displaying only the elements you need, you can create a worksheet

that is easier to use. If others are going to use your worksheet, you can customize the worksheet to limit access to elements such as the entry bar or tool box. The default display options that are applied to all new worksheets are set in **Preferences**.

The display options you select apply only to the current worksheet and are saved with the workbook.

To set worksheet display options:

1. Make the worksheet for which you want to set display options the current sheet.

2. Choose Window/Display Settings to display the Display Settings dialog box.

3. Click the check boxes of the items you want to display. A selected check box indicates the item is displayed on the current worksheet. An unselected check box indicates the item is hidden.

4. Click **OK** to apply the selected display options.

The options that can be set in the **Display Settings** dialog box are described in the following list:

- **Book Sizing**. This option allows you to increase or decrease the amount of workbook that is displayed on your desktop.

- **Book Moving**. This option allows you to move a book from one location to the next on your desktop.

- **Horizontal Scroll Bar (Book)**. This option displays the horizontal scroll bar in a workbook.

- **Vertical Scroll Bar (Book)**. This option displays the vertical scroll bar in a workbook.

- **Entry Bar.** This option displays the entry bar that is located at the top of your worksheet. All the elements of the entry bar are displayed.

- **Navigator Bar**. This option displays the navigator bar that enables you to tab through worksheets using the **Sheet** tab buttons or the **Tab** scrolling buttons.

- **Worksheet**. This option displays the cell grid, row and column headings, and any data in the worksheet.

- **Cell Grid**. The grid lines that mark the boundaries of the cells in your worksheet are displayed with this option.

- **Headings**. The row and column headings and the accompanying heading grid are displayed with this option.

- **Heading Grid**. This option displays the grid lines that mark the boundaries of the row and column headings.

- **Titles**. This option displays the worksheet titles you have set. Titles are set with **Format/Set Titles.**

- **Title Grid**. This option displays the grid lines that mark the boundaries of the title cells when titles are displayed.

- **Text Fields**. This option displays all the text fields in your worksheet. Text fields defined as cell notes are not affected.

- **Formula Text**. This option displays the text of the formulas entered in your worksheet. If this option is not selected, the results of the formulas are shown.

- **Notes**. All the text fields defined as cell notes are displayed with this option.

- **Graphics**. All the graphic objects, including charts, are displayed with this option.

- **Controls**. This option displays all the buttons you have drawn on your worksheet.

- **Page Breaks**. All the page breaks, including both default and manually inserted breaks, are displayed with this option.

- **Book Display Mode**. This option allows you to select the method for displaying fonts in workbooks. You can select **Printer Fonts (WYSIWYG)** for screen display that most closely matches your printer or **Screen Fonts (Speed)** for the fastest screen display.

- **Sheet Work Area.** The range of the worksheet appears in the text field.

- **Sheet Headings**. This option allows you to select whether columns are to be labeled with letters (**A1**) or numbers (**R1C1**). The following illustration shows a worksheet with both types of column headings.

- **Background Book Color**. This option allows you to change the background color of the workbook.

In the following illustration, the columns on the first worksheet are labeled with letters. On the second worksheet, the columns are labeled with numbers. The Current Cell Address changes to reflect the format used to label columns.

Figure 11-1

Columns labeled with letters.

Columns labeled with numbers.
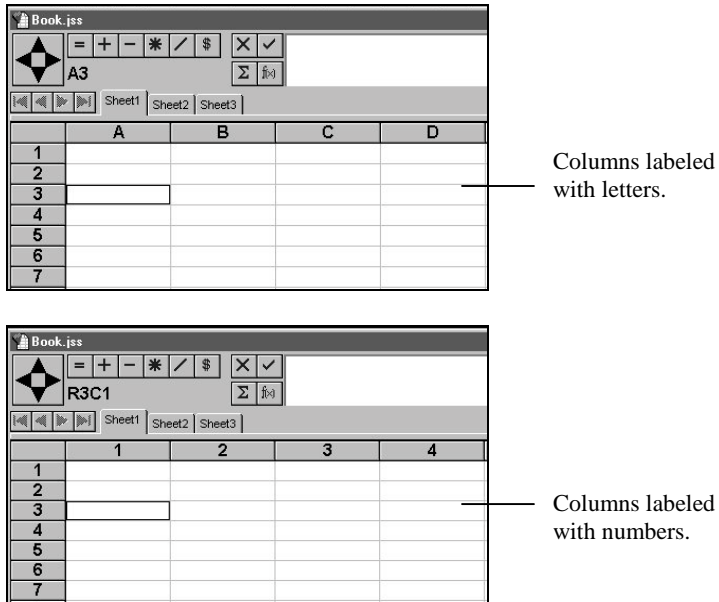
Formatting Worksheet Elements

In addition to specifying the elements of your worksheet you want to display, you can format the display of those worksheet elements. The following list describes the formatting that can be applied to worksheet elements:

- **Rows and Columns.** The size of worksheet columns and rows can be changed interactively in the worksheet or by selecting predefined settings.

- **Worksheet Grid.** The width, pattern, and color used for the cell and heading grid can be defined.

- **Heading and Worksheet Cells.** Cells in the worksheet and headings can be formatted with colors and patterns.

- **Heading Text.** You can select the text font, size, style, and color used for row and column heading labels.

- **Cell Borders.** Cell borders can be applied to selected cells to provide highlighting.

Resizing Rows and Columns

The height of rows and the width of columns can be changed interactively or in the **Row Height** and **Column Width** dialog boxes. Interactively changing the size of rows and columns allows you to visually gauge the best size for your worksheet, while using the dialog boxes allows you to enter a precise size.

<u>**To interactively resize a row or column:**</u>

1. With the **Worksheet** tool selected, position the pointer on the right border of the column heading or the bottom border of the row heading for the row or column you want to resize. The pointer appears as a split crossbar pointer when positioned on the border of a row or column heading.

2. Click and drag in the direction you want to resize the row or column. The border of the row or column moves as you drag the pointer across the worksheet

3. Release the mouse when the row or column is resized to the desired height or width.

To interactively resize multiple rows or columns:

1. Select the rows or columns you want to resize. You can select contiguous or noncontiguous rows or columns to resize.

2. Position the pointer on the right column heading border or bottom row heading border of one of the rows or columns you selected.

3. Click and drag in the direction you want to resize the rows or columns. Only the row or column whose border you are moving appears to change as you drag across the worksheet.

4. Release the mouse button when the row or column is resized to the desired height or width you want to apply to the selected rows or columns. Each selected row or column is resized to the same height or width.

Tip: You can resize multiple rows and columns to match the width of another row or column in your worksheet. Select the rows or columns you want to resize, including the column or row whose size you want to match. Position the pointer on the right column heading border or bottom row heading border of the column or row you want to match. Then, click once (do not click and drag). The selected columns or rows are resized to match the size of the column or row on whose border you clicked.

To resize rows and columns by command:

1. Select the rows or columns you want to resize. You can select single or multiple rows or columns. If you select multiple rows or columns, they can be contiguous or noncontiguous. You can also select a cell or range. JSheet Builder resizes the rows and columns in which the selected cell or range is located.

2. If you are resizing rows, choose **Format/Row/Height**. If you are resizing columns, choose **Format/Column/Width**. The **Row Height** or **Column Width** dialog box appears.

3. Select the option to define how the selected rows or columns should be resized.

4. Click **OK** to resize the rows or columns.

The following list describes the options available in the **Row Height** and **Column Width** dialog boxes:

- **Manual**. This option allows you to manually enter a column width or row height. Sizes are entered in points. The number wheels in which row and column sizes are entered are not active unless this option is selected.

- **Standard Height** or **Standard Width**. This option sets the size of the selected rows or columns to the default size. The standard height for rows and standard width for columns is different for each environment.

- **Best Fit**. This option resizes the row or column to fit any data entered in a cell in the selected row or column. Columns are resized to fit the longest string of data characters. Rows are resized to fit the tallest data created by the font and the point size used to display the data.

You can also decide to hide specific cells in your worksheet. Select a cell in a column or row, and choose **Format/Row/Hide** or **Format/Column/Hide**. To re-display the information, select **Format/Row/Unhide** or **Format/Column/Unhide**.

You can also select **Format/Row/Best Fit** or **Format/Column/Best Fit**. The column or row is adjusted to accommodate the cell that contains the largest text or the longest string of text. Standard Height returns the height and width of the row and columns to the default setting.

Resizing Rows and Columns with Objects

If a graphic object is located in a column or row you are resizing, the object is also resized. The section of the object overlaying the resized row or column is enlarged or reduced the same amount as the row or column. The object does not have to be selected to be resized. In addition, the object is resized whether it is locked or unlocked.

Adding Cell Borders

Cell borders allow you to highlight a selected cell or range by placing a border along any edge of the cell or range. The color and pattern of the cell border matches the formatting of the heading grid.

You can also outline a selected cell or range with a cell border. Cell borders are displayed even when the worksheet grid is hidden.

To add cell borders:

1. Select a cell, range, row, or column. Or, click once at the intersection of the row and column headings in the upper left corner of the worksheet grid.

2. Choose **Format/Cells** to display the **Format Cells** dialog box.

3. Click the **Border** tab to display the formatting options available, as shown in the following illustration.

Figure 11-2

Click the desired cell border line style.

Click the **Color** popup to select the cell border line color.

Select the sides of the cell(s) on which you want cell border lines displayed.
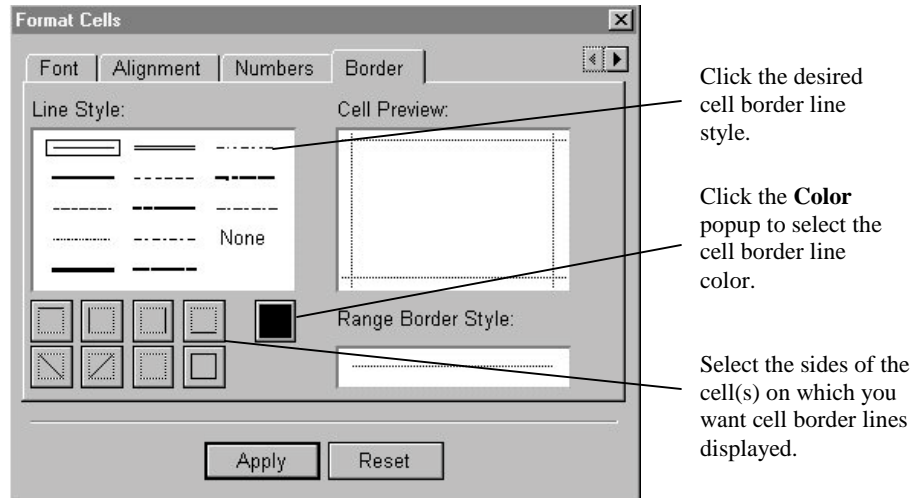
4. Make the selections desired to format the cell borders.

5. Click **Apply.** The formatting is applied to the entire worksheet grid.

The following illustration shows a worksheet in which cell borders have been placed. The worksheet grid is hidden so that you can see the cell borders on the top and bottom edges of the data range.

Figure 11-3

	A	B	C	D	E	F
1						
2			Sales	Expenses	Profit	
3		North	5,313.45	3,450.70	1,862.75	
4		Southeast	4,229.75	3,017.85	1,211.90	
5		Central	4,537.90	3,660.05	877.85	
6		West	4,574.20	2,861.00	1,713.20	
7						
8		Totals	$18,655.30	$12,989.60	$5,665.70	
9						
10						

Setting Titles

Rows and columns in your worksheet can be converted to row and column titles. Row and column titles augment the default row and column headings. Row and column titles provide more detailed information about the data contained in a row or column.

When a row or column is converted to a row or column title, the data in the row or column is locked. When you scroll through the worksheet, the row and column titles are always displayed, just like the row and column headings.

To set row and column titles:

1. Select the row or column you want to convert to titles. If you select a row or column, the selected row or column is converted to a row or column title. You can select just a row, just a column, or a combination of both.

2. Choose **Format/Freeze Panes** to convert the selected row(s) and column(s) to titles.

Important: You can also covert a range to titles. However, if you select a range, each row and column occupied by the range is converted to a title row or column. In addition, you cannot access the data in the range that was converted to titles.

To remove titles from your worksheet, you must choose **Window/ Display Settings** and uncheck the **Freeze Panes** check box in the **Display Settings** dialog box.

The following illustration shows a worksheet with titles that have been set. Column **A** was selected and converted to row titles. The worksheet has been scrolled to the right, but column **A** remains displayed because it

is a title column. Title rows and columns remain displayed regardless of which direction the worksheet is scrolled.

	A	D	E	F	G	H
1	MONTHLY EXPENSES	March	April	May	June	
2	Administrative	3,941.83	1,922.15	5,167.53	5,820.97	
3	Travel	12,101.79	13,660.98	8,262.72	1,025.42	
4	Advertising	5,408.38	15,763.91	10,601.39	6,434.85	
5	Supplies	5,022.71	8,672.65	1,575.86	3,199.08	
6	Equipment	6,686.76	8,642.48	3,358.85	14,074.53	
7	Contracting	4,391.84	14,445.88	15,050.44	8,876.24	
8	Utilities	4,664.74	5,357.57	7,016.14	1,375.12	
9						
10						

Displaying Multiple Windows

Multiple windows containing the same workbook can be displayed on your screen. Displaying multiple windows allows you to simultaneously view different sections of the same worksheet. Changes made to the worksheet in one window are reflected in all the other windows that contain the worksheet.

To display multiple windows:

1. Make the worksheet for which you want to display a multiple window the current window.

2. Choose **Window/New Book Window**.

A new window that contains a copy of the workbook is displayed. The window is given the same name as the original workbook window. In addition, a number is added to the name of each window to distinguish between the windows (for example, **Book.wkz:1** and **Book.wkz:2**). The number of new windows you can create is limited only by the memory of your system.

Selecting the Current Window

When you have multiple windows open, only one window is the current window. A window must be current for you to perform work in the window. The current window is the window to which keyboard, mouse, and command actions are directed. The current window is usually the top window on your screen.

Each windowing environment has a different method for indicating which window is the current window. Consult your system documentation for information about how to identify the current window in your environment.

With the mouse, you can click in a window to make it the current window. Some environments can be configured to allow you to simply move the mouse within the area occupied by the window to make it the current window. You can also make a window the current window using the JSheet Builder Menu Bar.

To select the current window from the menu:

1. Choose the **Window** menu. At the bottom of the **Window** menu is a list of the currently open windows. The windows are listed by name. The name of the current window has a check mark next to it.

2. Choose the window that you want to make the current window. The window you select is brought to the top of the windows displayed on your screen and is made the current window.

Arranging Multiple Windows

If you have multiple windows open, they can be arranged so that each window can be viewed simultaneously.

To arrange multiple windows:

1. Choose **Window/Arrange Windows** to display a submenu that contains the options for arranging windows. Windows can be tiled, stacked, or arranged side-by-side.

2. Choose a method for arranging windows from the submenu.

The following illustration shows worksheets arranged with each of these methods.

Figure 11-5

Tiled Windows
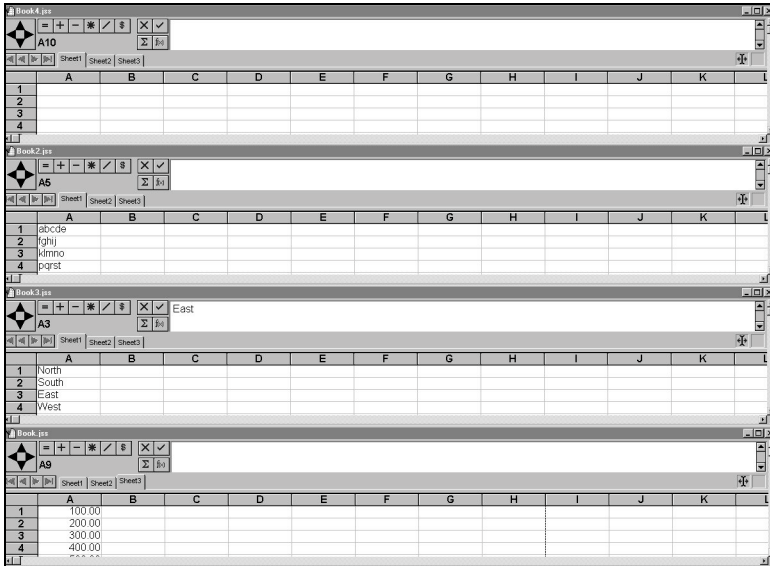
Stacked
Windows
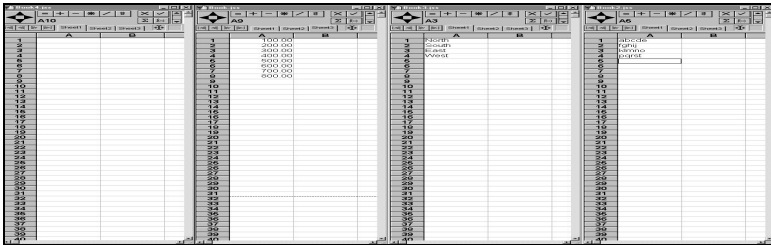
Side-by-side
Windows

Changing the Worksheet Scale

Worksheets are normally displayed at a scale of 100 percent. The amount
or type of information in your worksheet may require that you enlarge or
reduce the scale of a worksheet. You can set the scale of a worksheet
from a minimum of 24 percent to a maximum of 400 percent. Scales of
less than 100 percent reduce the worksheet. Scales of more than 100
percent enlarge the worksheet.

<u>To change the worksheet scale:</u>

1. Make the worksheet you want to scale the current window.

2. Choose **Window/Scale Window** to display a submenu with a list of scale percentages.

3. Choose the desired scale percentage from the submenu. Or, choose **Other** to specify a scale percentage not listed in the submenu.

If you choose **Other**, a dialog box appears and you are prompted to enter the desired scale percentage. Valid entries range from **24** to **400**.

When a worksheet is scaled, all of the row and column headings and cells are scaled. Any data and objects in the worksheet are also scaled. The entry bar is not scaled.

CHAPTER 12: CREATING CHARTS

Your ability to effectively communicate information to an audience is dependent on how well you present your data. The JSheet Builder charting tools can be used to graphically present the data in your worksheets to create dynamic presentations.

JSheet Builder charts are visual representations of the data in your worksheet. After creating a chart, you can customize it to present your data in the most effective way possible. This chapter introduces you to the techniques of creating charts, selecting chart types, and manipulating chart elements.

Drawing a Chart

Drawing a JSheet Builder chart is easy. After the data you want to chart is entered in your worksheet, a chart can be created in a few easy steps.

To create a chart:

1. Choose the **Worksheet** tool from the tool palette.

2. Select the range of data you want to chart. The range of data can include text that you want to use for series and division labels.

3. Choose the **Chart** tool from the tool palette. Notice that the selected range remains highlighted and the cursor changes to a crosshair pointer.

4. Position the pointer in the worksheet at the location where you want to begin drawing the chart.

5. Click and drag the pointer in the direction you want to draw the chart. A rectangle, indicating the size of the chart you are creating, is drawn as you drag the pointer across the worksheet.

6. When the rectangle is the size you want the chart to be, release the mouse button to draw the chart. Notice that the chart is selected and the data range is unselected.

Important: If the chart area you define is too small, JSheet Builder displays only a portion of the chart's plot area. You can click and drag the handles on the selected chart to increase its size and display all the chart elements.

Selecting Chart Types

You can use JSheet Builder to create many types of charts. When selecting a chart type, you need to consider the type of data that you are charting, as well as your presentation needs for that data. Each chart type offers a unique method for displaying data. Each chart type also has specific data requirements.

To select a chart type:

1. Select the chart to be changed.

2. Choose **Chart/Gallery** to display the **Gallery** dialog box. The dialog box contains a list of available chart types.

3. Choose the chart type you want to apply to the selected chart; click **OK** to change the chart to the type selected.

Tip: If the data you are charting is not appropriate for the type of chart you selected, the message **Not enough chart data** is displayed in the plot area. Select a different chart type or select a new data range and draw your chart again.

If your preferences are configured for modeless dialog boxes, the **Gallery** dialog box remains on the screen after you select and apply a chart type. This is helpful if you need to test several chart types to determine which type best represents your data.

Chart Type Definitions

An overview of each chart type is presented in the following section. Information about the data requirements and the characteristics associated with each chart type is provided.

Bar

*   Data in bar charts is represented as two- or three-dimensional vertical bars. Each bar represents a value in the data range.

*   Use the bar chart option to create the following types of charts: standard 2D or 3D bar, stacked 2D or 3D bar, 100% stacked 2D or 3D bar, or clustered 3D bar.

*   Bars are grouped according to their division along the horizontal axis.

- Bars that represent a series are located at the same position in each division and have the same color and pattern.

- By default, series represent row data; divisions represent column data.

- One row of data is required for each series.

Figure 12-1
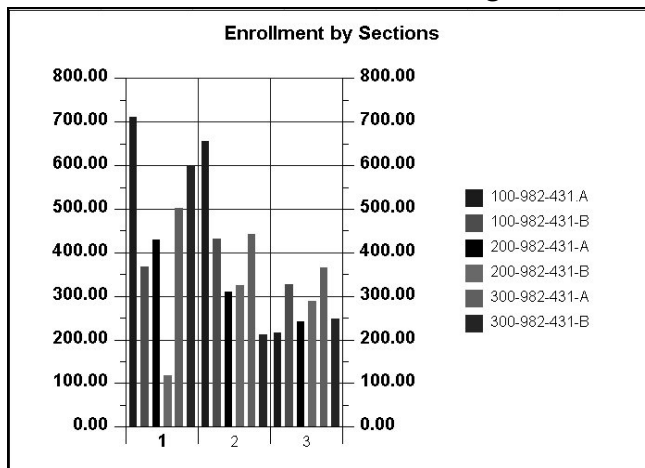
Horizontal Bar

- Data in horizontal bar charts is represented as two- or three-dimensional horizontal bars. Each bar represents a value in the data range.

- Use the horizontal bar chart option to create the following types of charts: horizontal 2D or 3D bars, horizontal 2D and 3D stacked bars, and horizontal 2D and 3D 100% stacked bars.

- Bars are grouped according to their division along the vertical axis.

- Bars representing a series are located at the same position in each division and have the same color and pattern.

- By default, series represent row data; divisions represent column data.

- One row of data is required for each series.

Figure 12-2
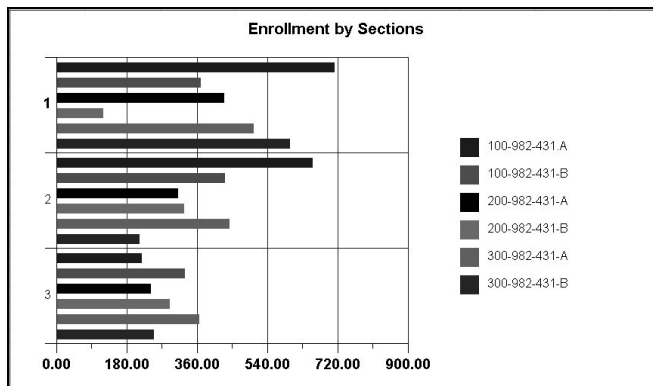
Line

- Data in line charts is represented as two- or three-dimensional lines. Each line represents a series of values in the data range.

- Use the line chart option to create the following types of charts: standard 2D or 3D lines, stacked 2D or 3D lines, and 100% stacked 2D or 3D lines.

- By default, series represent row data and divisions represent column data.

- One row of data is required for each series. Each row of data must contain at least two data items.

- In a 2D line chart, divisions are plotted along the horizontal axis, cell values are plotted along the vertical axis.

- In a 3D line chart, divisions are plotted along the horizontal axis, cell values are plotted along the vertical axis, and series are plotted along the depth axis.

Figure 12-3
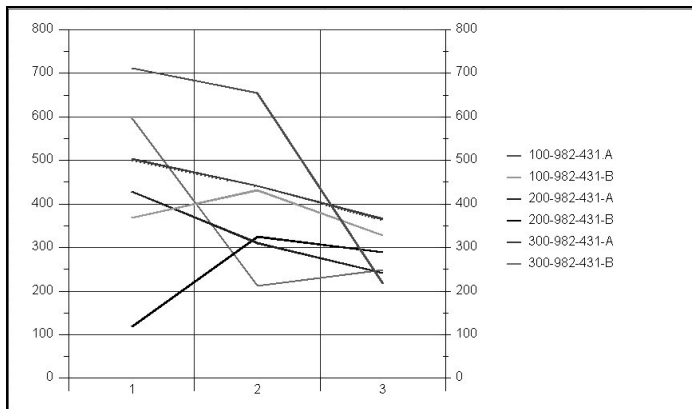
Pie

- Data in pie charts is represented as two- or three-dimensional slices of a pie. One pie is drawn for each division in the data range. Each slice represents a series in the data range.

- Use the pie chart option to create 2D, 3D, and doughnut charts.

- The size of a pie slice in relation to the other slices indicates the relative value of a series in relation to the other series in the division.

- The size of the pie in relation to the other pies indicates the relative value of all the series in the division in relation to the other divisions.

- By default, series represent row data and divisions represent column data.

- One row of data is required for each series.

Figure 12-4
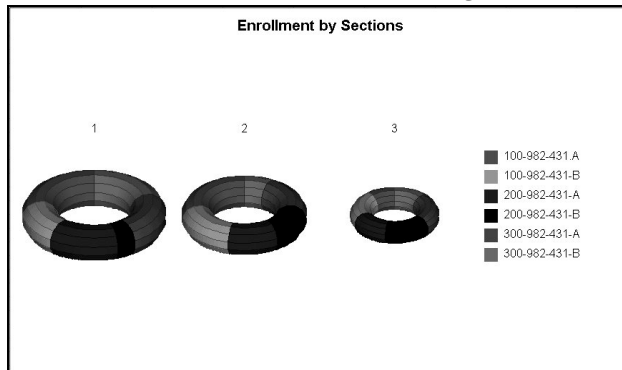
Scatter

- Data in scatter charts is represented as a series of points plotted on a two- or three-dimensional grid. Each set of data points represents a series in the data range.

- Use the scatter chart option to create scatter, xyz, and 3D scatter charts.

- In a scatter chart, a different geometric symbol is used to represent the data points for each series.

- By default, divisions represent row data and series represent column data.

- Two columns of data are required for each series. The first column is the x coordinate, and the second column is the y coordinate.

- The x coordinate is plotted along the horizontal axis, and the y coordinate is plotted along the vertical axis.

Figure 12-5
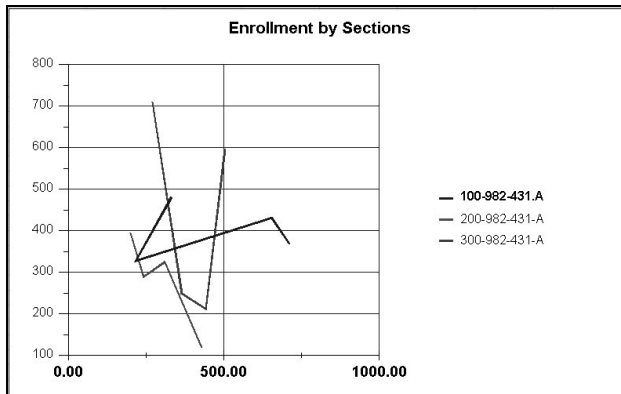
Layer

- Data in layer charts is represented as two- or three-dimensional layers. Each layer represents a series of values in the data range.

- Use the area chart option to create the following types of charts: standard 2D or 3D layer, stacked 2D or 3D layer, and 100% stacked 2D or 3D layer.

- In 2D layer charts, vertical lines divide the horizontal axis; each vertical line represents a division. The height of a chart layer at the point where it intersects a division line represents a cell value.

- Chart layers are stacked in the default display. The point where the top edge of the stacked layers intersects a division line represents the total for all the values in the division.

- Series represent row data; divisions represent column data.

- One row of data is required for each series. Each row of data must contain at least two data items.

- In 3D layer charts, divisions are plotted along the horizontal axis, cell values are plotted along the vertical axis, and series are plotted along the depth axis.

Figure 12-6
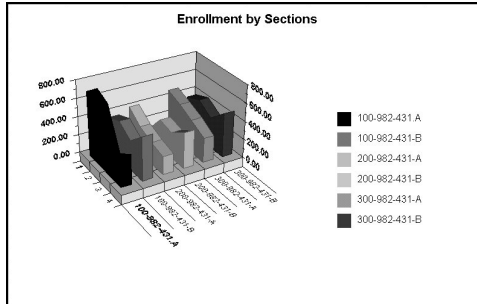
Step

- Data in step charts is represented as two- or three-dimensional steps. Each step represents a series in the data range.

- Series represent row data; divisions represent column data.

- Use the step chart option to create standard 2D and 3D step, stacked 2D and 3D step, and 100% stacked 2D and 3D step charts.

- In 2D step charts, vertical lines divide the horizontal axis; the area between these lines represents divisions. Cell values are plotted along the vertical axis, and series are plotted along the depth axis. The height of a chart step in a division area represents a cell value.

- In 3D step charts, divisions are plotted along the horizontal axis, cell values are plotted along the vertical axis, and series are plotted along the depth axis.

- Chart steps are stacked in the default display. The top edge of a group of stacked steps represents the total for all of the values in the division.

- One row of data is required for each series.

Figure 12-7
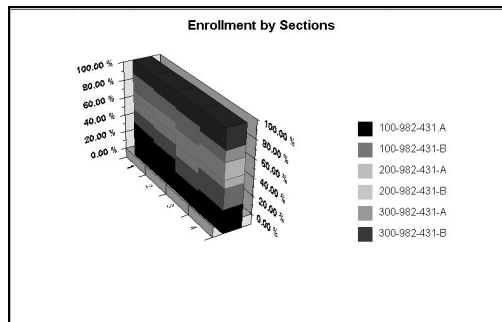
Radar

- Data in radar charts is represented as points along a circular charting surface. Data points are connected by a line. Each line and the connected points represent a series in the data range.

- Use the radar chart to create polar, radar line, and radar area charts.

- By default, divisions represent row data; series represent column data.

- Two columns of data are required for each series. The first column is the X coordinate, and the second column is the Y coordinate.

- The X coordinate is the distance of the data point from the center of the circle.

- The Y coordinate is the angle (measured in radians along an arc) where the data point is placed. The angle is measured counterclockwise from a 12 o'clock starting position.

Figure 12-8
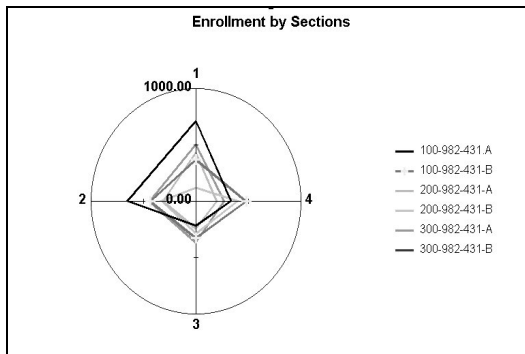
Surface

- Use this chart option to create surface, contour, or wireframe charts.

- Data in contour charts is represented as two-dimensional contour bands. Chart values within a specific range appear on the chart in bands of the same color or pattern.

- Data in surface charts is represented on a three-dimensional grid. Chart values within a specific range have the same elevation and are illustrated with bands of the same color or pattern.

- Data in wireframe charts is represented on a three-dimensional grid. Chart values within a specific range have the same elevation and are illustrated with grid lines.

- Data values are not identified by series or divisions.

- A minimum of two columns and two rows of data is required.

Figure 12-9
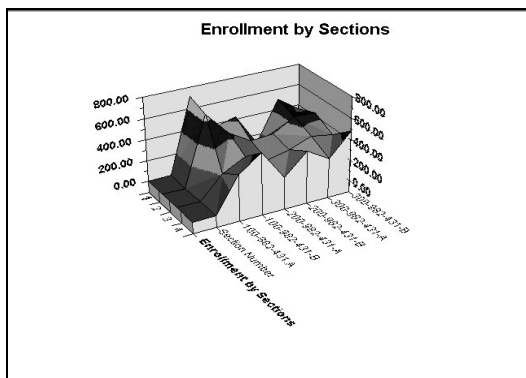
Bubble

- Data in bubble charts is represented as two-dimensional circles.

- Three columns of data are required for each series. The first column holds the X coordinate, the second column holds the Y coordinate, and the third column holds the bubble size.

Figure 12-10
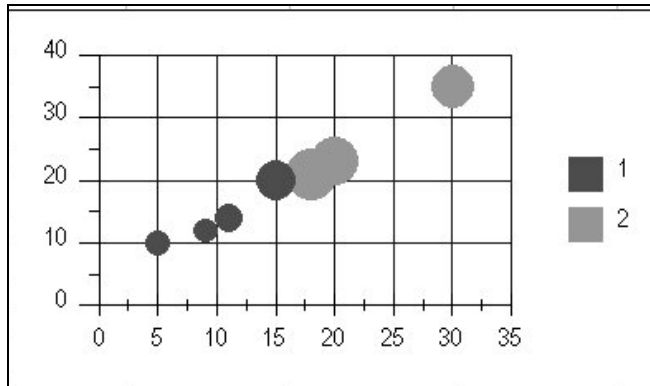
Stock

- Data in a stock chart is expressed as a combination of a two- or three-dimensional vertical line or bar that represents high and low values in the data range and a two-dimensional horizontal line that represents an opening or closing value.

- Use the HiLo chart option to create hi-lo, hi-lo close, hi-lo close right, open hi-lo close, open hi-lo close bar, two- and three-dimensional hi-lo bar, horizontal bar, and 3D clustered bar hi-lo charts.

- By default, divisions represent row data; series represent column data.

- A hi-lo chart requires two columns for each data series: the first column is used for the high point and the second is used for the low point.

- A hi-lo-close chart requires three columns for each data series; the first column is used for the high point, the second for the low point, and the third for the closing point.

- An open-hi-lo-close or an open-hi-lo-close bar chart (sometimes called candle stick charts) requires four columns of data for each data series: the first column is used for the open point, the second for the high point, the third for the low point, and the fourth for the closing point.

- The open or close mark does not have to be between the high and low points of the bar. The open or close value can be greater than the high point or less than the low point.

Figure 12-11
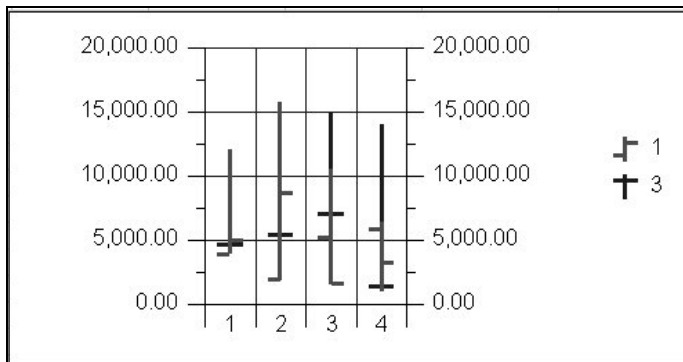
Gantt

- Data in gantt charts indicates the amount of time required to perform different activities in one project.

- There must be two columns of data for each series. The first column contains the start times, and the second column contains the duration.

- Formatting that is applied to the first column is used to display the series on the chart. Formatting that is applied to the second column of data is ignored.

Figure 12-12
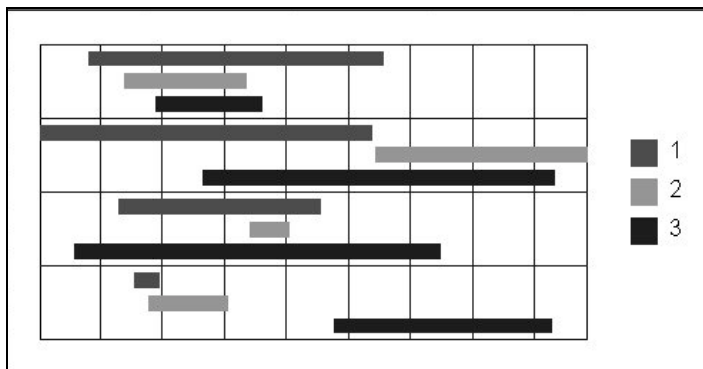
Combination

- Data in combination charts can be represented as two- or three-dimensional bars, lines, steps, or layers. Each series can be represented by a different type.

- Vertical lines divide the horizontal axis; the area between these lines represents divisions. Series values for a division are plotted between these lines.

- In a three-dimensional chart, the divisions are plotted along the horizontal axis, cell values are plotted along the vertical axis, and series are plotted along the depth axis.

- By default, series represent row data; divisions represent column data.

- One row of data is required for each series.

Figure 12-13
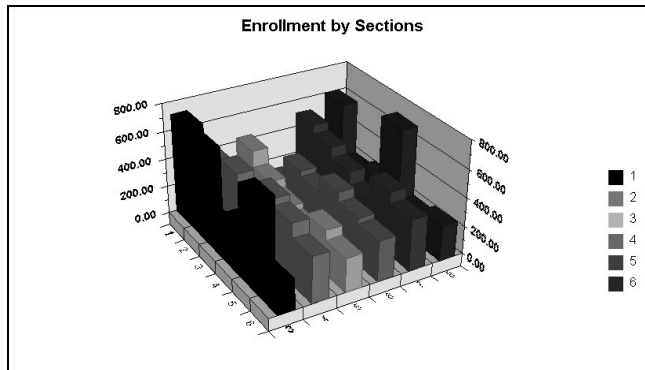
Creating Combination Charts

Combination and 3D combination charts allow you to apply a chart type to a series that is different from the chart type used for the other series in the same chart. Series in combination and 3D combination charts can be

drawn as lines, bars, steps, or layers. However, 2D and 3D elements cannot be drawn in the same chart.

To create a combination chart:

1. Select the series to which a chart type is to be applied. To select a series, click on a series entry in the chart legend.

2. Choose **Chart/Series** to display the **Chart Series** dialog box.

3. Select the **Options** tab.

4. Select a chart type from the **Series Type** popup menu.

5. Click **OK**. The chart type you chose is applied to the selected series.

Editing Charts

By creating a chart and selecting the type of chart you want to represent your data, you have merely scratched the surface of the JSheet Builder charting abilities. JSheet Builder provides a myriad of possibilities for you to edit and customize a chart.

In addition to formatting the appearance of your chart with colors, patterns, borders, and shadows, you can specify the manner in which data is presented in your chart. You can edit the chart series and axes while adding labels to your chart. In addition, you can manipulate the manner in which three-dimensional charts are displayed.

Changing the Chart Data Range

The data used to draw a chart is referred to as the chart data range. When you select a range and draw a chart, the range you select is automatically defined as the chart data range.

If you want the chart to represent a different range of data, you can modify the chart data range. You may want to add an additional row or column to the original data range, or you may want to define an entirely different range for the chart to represent.

To change the chart data range:

1. Select the chart for which you want to change the chart data range.

2. Choose **Chart/Gallery** to display the **Gallery** dialog box.

3. Click the **Data Sources** tab.

4. Enter the address of the range to serve as the new data range in the **Chart Data Range** field.

5. Click **OK**. The selected chart changes to represent the new chart data range.

Switching the Series and Divisions

All charts, with the exception of contour, surface, and wireframe charts, define the chart data by series and division. How the series and divisions of a chart are defined determines how the chart is drawn.

A series can represent one row or one column of data from the data range. Likewise, a division can represent one row or column of data from the data range. However, if a chart's series represent the rows in the data range, the divisions always represent the columns, and vice versa.

The following illustration shows two charts drawn from the same data range, but using different sources for the chart series. The chart on the left uses column data for the series data source. The chart on the right uses row data for the series data source.

Figure 12-14
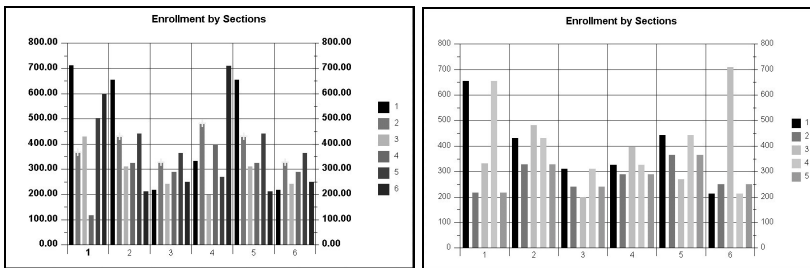
To change the data source for the chart series:

1. Select the chart to which series data source changes are to be made.

2. Choose **Chart/Gallery** to display the **Gallery** dialog box.

3. Click the **Data Sources** tab.

4. Click the **Series From Columns** button, shown below, to use column data to draw the chart series.
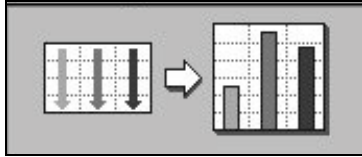
5. Click the **Series From Rows** button, shown below, to use row data to draw the chart series.
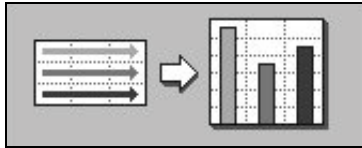
6. Click **OK**. The chart changes to reflect the new series data source.

Tip: If you have added or deleted a series in the selected chart, or modified the series data range for a series, you cannot change the series data source. Charts in which you have altered series are considered to have series supplied from noncontiguous ranges.

Changing the Series Data Range

The data used to draw a chart series is referred to as the series data range. You can change the data range used to draw a chart series without affecting the data ranges used to draw the other series in the chart.

To change a series data range:

1. Select the series for which you want to change the series data range. To select a series, click a series entry in the chart legend.

2. Choose **Chart/Series** to display the **Series** dialog box.

3. Click the **Selection** tab.

4. In the **Range** field, enter the address of the range you want to serve as the new data range.

5. Click **OK**. The selected series changes to reflect the data in the new series data range.

Formatting Chart Elements

After a chart is created, you can format the elements of the chart so it becomes a customized presentation. Many of the elements can be formatted in the same way you format objects, by specifying fill, border, and shadow options. You can also specify the layout of chart elements. The following illustration identifies the elements of a chart.

Figure 12-15
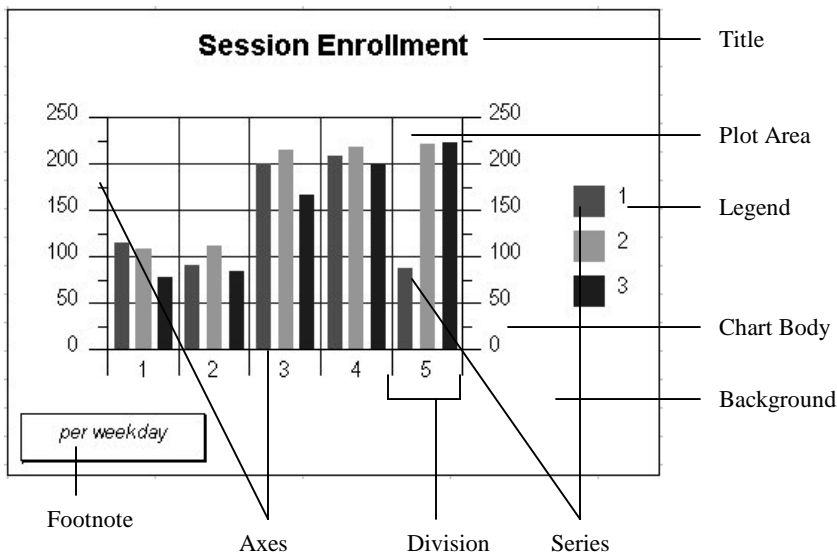
Selecting Elements and Displaying Dialog Boxes

For most chart elements, you can select the element and display the dialog box that formats the element with one action. With the **Object** tool selected, double-click the chart element you want to format. The element is selected and the dialog box that formats the element is displayed. For example, double-click the plot area to display the **Plot** dialog box. Or, double-click a series entry in the legend to display the **Series** dialog box.

Editing Series and Division Labels

If the chart data range contains text in the top row and left column, this text is automatically used as the labels for the chart's series and divisions. In addition to the text, any formatting applied to the text is also used. The following illustration shows a chart and its data range where division and series labels have automatically been placed.

Because the first column and top row of the data range contain text, they are automatically used for series and division labels. In this example, text in the first column is used for series labels; text in the first row is used for column labels.

Figure 12-16

	A	B	C	D	E
1		Sales	Expenses	Profit	
2	North	5896.80	3758.40	2138.40	
3	Central	7484.40	5994.00	1490.40	
4	Southeast	4110.40	2624.40	1486.00	
5	West	6288.84	4005.80	2283.04	
6					
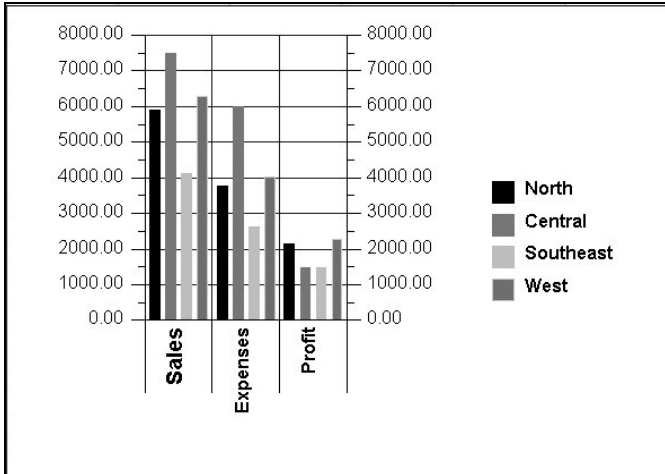
You can change the series and division labels by using text from a different range in your worksheet as the label range.

To change the division and series labels sources:

1. Select the chart in which you want to change the division or series labels.

2. Choose **Chart/Gallery** to display the **Gallery** dialog box.

3. Click the **Data Sources** tab.

4. Enter the address of the range to be used for the series labels in the **Series Label Range** field. Enter the address of the range to be used for the division labels in the **Division Label Range** field. The new series label range or division label range should contain one cell for each series or division to be labeled.

5. Click **OK**. The new series and division labels are applied to the selected chart.

Creating Chart Titles and Footnotes

A title and footnote can be added to your chart to provide additional information. By default, the title appears above the chart body and the footnote appears below.

When the top row and left column of a data range are used for series and division labels, the top left cell in the data range is automatically used as the chart title range. The content of the cell is placed above the chart body as the chart title. You can also manually define the chart title.

The chart footnote is not automatically created and must be defined manually.

To manually define a chart title or footnote:

1. Select the chart for which a title or footnote is to be defined.

2. Choose **Chart/Title** or **Chart/Footnote** to display the appropriate dialog box.

3. Click the **Options** tab.

4. Enter the text to be used for the title or footnote in the **Source** field.

   If a title or footnote has been automatically created for the selected chart, the address of the cell that contains the contents of the title is shown in the **Source** field.

   You can also enter a range in the **Source** field. If you enter a range, the text in the range is used for the title

or footnote. If the range contains more than one cell, the text from each cell is placed on a separate line. Any formatting applied to the data in the range is applied to the data in the chart.

5. Click **OK**.

6. Click the **Position** popup menu to select the position at which the title or footnote is to be placed. The title and footnote can be positioned to the left, center, or right. You can also choose to hide the footnote or title.

7. Click **OK**.

The title and footnote can be formatted like any object. You can define the fill, border, and shadow for the title or footnote. Select the title or footnote and then choose **Chart/Title** or **Chart/Footnote** to display the appropriate dialog box. Click the **Colors**, **Border**, and **Shadow** tabs to format these attributes. You can also format the fill and line colors and patterns with the **Colors** and **Lines** tools in the tool palette or the **Colors and Lines** dialog box.

Formatting Title and Footnote Text

If the title or footnote text is derived from a worksheet range, the text formatting applied to the worksheet text is also applied to the title or footnote. The text attributes for a manually defined title or footnote are set using the **Text** dialog box.

To format manually defined title or footnote text:

1. Select the chart title or footnote for which you want to apply text formatting.

2. Choose **Format/Text** to display the **Text** dialog box. (**Format/Text** is not available if the title or footnote is derived from a worksheet range.)

3. Select the text attributes you want to apply to the title or footnote text.

4. Click **OK**. The text formatting is applied to the selected title or footnote.

Positioning and Formatting the Chart Legend

A chart legend is automatically created when a chart is drawn. The legend identifies each series in the chart by color, pattern, and label.

The legend can be formatted like any object. You can define the fill, border, and shadow for the legend. Choose **Chart/Legend** to format these attributes of the legend. You can also format the fill and line colors and patterns with the **Colors** and **Lines** tools in the tool palette or the **Colors and Lines** dialog box.

In addition, you can select the placement of the legend in relation to the chart body. The legend can be positioned to the left, right, or centered below the chart body. Alternatively, you can choose to hide the chart legend.

To position a chart legend:

1. Select the chart whose legend you want to position.

2. Choose **Chart/Footnote** to display the **Chart Footnote** dialog box.

3. Click the **Options** tab and click the **Position** popup menu to select the position at which the legend is to be displayed.

4. Click **OK**.

Modifying the Chart Layout

When a chart is created, manual layout is used to place and size the chart body, legend, title, and footnote. When manual layout is enabled, you can manually resize or move these elements. The chart elements may not be resided or moved outside of the chart background area.

To change the layout mode, select **Chart/Gallery** and click the **Options** tab. Click the **Automatic Layout** check box to enable this layout style. For manual layout, unselect the option. Then click **OK.**

To manually resize a chart element:

1. Select the element to be moved or resized. Selection handles appear at the edges of the element.

2. To move the element, position the pointer in the element and click and drag.

3. To resize the element, position the pointer on a selection handle and click and drag.

*Important***:** If you enable manual layout and make layout changes to your chart, those changes are discarded if you revert to automatic layout.

Editing Chart Series

Series are the vehicle for representing data in a chart. When you select a chart type, you define the type of chart series to be drawn. After you have defined the type of series to be drawn, you can apply formatting to the individual series.

Hiding a Chart Series

If you do not want to display a series in a chart, it can be hidden. Hiding a chart series only removes its display from the chart; the series data is not removed from the chart data range. The series can be redisplayed at any time by following the steps detailed below.

To hide a chart series:

1. Select the series to be hidden. (To select a series, click the series entry in the chart legend.)

2. Choose **Chart/Series** to display the **Series** dialog box.

3. Select the **Options** tab.

4. Click the **Hide Series** check box.

5. Click **OK**. The selected series is hidden. The remaining series in the chart plot area do not expand to occupy the space vacated by the hidden series in the plot area.

To redisplay a chart series:

1. Select a series in the chart that contains the hidden series. Choose **Chart/Series** to display the **Series** dialog box.

2. Select the **Selection** tab.

3. Select the hidden series in the **Series** list box.

4. Select the **Options** tab.

5. Click the **Hide Series** check box.

6. Click **OK**. The hidden series is redisplayed.

Tip: You can hide the series entry in the legend without affecting the display of the series in the plot area. To do this, click the **Hide Legend Entry** check box in the **Options** tab of the **Series** dialog box.

Adding and Deleting Series

A series can be added to a chart by selecting and copying a range of data and then pasting that data into a chart. Series are deleted from a chart by selecting a series and choosing **Edit/Cut** or **Edit/Clear**.

To add a chart series:

1. Select the range of data to be used for the new series. The range you select must be contained in one row or column and should contain the same number of cells as the other series data ranges. For example, if you are adding a series to a chart with three divisions, the range you select should contain three cells of data.

2. Choose **Edit/Copy**.

3. Select the series in the chart after which you want to paste the new series. The new series is added after the series you select. If you do not select a series, you must select a chart. If a chart is selected, the new series is added after the last series in the chart.

4. Choose **Edit/Paste**. The new series is given the fill color, pattern, and line formats of the previous series. After pasting a series, you can apply different formats to the new series.

To delete a chart series:

1. Select the series you want to delete.

2. Choose **Edit/Clear** or **Edit/Cut**. The series you selected is deleted from the chart. You can also press BACKSPACE or DELETE to delete a selected series.

Important: When you use the **Edit/Cut** command to delete a series, you cannot use the **Edit/Paste** command to return the deleted series to your chart. However, if the data for the deleted series is still in the worksheet, you can use the steps described above to add the series to the chart.

Reordering Chart Series

The order in which series appear in a chart can be rearranged. The worksheet data used to create the series is not affected; only the display of the series in the chart is changed.

If a series is at the end of the series order and you attempt to move the series to a later position, the series is moved to the beginning of the series order. Likewise, a series at the beginning of the series order is moved to the end of the series order when you attempt to move the series to an earlier position.

To reorder a chart series:

1. Select the series to be moved.

2. Use the arrow keys to move the series in the desired direction. Use the UP or LEFT arrow to move the selected series to an earlier position in the series order. Use the DOWN or RIGHT arrow to move the selected series to a later position in the series order.

Exploding a Pie Series

Series in pie and 3D pie charts are displayed as slices of a pie. By default, the slices are displayed adjacent to each other, forming a circular pie. Slices can be moved away (exploded) from the other slices in the chart to add emphasis to the series. The slice can be exploded interactively or in the **Series** dialog box.

To interactively explode a pie series:

1. Click the mouse on the pie series to be exploded.

2. Click and drag the mouse away from the center of the pie to move the pie series. As you drag the pie series, an outline of the slice moves to show the position of the series.

3. Release the mouse button when the pie series is in the position you need. The pie chart is redrawn with the exploded series in the new position.

More than one series can be exploded on a pie. If the pie chart contains multiple pies (representing multiple divisions), you must individually explode the series on each pie in the chart. An exploded pie series can be returned to the pie by clicking and dragging the series back to the center of the pie.

To explode a pie series using the Series dialog box:

1. Select the series to be exploded.

2. Choose **Chart/Series** to display the **Series** dialog box.

3. Click the **Options** tab.

4. Enter the percentage the slice is to be exploded in the **Explode Pie Slice** number wheel. The value you enter is a percentage of the radius of the pie. This percentage represents the distance the slice is moved from the center of the pie. If you enter 0, the slice is not exploded. If you enter 100, the slice is exploded a distance equal to the radius of the pie.

5. Click **OK**.

Adding Labels to Series

By default, series labels are displayed in the chart legend. However, you can also display series labels in the plot area of the chart.

To add plot area series labels:

1. Select the series to which plot area labels are to be added.

2. Choose **Chart/Series** to display the **Series** dialog box.

3. Click the **Options** tab.

4. Click the **Data Labels** popup menu to select the location where the labels are to be displayed. Labels can be placed at the base of the series element, in the middle of the series element, or outside the series element. This popup menu also gives you the option to hide the series labels.

5. Select the display type for the labels from the **As** popup menu. The contents of the series label can be the text of the series label range, the value of the series element, or the percent of the series element as compared to the maximum axis scale value.

6. Click **OK**. The plot area series labels are displayed in the location you defined.

Formatting Plot Area Series Labels

The plot area series labels can be formatted like any object. You can define the fill, border, and shadow for the labels. Select the series labels and then choose **Format/Colors & Lines** to format these attributes. You can also format the fill and line colors and patterns with the **Colors** and **Lines** tools in the tool palette.

Plotting Series on an Auxiliary Axis

When series are drawn in a chart, they are scaled along the numeric axis. However, you can select a series and scale it along an auxiliary axis.

You may want to scale a series along an auxiliary axis if the values in the series data range are significantly larger or smaller than the values in the data range for the other series in the chart. Or, if you create a combination chart, you may want to scale the series you converted to a new series type along an auxiliary axis to provide clarity to the series' values.

To scale a series on an auxiliary axis:

1. Select the series to be scaled on the auxiliary axis.

2. Choose **Chart/Series** to display the **Series** dialog box.

3. Click the **Options** tab.

4. Click the **Plot On Auxiliary Axis** check box.

5. Click **OK**.

The following illustration shows a chart before and after a series is scaled on an auxiliary axis. The example charts plot the closing stock price and volume of stock traded over a two-week period. With both series plotted along the numeric axis, the **Closing Price** series is not accurately drawn because its values are significantly smaller than the **Volume Traded** values.

Figure 12-17
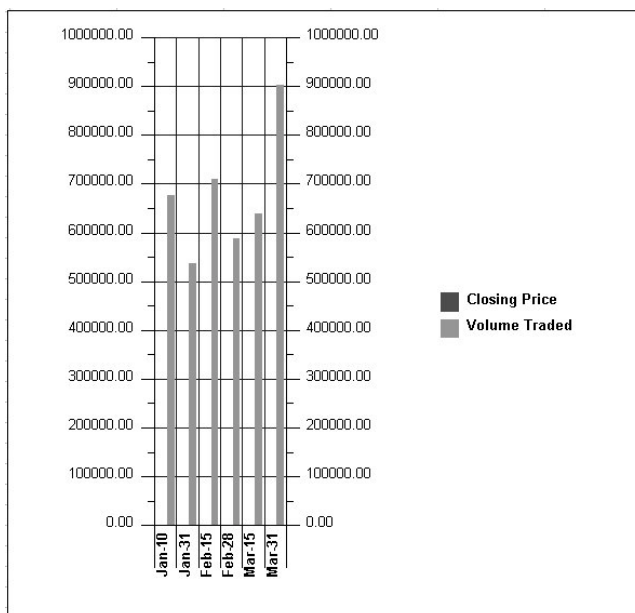
When the **Closing Price** series is plotted along the auxiliary axis, the chart becomes more meaningful. A relationship between the **Closing Price** and the **Volume Traded** can be determined.

Figure 12-18
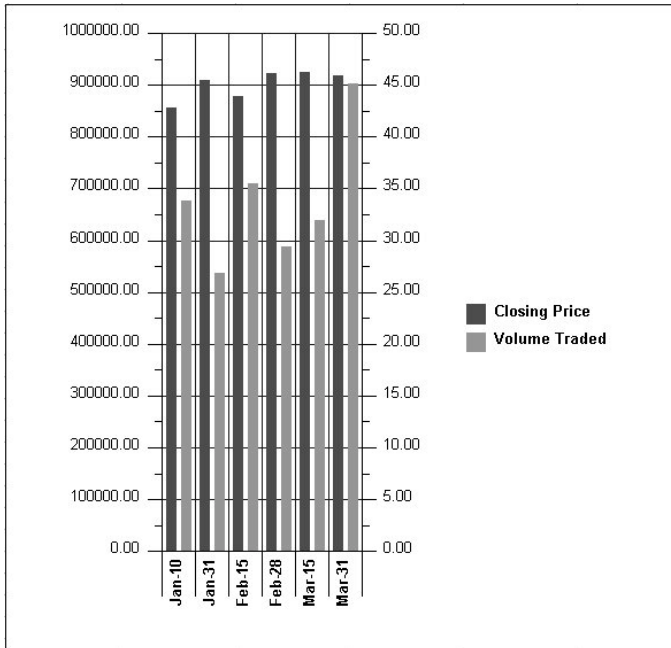
Adding Symbols to Series

Symbols can be added to series in some charts. Symbols are placed at the data points in charts. The previous illustration shows a line chart with symbols added to both series.

To add symbols to a series:

1. Select the series to which symbols are to be added.

2. Choose **Chart/Series** to display the **Series** dialog box.

3. In the **Markers** tab, click the **Symbol** popup menu to select the symbol to be applied.

4. Click the **Size** popup menu to set the point size of the symbol.

5. Click the **Color** popup to select the color for the symbol.

6. Click the **Line Width** popup menu to set the line width of the symbol.

7. Click **OK**. The selected symbol is applied to the series at each data point.

Smoothing Series

Series in some charts can be smoothed. A smoothed series is drawn with cubic splines to make the series appear less angular. You may want to smooth a series to place an emphasis on trends in the data, rather than on specific data points.

To smooth a series:

1. Select the series you want to smooth.

2. Choose **Chart/Series** to display the **Series** dialog box.

3. In the **Options** tab, click the **Smooth Series** check box.

4. Click **OK**. The selected series is smoothed.

The following illustration shows a line chart before and after all of the series are smoothed.

Figure 12-19
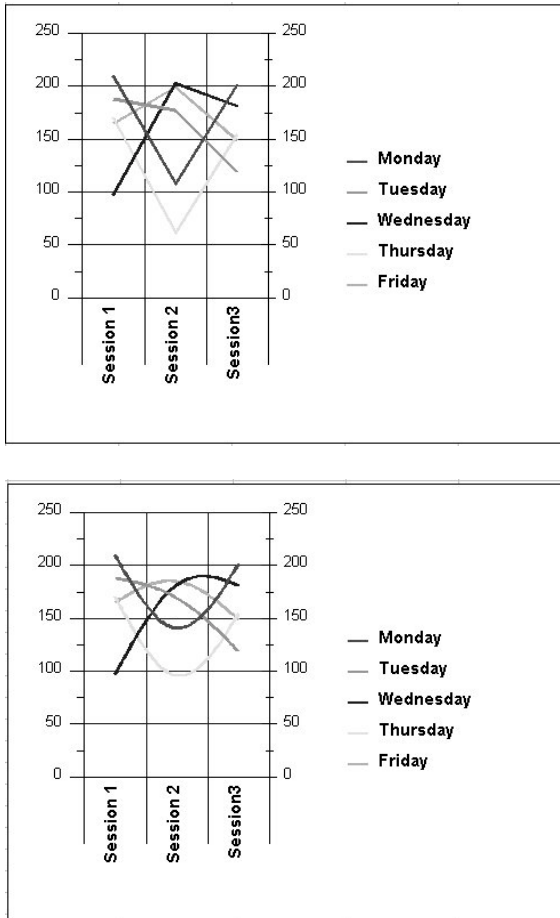
Setting the Series Gap Ratio

The amount of space between series elements is referred to as the series gap ratio. Series gap ratio is specified as a percentage of the series space

within a division. The following illustration shows a 2D chart where the series gap ratio has been modified. In the first chart, the gap ratio is set to 100 percent. In the second chart, the gap ratio is set to 0 percent.

Figure 12-20
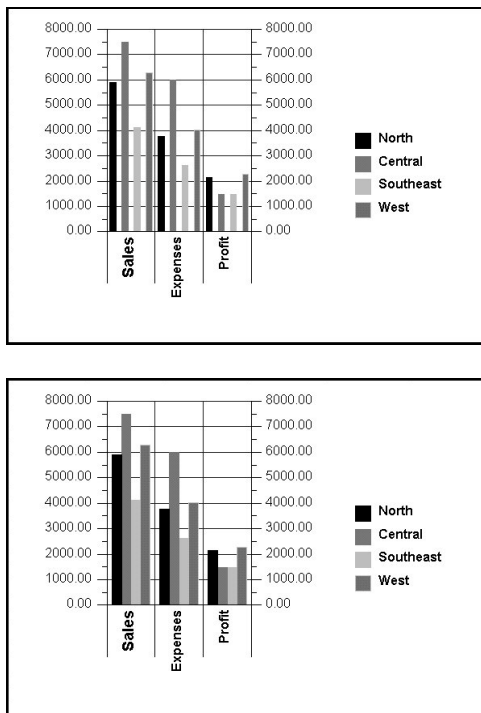
For 3D charts, the gap ratio is specified for both the space along the x-axis and the z-axis. The gap ratios are referred to as the x-gap ratio and the   z-gap ratio. The following illustration shows a 3D chart where the x-gap and z-gap ratios have been modified.

Figure 12-21
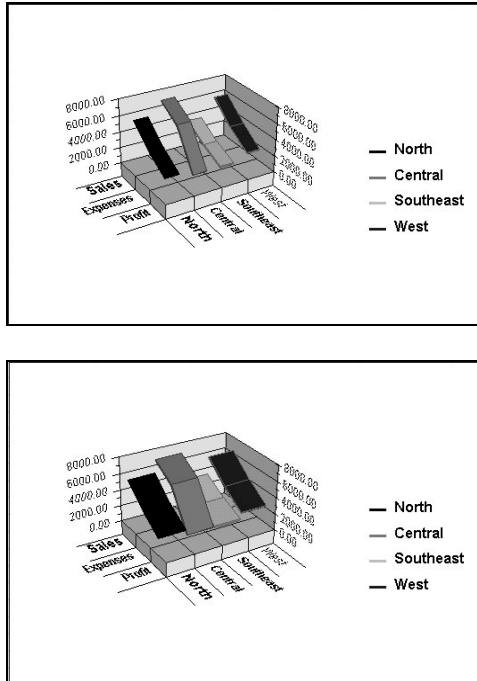
To set the series width:

1. Select the chart for which you want to set the series width.

2. Choose **Chart/Plot** to display the **Chart Plot** dialog box.

3. Select the **Options** tab and enter the width percentage in the **Gap Ratio** number wheel. The value you enter is a percentage of the series space available. A value

of 100 displays the normal gap ratio; a value of 0 displays the series edges touching.

4. Click **OK**.

Formatting Series Colors and Lines

The **Chart Series** dialog box provides options for formatting colors and lines for chart series. Select **Chart/Series** to display the **Chart Series** dialog box. The tabs for chart series are defined in the following table. Depending on the chart type, some options may not be available.

Tab	Definition
Colors	This option enables you to change the color, pattern, border, line thickness or line pattern of a selected series.
Guides	This option allows you to show x and y guides for a series, and to determine the line thickness of each guide.
Statistics	Use this option to display guide lines that show the minimum, maximum, mean, standard deviation, and regression for a series.
Markers	Use this option to apply a symbol to a series. You can adjust the size, color, and line width of the symbol.
Options	This tab allows you to hide a series, legend entry, or label, plot an auxiliary axis, change a series type, adjust the bar ratio and type, and explode a pie slice. You can also display data labels for a series.
Selection	This option allows you to specify which series you want to manipulate without returning to the chart.

To format series colors and lines:

1. Select the series you want to format. Only one series can be selected and formatted at a time.

2. Choose **Chart/Series** to display the **Chart Series** dialog box.

    If the current chart contains series elements that receive fill colors (for example, bars, layers, or pie slices), use the color popups and pattern popup in the

Color tab to apply foreground and background fill
colors and fill patterns to the current series.

The color popups, pattern popup, and line width popup
in the **Line** section format the foreground and
background line colors, line pattern, and line width for
line series and for the borders of the series that receive
fill colors.

3. Click the foreground and background color popups and
   pattern popups to format the fill colors and line colors
   for the selected series.

   The changes you make to the series colors and
   patterns are reflected in the **Chart Series** tab only if
   you select another series in the list box.

4. To apply colors and lines formatting to another series
   in the current chart, click the **Selection** tab and select
   a new series. Repeat step 3 for the selected series.

5. Click **OK**. The series colors and lines formatting is
   applied to the series in the current chart.

Selecting Line Styles, Joins, and Caps

When formatting series in line and polar charts and line series in
combination charts, you can apply a line style to the series. You can also
define how line angles are to be joined and how line ends are to be
capped.

To format line styles, joins, and caps:

1. Select the line series you want to format.

2. Choose **Chart/Series** to display the **Chart Series**
   dialog box.

3. Click the **Line** popup menu to select the style of line to be drawn.

   The selected series can be drawn as a solid line or as a line composed of dashes, dots, alternating dots and dashes, or alternating dashes and double dots.

   If you choose the **Fast** option from the **Line Style** popup menu, a solid line is drawn using your environment's native drawing routines. **Fast** lines are drawn quicker than other line styles.

4. Click the **Join Style** popup menu to select the method for drawing angles on bending lines. Line angles can be drawn with beveled, mitered, or rounded corners.

5. Click the **Cap Style** popup menu to select the method for drawing line endings. Lines can be drawn with round, flat, or squared ends.

6. Click **OK**. The selected line styles, joins, and caps are applied to the selected series.

Using Predefined Color Sets

JSheet Builder provides 12 predefined color sets that can be applied to chart series. The color sets are applied to all the series in the chart, not just the selected series.

To apply color sets to series:

1. Select a series in the chart to which you want to apply a color set.

2. Choose **Chart/Gallery** to display the **Chart Gallery** dialog box.

3. Click the **Color Schemes** tab. The color sets are **Default**, **Adobe**, **Alpine**, **Blue Velvet**, **Desert**, **Pastels**, **To The Max**, **Royalty**, **Santa Fe**, **Seaside**, and **Storm**. A preview of the selected color set is shown in the **Color Schemes** list box.

4. Choose a color set and click **OK**. The color set is applied to the series in the chart.

Blending Series Colors

In addition to defining fill and line colors and patterns for individual series, you can blend colors across a range of series.

To blend series colors:

1. Select the initial series in the range of series to be blended.

2. Choose **Chart/Gallery** to display the **Chart Gallery** dialog box.

3. Select the **Color Schemes** tab and select **Custom** from the predefined color sets popup menu.

4. Click the **From** popup menu and select a color for the initial series in the blending process.

5. Click **OK**.

6. Click the last series in the range of series to be blended.

7. Choose **Chart/Gallery** to display the **Chart Gallery** dialog box.

8. Select the **Color Schemes** tab and select **Custom** from the predefined color sets popup menu.

9. Click the **To** popup menu and select a color for the final series in the blending process.

10. Click **OK** to blend the colors in the designated range of series.

The series entries in the chart display the blended colors. The colors of the initial and ending series remain static. The colors of the series in between change to show the progression of colors created by blending.

The foreground fill color of the initial series is blended into the foreground fill color of the last series. Likewise, the background fill color of the initial series is blended into the background fill color of the last series. The foreground and background line colors of the blended series are set to match the blended foreground and background fill colors. The fill patterns are not altered.

Editing the Chart Axis

Two-dimensional charts have two axes. The numeric axis is the measurement scale for the data being charted. The division axis groups series elements by division. The auxiliary axis is an optional axis that can be defined in two-dimensional charts. The auxiliary axis is a version of the numeric axis and is a measurement scale for a selected series of data.

Three-dimensional charts have three axes. As with two-dimensional charts, there are the numeric axis and the division axis. The third axis, referred to as the series axis, displays all the elements of a series.

The numeric axis is also referred to as the dependent axis. The division axis is referred to as the independent axis. The following illustration identifies the axes in two- and three-dimensional charts.

Figure 12-22

Numeric Axis

Division Axis

Numeric Axis

Division Axis

Series Axis
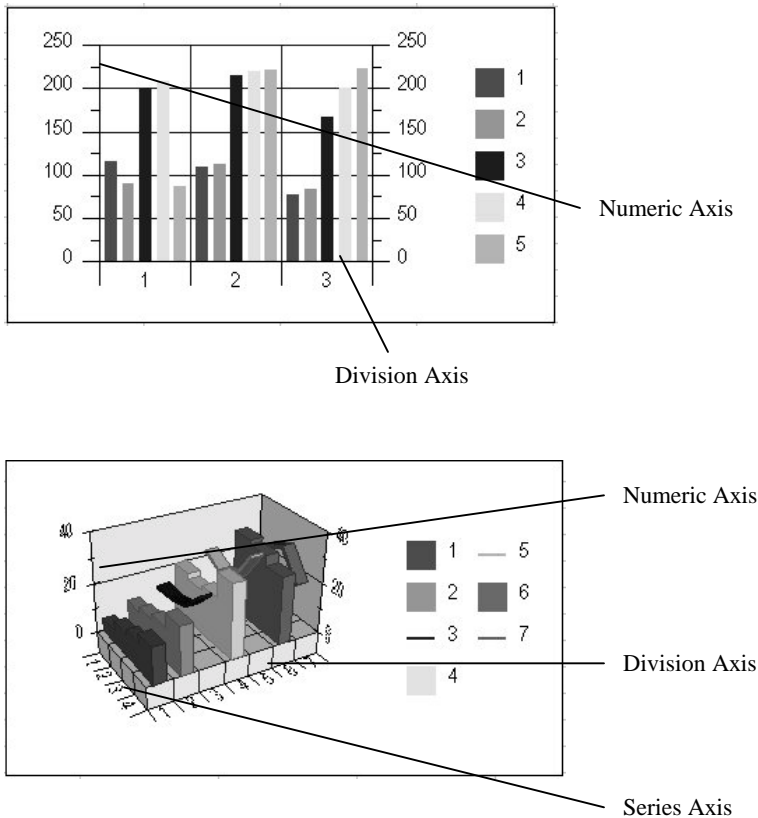
Defining Axis Colors and Patterns

You can define the foreground and background colors and pattern for an axis in the **Chart Axis** dialog box. Select the axis you want to format and choose **Chart/Axis**. Select a tab in the **Chart Axis** dialog box to modify

the axis line. The colors, pattern, and width you set for the axis line also apply to any tick marks displayed with the axis.

You can also use the **Colors** and **Lines** tools in the tool palette to format the colors, pattern, and line width of the axis line.

Adding an Axis Title

An axis title is displayed adjacent to the axis line in the chart plot area. Axis titles provide information about the data being plotted along the axis.

To add an axis title:

1. Select the axis to which you want to add a title.

2. Choose **Chart/Axis** to display the **Chart Axis** dialog box.

3. Select the **Options** tab.

4. Type the contents of the title in the **Source** text field.

   In addition to entering the text of the axis title, you can enter the address of a range containing the text to be used for the axis title. If more than one cell is specified, the contents of each cell creates a line of text in the axis title.

5. Enable the **Rotate** option to display the axis title vertical to the chart. Disable the **Rotate** option to display the axis title horizontal to the chart.

6. Click **OK**.

When you create an axis title for a vertical axis, by default the title is rotated. The following illustration shows a chart with and without the axis titles rotated.

Figure 12-23
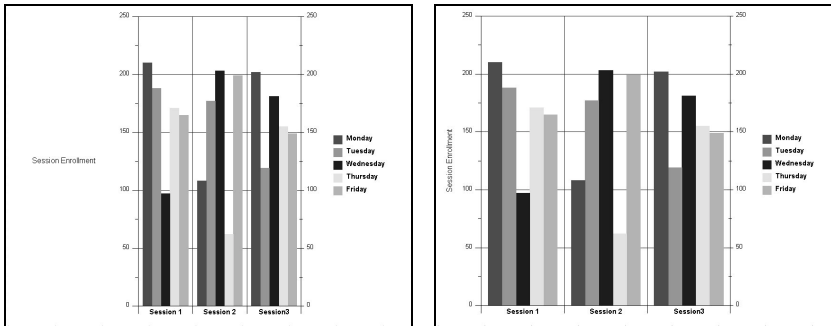
Tip: If you have defined an axis title, you can hide the title by enabling the **Hide** option in the **Chart Axis** dialog box. To redisplay the title, disable the **Hide** option. You cannot remove an axis title by deleting the contents of the **Text** field in the **Chart Axis** dialog box.

Defining the Axis Tick Marks

Tick marks along an axis identify the major and minor divisions. The type of axis scaling in effect and the range of data being scaled determine the number and placement of tick marks. You can define how the tick marks are displayed on the axis.

To set the axis tick mark display:

1. Select the axis to display tick marks.

2. Choose **Chart/Axis** to display the **Chart Axis** dialog box.

3. Click the **Options** tab.

4. Click the **Position** popup menu to select the location at which the tick marks are to be displayed. Tick marks can be displayed inside the plot area, outside the plot area, or centered on the axis.

5. Enter the length of the tick marks in the **Length** number wheel. The length you enter is in points. The value specifies the length of major division tick marks. Minor division tick marks are half the length of major division tick marks.

6. Click **OK**.

Hiding the Axis

An axis can be hidden from display on a chart. When an axis is hidden, any scale values, tick marks, grid lines, and titles are hidden with the axis.

To hide an axis:

1. Select the axis to be hidden.

2. Choose **Chart/Axis** to display the **Chart Axis** dialog box.

3. Click the **Show Axis** check box in the **Options** tab to hide the selected axis.

4. Click **OK**.

Setting the Axis Scale

The values displayed on an axis can be in one of four formats. The following list describes the axis scaling format options:

- **Linear**. Chart values are plotted in a linear scale with values ranging from the minimum to the maximum chart range value. The number of major and minor divisions is set automatically. This is the default scaling method for chart axes.

- **Percent**. Chart values are plotted in a linear scale with values based on percentages of the chart range values. The maximum chart range value is 100 percent; all other values are plotted as percentages of that value.

- **Logarithmic**. Chart values are plotted in a logarithmic scale with values based on a log base value entered in the **Chart Axis** dialog box. The default log base is 10.

- **Manual**. Chart values are plotted in a linear scale according to the minimum and maximum axis values entered in the **Chart Axis** dialog box. When using manual scaling, you also define the number of major and minor divisions displayed on the axis.

To set the axis scale format:

1. Select the axis for which the scale format is to be set.

2. Choose **Chart/Axis** to display the **Chart Axis** dialog box.

3. Select the **Scale** tab.

4. Click one of the **Scale Type** radio buttons to select a type of axis scaling. Or, click the **Manual** check box to enable manual scaling.

5. If you select **Logarithmic** scaling, enter the base in the **Log Base** number wheel.

6. If you select **Manual** scaling, enter the maximum and minimum scale values in the **Maximum Value** and **Minimum Value** fields.

7. Enter the number of major and minor divisions in the **Major Divisions** and **Minor Divisions** fields.

8. Click **OK**.

Manipulating 3D Charts

You can define several options that are unique to 3D charts. The following list describes these options:

- The elevation and rotation at which 3D charts are displayed can be defined.

- You can specify the perspective and distance from which 3D charts are viewed.

- The intensity and sources of light illuminating 3D charts can be set.

Changing the 3D View

The 3D view can be changed interactively in the worksheet or through the **Chart Plot** dialog box.

Using the interactive method is quicker and provides instant feedback as the chart is immediately repainted to the new position you specify. Using

the **Chart Plot** dialog box is not as quick as the interactive method, but provides a greater degree of control than the interactive method.

To interactively change a 3D chart's elevation, rotation, and perspective:

1. Position the pointer in the plot area of the chart and click the mouse.

2. Press SHIFT while you click and drag the mouse in the desired direction. The pointer becomes the rotation cursor. As you drag the mouse, an outline of the chart moves in the direction of the pointer movement.

   Drag the mouse up and down to change the chart's elevation. Drag the mouse left and right to change the chart's rotation. If the chart is a 3D pie chart, dragging left and right has no effect.

   Drag the mouse up to decrease the width to height ratio; drag the mouse down to increase the width to height ratio. Drag the mouse to the left to decrease the depth to height ratio; drag the mouse to the right to increase the depth to height ratio.

3. Release the mouse button to place the chart in the new position. The chart is repainted at its new elevation, rotation, and perspective.

Using the Chart Plot Dialog Box

The **Chart Plot** dialog box not only allows you to change the elevation, rotation, and perspective of a 3D chart, but you can also define the horizontal and vertical vanishing points and the height of the 3D base.

<u>To manipulate a chart with the Chart Plot dialog box:</u>

1. Select the 3D chart to which changes are to be made.

2. Choose **Chart/Plot** to display the **Chart Plot** dialog box. The sample area in the dialog box displays a representation of the current position and perspective of the selected chart.

3. Select the **3D View** tab.

4. Click the slide bar below the sample area to change the rotation of the chart. Drag the slider left to rotate the chart to the left; drag the slider right to rotate the chart to the right.

5. Click the slide bar to the left of the sample area to change the elevation of the chart. Drag the slider up to increase the viewing elevation; drag the slider down to decrease the viewing elevation. You can also click and drag the chart sample in the **3D View** tab to interactively set the elevation and rotation of the chart.

6. Click the **Distance** slide bar to change the distance from which the chart is viewed. Drag the slider up to increase the viewing distance; drag the slider down to decrease the viewing distance

7. Enter the X and Y vanishing points in the **Vanishing** number wheels to change the point of perspective from which the chart is viewed.

   The vanishing points control the point of perspective from which the chart is viewed. You can enter values from **0** to **100**. When entering the X (horizontal) vanishing point, **0** is the left corner of the chart and **100** is the right corner. When entering the Y (vertical)

vanishing point, **0** is the bottom corner of the chart and **100** is the top corner.

8. Click **OK**.

Changing 3D Light Sources

When formatting a 3D chart, you can define the direction from which light is directed to your chart and the amount of surrounding light that illuminates your chart.

To set the 3D light sources:

1. Select the 3D chart to which changes in the light sources are to be made.

2. Choose **Chart/Plot** and select the **3D Light Sources** tab from the **Chart Plot** dialog box. The dialog box contains a sample chart and a light source check box.

3. Check the available check boxes to modify the sources of illumination.

4. Click the **Ambient Light** slide bar to set the amount of ambient light illuminating the chart. Light that illuminates a three-dimensional chart from all sides is referred to as ambient light.

   Drag the slider up to increase the ambient light; drag the slider down to decrease the ambient light. Ambient light is cast upon the chart in addition to light from the fixed light sources. Ambient light shines on all sides of the 3D chart. If ambient light is set at 100 percent, all sides of the chart are illuminated equally no matter what light sources are turned on. If ambient light is set

at 0 percent, only the sides of the chart adjacent to the active source lighting are illuminated.

Setting Special Chart Options

Pie, 3D pie, 3D bar, wireframe, surface, and contour charts have options that are unique to each type of chart. These options are set in the **Chart Options** dialog box. The dialog box displays the options specific to a type of chart when that chart is selected and you choose **Chart/Options**. The following sections contain information about these options.

3D Bar Options

The following option is available for 3D bar and horizontal 3D bar charts:

- **Cylindrical Bars**. By default, the series elements in a 3D bar chart are drawn as three-dimensional square bars. Select this option to display the elements as three-dimensional cylindrical bars.

Pie and 3D Pie Options

The following options are available for pie and 3D pie charts:

- **Start Angle**. The start angle specifies at what angle drawing of the first pie slice begins. Enter the start angle in the **Start Angle** number wheel. The starting angle is entered in degrees and can range from 0 to 360. A starting angle of 0 begins drawing at the three o'clock position. Increasing angles rotate the starting position counterclockwise.

- **Pie Sizes**. When more than one pie is drawn, this option determines the relative size of each pie. Choose **Equal** from the

Pie Sizes popup menu to make all the pies equal size, regardless of the pie slice values. Choose **Weighted Average Of Pie Slices** to make the size of each pie relative to the total value of the slices in each pie.

- **Slice Sorting**. This option determines the order the slices are drawn in a pie. Choose **None** from the **Slice Sorting** popup menu to draw the slices in the order the data appears in the worksheet. Choose **Ascending** to draw the smallest slice first, followed by the next larger slice, until all the slices are drawn. Choose **Descending** to draw the largest slice first, followed by the next smaller slice, until all the slices are drawn.

Contour Chart Options

The following options are available for contour charts:

- **Smoothing**. This option smoothes the lines of the chart, rounding the points along the contour lines. When this option is enabled, you can specify how many segments of smoothing are to be applied to each data item. As many as 50 segments can be applied to a data item.

- **Display**. This option determines what is to be displayed in the contour. Choose **Contour Bands Only** to display only the bands of colors and patterns that fill the contour regions. Choose **Contour Lines Only** to display only the lines that border and separate the contour regions. Choose **Contour Bands And Lines** to display both the bands and lines.

Surface Chart Options

The following options are available for surface charts:

- **Smooth Using**. This option performs the same function as smoothing in contour charts.

- **Hide Axes And Stage Walls**. This option hides all the axes and the plot area stage walls behind the surface area.

- **Surface Grid**. This option displays the grid that marks the changes in angle along the surface of the chart.

- **Surface Display**. This option determines what is to be displayed on the surface of the chart. Choose **No Bands Or Lines** from the **Surface Display** popup menu to hide the bands and lines that mark the regions of the surface. Choose **Bands Only** to display only the bands of colors and patterns that fill the surface regions. Choose **Lines Only** to display only the lines that border and separate the surface regions. Choose **Both Bands And Lines** to display both the bands and lines.

- **Base Display**. This option determines what is to be displayed on the base below the surface. The base displays a contour that is a two-dimensional representation of the surface area. Choose **Pedestal** to display the pedestal that raises the surface above the base. Choose **Contour Bands Only** to display only the bands of colors and patterns that fill the base contour regions. Choose **Contour Lines Only** to display only the lines that border and separate the base contour regions. Choose **Contour Bands And Lines** to display both the bands and lines.

Wireframe Chart Options

The following options are available for wireframe charts:

- **Smooth Using**. This option performs the same function as smoothing in contour charts.

- **Show Axes And Stage Walls**. This option shows all the axes and the plot area stage walls behind the wireframe area.

- **Show Surface Contour Lines**. This option displays contour lines that border and separate the wireframe regions.

- **Show Base Contour Bands**. This option displays the bands of colors and patterns that fill the base contour regions.

- **Show Base Contour Lines**. This option displays the lines that border and separate the base contour regions.

Tip: If the **Show Surface Contour Lines**, **Show Base Contour Bands**, and **Show Base Contour Lines** options are disabled, the chart legend is hidden.

CHAPTER 13: BOUNDIN FUNCTIONS

Boundins functions are:

- files that contain one or more external functions.

- routines written in a third-generation programming language (such as, C or Pascal) that can be accessed as if they are built-in functions.

Boundin functions are used to perform specialized tasks, such as accessing system resources, querying serial devices, making calls directly to the operating system, and defining mathematical calculations that are specific to the needs of the user.

Boundin functions are defined in a file that is written in a programming language. This file, referred to as a boundin tool, may contain one or more boundin functions. Multiple arguments of various types (e.g., strings, values, and arrays) can be passed to boundin functions. Boundin functions can return one number, string, error, or array.

Note: This chapter addresses boundin functions using the C programming language. If you are writing boundin functions in a different programming language, define equivalent structures and use parallel steps to follow the instructions provided in this chapter.

Using Boundin Functions

Using a boundin function is very similar to using a JavaScript or HyperScript function. First, the boundin tool must be loaded into memory; place the boundin in the Plugins directory to load the tool into memory.

Once a boundin tool is loaded, any of the external functions contained in the tool can be used. A boundin function is used in the same manner as any script function. For example, if a boundin tool named MyMath contains a function named MyMult requiring two numerical arguments, MyMult can be used in numerous ways, as shown in the examples below.

Examples

```
=MyMath:MyMult(A1, 3)
=3 + MyMath:MyMult(2,3) / RAND()
PUT MyMath:MyMult(PI(),7) INTO B6
```

As with scripts, if there are spaces in either the tool or the function name, the tool name and function name must be enclosed in a set of single quotation marks (e.g., 'File:Bd Function').

Writing Boundin Tools

A boundin tool file is comprised of four sections. Each section is required and must be included in the following order:

- **Header.** This section contains information about the number of boundin functions defined in the tool, and the header files that must be included. The header may include global variables and type definitions required by your boundin functions.

- **Initialization.** Instructions that initialize the communications link between JSServer and the boundin functions are included in

this section. You also can provide initialization information tailored to the needs of your boundin functions in this section.

- **Boundin Functions.** This section contains the boundin functions you create. Your boundin functions can perform a variety of actions, from mathematical calculations to array manipulation to system information retrieval.

- **Cleanup.** The cleanup section performs any exit tasks required by the functions in your boundin tool. For example, to globally allocate memory, you can use the cleanup section of the boundin tool to free the allocated memory.

Using Ssbound.h File Structures

Boundin tools are based on the structures provided in the **boundin.h** file provided with your JSServer media. Three structures defined in the **boundin.h** file (BDRELT, BDROUT, and VAL) are needed to enable communication between your boundin tool and HyperScript. Each of these structures is described below.

BDRELT Structure

Each boundin function in a tool has a BDRELT structure in the relts array. The BDRELT structures contain information about the functions in your boundin tool.

Boundins use Pascal strings (arrays where the first byte is the length of the string) to store character arrays. The string is restricted to 255 characters.

The first element in this structure (pfunc) is a pointer to the boundin function. The second element (name) is a Pascal string with the name of the function in it. This is the name you must use when you refer to your

boundin function from within a function. For clarity, assign the function and function pointer the same name.

The number of arguments your function receives is stored in the last element (narg). The minimum number of arguments is 0; the maximum number is 50. The spreadsheet engine checks to make certain the correct number of arguments is provided each time your boundin function is called. You must provide any further argument checking (e.g., type or range) within the boundin function itself. **boundin.h** defines additional flags that can be added to the nargs for optimization usage.

BDROUT Structure

The BDROUT structure is the top level structure used to retrieve information about a boundin tool. The structure contains three elements, described below:

- The first element in the BDROUT structure is nrout. This element is used to define the number of functions in the boundin. The nrout element must be set to the number of boundin functions defined in the boundin tool.

- The second element (exitfunc) is a pointer to an exit function. The exit function should perform any necessary cleanup when the tool is removed.

- The last element (relts) in the BDROUT structure is an array of type BDRELT. The number of elements in relts should be the same as the number to which nrout is set (numfuncs).

VAL Structure

The VAL structure passes information to and from the calculation engine. Specifically, every boundin function receives a pointer to an array of VALs (from which the arguments are extracted) and a pointer to a VAL (for returning the result). This allows all arguments and results to be numeric, text, error, or array, but still have the same type.

The first element in this structure is a union. The elements within the union are used as follows: numeric for a numeric argument, string for a text argument, err for an error argument, and array for an array.

The flag signifies which element within the union is being used. The flag corresponds as follows: 0 is numeric, 1 is string, 2 is error, and 6 is array. For example, to pass a number to a function, the flag element should be set to 0 with the number loaded into numeric. For convenience, the **boundin.h** file defines these values as NUMERIC, STRING, ERR, and ARRAY, respectively.

Returning Errors

The following methods can be used to return an error defined in a boundin function:

- You can return an error by setting the flag to 2 and then setting err to a number corresponding to the desired error number. If you specify an error number, do not include leading zeroes in the error number (e.g., 13, not 0013).

- You can specify one of the error keywords provided in **boundin.h**.

The error keywords and their related error numbers and descriptions are shown in the following table.

Error Keyword	Error No.	Description
BADARGS	3	Incorrect number of arguments.
BADSYNTAX	4	Invalid syntax.
LOOKUPFAILED	6	Lookup failed.
REFERR	7	Reference error.
INSUFDATA	8	Insufficient data.
DIVZERO	9	Division by zero is not allowed.
TOOCOMPLEX	11	Formula is too complex.
ARGBAD	12	Argument is inappropriate.
MISSINGWS	13	No worksheet.
REMOTENA	15	Remote data is not available.
BADARRAY	17	Invalid array syntax.
BADDATE	18	Inappropriate date value.
BADTIME	19	Inappropriate time value.
NOMEM	21	Not enough memory.
USRERR	26	User error.
BADINDEX	30	Array index is beyond the number of dimensions.
WRONGDIMS	32	Wrong number of dimensions.
NOTARRAY	33	Variable is not an array.
BADARRAYSIZE	34	Array is not allowed in this context.
FUNCUNAVAILABLE	35	Function is not available.
SQLERROR	44	SQL error.
SQLWARNING	45	SQL warning.
BADFUNCNAME	59	Bad function name.
BADIMPFUNC	61	Bad imported function.
INTERNALERR	99	Internal error.

Error keywords are used in the example boundin tool provided at the end of this chapter.

Creating Boundin Tool Sections

As mentioned, a boundin tool is composed of four sections: the header, the initialization, the functions, and the cleanup sections. All four sections must be defined in a boundin tool file.

Writing the Header Section

The header section of the boundin tool defines the number of functions you need to call in the boundin tool, as well as the header files that you need to include. The constant numfuncs, which represents the number of functions in the boundin tool, must be defined first.

The number of functions to call in your boundin tool does not need to equal the number of functions defined in the tool. For example, you may have functions for use in other routines. Only the number of functions you want to call via calculation engine should be included as the defined number of functions.

The following statements comprise an example of the header section of a boundin tool.

Example

```
#define numfuncs 1
#include "boundin.h"
```

This example header section declares one boundin function in the boundin tool. The required header file (**boundin.h**) is included.

System: Some environments may require additional header files. For example, the Windows environment requires the #include <Windows.h> statement prior to the **boundin.h** inclusion.

Writing the Initialization Section

The initialization section defines the structures your boundin functions use. In the initialization section, you can create an initialization routine tailored to the requirements of your boundin tool. You may want to allocate memory, open drivers, or initialize variables in this function.

The header and initialization sections are called when the boundin is loaded.

All of the required structural information for the initialization section is provided in the **boundin.h** file. The following example shows the initialization section of a boundin tool (using ANSI conventions).

Example

```
#define numfuncs 2
IATFUNC Func1(PVAL, PVAL);
IATFUNC Func2 (PVAL, PVAL);

/*BDROUT defines the Wingz Boundin interface */
BDROUT rout =
{
numfuncs, /* Number of functions in Boundin */
XFDEF (ExitFunc), /*Function to call on exit, or NULL */

{
{ XFDEF(Func1), "\005Func1", 0 | NORMAL}, /* No arguments */
{ XFDEF(Func2), "\005Func2", 1| NORMAL} /* One argument */
}
};
/* Point of entry */
BDMAINFUNC(BoundinCalls * calls)
{
return &rout;
}
```

The initialization section in your boundin tool must return a pointer to a BDROUT. The elements in the BDROUT, including the RELTS for each function, must be set in the code of the BDMAINFUNC function. Although other code may exist in the BDMAINFUNC function, the previous example shows the minimum amount of code needed. Additional code may be required in this function if your boundin function needs other initialization.

Writing the Boundin Functions Section

Each boundin function has two arguments; each is a pointer to a VAL structure. The first argument is used for the return value (a boundin function has only one return value). The second is a pointer to the array of arguments the boundin function receives as its input.

Note that the array is of size narg, which is specified by narg in the RELT structure during initialization. The calculation engine does not call the function unless the correct number of arguments (which can range from 0 to 50) is passed.

The following example might be used by a boundin function to multiply two numeric arguments. The example shown was created using ANSI C.

Note: If you are programming in a language other than C, check the order in which parameters are passed to functions. If they are passed in the opposite order, declare parg and then pret in your function.

Example

```
IATFUNC MyMult(PVAL pret, PVAL parg)
{
if (parg[0].flag == NUMERIC && parg[1].flag == NUMERIC)
{
/* Multiply numbers together and return result */
xfSetLong(pret, parg[0].val.numeric * parg[1].val.numeric);
}
else
{
/* Argument is bad */
xfSetErr (pret, ARGBAD);
}
}
```

Writing the Cleanup Section

The final section of your boundin tool consists of the exit routine (ExitFunc) that performs any cleanup needed when the tool is removed.

For example, if you allocate memory in any function, it should be freed in the exit routine if it has not already been freed. The ExitFunc function is executed when the REMOVE BOUNDIN HyperScript command is issued.

If your boundin tool requires no cleanup, the ExitFunc pointer in the initialization section of your boundin tool should be set to null. The following example shows an ExitFunc that is set to null in a boundin tool file that requires no cleanup routine. Any cleanup routines your boundin tool requires should be added to ExitFunc.

Example

```
IATEXITFUNC ExitFunc(void)
{
}
```

When all four of the sections are created, the boundin tool is ready to be compiled, linked, and placed in the Plugins directory.

Compiling and Linking Boundins

The steps involved in the compiling and linking process are dependent on your compiler and environment. Refer to *Using Boundins in the Windows Environment* to compile and link your boundins in the Windows environment. The section, *Building Boundins in the Motif Environment* contains boundin tool information as it relates to the Motif environment. Refer to the Investment Intelligence Systems Corporation web site for updated product information. To ensure you receive notification of these updates, register your copy of the product.

Using Boundins in the Windows Environment

In the Windows environment, boundins are implemented as Dynamic Linked Libraries (DLLs). To create and use a boundin tool in this environment, you must compile and link the file as a DLL.

Example boundins, makefiles, and batch files that contain the compile and link statements are provided in your installation media. These files are included to compile and link the examples and to provide further information about how to compile and link your boundins.
The following section describes the compile and link procedures necessary to create DLLs in MicroSoft C++, version 5.0.

Using Microsoft Visual C++

To call a DLL created in Microsoft Visual C++, version 5.0, you must compile and link the file to the iattools library. The compilation statement must provide an include path to the **boundin.h** file. In the following example, it is assumed that the header file is in the current directory.

Example

cl /c /I. -DWIN32 array.c

The following is an example link statement using Microsoft Visual C++. The iattools library (required by the boundin) must be linked in this statement.

Example

link array.obj .\iattools.lib /OUT:array.dll /DLL

The examples provided with the installation contain command line makefiles that provide an easy mechanism to build the example boundins. To execute a makefile, issue the statement in the following example.

Example

nmake -f array.mak

Building Boundins in the Motif Environment

This section describes the procedures necessary to compile and link boundins using the native C compiler. The process of compiling and linking in the Motif environment is known as a "build."

To build a boundin tool in the Motif environment, you must use the makefile included with the JSheet product. This makefile defines the location of the include files and libraries based on the JSHEET environment variable. This environment variable must be set to the JSheet application directory.

The following example builds the Example boundin tool provided on your installation media. Before building this boundin tool, make sure you are in the $JSHEET/boundin directory.

Example

make Example

Updating Wingz 2.5 and HyperScript Tools 1.5 External Files

A boundin is similar to an external in form. Existing externals will run, but they must be rebuilt to take advantage of the additional features of boundins. The most noticeable difference between externals and

boundins is in the initialization section of the script. A number of macros are used to provide better platform-independent support.

To update the external:

1. Replace iattools.h with boundin.h.

2. Convert IATMAINFUNC to BDMAINFUNC.

An external IATMAINFUNC:

```
IATMAINFUNC(void)
{
rout.nrout = numfuncs
rout.exitfunc = ExitFunc;
rout.relts[0].pfunc = mult2args;
rout.relts[0].name = "\004mult";
rout.relts[0].narg = 2;
rout.relts[1].pfunc = add2args;
rout.relts[1].name = "\003add";
rout.relts[1].narg = 2;
rout.relts[2].pfunc = rev;
rout.relts[2].name = "\007reverse";
rout.relts[2].narg = 1;

return &rout;
}
```

The corresponding BDMAINFUNC:

```
BDROUT rout =
{
numfunc, XFDEF(ExitFunc),
{
{ XFDEF(add2args), "\003add", 2 | NORMAL},
{ XFDEF(mult2args), "\004mult", 2 | NORMAL},
{ XFDEF(rev), "\007reverse", 1 | NORMAL}
}
};
BDMAINFUNC(BoundinCalls *calls)
```

```
{
return &rout;
}
```

You have the option to "set" parameters.

The macros listed below may be used to set variables in VAL structures.
An original external could set basic values as follows.

```
pret->flag = NUMERIC;
pret->val.numeric = 1234; /* Number */

pret->flag = ERR;
pret->val.err = ARGBAD; /* Error */

pret->flag = STRING;
pret->val.string = buf; /* Pascal String */
```

A boundin can use macros to provide clearer implementations:

```
xfSetLong(pret, 1234); /* Numeric */
xfSetErr(pret, ARGBAD); /* Error */
xfSetString(pret, buf); /*String */
```

Using Global Variables

When calling a boundin function, you cannot access other global
variables. The parg and pret arguments provide the only communication
available to or from JSServer and JSBuilder. Global variables defined in
a tool remain intact until the boundin tool is removed.

Returning Values

When the calculation engine calls a boundin function, its return VAL is
set to a numeric 0. This is the result unless your boundin function
changes it.

Noting Boundin Function Limitations

There are two limitations to note when using boundin functions:

- HyperScript uses Pascal strings to store character arrays. A Pascal string is an array that uses the first byte to contain the length of the string. Therefore, string length is limited to 255 characters.

- The number of arguments passed to a boundin function (defined in narg) is limited to 50.

Using Function Prototypes

The **boundin.h** file contains a set of function prototypes that can be used to perform specific tasks in your external functions. The following table lists and describes these functions. For information about the data types in these functions, refer to your **boundin.h** file.

Function Prototype	Description
p2copy(pstr,cstr)	This function copies a Pascal string pstr into the C string cstr and returns a pointer to the Pascal string. cstr should have enough space allocated to hold pstr.
c2pcopy(cstr, pstr)	This function copies a C string cstr into the Pascal string pstr and returns a pointer to the Pascal string. pstr should have enough space allocated to hold cstr.
ustrcat(destination, source)	This function operates on Pascal strings. ustrcat takes a pointer to a destination string and a pointer to a source string. The function appends the source string to the destination string. The length of the string that was appended is returned.

ustrncat(destination, source, nbytes)	This function operates on Pascal strings. ustrncat takes a pointer to a destination string, a pointer to a source string, and the maximum number of bytes to append. This function copies the specified number of bytes (nbytes) of the source string to the destination. If the source string is larger than nbytes, only nbytes is appended. If the source string is smaller than nbytes, all of the source string is copied. The length of the string that was appended is returned.
ustrcmp(string1, string2)	This function operates on Pascal strings. ustrcmp takes two arguments, a pointer to string1, and a pointer to string2. 0 is returned if both strings are equal; a negative number is returned if string1 is less than string2; or, a positive number is returned if string1 is greater than string2.
Ustrncopy(destination,source,nbytes)	This function operates on Pascal strings. ustrncopy takes three arguments, a pointer to a destination string, and a pointer to a source string. This function copies the specified number of bytes (nbytes) of the source string to the destination. If the source string is larger than nbytes, all of the source string is copied. The length of the copied string is returned.
xfNewArray(arrayhead,ndims,dims)	This function creates a new ndim-dimensional array that matches the dimensions pointed to by dims, in the VAL structure pointed to by arrayhead. If the function is successful 1 is returned; 0 is returned if it is not. Note that this function uses the C convention where an array's indices begin at 0, unlike HyperScript where an array's indices begin at 1.
xfSetArrayEl(array, dims, value)	This function sets an array element. dims is used as the index into the array structure and the contents of value is copied into the array element as specified. If the function is successful 1 is returned; 0 is returned if a subscript is out of bounds or memory allocation fails. Note that this function uses the C convention where an array's indices begin at 0, unlike HyperScript where an array's indices begin at 1.
xfSetArrayNumEl(array, dims, value)	This function sets an array element with the specified numeric value. The array dims is used as the index into the array structure and the contents of value is copied into the array element as specified. If the function is successful 1 is returned; 0 is returned if a subscript is out of bounds or memory allocation fails. Note that this function uses the C convention where an array's indices begin at 0, unlike HyperScript where an array's indices begin at 1.

xfSetArrayStrEl(array, dims, value)	This function sets an array element with the specified string. The array dims is used as the index into the array structure and the contents of value is copied into the array element as specified. If the function is successful 1 is returned; 0 is returned if a subscript is out of bounds or memory allocation fails. Note that this function uses the C convention where an array's indices begin at 0, unlike HyperScript where an array's indices begin at 1.
xfGetArrayEl(array, dims, value)	This function gets an array element. The array dims is used as the index into the array structure and the contents of value is copied into the array element as specified. If the function is successful 1 is returned; 0 is returned if a subscript is out of bounds or memory allocation fails. If the specified element does not exist or has not been set, value is a numeric 0. Note that this function uses the C convention where an array's indices begin at 0, unlike HyperScript where an array's indices begin at 1.
xfCheckArrayIndex(array, indices)	This function checks for the validity of indices against the dimensions of the array. This function returns 1 if the indices are valid; 0 is returned if they are not.
xfFreeArray(array)	This function frees the array and converts it to 0. It does not free the passed structure. Nothing is returned by this function.
xfAddInput(skt, mask, callback, clientdata)	This function is supplied with a socket to listen upon, the listening type (such as, INPUT_MASK_READ, INPUT_MASK_WRITE, or INPUT_MASK_EXCEPTION), a callback function and client data. If the appropriate event occurs on the socket, the callback is executed passing the clientdata. The function returns an identifier.
xfRemoveInput(identifier)	This function removes the appropriate identifier. The socket is not closed; it is merely excluded from some listeners. The user is responsible for closing the socket.
xfSetTimedFunc(callback, timeval, clientdata)	This function executes the callback with the supplied clientdata when the specified timeval has elapsed. The function returns an identifier.
XfRemoveTimedFunc(identifier)	This function removes the appropriate timer callback.
xfNoMoreMemory()	This function displays a message box that reports that no more memory is available.
xfEnvFrom Wingz(pstr)	This function translates environment-specific characters to the Wingz character set.
xfWingzFromEvn(pstr)	This function translates a Wingz character string to the environment character set.
xfGetLastCellErr()	This function returns the last error in a workbook.
xfExternalHandle(name)	This function returns the handle of the name boundin library.

xfDLOpen(libraryname)	This function loads the appropriate library into memory. In the windows environment, libraries are in the form of dynamic link libraries (dlls).
xfDLSym(libraryhandle, procname)	This function removes the library from memory.
xfDLError()	This function returns the last error that occurred when attempting to perform an xfDLOpen. In the Windows environment, this returns NULL.
xfDaysToDmy(days, pdd, pmm, pyy)	This function converts a number of days into the days, months, and years for a specific period of time.
xfDmyToDays(dd,mm,yy)	This function returns the number of days since 12/31/1899. If the date is before 12/31/1899, it is a negative number.

Function prototypes are used in the boundin tool example provided in the following section.

A Boundin Tool Example

This example shows an entire boundin tool. All the necessary boundin function sections are included. This example is for your convenience. The name of this example tool is array.c.

The boundin tool contains two boundin functions: ReturnArrayEle1 and ReturnArrayEle2. When either of these boundin functions is called, an array is passed to the function.

The first function (ReturnArrayEle1) receives a one-dimensional array and a position. ReturnArrayEle1 returns the array element stored in the position. The second function (ReturnArrayEle2) performs the same procedure on a two-dimensional array. Both functions return the specified element of an array.

Example

(This is the header section of the external tool.)

```
/* The following windows.h inclusion must be defined if you are using the
Windows environment. */
#if defined(WIN32)
```

```
#include<windows.h>
#endif

#define numfuncs 2
#include "boundin.h"

IATFUNC ReturnArrayEle1(PVAL, PVAL);
IATFUNC ReturnArrayEle2(PVAL, PVAL);

/* BDROUT defines the Wingz/Boundin interface */
BDROUT rout =
{
numfuncs, XFDEF(NULL),
{
{XFDEF(ReturnArrayEle1), "\017ReturnArrayEle1", 2 | NORMAL},
{XFDEF(ReturnArrayEle2), "\017ReturnArrayEle2", 3 | NORMAL}
}
};
/*Function descriptions (appear in function glossary) */
BDFUNCLIST =
{
"Array Boundin",
"ReturnArrayEle1(1D_array, position)"
"Returns an array element of a 1D array",
RETARRAY,

"Array Boundin",
"ReturnArrayEle1(2D_array, position1, position2)",
"Returns an array element of a 2D array",
RETARRAY,

NULL, NULL, NULL, 0
};

/* Point of entry */
BDMAINFUNC(BoundinCalls * calls)
{
return &rout;
}

/* The following function is used in the Windows environment. */
/* It is required to build a dynamic link library (DLL). */
#if defined(WIN32)
BOOL APIENTRY DllMain (HANDLE hModule, DWORD dwReason, LPVOID
lpReserved)
```

```
{
return TRUE;
}
#endif

/* This function returns an array element of a 1 dimensional array. */
/* The array is in parg[0] and the element specification is in parg[1]. */
IATFUNC ReturnArrayEle1(PVAL pret, PVAL parg)
{
unsigned short dims;
VAL tmpVal;

/* Make sure it is an array. */
if (parg[0].flag == ARRAY)
{
/* Make sure it is a 1 dimensional array. */
if (parg[0].val.array.dims == 1)
{
/* Make sure 2nd arg is number and in range of array. */
if (parg[1].flag == NUMERIC && parg[1].val.numeric > 0 &&
parg[1].val.numeric <= parg[0].val.array.dl)
{
/* In C, arrays start at 0. */
dims = parg[1].val.numeric - 1;

/* Get the array element. */
if (!xfGetArrayEl(&parg[0], &dims, &tmpVal))
{
xfSetErr(pret, BADARRAY);
return;
}
pret->flag = tmpVal.flag;
pret->val = tmpVal.val;
return;
}
else
{
xfSetErr(pret, BADINDEX);
return;
}
}
else
{
xfSetErr(pret, WRONGDIMS);
```

```
return;
}
}
else
{
xfSetErr(pret, NOTARRAY);
return;
}
}
```

(This is the external functions section of the external tool.)

```
/* This function returns an array element of a 1 dimensional array. */
/* The array is in parg[0] and the element specification is in parg[1]. */

IATFUNC ReturnArrayEle1(PVAL pret, PVAL parg)
{
unsigned short dims;
VAL tmpVal;

pret->flag = ERR;

/* Make sure it is an array. */
if (parg[0].flag == ARRAY)
{
/* Make sure it is a 1 dimensional array. */
if (parg[0].val.array.dims == 1)
{
/* Make sure 2nd arg is number and in range of array. */
if (parg[1].flag == NUMERIC && parg[1].val.numeric > 0
&& parg[1].val.numeric <= parg[0].val.array.d1)
{
/* In C, arrays start at 0. */
dims = parg[1].val.numeric - 1;

/* Get the array element. */
if (!xfGetArrayEl(&parg[0], &dims, &tmpVal))
{
pret->val.err = BADARRAY;
return;
}
pret->flag = tmpVal.flag;
pret->val = tmpVal.val;
```

```
return;
}
else
{
pret->val.err = BADINDEX;
return;
}
}
else
{
pret->val.err = WRONGDIMS;
return;
}
}
else
{
pret->val.err = NOTARRAY;
return;
}
}

/* This function returns an array element of a 2 dimensional array. */
/* The array is in parg[0] and the element specifications are in parg[1] */
/* and parg[2]. */

IATFUNC ReturnArrayEle2(PVAL pret, PVAL parg)
{
unsigned short dims[2];
VAL tmpVal;

pret->flag = ERR;

if (parg[0].flag == ARRAY)
{
if (parg[0].val.array.dims == 2)
{
if (parg[1].flag == NUMERIC && parg[2].flag == NUMERIC &&
parg[1].val.numeric > 0 &&
parg[1].val.numeric <= parg[0].val.array.d1 &&
parg[2].val.numeric > 0 &&
parg[2].val.numeric <= parg[0].val.array.d2)
{
/* In C, arrays start at 0. */
```

```
dims[0] = parg[1].val.numeric - 1;
dims[1] = parg[2].val.numeric - 1;

/* Get the array element. */
if (!xfGetArrayEl(&parg[0], dims, &tmpVal))
{
pret->val.err = BADARRAY;
return;
}
pret->flag = tmpVal.flag;
pret->val = tmpVal.val;
return;
}
else
{
pret->val.err = BADINDEX;
return;
}
}
else
{
pret->val.err = WRONGDIMS;
return;
}
}
else
{
pret->val.err = NOTARRAY;
return;
}
}
```

(This is the cleanup section of the external tool.

```
IATFUNC ExitFunc(void)
{
}
```
/*ExitFunc is empty because no clean-up is required. */

To test the first external function example (ReturnArrayEle1), use the following example in a script and name the external file array.c.

Example

```
DEFINE arr[3]
{omit .dll for UNIX}
GET BOUNDIN "array.dll"
FILL ARRAY arr WITH "1st", "2nd", "3rd"
MESSAGE array:ReturnArrayEle1(arr, 2)
REMOVE BOUNDIN "array"
```

In this example script, the second element of the array (2nd) is returned in the MESSAGE dialog box.

To test the second external function example (ReturnArrayEle2), use the following example in a script and name the external file array.c.

Example

```
DEFINE arr[2, 3]
{omit .dll for UNIX}
GET BOUNDIN "array.dll"
FILL ARRAY arr WITH "1st", "2nd", "3rd", "First", "Second", "Third"
MESSAGE array:ReturnArrayEle2(arr, 2, 2)
REMOVE BOUNDIN "array"
```

In this example script, the second element in the second dimension of the array (Second) is returned in the MESSAGE dialog box.

CHAPTER 14: PRIVILEGES

As discussed in *Chapter 5*, you can use the JSBuilder cell locking feature to obtain a level of security for the data in your worksheets. To obtain a higher degree of control over who can access JSBuilder workbooks, you can assign privileges at the workbook, worksheet, or cell range level.

Read this chapter to learn:

- the default settings for workbook privileges.

- the various categories of workbook, worksheet, and cell range privileges.

- how to change the ownership of a workbook.

- how to set workbook, worksheet, and cell range privileges.

- how to save to and apply privileges from a template.

- how to use the batch privileges feature to set privileges for entire directories of files.

Default Workbook Privileges

There is an implicit group, called **public**, to which every user belongs. To set explicit workbook privileges, all privileges for **public** must be removed.

The default setting for workbook ownership is on the **Environment** tab of the **Preferences** dialog box. As shown in the illustration below, the **Default Book Owner** option is set to **public**. To change the default owner, select the **Default Book Owner** option and enter the name of the desired workbook owner. The workbook owner has implied read, write, save, and grant privileges. If there is no explicit entry for a user at the workbook level, all users other than the owner have read-only privileges.

Figure 14-1
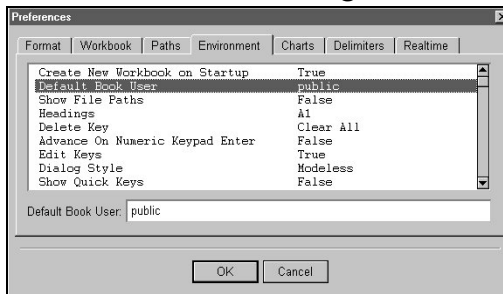
In addition to the **Default Book Owner** setting, default settings for workbook ownership are also set under the **Workbook** tab of the **Preferences** dialog box. As shown in the illustration below, the default settings for the **Public Read, Public Write**, and **Public Save** privileges are all set to **True**. To remove the default read, write, and save privileges for **Public**, select each option and uncheck the corresponding check box.

Figure 14-2
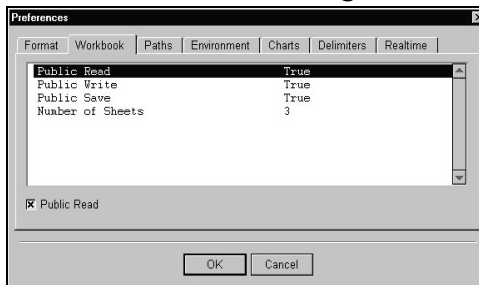
Setting Workbook Privileges

When you create a new workbook, the owner identified in the **Default Book Owner** setting under the **Environment** tab in the **Preferences** dialog box is the workbook owner. To change the owner for the current workbook, or to assign user privileges for the workbook, select **Sheet/Privileges/Book Privileges** from the JSBuilder menu. The **Book Privileges** dialog box is displayed, as illustrated below.

Figure 14-3
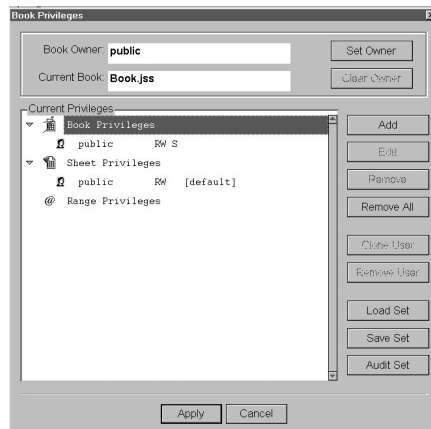
To change the workbook owner:

    1. Click the **Set Owner** button in the top left corner of the **Book Privileges** dialog box. The **Set Book Owner** dialog box is displayed.

    2. In the **Set Book Owner** dialog box, click the **Book Owner** dropdown menu to display a list of available users; select the name of the desired owner from the list.

3. Click **OK**. The name of the new owner is displayed in the **Book Owner** field in the **Book Privileges** dialog box.

4. Click **Apply** to apply the change to the current workbook.

Assigning Workbook Privileges

You can assign four categories of privileges at the workbook level:

- **Read-Only.** Assign read-only privileges to give the user permission to open a workbook; access the recalculation or iteration mode; and access named ranges. The user is not allowed to write, save, or modify the structure of the workbook or worksheet file.

- **Read-Write.** Assign read-write privileges to give the user permission to add, delete, or rename worksheets; change the recalculation or iteration mode; modify named ranges; change the structure of a worksheet or workbook; and save the worksheet or workbook.

- **Read-Write-Save.** Assign read-write-save privileges to give the user access to all workbook functionality.

- **Grant.** Assign grant privileges to allow users to grant their privileges to another user. Users may grant only those privileges that they personally possess.

Workbook privileges are assigned in the **Book Privileges** dialog box. To display the **Book Privileges** dialog box, select **Sheet/Privileges/ Book Privileges** from the JSBuilder menu.

To assign workbook privileges:

1. In the **Current Privileges** section of the **Book Privileges** dialog box, select **Book Privileges** and click the **Add** button; the **Add Book Privileges** dialog box is displayed.

Figure 14-4
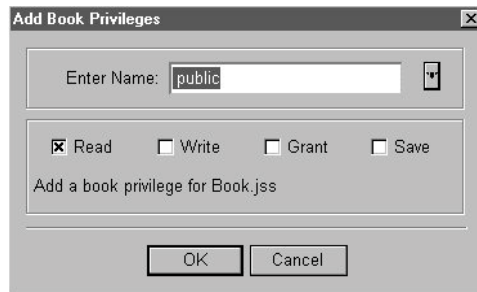
2. To add privileges for a user other than the user displayed in the **Enter Name** field, click the dropdown arrow and select a different user from the list.

3. When the appropriate user is displayed in the **Enter Name** field, check the desired check boxes to assign the corresponding privileges.

4. Click **OK**. The user and the privileges assigned to the user are displayed in the **Current Privileges** section of the **Book Privileges** dialog box.

5. Repeat steps 1 through 4 to add privileges for more users, if needed.

6. Click **Apply** to apply the privileges to the current workbook.

Editing and Removing Workbook Privileges

You can also edit and remove workbook privileges that are assigned to users using the **Book Privileges** dialog box.

To edit workbook privileges:

1. Select **Sheet/Privileges/Book Privileges** from the JSBuilder menu to display the **Book Privileges** dialog box.

2. In the **Current Privileges** section, select the user listed in **Book Privileges** for which you want to edit privileges and click the **Edit** button; the **Edit Book Privileges** dialog box is displayed.

3. Make the changes needed by checking or unchecking the corresponding privileges check boxes.

4. Click **OK** to apply the changes. The new privileges assigned to the user are displayed in the **Current Privileges** section of the **Book Privileges** dialog box.

5. Repeat steps 1 through 4 to edit privileges for other users, as needed.

6. Click **Apply** to apply the privileges to the current workbook.

To remove workbook privileges:

1. Select **Sheet/Privileges/Book Privileges** from the JSBuilder menu to display the **Book Privileges** dialog box.

2. In the **Current Privileges** section, select the user listed in **Book Privileges** for which you want to remove privileges and click the **Remove** button.

3. Click **OK** in response to the prompt to remove the privileges for the selected user.

IMPORTANT: Click the **Remove All** button in the **Book Privileges** dialog box to remove all privileges (workbook, worksheet, and range).

Setting Worksheet Privileges

Once you assign workbook privileges, you can assign privileges at the worksheet level.

IMPORTANT: Privileges at the worksheet level cannot contradict the privileges assigned at the workbook level. For example, a workbook with no privileges assigned at the workbook level cannot be opened, regardless of whether or not read and write privileges have been assigned at the worksheet level.

You can assign three categories of privileges at the worksheet level:

- **Read-Only.** Assign read-only privileges to give the user permission to read the specified worksheet(s), access the recalc or iteration mode; and access named ranges. The user is not allowed to write, save, or modify the structure of the worksheet file(s). Worksheets that do not have read privileges are displayed as blank worksheets and the worksheet name tab is replaced with **N/A**.

- **Read-Write.** Assign read-write privileges to give the user permission to add, delete, or rename the specified worksheet(s); change the recalc or iteration mode; modify named ranges; change the structure of the specified worksheet(s); and save the

worksheet(s). Worksheet names cannot be edited on worksheets that do not have write permissions.

- **Grant.** Assign grant privileges to allow users to grant their privileges to another user. Users may grant only those privileges that they personally possess.

If no explicit privileges are set for a user at the worksheet level, the privileges default to those of the **[default]** worksheet. If no explicit privileges are set for a user for the **[default]** worksheet, then the owner of the book has read, write, and grant privileges and all other users have read-only privileges.

Worksheet privileges are assigned in the **Book Privileges** dialog box. To display the **Book Privileges** dialog box, select **Sheet/Privileges/ Book Privileges** from the JSBuilder menu.

To assign worksheet privileges:

1. In the **Current Privileges** section of the **Book Privileges** dialog box, select **Sheet Privileges** and click the **Add** button; the **Add Sheet Privileges** dialog box is displayed.

Figure 14-5
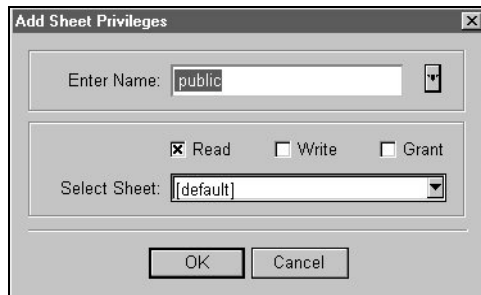
2. To add privileges for a user other than the user displayed in the **Enter Name** field, click the dropdown arrow and select a different user from the dropdown list.

3. When the appropriate user is displayed in the **Enter Name** field, check the desired check boxes to assign the corresponding privileges.

4. To specify a worksheet other than the one displayed in the **Select Sheet** field, click the dropdown arrow and select a different worksheet from the dropdown list.

5. Click **OK**. The user, the worksheet, and the privileges assigned are displayed in the **Current Privileges** section of the **Book Privileges** dialog box.

6. Repeat steps 1 through 5 to add privileges for more users or more worksheets, as needed.

7. Click **Apply** to apply the privileges to the current workbook.

To remove worksheet privileges:

1. Select **Sheet/Privileges/Book Privileges** from the JSBuilder menu to display the **Book Privileges** dialog box.

2. In the **Current Privileges** section, select the user listed in **Sheet Privileges** for which you want to remove privileges and click the **Remove** button.

3. Click **OK** in response to the prompt to remove the worksheet privileges for the selected user.

Setting Cell Range Privileges

Once you assign workbook and worksheet privileges, you can assign privileges at the cell range level.

IMPORTANT: The use of cell linking is discouraged, and therefore, restricted, to prevent a security breach. A link may not be made to another workbook unless that workbook is open and the user entering the link has access privileges to that workbook. A link may not be made to any cell in a worksheet that has non-readable cells.

You can assign three categories of privileges at the cell range level:

- **Read-Only.** Assign read-only privileges to give the user permission to read the specified cell range(s). The user is not allowed to write, save, or modify the structure of the worksheet. Cell ranges that do not have read privileges are displayed as blank cells and ranges.

- **Read-Write.** Assign read-write privileges to give the user permission to add, delete, or rename the specified cell range(s) and save the worksheet. Modifications cannot be made to cell ranges that do not have write privileges.

- **Grant.** Assign grant privileges to allow users to grant their privileges to another user. Users may grant only those privileges that they personally possess.

If no explicit privileges are set for a user at the cell level, the privileges default to those of the worksheet containing the cell.

Cell range privileges are assigned in the **Book Privileges** dialog box. To display the **Book Privileges** dialog box, select **Sheet/Privileges/ Book Privileges** from the JSBuilder menu.

To assign cell range privileges:

1. In the **Current Privileges** section of the **Book Privileges** dialog box, select **Range Privileges** and click the **Add** button; the **Add Range Privileges** dialog box is displayed.

Figure 14-6
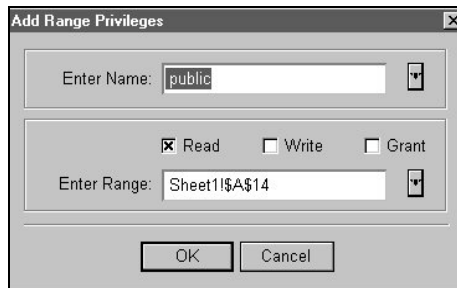
2. To add privileges for a user other than the user displayed in the **Enter Name** field, click the dropdown arrow and select a different user from the dropdown list.

3. When the appropriate user is displayed in the **Enter Name** field, check the desired check boxes to assign the corresponding privileges.

4. The currently selected range is displayed in the **Enter Range** field. To specify a different named range, click the dropdown arrow and select the desired named range from the list.

5. Click **OK**. The user, the worksheet, the cell range, and the privileges assigned are displayed in the **Current Privileges** section of the **Book Privileges** dialog box.

6. Repeat steps 1 through 5 to add privileges for more cell ranges, as needed.

7. Click **Apply** to apply the privileges to the current workbook.

To remove cell range privileges:

1. Select **Sheet/Privileges/Book Privileges** from the JSBuilder menu to display the **Book Privileges** dialog box.

2. In the **Current Privileges** section, select the user listed in **Range Privileges** for which you want to remove privileges and click the **Remove** button.

3. Click **OK** in response to the prompt to remove the cell range privileges for the selected user.

Cloning Privileges

Occasionally, it may be useful to duplicate all of the levels of privileges for an individual user and assign those privileges to a different user. This can be accomplished by cloning the privileges for the user.

To clone user privileges:

1. Select **Sheet/Privileges/Book Privileges** from the JSBuilder menu to display the **Book Privileges** dialog box.

2. In the **Current Privileges** section, select the user (at the appropriate privilege level) for which you want to clone privileges and click the **Clone User** button. The **Clone** dialog box is displayed.

Figure 14-7
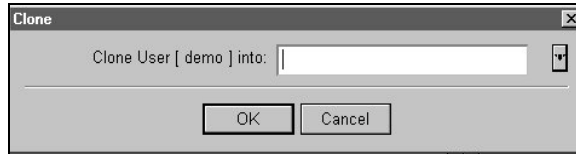
3. Click the dropdown arrow to select the user that is to receive the cloned privileges.

4. Click **OK**. The user and privileges are displayed in the **Current Privileges** section of the **Book Privileges** dialog box.

5. Click **Apply** to apply the privileges to the current workbook.

Saving and Applying Privilege Sets

There may be occasions when it is convenient for you to save a set of privileges assigned to a workbook and apply the saved privileges to a different workbook. JSBuilder enables you to easily save and retrieve privilege sets.

To save a set of privileges to a template:

1. Select **Sheet/Privileges/Book Privileges** from the JSBuilder menu to display the **Book Privileges** dialog box.

2. Click the **Save Set** button to save the privileges specified for the current workbook; the **Save** dialog box is displayed.

3. In the **Save** dialog box, enter the desired name for the set of privileges and click **Save**. The privileges are saved as a template file (*.jtp).

To apply a set of privileges saved in a template:

1. Make the workbook that you want to apply the privilege set to the current workbook.

2. Select **Sheet/Privileges/Book Privileges** from the JSBuilder menu to display the **Book Privileges** dialog box.

3. Click the **Load Set** button; the **Open** dialog box is displayed.

4. In the **Open** dialog box, select the template file that contains the privilege set that you want and click **Open**.

5. The set of privileges is displayed in the **Book Privileges** dialog box.

6. Click **Apply** to apply the privileges from the template file to the current workbook.

Setting Batch Privileges

In addition to using **Sheet/Privileges/Book Privileges** to set or remove workbook, worksheet, or range preferences, you can also set or remove privileges on entire directories of files using the batch privileges features of JSBuilder. When you select **Sheet/Privileges/Batch Privileges**, the **Batch Privileges** dialog box, shown below, is displayed.

Figure 14-8
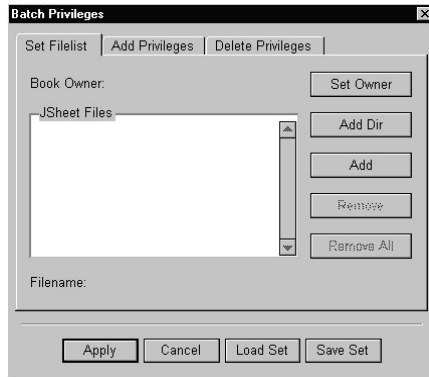
Selecting Directories or Files

The directories or files on which you want to set, remove, or modify privileges are specified on the **Set Filelist** tab of the **Batch Privileges** dialog box.

To set privileges for a directory of JSheet files:

1. On the **Set Filelist** tab of the **Batch Privileges** dialog box, click the **Add Dir** button to select the directory of files to which you want to add privileges. An **Add** dialog box is displayed, an example of which is shown below.

Figure 14-9
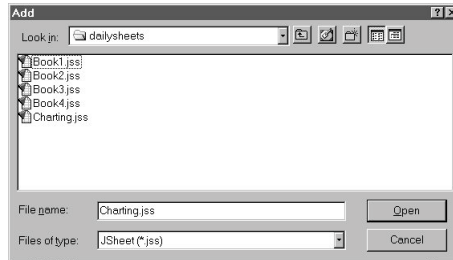
2. Click the **Open** button to add the displayed directory of files. The files are displayed in the **JSheet Files** list box.

Figure 14-10
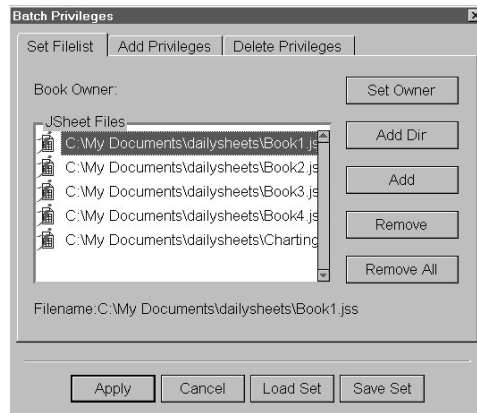
3. Click the **Add Privileges** tab and then click the **Add** button to specify the privileges you want to set. The **Batch – Add Book Privileges** dialog box, shown below, is displayed.

Figure 14-11
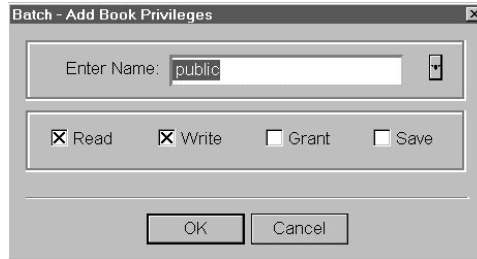
NOTE: If you have privileges defined and saved in a privileges template file, instead of clicking the **Add** button, click the **Load Set** button at the bottom of the **Batch Privileges** dialog box to access those privileges.

4. To set privileges for a user other than the one displayed in the **Enter Name** field, click the dropdown arrow to the right of the **Enter Name** field and select the desired user name from the list. Once the appropriate user name is displayed in the **Enter Name** field, check the corresponding check boxes (**Read, Write, Grant**, and **Save**) to specify the privileges you want to set. When the desired privileges are checked, click **OK**. The privileges and the user name are displayed in the **Privileges To Add** list box on the **Add Privileges** tab of the **Batch Privileges** dialog box, as shown below.

Figure 14-12
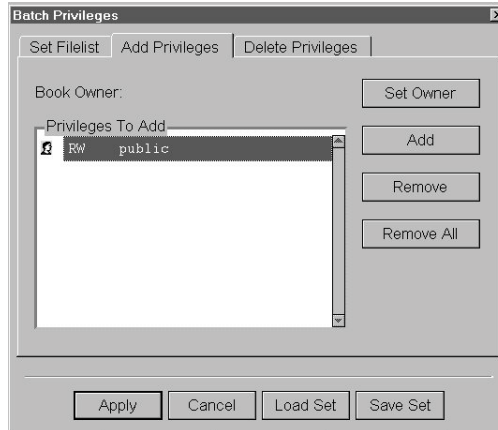
5. To add privileges for a different user, repeat steps 3 and 4. When all of the privileges have been specified for all of the desired users, click the **Apply** button at the bottom of the **Batch Privileges** dialog box to apply the privileges.

Setting the Owner

There may be instances when you need to change the owner of one or more directories or files. This task can be accomplished easily using the **Batch Privileges** dialog box.

To change the owner:

1. On the **Set Filelist** tab of the **Batch Privileges** dialog box, click the **Add Dir** button to select the directory of files for which you want to set the owner. The **Add** dialog box is displayed

2. Click the **Open** button to add the displayed directory of files. The files appear in the **JSheet Files** list box.

3. Click the **Set Owner** button on the **Set Filelist** tab. The **Set Book Owner** dialog box is displayed.

Figure 14-13

4. Click the **Book Owner** dropdown menu to display a list of available users; select the name of the desired owner from the list.

5. Click **OK**. The name of the new owner is displayed in the **Book Owner** field on the **Set Filelist** tab.

6. Click **Apply** to apply the change for the specified directory.

Removing Privileges

You can also use the **Batch Privileges** dialog box to remove privileges from one or more files or directories.

To remove privileges:

1. Select the **Delete Privileges** tab in the **Batch Privileges** dialog box and click the **Add** button to select the privileges you want to delete. The **Batch – Delete Book Privileges** dialog box appears, as shown below.

Figure 14-14
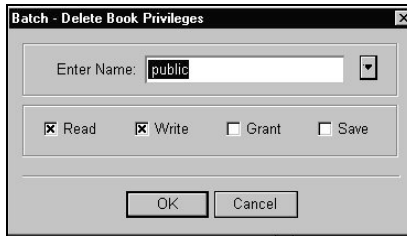
2. To delete privileges for a user other than the one displayed in the **Enter Name** field, click the dropdown arrow to the right of the **Enter Name** field and select the desired user name from the list. Once the user name is displayed in the **Enter Name** field, check the check boxes (**Read, Write, Grant**, and **Save**) to specify the privileges you want to delete. When the desired privileges are checked, click **OK**. The privileges and the user name are displayed in the **Privileges To Delete** list box on the **Delete Privileges** tab of the **Batch Privileges** dialog box.

Figure 14-15
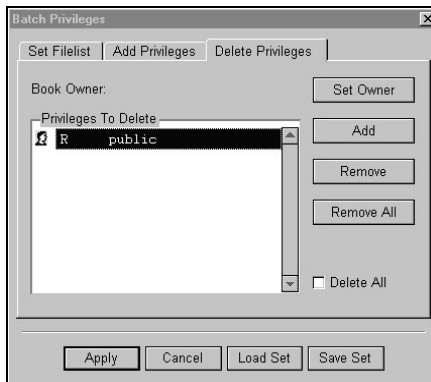
3. Click **Apply** to delete the privileges.

CHAPTER 15: IMPORTING FILES

JSheet Builder can import worksheets created in other applications. JSheet Builder recognizes files saved in Excel '97, Excel 5.0, Excel 2.x, DIF, SYLK, text formats, and files saved from Lotus 123 versions 1a and 2.0. This chapter provides information about converting dates in worksheets imported into JSheet Builder.

In addition, this chapter provides detailed information about importing Excel files. Review this information to ensure that data contained in your Excel files is imported correctly. Refer to *Chapter 2* for information about importing foreign worksheets.

Converting Dates in Imported Worksheets

Various methods are used by spreadsheet applications to represent dates. Because of these differences, dates must be converted when opening foreign worksheets in JSheet Builder to assure that the dates are displayed correctly.

The **DateConv.scz** utility script is provided to facilitate the accurate conversion of foreign files that contain dates.

To convert dates in imported files:

1. Choose **File/Open/Workbook** to display the **Open** dialog box.

2. Select the foreign worksheet to be opened.

3. Click **Open** to open the selected worksheet.

4. Choose **File/Open/Script** to display the Open dialog box again.

5. Select the **DateConv.scz** script.

6. Click the **Action** popup menu and choose **Run**.

7. Click the **Run** button to display a dialog box that enables you to choose the type of date conversion needed for your file.

8. Select the appropriate **File Source**. If the foreign file is a SYLK, WKS, or WK1 file generated by Excel version 1.5 or 2.2x that uses a starting date of 1904, choose **Excel**. If you are importing an Excel version 2.2, 5.0, '97, SYLK, WKS, or WK1 file using the 1900 date option, choose **Lotus**. Custom date formats applied to these files are not converted. Choose **Lotus** if your file is a WKS or WK1 file generated by Lotus 123. Select **Full Impact** if your file is a WKS or WK1 file generated by Full Impact.

9. Click **OK**.

Converting Dates from Formulas and Text Strings

The date conversion script converts only numbers that are formatted as dates. Text strings formatted as dates and dates that are the results of formulas are not converted. Cells that contain these types of dates are flagged to enable you to verify the cell contents.

When the script encounters a cell that contains text that is formatted as a date or a date that is the result of a formula, a new file is created that contains a list of those cells and their contents. You should review the listed cells and their contents to determine if the dates need to be converted manually.

If a date from an Excel or Full Impact worksheet needs to be converted manually, add 1,462 days to the specified date. If a date from a Lotus 123 worksheet needs to be converted manually, add one day if the date is prior to March 1, 1900.

Importing Excel Files

JSheet Builder imports Excel '97, 5.0, and 2.x files. Only sheet files are translated; Excel chart files and Excel macro sheets are not imported.

After importing an Excel file, the contents of the imported file may differ from the source file. Before proceeding, you should review the imported file for elements that must be modified. The following sections describe the items you must verify.

Identifying File Differences

Because of differences between JSheet Builder and Excel files, some features, functions, and formulas need additional translation after

importing. Review each of the following areas to ensure that the imported file produces the desired results:

- Verify whether the source file is password protected.

- Review the formatting of printing options, display options, custom colors, and fonts for variations.

- Review differences in number precision, calculation iteration, and number exponentiation.

- Identify differences created when importing arrays, cell notes, named items, dates, tables, formulas, and databases.

Importing Protected Excel Files

Due to the security imposed by password protection, JSheet Builder cannot import an Excel file when any of the following statements are true:

- The file itself is password protected.

- The file contains cells that are password protected.

- The file contains windows that are password protected.

To import a file that contains any of these protections, the password protection must first be removed in the application used to create the file.

Any Excel file that is window protected without a password is imported as a non-window protected workbook.

Identifying Format Variations

JSheet Builder and Excel files handle standard print options, display options, and custom cell formats differently. The following sections define these exceptions.

Adapting Printing Specifications

Excel files can contain report headers and footers. The header and footer text from the source file is placed in the imported workbook below the imported data. The cells in which the header and footer text is placed are automatically defined as the report header range and the report footer range, respectively.

Excel headers and footers are imported literally. If macro strings are included in the header or footer, the macro string is imported, rather than the result of the string.

For example, the source file may contain the macro string "&F" in the header definition to print the name of the file as the header. The macro string is imported literally and &F is placed in the imported workbook below the imported data. You should replace the macro string with the appropriate header text.

The Excel print area is imported as the named range Print Area. However, you must manually define this range as the report print range.

To define the print range:

      1. Select **File/Page Preview** to display the **Page Preview** dialog box.

      2. Click **Body** to display the **Report Body** dialog box.

3. In the **Contents** section of the dialog box, click the **Print Range** popup menu and choose **Named Range** to display the **Select Range Name** dialog box.

4. Choose **Print_Area**.

5. Click **Select** to dismiss the **Select Range Name** dialog box and to make the **Report Body** dialog box active.

6. Click **OK** to dismiss the **Report Body** dialog box and to make the **Page Preview** dialog box active.

7. Click **Close**.

Other print options defined in the source file are ignored in the imported workbook. Options ignored include gridlines, row and column headings, margins, paper size, and paper orientation. All printer specific options are also ignored. These options must be redefined in JSheet Builder.

JSheet Builder ignores the split windows and frozen titles options in Excel files.

Translating Custom Color Formatting

JSheet Builder and Excel assign custom formatting colors differently. In JSheet Builder, custom formats, positive numbers, zero values, and text entries are assigned a single color. Negative numbers can be assigned a different color, if desired. Excel allows a different color to be assigned to each type of numeric data. An Excel custom format is shown in the following example.

Excel Example

[RED]$#,##;[BLUE]($#,##);[CYAN]GENERAL;[GREEN]GENERAL

JSheet Builder translates the entire custom format, but assigns the color red to all the positive values, zero values, and text entries. Negative values appear in blue. The translated JSheet Builder custom format is provided in the following example.

JSheet Builder Example

"$"#,##;\("$"#,##\);GENERAL; GENERAL

Converting Fonts

If all fonts used in the Excel file are installed in the environment in which you are running JSheet Builder, the imported workbook displays the fonts as they were formatted in the source file. If the Excel file contains fonts not installed in your environment, the default font specified for JSheet Builder is substituted for the unavailable fonts.

A font used in an Excel file can be mapped to a font in your environment using the HyperScript MAP FONT command. When you map a font, you specify an alternative font for displaying and printing the original font.

Tip: The MAP FONT command affects all the workbooks that you open in the current JSheet Builder session. Data in these worksheets retain their original formatting. Only the font used to display and print the mapped font is affected.

A font is mapped in the following example, where Times is the original font in the source worksheet and Palatino is the font used to display all the data in the imported worksheet that is formatted with the Times font.

Example

MAP FONT "Times" TO "Palatino"

Identifying Calculation Differences

Several differences in the methods for calculating formulas and evaluating numbers may create variations in the data of an Excel file when imported into JSheet Builder. The following sections describe these differences.

Using Number Precision in Formula Calculation

The Excel **Precision as Displayed** option has no equivalence in JSheet Builder. When calculating a formula, JSheet Builder ignores the precision defined for cells that contain the data included in the formula. JSheet Builder uses the greatest possible precision provided by the data being calculated.

Calculating Circular References

In Excel files, you can define the maximum number of times a circular reference can be calculated and the maximum amount of change allowed in the circular reference.

JSheet Builder imports the setting for the maximum number of calculations, but does not import the change value. You must manually define the change value for the imported worksheet in the Recalc Options dialog box. In addition, you must specify a test cell for JSheet Builder to monitor when calculating circular references. Refer to *Chapter 7* for information about calculating circular references.

Resolving Differences in Precedence Order

JSheet Builder and Excel files use a different order of precedence when evaluating numbers with exponentiation and negation. JSheet Builder considers exponentiation before negation; Excel files consider these factors in reverse order.

For example, the number **-2^4** is evaluated as **-16** in JSheet Builder and **16** in Excel.

Numbers that include both exponentiation and negation are evaluated using the JSheet Builder order of precedence in the imported worksheet. You should modify these numbers so the correct value is displayed. The example in the previous paragraph should be changed to **(-2)^4**.

Identifying Differences in Worksheet Elements

Some worksheet elements are treated differently in JSheet Builder than in Excel files. As a result, some variations occur when importing Excel arrays, cell notes, names, dates, tables, databases, and formulas. The following sections describe these differences.

Translating Excel Arrays

JSheet Builder does not use the Excel array notation. Therefore, arrays and formulas referencing arrays cannot be directly imported. Any formula containing an array yields an error message. For example, an Excel array formula such as {=A1:A3+B1:B3} translates as ERR{=A1..A3+B1..B3}.

Similarly, any formulas containing array constants cannot be directly imported into JSheet Builder. For example, the Excel formula =SUM({1,2,3}*4) imports as ERR=SUM({1,2,3}*4). This example could be corrected by distributing the array. For example, replace this error with the formula =SUM(1*4+2*4+3*4).

Importing Cell Notes

Excel cell notes are not imported into JSheet Builder. You must manually enter any cell notes in the imported worksheet.

Resolving Range Names

In most cases, named ranges in Excel files are imported into JSheet Builder. However, some range names that are valid in Excel files are invalid in JSheet Builder because they could be confused with a cell reference.

For example, the range name **ABC12** is valid in Excel files. However, in a JSheet Builder workbook, the range name **ABC12** could be confused with a reference to the cell located in column **ABC** and row **12**. Therefore, such a range name is imported as a cell reference rather than as a range name.

In Excel files, you can name constant values and formulas. JSheet Builder does not import these names directly. Any constant value names or formula names are placed in the imported worksheet below the header and footer information. The accompanying value or formula is included with the name.

Because JSheet Builder does not recognize the names of values and formulas, any imported formulas that refer to these names cannot be calculated.

Converting Dates

Refer to the section *Converting Dates in Imported Worksheets* in this appendix for information about converting dates in imported Excel files.

Translating Tables

Most Excel tables import directly into JSheet Builder. However, some exceptions exist. In these cases the table values and formulas are properly imported, but they do not retain the table properties.

- JSheet Builder does not use row-input tables. Therefore, any Excel row-input tables are translated as values and formulas.

- JSheet Builder maintains only one table per worksheet. If your Excel file contains more than one table, the last table retains its table properties. All other tables are translated as values and formulas.

Importing Databases

JSheet Builder translates the Excel data range and criteria range as the named ranges Database and Criteria, respectively. To use these ranges with database functions, define them as database elements in JSheet Builder.

To define the database range:

1. Select the range containing the database.

2. Select the range containing the criteria.

3. Choose **Sheet/Database/Set Database Ranges**. The **Database & Criteria Ranges** dialog box is displayed. The addresses of the ranges are entered in the **Database Range** and **Criteria Range** fields because they are currently selected in your worksheet.

4. Click **OK**.

All JSheet Builder database restrictions apply to databases in imported files. Therefore, you must redefine the database criteria to meet JSheet Builder standards.

Translating Formulas

In addition to the previously discussed limitations on using Excel arrays, names of formulas, and names of constant values in formulas, some other restrictions apply to imported Excel formulas.

- Only valid Excel formulas can be imported. Formulas that contain error messages in the source file are not imported.

- If the Excel formula contains a function for which JSheet Builder does not contain an equivalent, the formula is imported as text.

- If the Excel formula contains a function for which JSheet Builder does not recognize the same number of arguments or the same type of arguments, the formula is not imported. The following Excel functions yield error messages in JSheet Builder.

- Some Excel formulas attempt to evaluate string expressions in a function that normally expects a numeric expression. When these formulas are imported, JSheet Builder either yields an error or assigns the text a zero value. For example, Excel worksheet evaluates DAY("51166") as the number 31. This function anticipates a date argument. However, the Excel worksheet attempts to calculate the function anyway. Because JSheet Builder requires a date argument, this example yields an error in the imported worksheet. To prevent confusion and eliminate unexpected results, verify that Excel formulas use the anticipated arguments before importing the worksheet into JSheet Builder.

- If an Excel formula contains a range operator such as an intersection, a union, or a range operand, the formula yields an error when imported. For example, the Excel formula =SUM((B1:D1) (D1:D3)) is translated as ERR=SUM((B1..D1) (D1..D3)).

Converting Functions

In some cases, Excel formulas translate directly into JSheet Builder. However, the formula may contain a function that yields a different result in JSheet Builder.

In Excel files, the INT() function returns the greatest integer less than or equal to the argument. In JSheet Builder, this function returns the integer portion of any numeric expression. In some cases, these values are different. For example, the formula =INT(-9.5) returns -10 in an Excel file and -9 in JSheet Builder.

Tip: The Excel TRUNC() function produces the same results as the INT() function in JSheet Builder.

JSheet Builder statistical functions count lists of items differently than Excel statistical functions. Excel statistical functions ignore cells containing text. JSheet Builder includes text cells in the count of items and assigns the text cell a value of **0**. However, JSheet Builder does not include blank cells in a count of items. All database functions and statistical functions that count lists of items are affected by this different method of counting cells.

Boolean logic functions such as TRUE() and FALSE() yield the same results in JSheet Builder as in Excel files. However, these results are returned as numbers in JSheet Builder and text in Excel files. The results of the boolean logic functions are shown below.

Example

	Excel	**JSheet Builder**
=TRUE()	TRUE	1
=FALSE()	FALSE	0

This format holds true for all other logical functions (for example, IF(), ISBLANK(), ISERR(), ISNA(), ISNUMBER(), ISRANGE(), and ISSTRING()).

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