Meta5

Data Access Tools User's Guide

Version 4.3

Contents

Notices

References in this publication to Meta5 products, programs, or services do not imply that Meta5 intends to make these available in all countries in which Meta5 operates. Any reference to a Meta5 product, program, or service is not intended to state or imply that only that Meta5 product, program, or service may be used. Subject to Meta5's valid intellectual property or other legally protectable rights, any functionally equivalent product, program, or service may be used instead of the Meta5 product, program, or service. The evaluation and verification of operation in conjunction with other products, except those expressly designated by Meta5, are the responsibility of the user.

Meta5 may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

Meta5, Inc.
122 West Main Street
Babylon, NY 11702
U.S.A.

Licensees of this program who wish to have information about it for the purpose of enabling (1) the exchange of information between independently created programs and other programs (including this one) and (2) the mutual use of the information that has been exchanged, should contact:

Meta5, Inc.
122 West Main Street
Babylon, NY 11702
U.S.A.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

Various components of the Meta5 software system require the presence of one or more third party software products, including but not limited to Microsoft Excel for Meta5's Xlaunch, Xtract software product, Microsoft Word for Meta5's WordTool software product, Microsoft Outlook for Meta5's SendOut software product, Brio's BrioQuery for Meta5's AutoBrio software product, Business Objects' BusinessObjects for Meta5's BOConnect software product and/or IBM's Lotus Notes for SendNts software product. No license is granted by Meta5 to our customers for the use of these third party programs in conjunction with our software products. Furthermore, it is the obligation of our customers to ascertain

whether it has sufficient licenses from these third parties, for the third party software in order to utilize the above mentioned Meta5 software programs.

Trademarks

The following terms are trademarks of Meta5, Inc. in the United States or other countries or both:

Meta5

UNIX is a registered trademark in the United States and other countries licensed exclusively through X/Open Company Limited.

Microsoft, Windows, Windows2000, Windows 98, Windows ME, Windows XP, Windows NT, Excel, Word, Outlook and the Windows 95 logo are trademarks or registered trademarks of Microsoft Corporation.

Brio and Brio Query are registered trademarks of Brio Software Inc.

BusinessObjects is a trademark of Business Objects SA.

Lotus Notes and Lotus 123 are Trademarks of Lotus Software, a subsidiary of IBM Corporation.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Other company, product, and service names, which may be denoted by a double asterisk (**), may be trademarks or service marks of others.

About This Book

This book describes four Meta5 tools for accessing, formatting, and displaying database information. This book provides detailed instructions for using the Browser, Query, Reporter, and SQL Entry tools. The book is divided into four parts, one part for each tool. Each tool is treated independently and can be studied in any order.

Who Should Read This Book

This book is intended for end users who analyze and display data. You should have a basic understanding of the Meta5 user interface, and you should be able to:

- Open and close windows
- Access and use the `Special` menu
- Use Meta5 function keys

If you are unfamiliar with the Meta5 user interface, see *Getting Started with the Meta5 Developer's Desktop*.

You should be familiar with databases in general and the specific databases with which you are working. You may require special access from your database administrator to perform some of the operations described in this book.

This book is also intended for anyone required to perform any of the following functions:

- Select specific data from a database
- Analyze data for relationships and trends
- Perform calculations using mathematical and relational operators
- Arrange, format, and display data in flexible and informative ways
- Create professional reports with charts, graphs, and text

The Capsule tool is referred to often. This tool allows you to set up and process a sequence of operations. In a capsule application, the output of one Meta5 tool is used as the input to the next Meta5 tool. In this way, a complex sequence of data analysis and display can be run repeatedly. An understanding of the Capsule tool is not required for learning the tools in this book. For more information on using the Capsule tool, see the *Capsule User's Guide*.

We'd Like Your Comments

Your feedback is important to us in providing you with the most accurate and high-quality information. If you have any comments about this book or any other Meta5 documentation, please visit our Website at:

```
http://www.meta5.com
```

There you'll find the feedback page where you can enter comments and send them to us.

Chapter 1.   The Browser Tool

The Browser tool is used by people who need to quickly and easily browse through items in a database. This tool is designed to let users examine different tables and columns, and set up relationships and criteria that can then be transferred into other Meta5 tools to carry out more detailed queries and reports.

The Browser tool retrieves, organizes, and displays columns of data from specified tables. The Browser tool lets you select items from a database by constraining columns, and then displays only the items that meet the criteria you specify.

The Browser tool can be used for various purposes, for example:

- As a stand-alone tool that quickly displays data from a database
- As an interface tool with which to set constraints on database items, view the result, and transfer the desired constraints into other Meta5 tools

The Browser Icon

The Browser Icon is your access to the Browser tool. Your database administrator might configure or define Browser icons and make them available for your use. These preconfigured icons are generally available in a public file drawer.

You can also copy a new Browser icon to your desktop from the *Blank Icons file drawer and configure it to correspond to a specific database category yourself. If you cannot find a blank Browser icon, ask your system administrator for assistance.

Preconfigured Browser icons typically have a name that describes their subject matter. Blank Browser icons are named Browser until you rename them.

The Browser Windows

The Browser tool operates mainly in three windows:

- The Main Browser window
- The Browser Controls window
- The Category window

Each window is described in Table 1 on page 2.

Table 1. Browser windows

Name	Description
Main Browser window	This window shows data from the database category and lets you constrain selections, making the displayed data more specific. The name you have assigned the icon is displayed in the window header, or, if you have not renamed it, the name Browser is displayed.
Category window	This window displays all the tables and joins in the database category to which the Browser icon is configured. The name in the window header is the name of the database category.
Browser Controls window	You use this window as a set-up or work area when building a Browser icon. The tables you copy into this window from the category window are displayed in the main Browser window when you request data from the database.

Related Tools

You can use other Meta5 tools to retrieve, organize, and display data from a database. The Browser tool is designed to provide a high-level interface for your database, but not to supply detailed online reports. If you want to display or print dimension data and fact data from your database, you should consider using the Query tool or the Reporter tool.

Chapter 2.   Using a Browser Icon

This chapter explains how you can use a Browser icon that has already been configured (set up to retrieve data from a specific database) and defined (set up to display certain data in a certain way). First, you will see how a typical main Browser window looks when you first open it. Then, you will learn ways to adjust and enhance the tool so that you can browse the data you want from a database category. These sections are included in this chapter:

- "When You Open a Browser Icon"
- "Constraining Data in a Browser" on page 5
- "Adding Tables and Columns to a Browser Icon" on page 11
- "Using the Get New Data Button and the Apply Button" on page 14
- "Copying Browser Data to Other Tools" on page 15
- "Canceling Changes in a Browser" on page 18
- "Stopping Data Retrieval" on page 18

When You Open a Browser Icon

A Browser icon must be configured and defined before you open it for the first time. If not, it is displayed as shown in Figure 1:
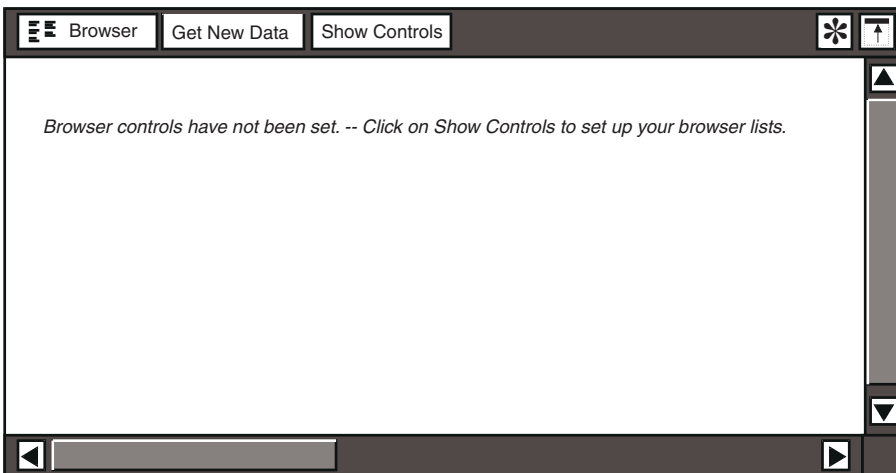
Figure 1. An unconfigured Browser icon

If the Browser Is Not Configured

The icon must be configured before it can be defined or used.

If the browser is not configured as explained in "Chapter 3. Configuring and Defining a Browser Icon," on page 21, and you click on the `Show Controls` button, no other windows open, and the following message is displayed:

```
Cannot find the Database Server Name. -- Open the Options window
and select
Other Data.
```

If the Browser Is Not Defined

The browser must be defined before data can be displayed in the main Browser window. If the Browser icon has been configured but not defined, and you click on the `Show Controls` button, the Browser Controls window and the category window open. Instructions for defining a Browser icon can be found in "Choosing Data from the Category Window" on page 26.

If the Browser Is Configured and Defined

When you open a Browser icon that is configured and defined, it looks like the window shown in Figure 2.

The browser window shows:

Sales Records | Get New Data | Show Control

Display Product Information | Territory Information

Product Description =	Brand Description =	PRODUCT ID =
A1 Deodorant	A1 Deodorant	1105
A1 Deodorant 12 oz	A1 Hair Coloring	1106
A1 Deodorant 20 oz	A1 Shaving Cream	1110
A1 Deodorant 36 oz	A1 Skin Cream	1301
A1 HC Natural Blond	A1 Soap	1302
A1 HC Natural Brunette	Deluxe Deodorant	1310
A1 HC Natural Grey	Deluxe Hair Coloring	1350
A1 HC Natural Redhead	Deluxe Soap	1401
A1 HC New Life		1403
A1 HC Root Beautiful		1410
A1 HC Streak		1605

This browser shows two tables (on two separate pages).

This page of the browser shows columns from the Product Information table.

Each column shows all of its items unless it has been constrained.

Use the scroll bars to see more items or more columns.

Figure 2. Main Browser window of a Browser icon that is configured and defined

To narrow down the browser display to the data you want, you might need to do one of the following tasks:

- Constrain data by using the current operator or by selecting a new operator
- Add a table or a column
- Delete a table or a column

Constraining Data in a Browser

Constraining data lets you specify the type and range of data that is displayed in a Browser window. For example, suppose your Browser icon lists all of your company's products, their brand descriptions, and their product identification numbers. You want to know the ID number of a particular product that belongs to the A1 Deodorant brand, but you cannot remember the product's packaging size.

When you constrain data in a column, any remaining columns in the main Browser window are affected. For example, if you constrain the Brand Description column to *A1 Deodorant*, only data associated with deodorants is displayed in the main Browser window. You can now review the list of deodorant sizes until you find the one you want.

Constraining data changes the information displayed in the main Browser window temporarily. You can reset any constraint and display other specific information.

There are three methods for constraining data in the main Browser window. The first two methods default to the current operator, and the third method allows you to select an operator. You constrain data by:

- Double-clicking on an item in a column, described in "Setting Constraints with the Current Operator"

- Selecting one or more items, then selecting the column heading, described in "Constraining to More Than One Item at a Time" on page 7

- Selecting an item or items in a column, then selecting an operator from the `Constraint Operator Button` menu, described in "Setting Constraints by Selecting an Operator" on page 8

There is a fourth method for constraining data, but usually it is done by the person who defines the Browser icon. If, while using a particular Browser icon, you find that you always apply the same constraint, you might want to hard code the constraint into the browser. This is done using the browser controls, and the procedure is explained in "Constraining a Column in the Table Options Window" on page 41.

Setting Constraints with the Current Operator

The current constraint operator for a column is displayed in the small square on the right side of the column heading.

To constrain a column using the current constraint operator:

1. Select a data value in a column. For example, to constrain the Product Description column to A1 Deodorant 20 oz, select the *A1 Deodorant 20 oz* value in the Product Description column.

2. Select the item again, or select the column heading (Product Description). The column collapses to display only the selected item, as shown in Figure 3.
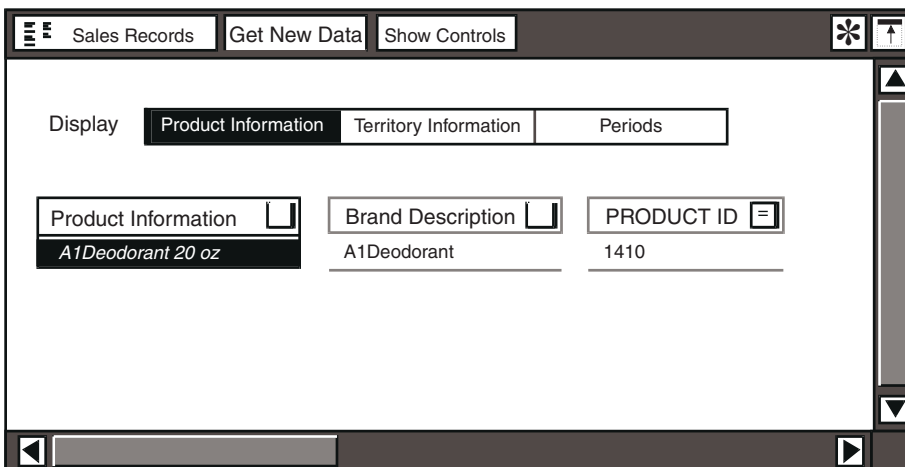
Figure 3. A column constrained to one item

When you constrain a column to an item:

- The border around the constrained column changes to a bold line, indicating that the column has been constrained to the displayed data value.
- All the text inside the border is displayed in bold.
- The constrained element is displayed in bold and italic.

When you double-click on a data value in a column, the other columns collapse to display only values that satisfy the constraint. You can easily manipulate large columns by constraining them to produce fewer matches.

To display all the column data again, select the constrained data value or the column heading.

Constraining to More Than One Item at a Time

You can constrain a column to two items at the same time, or to a range of items.

To constrain the list to two column items that might be separated by other items in the list:

1. Select the first item you want.
2. Move the pointer to your second choice.
3. Click mouse button 2.
4. Click on the column heading.

Figure 4 on page 7 shows two separate items that have been selected and the constrained list.
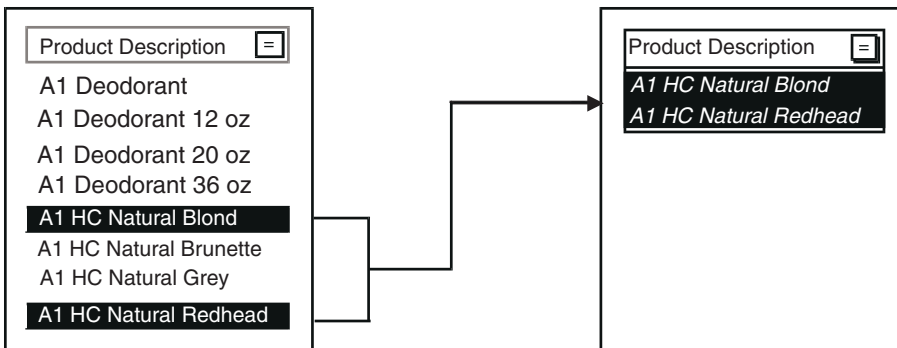
Figure 4. A column constrained to two separate items

To constrain the list to a range of items, that is, to several column items that are together in the list:

1. Select the first item you want.
2. Point to your second choice.

3. Press and hold mouse button 2 while moving through the list to your last choice.

4. Release mouse button 2.

5. Click on the column heading.

Figure 5 on page 8 shows a selected range and the constrained list.
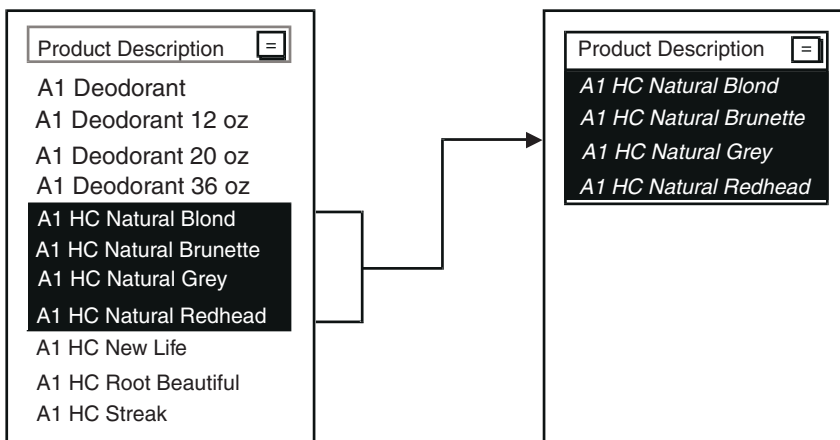
Figure 5. A column constrained to a range of items

Another way to select a range of items is to use the `Between` or `Not Between` operator, as explained in "Setting Constraints by Selecting an Operator" on page 8.

Setting Constraints by Selecting an Operator

To constrain a column by using an operator:

1. Select an item in a column.

2. Select the `Constraint Operator` button in the column heading. The `Constraint Operator Button` menu is displayed as shown in Figure 6.

Product Description ⊟	Brand Description ⊟	PRODUCT ID ⊟
A1 Deodorant	**A1 Deodorant**	= Equal
A1 Deodorant 12 oz	A1 Hair Coloring	≠ Not Equal
A1 Deodorant 20 oz	A1 Shaving Cream	< Less Than
A1 Deodorant 36 oz	A1 Skin Cream	≤ Less Than Or Equal
A1 HC Natural Blond	A1 Soap	> Greater Than
A1 HC Natural Brunette	Delux Deodorant	≥ Greater Than Or Equal
A1 HC Natural Grey	Delux Hair Coloring	.. Between
A1 HC Natural Redhead	Delux Soap	<> Not Between
A1 New Life		1403
A1 HC Root Beautiful		1410
A1 HC Streak		1605

Figure 6. Constraint Operator menu

3. Select an operator in the `Constraint Operator Button` menu. The operator you selected is displayed in the `Constraint Operator` button, and the column is constrained to your selection.

You can change a constraint without first redisplaying all data in a column.

For example, suppose you want to know the product ID numbers of all the products that are not included in the brand description *A1 Deodorant*. To display the numbers, you select that item, select the `Constraint Operator` button for that column, and then select `Not Equal` in the menu.

The main Browser window is displayed as shown in Figure 7 on page 10. Note the sign in the Brand Description column's `Constraint Operator` button.
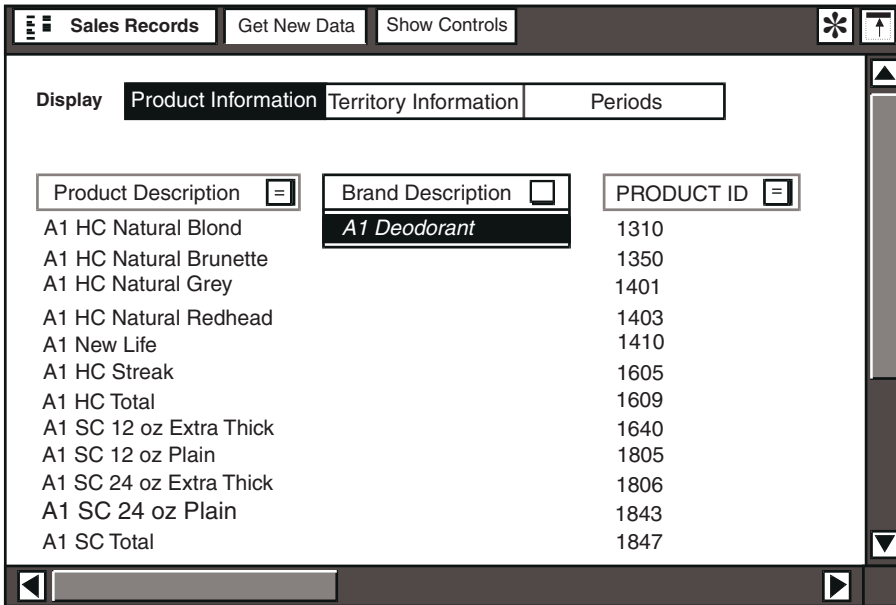
Figure 7. A column constrained by an operator

If you select a `Constraint Operator` button and the menu shows only two choices, it means the sorting order of that column is defined to follow the sorting order of another column. More information about column sorting can be found in "Ordering Column Contents" on page 31.

In Figure 7 on page 10, you see that:

- The Brand Description column displays only the item you selected.
- The Product Description column displays all items except the product descriptions corresponding to the brand description *A1 Deodorant*.
- The PRODUCT ID column displays product numbers for all items that are still displayed in the Product Description column.

Selecting an operator gives you a wide range of choices for constraining data. You can further refine your data by constraining the rest of the columns.

Some operators allow you to select more than one column item:

- For the `Equal` and `Not equal` operators, you can select two or more values.
- For the `Between` and `Not Between` operators, you select two column items. For the remaining operators, you select only one column item.

All of the operators work on columns of all data types. For example, if you go to the Product Description column and select the `Less Than` operator and the item *A1 HC Total*, the Browser Tool displays all the items that come before *A1 HC Total* in the column.

The Browser tool displays values inclusively. Table 2 provides examples to help explain this feature.

Table 2. Displaying values inclusively

If you select this:	Browser displays this:
The **Between** operator and two column items	Values for the two column items you selected, plus values for all items that lie between them
The **Not Between** operator and two column items	Values for all column items except the two you selected and those that lie between them

Adding Tables and Columns to a Browser Icon

You can increase the amount or type of data in an existing Browser icon by adding new tables and columns in the Browser Controls window.

This section provides the basic steps for adding tables and columns. For more details, see:

- "Choosing Data from the Category Window" on page 26
- "Specifying Column Options" on page 29
- "Creating Column Groups (Joining Tables)" on page 35

To add new tables and columns:

1. Select `Show Controls` in the main Browser window header. The Browser Controls window opens.
2. Select the Browser Controls window header. The category window opens as shown in Figure 8 on page 12. In this example, the Sales Records browser is browsing the Sales Tracking category of the database.
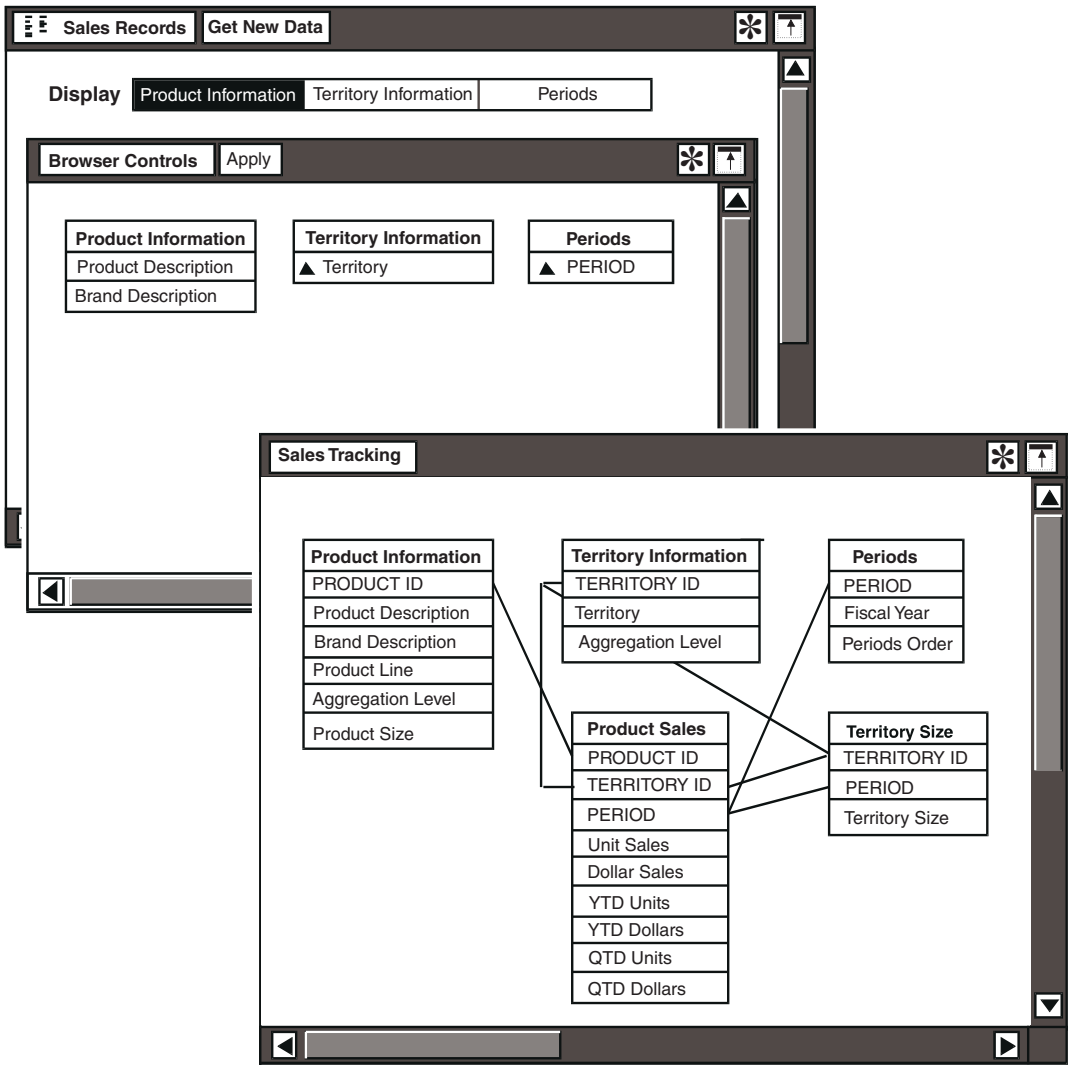
Figure 8. Category window of Sales Tracking category

3. Select the tables or columns in the category window that contain the information you want to add to your Browser icon.

For example, suppose that in the Product Information page of your current main Browser window, only the Product Description and Brand Description columns are displayed, and you want to add the PRODUCT ID column. To do this, you must add the PRODUCT ID column to the Browser Controls window. Begin by going to the category window and selecting the PRODUCT ID column from the Product Information table.

4. Copy the PRODUCT ID column into the Product Information table in the Browser Controls window. In this case, the Product Information table is displayed as in Figure 9:

Product Information
▲ Product Description
▲ Brand Description
▲ PRODUCT ID

Territory Information
▲ Territiroy

Periods
▲ PERIOD

Figure 9. Product Information table

You can copy the new column to any position in the table. Its position in the Browser Controls window determines its position in the main Browser window.

When you modify the contents of the Browser Controls window, the existing data in the main Browser window is replaced with a message instructing you to get new data.

5. Before you retrieve new data, you should set any column options that are necessary. (For example, you might want a column to be hidden, or to be sorted in the same order as another column, or to show items as a particular data type.) For more information on setting column options, see "Specifying Column Options" on page 29.

   a. Select the new column you have added in the Browser Controls window.

   b. Open the Column Options window and specify how the information for that column should be displayed. Close the Column Options window and the Browser Controls window, select the column and either use the pop-up function pad (press both mouse buttons at the same time) or press the Options function key.

6. Click on `Get New Data` in the main Browser window header. The new data is added to your browser. In this example, the main Browser window opens, shown in Figure 10:
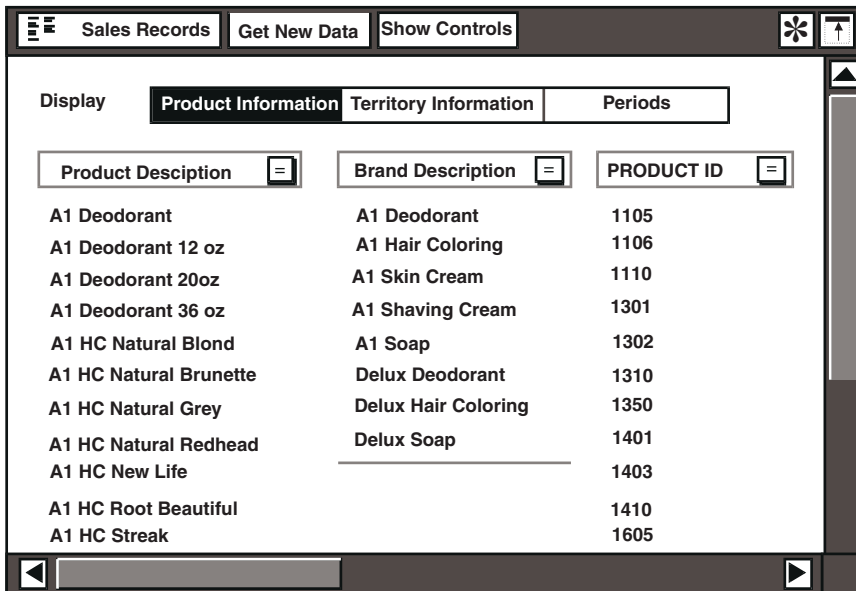
Figure 10. The main Browser window

When the database is updated, you should click on `Get New Data` in the main Browser window header to ensure that your Browser icon contains the latest information from the database. Depending upon the size of your Browser icon, updating the data can take several minutes. Your database administrator can tell you how often the database is updated.

Using the Get New Data Button and the Apply Button

There is no difference between the data you retrieve by clicking on `Get New Data` in the main Browser window or by clicking on `Apply` in the Browser Controls window. These two buttons are placed in both windows for your convenience in different situations.

- When you open a browser that is defined, the data you see is any data that was retrieved the last time the browser was open. New data is not automatically retrieved when you open a browser; you must click on the `Get New Data` button.

  You do not have to make any changes in the Browser Controls window before clicking on `Get New Data`.

- When the Browser Controls window is open, you can get new data by clicking on `Apply` in that window or by clicking on `Get New Data` in the main Browser window. An even more convenient way to get new data, if you are finished making your changes, is to close the Browser Controls window.

Copying Browser Data to Other Tools

If you are working with the Meta5 Query, Reporter, Text, Envelope, or Spreadsheet tools, you do not have to spend time recreating work you have done in a Browser icon. Instead, you can copy data from the main Browser window into other tool windows on your desktop. For example:

- You can set up and narrow your reporting criteria in a Browser icon, and then copy the column data into the constraint window of a Query icon or a Reporter icon, thereby setting up your query or report.

- You can copy Browser column data into a Text or Envelope window, or into a Spreadsheet cell.

Copying Data to a Reporter or Query Icon

If you want to use data from your Browser icon to constrain an options window in a Reporter or Query icon, open both the Browser icon and the destination icon and follow these steps:

1. Select the column data that you want to transfer. For example, you could select several items from a column in the main Browser window, as shown in Figure 11.

🖥 Sales Records	Get New Data	Show Controls	✳ ⬆

Display	**Product Information**	Territory Information	Periods

Product Desciption =	Brand Description =	PRODUCT ID =
A1 Deodorant	A1 Deodorant	1105
A1 Deodorant 12 oz	A1 Hair Coloring	1106
A1 Deodorant 20oz	A1 Skin Cream	1110
A1 Deodorant 36 oz	A1 Shaving Cream	1301
A1 HC Natural Blond	A1 Soap	1302
A1 HC Natural Brunette	Delux Deodorant	1310
A1 HC Natural Grey	Delux Hair Coloring	1350
A1 HC Natural Redhead	Delux Soap	1401
A1 HC New Life		1403
A1 HC Root Beautiful		1410
A1 HC Streak		1605

Figure 11. Column items selected for transfer

2. Copy the data inside the blank constraint field in the options window of the destination icon.

For example, if you copy the data from this example into a Reporter icon, you use the `Value` field of the Heading Options window. The data is displayed, as shown in Figure 12 on page 16.

Heading Options	Apply	Cancel	Reset	⬆

Display | Constraint | Format | Special Cases |

Database Name edu_sl_prod.proddesc   Product Description
Type/Description Text String/

Label [Deodorant Products]

Operators

=	Not=	<	>	<=	>=
Between	Not Between	Like	Not Like	Null	Not Null

Source | Value Field | Text con |

Value
```
A1 Deodorant, A1 Deodorant 12 oz, A1 Deodorant 20 oz,
A1 Deodorant 36 oz
```

(Show All Choices)
(Show Constrained Choices)

Display Order of Heading Values | Alphabetic | Constraint List |

Figure 12. Data copied into the Constraint page of a Reporter's Heading Options window

The data is displayed as a single line of text in the `Value` field. List separators (commas and spaces) are automatically inserted between items.

If you copy more than one group of items into the same Reporter or Query field, you must manually insert a comma and a space between groups of items.

For more information about the Query tool, see Part 2, "Query User's Guide," on page 55. For more information about the Reporter tool, see Part 3, "Reporter User's Guide," on page 145.

Copying Data to a Text or Envelope Icon

If you want to copy Browser data to a Text or Envelope icon, open both the Browser icon and the other icon and follow these steps:

1. Select the column data from the main Browser window.

2. Copy the data inside the Envelope window.

   If you copy the data from the current example into a Text icon, the Text window is displayed as shown in Figure 13 on page 17.
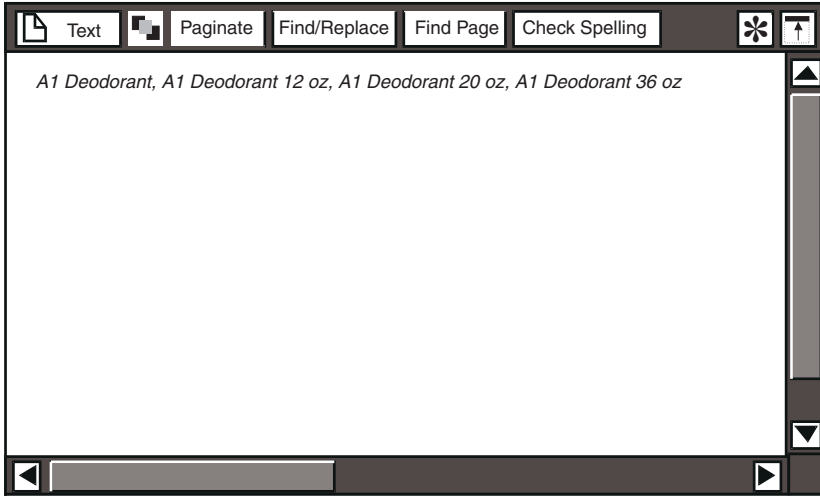
Figure 13. Data copied from a browser to a Text window

The data is displayed as a single line of text in the Text window. The Browser tool inserts list separators.

For more information on using the Text tool, see the *Text User's Guide*. For details on using the Envelope tool, see *Getting Started with the Meta5 Developer's Desktop*.

Copying Data to a Spreadsheet Icon

To copy Browser column data to a Spreadsheet icon, open both the Browser icon and the Spreadsheet icon and follow these steps:

1. Select the spreadsheet cell into which you want to copy an item from a column. Open the Spreadsheet Options window. It opens as shown in Figure 14 on page 18.

2. Select the column data from the main Browser window.

3. Copy the data inside the `Entry` field of the Spreadsheet Options window. If you copy the data from the current example, the `Entry` field is displayed as shown in Figure 14 on page 18.

4. Select the appropriate data type for your entry. In this example, the data copied in from the Browser tool are several column items that are automatically separated by commas and spaces, and the data type is text.

You can also copy into the Spreadsheet icon's `Entry` field:

- A single date, and select `Date` in the `Type` field
- A single number, and select `Number` in the `Type` field
- Any appropriate column data, and use it to construct a valid formula
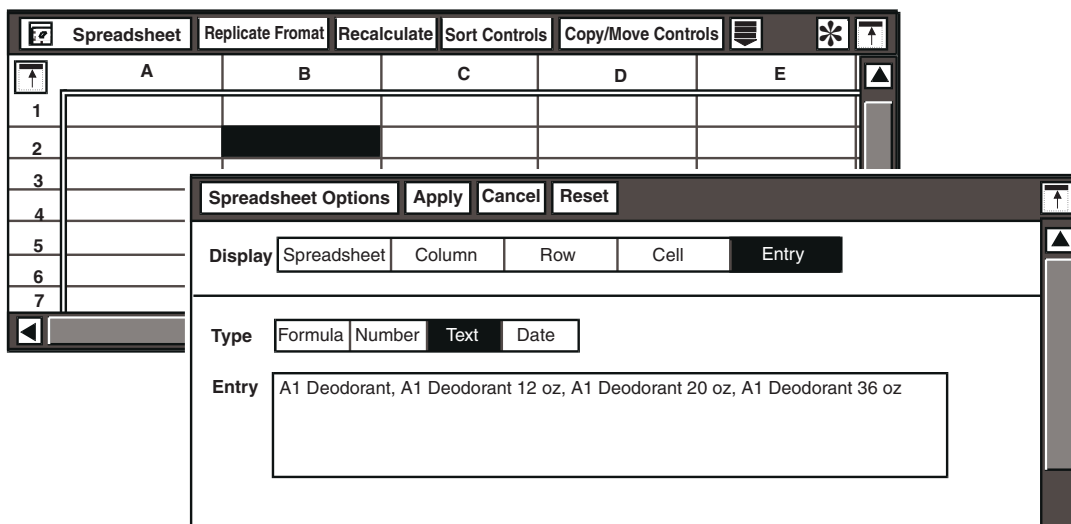
Figure 14. Selected Spreadsheet cell and Spreadsheet Options window

See the *Spreadsheet User's Guide* for details on using the Spreadsheet tool.

Canceling Changes in a Browser

You can cancel any changes you made in the main Browser window and in the Browser Controls window. To do this, open the `Special` menu of the main Browser window header and click on `Cancel Changes`.

The Browser tool automatically cancels all changes that you made while the icon was open on your desktop, and the icon closes.

The Column Options window has a different purpose. For details, see "Chapter 3. Configuring and Defining a Browser Icon," on page 21.

Stopping Data Retrieval

If you decide that you want to make more changes in a Browser icon after you have started retrieving data, or if you decide that you do not want to retrieve new

data after the process has started, you can stop the data-retrieval process by pressing the Stop function key.

Sometimes, the system stops data retrieval automatically.

For details on handling any of these cases, see "Stopping Data Retrieval" on page 42.

Chapter 3.   Configuring and Defining a Browser Icon

Before a Browser icon can be used, it must be configured to a specific database category, and then defined in relation to specific tables and columns in the database. You should read this chapter if you are responsible for setting up browsers for others or yourself to use. If you want to know how to use a browser that has already been set up for you, see "Chapter 2. Using a Browser Icon," on page 3.

The first part of this chapter describes the configuration process:

- • "Naming and Configuring a Browser Icon"
- • "Securing Your Icon" on page 25
- • "Features of the Main Browser Window" on page 25

The second part of the chapter describes how to define the Browser icon so that it can retrieve the data you want in the right order and format. The following topics are covered:

- • "Choosing Data from the Category Window" on page 26
- • "Specifying Column Options" on page 29
- • "Creating Column Groups (Joining Tables)" on page 35
- • "Constraining a Column in the Table Options Window" on page 41
- • "Displaying Column Data in the Main Browser Window" on page 42
- • "Stopping Data Retrieval" on page 42

Naming and Configuring a Browser Icon

Use the Icon Options window to name and configure Browser icons, and to specify the database from which you want data.

You name a Browser icon the same way you name any other icon:

1. Select the Browser icon.
2. Open the Icon Options window. The `Display` field near the top of the window provides a choice of two pages: Name and Size, or Other Data. The Name and Size page is displayed by default.
3. Unless you want your Browser to retain the existing name, delete the text in the `Database Name` field and type a new name.

To configure a Browser icon for database access:

1. Select the Icon Options window. The Other Data page opens, shown in Figure 15 on page 22.

2. Using the information provided in Table 3 on page 22, type values in the fields that are shown in Figure 15 on page 22. The database you are using might be sensitive to the use of uppercase and lowercase characters, so enter your data accordingly.

   Entering information into these fields configures a Browser icon to a specific category in a physical database on a specific database service.

Icon Options	**Apply**	Cancel	Reset		
Display	Name and Size	Other Data			
Gateway	mydbs:HQ				
Database Name	information				
Category	personnel				
WTDD Owner					
SQL ID					
Database Logon	**Specified Here**	From Data Access Controls			
Secured	**No** Yes				
User Name	operator				
Password					

Figure 15. Other Data page of the Icon Options window

3. When you finish entering information, close the window.

Table 3 describes the fields in the Icon Options window. Several of these fields either are optional or might not apply to a particular installation. Your system administrator can tell you which fields are used in your installation.

Table 3. Icon Options window fields

Field	Type of input	Required / Optional
Gateway	Type the name of the database gateway to which you want your data access icon to have access. If the service is on a different realm from the one you are on, immediately follow the gateway name with a colon and then the realm name. For example: `mydbs:HQ`	Required

Table 3. Icon Options window fields

Field	Type of input	Required / Optional
Database Name	Type the name of the database that contains the category needed for this data access icon.	Required
	If your server stores more than one physical database, you must identify the database to which you want access. It is unnecessary to supply a database name if only one physical database exists, or if you want access to a default database.	
	For DB2 for MVS databases, type the name of the DB2 subsystem you want to access. For DB2 for VM databases, type the name of the virtual machine running DB2 for VM. For AS/400 databases, you do not need to enter anything in this field, because the AS/400 is a single-database system.	
	To connect to a supported remote IBM database using Distributed Relational Database Architecture (DRDA), immediately follow the local database name with a period and then the name of the server through which the connection is being made. For example: `DSN.TD1`	
	To connect to a remote SYBASE or Red Brick database, immediately follow the SQL Server name with a vertical bar and then the name of the database you want to access. For example: `SYBSERVER2|SYBPROD`.	
	To connect to a remote ORACLE database, specify the full database name or its alias. For the full database name, specify the standard single-character prefix used for the remote connection (such as T for TCP/IP), followed by a colon, the name of the target host followed by another colon, and finally the system ID (SID) of the target ORACLE database. For example: `T:host1:DBS`	
	If you have questions about the database name, consult you database administrator.	
Category	Type the print name or the internal name of the database category needed for this data access icon. The name you enter is displayed in the window header of the category window.	Required
WTDD Owner	If the icon is configured for access to a database that supports multiple WTDDs and qualified table names, type the name of the owner of the WTDD tables. If you enter a value in this field, you do not have to drop and recreate synonyms whenever you want to access a different WTDD within the same database.	Might not apply in your installation

Table 3. Icon Options window fields

Field	Type of input	Required / Optional
SQL ID	If you are using DB2, type the table qualifier name. The ID entered in this field overrides the default table qualifier name, which is the name entered in the `User Name` field. If you have questions about the table qualifier name, consult your database administrator.	Might not apply in your installation
Database Logon	Select `Specified Here` if you want database access to be based on information you type in the `User Name` and `Password` fields. Select `From Data Access Controls` if you want access to be based on information in the desktop's Data Access Controls window. If you have questions about security, consult your database administrator.	Optional. The default value is `Specified Here.`
Secured	Select `Yes` to set the icon's `User Name` field to the user ID of the desktop on which the icon resides. This is an irreversible operation. Before you select `Yes`, see "Securing Your Icon" for important information.	Optional. The default value is `No.`
User Name	Type a valid user ID. This might be the same as your desktop user ID, depending on how your database security is set up. When the data access icon connects to the RDBMS, this is the user ID sent to the RDBMS. If you are using the DB2 for OS/2 DRDA gateway to connect to a DRDA server, and your DB2 for OS/2 user ID is different from your DRDA server user ID, you must specify both user IDs separated by a period. For example: `DB2 for OS/2_userid.DRDAID`	Required
Password	Type the database user's password. This password might be the same as your desktop password, depending on how your database security is set up. For security, the password is never displayed. If you are using the DB2 for OS/2 DRDA gateway to connect to a DRDA server, and your DB2 for OS/2 password is different from your DRDA server password, you must specify both passwords separated by a period. For example: `DB2 for OS/2_password.DRDA_password`	Required

Securing Your Icon

Suppose you have created a Browser icon and you want to prevent unauthorized users from opening it on their own desktops. You can use the `Secured` field to restrict access to the icon, so that only users with specified database privileges can open and use it.

When you secure a Browser icon, the user ID of the desktop where the icon resides becomes the `User Name`. When a secured icon is mailed, the User Name changes to the user ID of the recipient. The icon cannot be opened or used by the recipient unless his or her desktop name has the appropriate privileges for the database.

You cannot change the `User Name` field of a secured icon. Also, you cannot unsecure a secured icon.

If you receive a secured icon from another user and the database does not recognize your user ID, you will not be able to open the icon.

Attention:
> Securing an icon is an irreversible operation. Before you secure an icon that you plan to distribute to other users, check with your database administrator to make sure that the other users' desktop names are authorized to use the database you have specified.

The preferred way to secure a Browser icon is to configure it to read the user ID and password setting from the desktop's Data Access Controls window. This window is accessible from the `Special` button in the lower right corner of your developer's desktop. See *Getting Started with the Meta5 Developer's Desktop* for details on how to use the Data Access Controls window, or consult your system administrator.

Features of the Main Browser Window

When you open a new Browser icon, the main Browser window is displayed.

A message is displayed in the Browser window informing you that the icon is currently empty of data, and asking you to click on the `Show Controls` button. See "Choosing Data from the Category Window" for information about using that button.

The buttons in the Browser window header are described in Table 4.

Table 4. Main Browser window header buttons

Button Name	Function
Get New Data	Lets you retrieve data corresponding to the tables and columns specified in this Browser icon.

Table 4. Main Browser window header buttons

Button Name	Function
Show Controls	Opens the Browser Controls window, where you specify which database tables and columns you want to display in the main Browser window.
Special (indicated by an asterisk)	Displays a menu offering an option which cancels any changes you have made in your Browser icon since you last closed it. This button is not the same as the button in the lower right corner of your developer's desktop.

Choosing Data from the Category Window

To define a Browser icon, you must first select tables from the database. (The particular database with which you are working was specified when the icon was configured. For details on configuring Browser icons, see "Naming and Configuring a Browser Icon" on page 21.)

To select tables:

1. Open a Browser icon. The main Browser window opens.

    • If this Browser icon is defined, and you are opening it to view or modify the contents, only the main Browser window opens. In this case, you need to perform step 2.

    • If this Browser icon is being opened for the first time, the two windows described in the following two steps (the Category window and the Browser Controls window) open, and you can skip steps 2 and 3.

2. Select `Show Controls` in the main Browser window header. The Browser Controls window opens.

3. Select the Browser Controls window. The Category window opens. There are now three windows open on your desktop, as shown in Figure 16 on page 27.

    The Category window name is named for the database category specified when the icon was initially configured. In this example, the category window name is Sales Tracking.

Sales Records | Get New Data | Show Controls | ✳ | ⬆

▲
Browser controls have not been set. --Click on Show Controls to set up your browse lists ▓

Sales Tracking | ✳ | ⬆

▲

| Product Information |
| PRODUCT ID |
| Product Description |
| Brand Description |
| Product Line |
| Aggregation level |
| Product Size |

| Territory Information |
| TERRITORY ID |
| Territory |
| Aggregation level |

| Periods |
| PERIOD |
| Fiscal Year |
| Period Order |

Table

| **Product Sales** |
| PRODUCT ID |
| TERRITORY ID |
| PERIOD |
| Unit Sales |
| Dollar Sales |
| YTD Units |
| YTD Dollars |
| QTD Units |
| QTD Dollars |

| **Territory Size** |
| TERRITORY ID |
| PERIOD |
| Territory Size |

Columns

main Browser window

Category window

Browser Controls window

Browser Controls | Apply | ✳ | ⬆

▲
Browser controls have not been set. --Click on Show Category and copy table(s) here

Figure 16. Main Browser window, category window, and Browser Controls window

This example shows a new Browser icon that is configured but not defined (the Browser Controls window has not been set up yet). Therefore, the category window and the Browser Controls window open automatically when you open the main Browser window, and the main Browser window contains no data.

4. From the Category window, select the tables that contain data you want to include in your Browser icon. For example, suppose you want to define a Browser icon that displays data about products sold, specific territories, and specific periods. In this example, first select the Product Information table.

5. Copy the table into the Browser Controls window.

6. Repeat steps 4 and 5 to copy other tables into the Browser Controls window. In this example, copy the Territory information and Periods tables into the Browser Controls window.

   Be careful which tables you copy. A finished Browser icon displays a row or data element for each value in each column of the table you select. For a faster response, you might want to avoid tables with very long columns in them, especially columns containing facts or measures (for example, the Unit Sales column from the Product Sales table shown in Figure 16 on page 27). For more information, see "Modifying Column Length" on page 30 and "Avoiding Problems with Long Columns" on page 40.

7. Close the Category window. The Browser Controls window now contains the tables copied from the Category window. An upward-pointing arrow is displayed next to each column name. The arrow changes position or is not displayed depending on how you order the column contents. See "Ordering Column Contents" on page 31 for details.

8. Delete the columns you do not want to include in your Browser icon. Suppose you want to keep only Product Description and Brand Description in the Product Information table of the current example. From each table, select and delete the columns you do not want. The Browser Controls window then opens.

   You can move columns within a table if you want to rearrange the order in which the data is displayed.

From this point, you can display your columns in the main Browser window any time you like. None of the steps that follow are necessary before you can see your Browser icon. However, if you want to fine-tune the data that the Browser tool retrieves, you can choose to do one or more of the following tasks:

Table 5. Fine-tuning your data

If You Want to Do This:	See This Section:
Streamline retrieval by identifying long columns	"Modifying Column Length" on page 30
Sort two or more columns in the same order	"Ordering Column Contents" on page 31
Use a column invisibly in your browser	"Hiding a Column" on page 33
Identify a column's data as integers, real numbers, characters, or dates	"Specifying a Data Type" on page 33
Show columns from two different tables in the same main Browser window	"Joining Tables" on page 38

Table 5. Fine-tuning your data

If You Want to Do This:	See This Section:
Join tables without columns in common; or show columns from three or more tables in the same main Browser window	"Joining More Than Two Tables" on page 39
Narrow the focus of your Browser query to certain data	"Constraining a Column in the Table Options Window" on page 41

Specifying Column Options

After you copy a table into the Browser Controls window, you can specify how the data for each column in that table should be displayed.

To define column options:

1. Select a column in a table in the Browser Controls window. For example, select Product Description.

2. Open the Column Options window, shown in Figure 17 on page 29.

Figure 17. Column Options window

3. Select a choice for each field that is displayed in the Column Options window. All of the fields are described in detail in the following sections:

   - "Modifying Column Length" (using the `Column Length` field)
   - "Ordering Column Contents" on page 31 (using the `Column Order` field)
   - "Hiding a Column" on page 33 (using the `Display` field)

- • "Specifying a Data Type" on page 33 (using the `Show Data As` field)

4. Click on `Apply` in the window header, or close the window to apply the options.

5. Repeat these steps for each column in your Browser Controls window.

If you want to cancel a change you made after clicking on Column Options window, click on the `Cancel` button. If you want to return to the previous settings, click on `Reset`.

If the default values for a particular column serve your needs, you do not have to select anything in the Column Options window. However, it is always a good idea to check the data type assigned to a column (using the `Show Data As` field).

Modifying Column Length

The size of a column determines how much workstation memory is used. In the Column Options window, you can specify whether the column you are specifying is long or short.

A long column has many unique rows or elements. ("Long" in this case does not necessarily imply large strings.) A short column has fewer rows or elements.

Generally, the number of rows in a long column exceeds 100, but if the rows take up more than the average space, a column of less than 100 rows can be considered long. The issue is whether the complete contents of the column can fit into workstation memory.

- • When you select `Short` in the `Column Length` field, you are specifying that you know the column is short enough that the entire contents of the column can fit into workstation memory. Selecting `Short` instructs Meta5 to display the column's contents in the main Browser window.

    If you want the Browser tool to attempt to retrieve all the data in a column regardless of its length, you can specify the column as `Short`. If your workstation has enough memory, the query finishes successfully and all the data is displayed. If there is too much data to fit into your workstation's memory, you get a message like the one shown in Table 7 on page 43.

- • When you select `Long` in the `Column Length` field, you are specifying that the column might be too long to fit entirely into workstation memory. In this case, Meta5 does not store the column's contents in memory, and displays them in the main Browser window only if the number of data values is less than 100, which is Browser's column-length threshold. If the column contains more than 100 values, the message `Too many values` is displayed in the column.

If you select `Long`, you can still ensure that the contents of the column are retrieved and displayed in the main Browser window by doing one or both of the following tasks:

- Set constraints that restrict the amount of data Browser retrieves from that column. For details, see "Constraining a Column in the Table Options Window" on page 41.

- Select `Yes` in the `Apply threshold to Long columns` field in the Table Options window. For details, see Step 4 of "Joining Tables" on page 38.

When you select `Long`, the `Other Column` choice is deleted from the `Column Order` field.

In the Browser Controls window, the column name is displayed in italics, indicating that `Long` has been selected in the `Column Length` field.

Typically, you begin by selecting `Short` in the `Column Length` field. (`Short` is the default value, and it allows Browser to retrieve data without applying its column-length threshold.) If you later discover that some columns are using too much memory, or if you experience performance problems, you can specify the columns with the most unique data items as `Long`. Remember that the width of a column can affect the amount of memory used. For example, a column that is 250 characters wide requires a lot of memory, and slows down performance both while defining the browser and during later use.

If you have specified individual columns as `Long`, and then you decide that you want Browser to try to retrieve all the data in all your columns, you can override the `Long` specification:

1. Select the whole table in the Browser Controls window.

2. Open the Table Options window.

3. In the `Apply threshold to Long columns` field, select `No`.

By doing this, you are specifying that the long-column threshold should be applied to any columns that have been specified as `Long`.

The `Apply threshold to Long columns` field is discussed in more detail in Step 4 of "Joining Tables" on page 38.

Ordering Column Contents

Columns can be displayed in the main Browser window in three different orders. You can choose to:

- Sort columns in ascending order
- Sort columns in descending order
- Sort one column according to corresponding data in another column

When you select a column in the Browser Controls window and open the Column Options window, three choices are listed.

- Select `Ascending` if you want numbered columns to list beginning with the lowest value. When you select `Ascending`, an upward-pointing arrow is displayed next to the column name in the Browser Controls window.

- Select `Descending` if you want numbered columns to list beginning with the highest value. When you select `Descending`, a downward-pointing arrow is displayed next to the column name in the Browser Controls window.

- Select `Other Column` if you want the selected column to be sorted by another column.

  When you select `Other Column`, a new field named `Order By Column` is displayed below the `Column Order` field.

  The `Order By Column` field is where you specify the other column in whose order you want your selected column to be sorted. In the field, type or copy a column name from the Browser Controls window. Always try to specify a short column in this field; otherwise, it might take a long time to define your browser.

  After you have specified `Other Column` and closed the Column Options window, a blank space is displayed to the left of the column name in the Browser Controls window, instead of the arrow.

Ordering a Column by a Column from Another Table

A column can be ordered only by another column from the same table, or by a column from another table that has been joined to the first column's table.

As an example, suppose you have copied the Territory column from the Territory Information table into the Product Information table. In the first page of your main Browser window, you want the Product Description column to be ordered by the Territory column. To do this, first create a join between the Product Information table and the Territory Information table, as explained in "Creating Column Groups (Joining Tables)" on page 35. After you have joined the two tables:

1. In the Browser Controls window, select the Column Options window.
2. Type or copy `Territory` into the `Order By Column` field.

Unique and Duplicate Values

If a column is sorted in `Ascending` or `Descending` order, the Browser tool displays only unique values in that column. If a column is sorted by another column, it can contain duplicate values. This is shown in Figure 18 on page 33.

Territory [=]

Atlanta
Chicago
Dallas

Territory Size [=]

1072
1035
984 } *Atlanta's territory sizes during a given period* ←

156
125
162 } *Chicago's territory sizes during the same period*

1105
1072
1099 } *Dallas's territory sizes during the same period* ←

Both Atlanta and Dallas had a territoy size of 1072 period.

Figure 18. One column sorted by another and displaying duplicate values

Because the values in the Territory Size column are sorted by the Territory column, each territory's sizes are displayed for a specified period. In this particular case, Atlanta and Dallas happened to be of the same size during that period; therefore, you see the number 1072 twice in the Territory Size column.

If the Territory Size column were sorted in ascending or descending order without regard to another column, you would not see any duplicate values.

Hiding a Column

You can display or hide columns in the main Browser window with the Column Options window.

- Select `Show Column` when you want a column to be displayed in the main Browser window.
- Select `Hide Column` when you do not want a column to be displayed in the main Browser window.

  Normally, if you do not want a column to be displayed in the window, you delete it from the table in the Browser Controls window. However, you might need to keep such a column in the table, even though you do not want to see it. For example, you might want to hide a column that controls the sorting order of another column, as described in "Ordering Column Contents" on page 31.

If memory usage is a concern, it is better to delete unnecessary columns than to hide them.

Specifying a Data Type

You can decide how the Browser tool interprets data in a column. You can specify that the data be interpreted as integers, real numbers, characters, or dates. These choices are displayed in the Column Options window.

Integer

If you want a column interpreted numerically, select `Integer` in the `Show Data As` field.

Real

If you want numeric data in a column to be displayed with a specified degree of precision, select `Real` in the `Show Data As` field. When you select `Real`, the `Precision` field is displayed, as shown in Figure 19 on page 34.

Show Data As	Integer	Real	Character	Date		
Precision	00000.	0000.1	000.02	00.003	0.0004	.00005

Figure 19. Choosing Real displays the Precision field

The `Precision` field lets you specify the number of decimal places you want to display after the decimal point in a number. Numbers greater than or equal to five round up, and numbers less than five round down.

Because the Browser tool performs no calculations, there is no default setting for the `Precision` field. When you first open the Column Options window, the selected choice reflects the current precision assigned this column. Or, if you are changing the data type from `Integer` or `Date` to `Real`, the default is `00000`.

Table 6 on page 34 describes the result of each choice in the `Precision` field. The number 2.37519 is used as an example here.

Table 6. Numeric precision for column data

Places desired	Select	Displays 2.37519 as
0	00000	2
1	0000.1	2.4
2	000.02	2.38
3	00.003	2.375
4	0.0004	2.3752
5	.00005	2.37519

Character

If the data in a column is text, or if you want the data to be displayed in alphabetical order, select `Character` in the `Show Data As` field.

Date

For a column containing dates, select `Date` in the `Show Data As` field. When
you select `Date`, a new field named `Date Resolution` is displayed, as shown
in Figure 20 on page 35.

Show Data As	Integer	Real	Character	Date

Date Resolution	Day	Week	Quad Week	Month	Odd BiMo	Even BiMo	Qtr	Year

Figure 20. Choosing Date brings up the Date Resolution field

The `Date Resolution` field lets you display a date as a day, week, four-week
period (Quad Week), month, even or odd bimonthly date, quarter, or year. For
example, select `Month` if you want column data to be displayed by month.

Creating Column Groups (Joining Tables)

In your finished main Browser window, using the techniques described up to this
point, you can display up to 15 tables. However, if you want to be able to constrain
columns so that their data is interrelated, you must either use only columns from
one table, or use another technique: joining tables to create *column groups*.
Column groups are associated groupings of columns that can be constrained in
conjunction with one another.

Unjoined Tables

Figure 21 on page 36 shows an example of unjoined tables.

- Columns from one table have been copied into the first page (Product
  Information) of the Browser icon. When you constrain any columns on this
  page, the data in one column relates to the data directly across from it.

- Columns from two different tables (Territory Size and Territory Information)
  have been copied into the second page (Territory Information) of the
  browser. However, even though they are displayed on the same page of the
  main Browser window, there is no relationship between data from the
  different tables. Unless you create column groups (join tables), these
  columns cannot be constrained so that they read across as rows of related
  data.
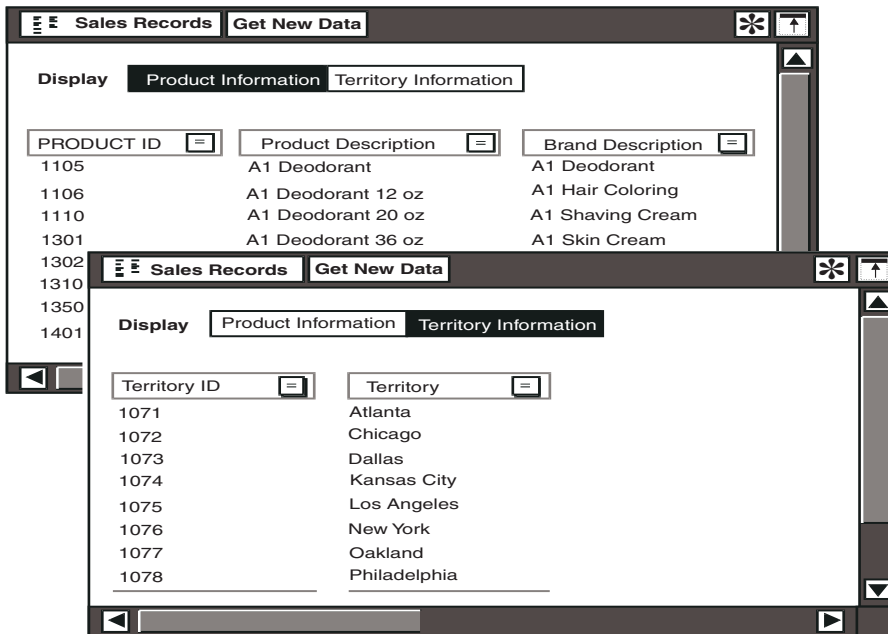
Figure 21. Two pages of a single main Browser window, displaying unjoined tables

You must join tables if you want:

- To have two columns from different tables displayed in the same browser window and sorted in the same order
- To constrain columns from different tables in relation to one another

The only indication in the Browser Controls window that column groups have been joined is the relationship between data from constrained columns.

Joined Tables

Suppose you want to display a column from the Territory Information table and a column from the Territory Size table in a single page of your finished browser, and you want to be able to constrain columns of either table to show related data. By joining those two tables in the Browser Controls window, you can create a Browser window like the one shown in Figure 22.
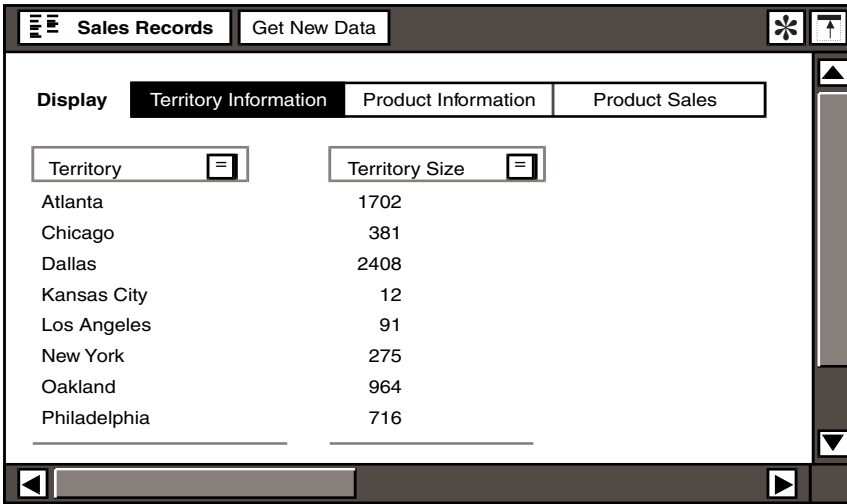
Figure 22. One page of a main Browser window, displaying joined tables

The category window from which the tables in Figure 22 came are displayed as shown in Figure 23 on page 37.
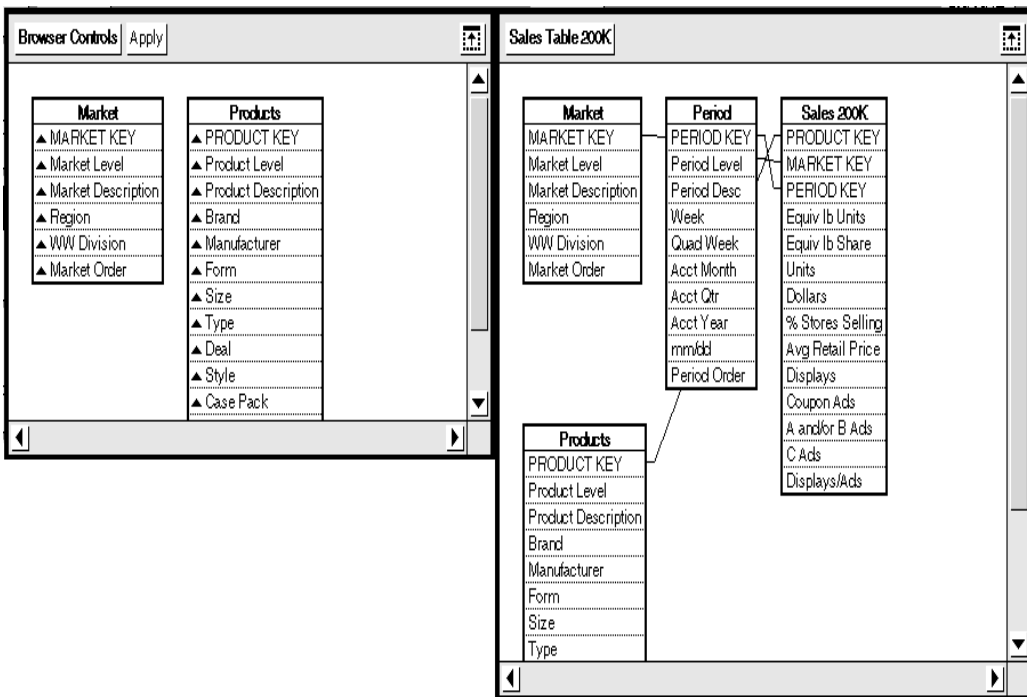
Figure 23. Browser Controls window and Category window

To see all the tables in a particular database, look at the Category window. Lines between tables indicate joins that have been created using the DBA tool. Those joins have already been put in place by your system administrator or database administrator, and are permanent in the database category. To create the kind of browser that can display columns from more than one table on one page, you must create further joins, using Structured Query Language (SQL) in the Table Options window, as explained in the next section.

If you need more information about using the SQL tool, see Part 4, "SQL Entry User's Guide," on page 231.

Joining Tables

The general process for joining tables is as follows. (Note that this process creates joins only for the browser with which you are working.)

1. Place a copy of a table from the category window in the Browser Controls window. This table is the one that is displayed in the finished main Browser window and is named in the title bar. In the following steps, this table is referred to as the receiving table. (When you add columns in the following steps, the columns show up in this table).

2. Copy a column from another table in the category window into the receiving table in the Browser Controls window. Make sure that the receiving table and the table contributing the column are joined in the category window.

   • You only have to copy a column from the contributing table into the Browser Controls window; you do not have to copy the whole contributing table.

   • The column used to join the two tables does not have to be the same column that you are copying into the table in the Browser Controls window.

   • If the receiving table and the contributing table have no columns in common, you still might be able to join them and group columns from them. For the basic procedure, see "Joining More Than Two Tables" on page 39; for details, see "Chapter 4. More on Joining Tables," on page 45.

3. Select the receiving table in the Table Options window, which is shown in Figure 26 on page 47.

4. In the `Apply threshold to Long columns` field, select either `Yes` (the default value) or `No`. This choice specifies whether the Browser tool automatically applies its column-length threshold during the retrieval process. (If your browser contains no columns that have been specified as `Long`, it does not matter which choice you select. For information on specifying a column as `Long` or `Short`, see "Modifying Column Length" on page 30.)

   • When `Yes` is selected, Browser applies the threshold (100 rows or less) to all columns that have been specified as `Long`. That is, if Browser finds a column that has been specified as `Long` and that has over 100 rows, the tool does not try to retrieve that column's data, but displays the

message `Too many values`. (If a column has been specified as `Long`, but has 100 rows or less, it falls under the threshold and all its data is retrieved, unless the workstation runs out of memory.)

Browser does not apply the threshold to any column that has been specified as `Short`, and tries to retrieve all that column's rows.

Selecting `Yes` makes retrieval quicker if there are very long columns in your query, but you might not get all the data you want.

- When `No` is selected, Browser does not apply the threshold; it retrieves in full, or tries to retrieve, every column you have specified. If any of your columns have over 100 rows, the retrieval time can be very long. Depending on your workstation's memory capacity, other limits in your system, and contention for system resources in your installation, such a lengthy process can cause a problem: You or your user might have to wait too long for a response, or the workstation might time out or run out of memory.

  On the other hand, if capacity and response time are not issues in your system, it might be preferable to have `No` selected so that every row of data is retrieved.

  In most situations, it is better to select `Yes` in the `Apply threshold to Long column` field.

5. In the `(Other)` field, using SQL, write a `WHERE` statement that associates the receiving table with one or more tables. Note these requirements:

   - Each `WHERE` statement must begin with the keyword `WHERE`.

   - In a `WHERE` statement for this purpose, you must supply the internal name of each column that you are using to associate the contributing table with the receiving table.

     The internal name of a table or column might not be obvious at first. If you need help in identifying an internal name, see "Chapter 4. More on Joining Tables," on page 45.

6. Close the Table Options window.

7. Deselect the primary table in the Browser Controls window and do one of the following tasks to bring up the finished main Browser window:

   - Click on the Browser Controls window header, and then close the Browser Controls window.

   - Close the Browser Controls window.

   - Click on the `Get New Data` button in the main Browser window header.

Joining More Than Two Tables

Suppose you want your finished browser to display, on a single page, columns from two tables that have not been joined in the Category window. This means you must group columns from a receiving table and a contributing table that have no columns in common.

The basic steps in this process are:

1. Find a third column from a table that has columns common to the other two tables.

2. Create joins between all three columns, using a `WHERE` statement that follows this model:

```
where T1.columnA = T2.columnA and T2.columnB = T3.columnB
```

For details, see "Chapter 4. More on Joining Tables," on page 45.

To display your finished main Browser window, click on `Apply`, close the Browser Controls window, or click on `Get New Data` in the main Browser window. Your finished main Browser window should now resemble the one in Figure 24.
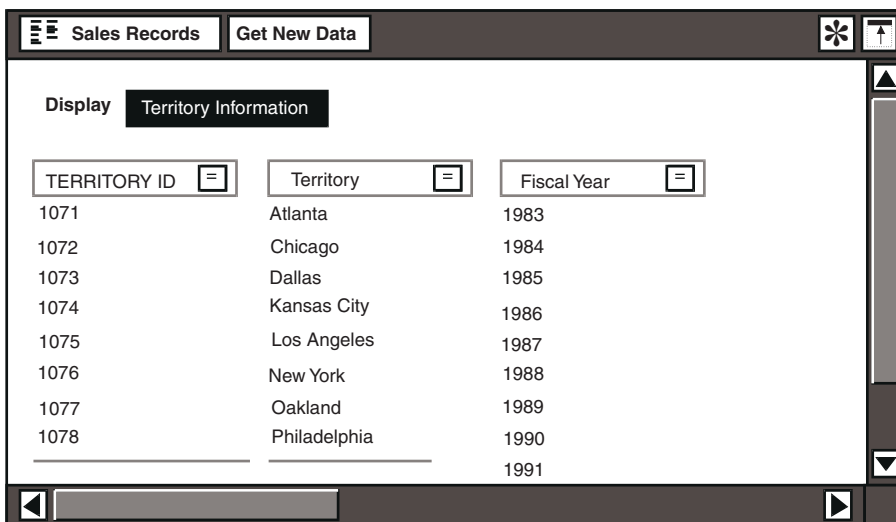
Figure 24. The main Browser window

If you want to display three or more columns from different tables in the same main Browser window, you must join the tables using this procedure.

Avoiding Problems with Long Columns

The Browser tool is designed to give you a quick view of the kind of data that is displayed in dimension tables rather than fact tables. The two types of table have the following characteristics:

- Dimension tables have columns that describe attributes of a fact or data item. Dimensions can also be thought of as entities, or properties of entities, represented in a database. Some dimension columns contain descriptive labels for items, such as products, brands, and market locations; others furnish the scope for viewing facts, such as periods of time.

- Fact tables have columns that contain recorded data measures of the entities listed in a database. Facts typically are the numbers, such as unit price, sales volume, or unit sales, that make up the body of a detailed report.

The Browser tool can be used to review the relationships between dimensions and subsets of dimensions, such as:

```
Brand Description   Product Line   Product Description   Product
Size
```

If you want to view actual sales figures for a product in a particular quarter, you might want to consider using another Meta5 tool that is designed to display fact data as well as dimension data. Tools that can be used to retrieve fact data from a database and view it online are the Query tool or the Reporter tool; the tools for printing such data are the Reporter tool or the Layout tool. Details on those tools can be found in Part 2, "Query User's Guide," on page 55, Part 3, "Reporter User's Guide," on page 145, and the *Layout User's Guide*. For more information about dimension tables and fact tables, see *Administering Databases with Meta5*.

You can save time by setting up constraints in a Browser icon, viewing and adjusting those constraints, and then copying the constraints to another Meta5 tool. In "Chapter 2. Using a Browser Icon," on page 3, there are instructions for constraining columns and using those constraints elsewhere in Meta5.

The Browser tool can display fact columns, but it is designed primarily to provide a quick look into the database. Fact columns are generally quite long, and if the Browser tool encounters a very long column, retrieval can take more time than you or the user can afford to wait, or the workstation can time out. This is because each table that is represented in any way in the Browser Controls window (whether copied into the window, or only included in the WHERE statement) is scanned completely, including all of its columns. It is, therefore, recommended that you copy into the Browser Controls window only dimension tables, that is, tables with no fact columns.

Constraining a Column in the Table Options Window

If you want to constrain a single column, you can either wait and constrain it in the finished browser, as explained in "Chapter 2. Using a Browser Icon," on page 3, or you can use the Table Options window and type the constraint into the (Other) field. For example, you can enter the following statement in the (Other)) field to limit the Brand Description column to displaying entries for *A1 Soap*:

```
where branddesc = 'A1 Soap'
```

To undo a constraint that you have set in the Table Options window, you must return to the Table Options window and rewrite or delete the WHERE statement.

Displaying Column Data in the Main Browser Window

After you select the database tables and columns for your Browser icon and set options on the columns, you can display the column data in the main Browser window.

Before displaying column data, open both the Browser Controls window and the main Browser window.

To display column data in the main Browser window:

1. Click on `Apply` in the window header of the Browser Controls window. The Browser tool retrieves information from the database. If the database tables are large, the retrieval process can take several minutes.

   The main Browser window displays database information for columns according to the options you selected in the Column Options window. The `Display` field is shown at the top of the window and contains a choice for each of the tables you copied into the Browser Controls window.

2. Select a choice in the `Display` field. For example, when you select `Territory Information`, the main Browser window opens.

3. Close the Browser Controls window. You can reopen the Browser Controls window at any time by selecting `Show Controls` in the main Browser window header.

   Your Browser icon is now ready to use. For information on adding, changing, and constraining data, see "Chapter 2. Using a Browser Icon," on page 3.

Stopping Data Retrieval

If you decide that you want to make more changes in a Browser icon, or for some reason you do not want to retrieve new data after the process has started, you can stop the data-retrieval process. Sometimes, the system stops data retrieval automatically. Both situations are described in this section.

When You Stop Data Retrieval

To manually stop data retrieval at any time, press the Stop (F9) function key. The data retrieval process comes to a halt and the cursor returns to its arrow shape.

When Meta5 Stops Data Retrieval

Sometimes the Browser tool automatically stops data retrieval. The three most common reasons are listed in Table 7, along with the messages that display on your workstation.

Table 7. Reasons for Meta5 to stop data retrieval, and respective Meta5 messages

Problem	Meta5 Message
The database gateway to which your browser is configured is unavailable.	The database request failed. -- Try again later or inform your system administrator.
The database service to which your browser is configured is unavailable.	Cannot reach database server. -- Try again later, check address, or inform your database administrator.
The amount of data you are attempting to retrieve does not fit in the memory available on your workstation.	Because of a low memory condition, the workstation has simulated a Stop key. -- Increase your available memory and/or contact your system administrator.

In any of these three cases, when data retrieval automatically stops, the Important Message window opens.

If you receive one of these messages, click `OK` to close the Important Message window.

If the Database Gateway Service or Database Service Is Unavailable

If your browser is configured to either a database gateway service or a database service that is unavailable, you can, as the message suggests, do one of the following tasks:

- Try your retrieval request when the database gateway service or database service is available.
- Check to see that you have the correct address in the Browser's Icon Options window.
- Contact the system administrator for a database service, or the database administrator for a database gateway service.

Even while a service is unavailable, you can open and use your browser if it already contains data. The data you last retrieved is still displayed, and you can constrain columns as you like. (However, if you try to use the `Show Controls` or `Get New Data` buttons, you receive a message saying that Browser tool cannot reach the service.)

If There Is Not Enough Memory

If you receive a message that not enough memory is available to retrieve the data you wanted, you can reduce either the amount of data in your request or the amount of memory required by other processes running on your workstation. Try one or more of the following options:

- Close any windows that you do not need to have open on your desktop during the retrieval process.

- Look at the tables in your browser. Are any of them fact tables (do any of them contain fact columns)? Select a table in the Browser Controls window and open the Table Options window. In the `Apply threshold to Long column` field, is `No` selected? Select `Yes` instead.

- Look at the columns in your browser; are any of them long? If you suspect so, open the Browser Controls window. Select a column, open the Column Options window, and select `Long` instead of `Short`.

If none of these remedies works for you, and you are sure that you are not asking Browser to retrieve too much data, contact your system administrator.

See "Modifying Column Length" on page 30 and "Avoiding Problems with Long Columns" on page 40 for more information.

Other Messages

If the data retrieval process stops and you see a message other than the ones mentioned in this section, see *Messages and Codes*.

Truncated or "Lost" Messages

Occasionally you might see a message that seems to have been truncated or shortened. Or, you might want to review a message after you closed the Important Message window. In either case, you can open the Message Log window and read the full text of all messages sent recently to your desktop.

To open the Message Log window, click on the `Message Log` button on the right side of the message bar. The `Message Log` button looks like this:

▲

In some cases, you might find that a message is truncated even in the Message Log window. If so, consult your system administrator.

Chapter 4.   More on Joining Tables

Basic instructions for defining a browser are in "Chapter 3. Configuring and Defining a Browser Icon," on page 21. This chapter provides some details that you might find useful when defining a browser:

- "Why Should You Join Tables?"
- "How to Find the Internal Name of a Table or Column" on page 46
- "Joining More Than Two Tables" on page 49

Why Should You Join Tables?

You can define a browser by copying one or more tables from the category window into the Browser Controls window, and deleting from each copy of a table the columns you do not want in your browser. The resulting main Browser window shows each copied table on its own page of the window.

However, a simple browser might not always satisfy your needs or the needs of your users. Sometimes you might want to define a browser that lets you see columns from two or more tables in one page of the main window. To do that, you must join the tables in the Browser Controls window. (This is also called grouping columns.) Figure 25 on page 46 shows an example of a browser that includes both joined and unjoined tables.

Territory Information, Product Information, and Product Sales are three unjoined tables. Columns selected from them must appear on three separate pages of this main Browser window. To see columns from the Product information or Product Sales table, you must select on of those choices.

							✳	⊤
ᴱᴱ **Sales Records**	Get New Data							

Display	**Territory Information**	Product Information	Product Sales	◄

Territory	=		Territory Size	=
Atlanta			1072	
Chicago			381	
Dallas			2408	
Kansas City			12	
Los Angeles			91	
New York			275	
Oakland			964	
Philadelphia			716	

Territory and Territory Size are columns from two different tables, copied into the Territory information table; but the two columns can now appear on a single browser page because their tables have been joined.

Figure 25. First page of a main Browser window, displaying joined tables

"Creating Column Groups (Joining Tables)" on page 35 gives you instructions for joining tables. To create a join between two tables, you must use SQL in a `WHERE` statement that uses the tables' internal names. However, a table's internal name might not be obvious at first. The way to find it is explained in the next section.

For more information about using SQL, see Part 4, "SQL Entry User's Guide," on page 231.

How to Find the Internal Name of a Table or Column

Type the following SQL statement in the Table Options window to join the Territory and Territory Size tables.

```
WHERE T1.terrnum = T2.terrnum
```

The main Browser window is displayed in Figure 25 on page 46.

In the `WHERE` statement, you must supply the internal name of each column that you are using to associate the contributing table with the receiving table. In the `WHERE` statement, terrnum is the internal name of the column TERRITORY ID, which is common to both the contributing and receiving tables.

Figure 26 on page 47 shows the three windows that open when you copy tables or columns from the category window into the Browser Controls window, select the copied table, and open the Table Options window to write a WHERE statement.

Table Options Apply Cancel Reset

Name   Territory Information

Apply threshold to Long columns   Yes   No

Select   T1.terrnum, T1.territory, T1.agglevel, T2.terrsize   ← ③

From   edu_sl_terrinfo T1, edu_sl_terrsize T2   ← ④

(Other)   where T1 terrnum = T2 terrnum   ①

⑤

Sales Tracking

Product Information
PRODUCT ID
Product Description
Brand Description
Product Line
Aggregation Level
Product Size

Territory Information
TERRITORY ID
Territory
Aggregation Level

Periods
PERIOD
Fiscal Year
Period Order

Product Sales
PRODUCT ID
TERRITORY ID
PERIOD
Unit Sales
Dollar Sales
YTD Units
YTD Dollars
QTD Units
QTD Dollars

Territory Size
TERRITORY ID
PERIOD
Territory Size

Browser Controls Apply Show Category

Territory Information
▲ TERRITORY ID
▲ Territory
▲ Aggregation Level
▲ Territory Size   ← ②

Figure 26. How to find the internal name of a table

The circled numbers and arrows in Figure 26 on page 47 correspond to the following items:

1. In the example in Figure 26 on page 47, the Territory Information table has been copied as the primary table into the Browser Controls window.

2. A copy of the Territory Size column has been added to the Territory Information table.

3. When the Territory Information table is selected in the Browser Controls window and the Table Options window is opened, it is displayed as shown at the top of Figure 26 on page 47. In the `Select` field, you see the internal name of each column in the table:

Table 8. Internal names of columns

Column name as shown in Browser Controls window	Internal column name as shown in Table Options window, Select field
TERRITORY ID	T1.terrnum
Territory	T1.territory
Aggregation Level	T1.agglevel
Territory Size	T2.terrsize

The column copied from the Territory Size table is identified as T2.terrsize, that is, the terrsize column from Table 2. In the Table Options window, the internal name of each table represented in the Browser Controls window as shown in Table 9.

Table 9. Internal names of tables

Table name as shown in category window	Internal table name as shown in Table Options window, From field
Territory Information	edu_sl_terrinfo T1
Territory Size	edu_sl_terrsize T2

The identifier T2 (for Table 2) is displayed as an alias of the Territory Size table.

The `WHERE` statement, which you write in the `(Other)` field using SQL statements and the tables' internal names, ties the two tables together by means of their common column, TERRITORY ID. In Table 1 (Territory Information, the primary table in the Browser Controls window), that column is T1.terrnum and in Table 2 (Territory Size) it is T2.terrnum. Terrnum is the internal name of the column common to both tables. The syntax for the `WHERE` statement is:

```
where T1.terrnum-T2.terrnum
```

If the internal name of a table or a column is not apparent from the Table Options window, go to the Category window and select the table or column twice. Its internal name is displayed as shown in Figure 27 on page 49.

The internal name of the TERRITORY ID column, as needed in the (Other) field of the Table Options window, is T1.terrnum (T1 because, in this example, the Browser tool has assigned T1 as the alias name for the table edu_sl_terrinfo.
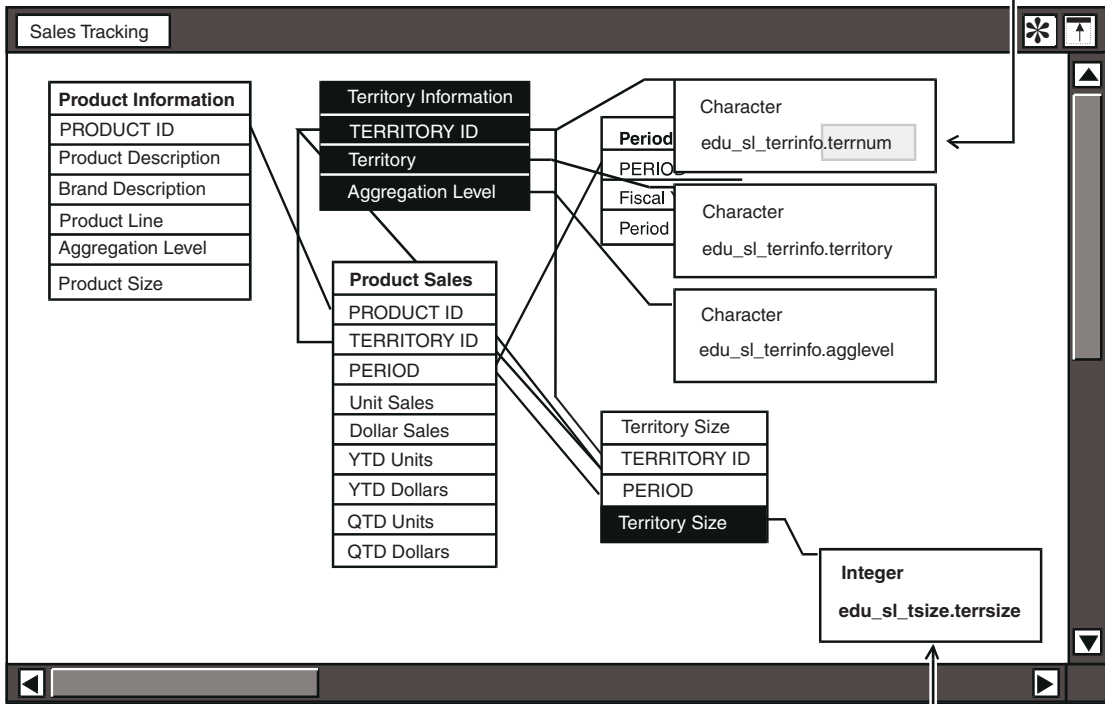
The full internal name of the Territory Size column (terrsize) of the Territory size table (edu_sl_terrsize).

Figure 27. Displaying internal names in the Category window

To return the Category window to its original appearance, select the table or column again.

Joining More Than Two Tables

You might need to join more than two tables if you are trying to accomplish either of these goals:

Table 10. Tasks requiring joining more than two tables

Goal	The basic procedure
One page of your finished browser displays columns from two tables that have not been joined in the category window (columns from a receiving table and a contributing table that have no columns in common).	Find a third table that has columns common to the other two, and create joins between all three.
One page of your finished browser displays columns from three or more tables.	Form a continuous join between the three tables.

The following procedure continues with the same table and column examples that are used in Figure 26 on page 47.

1. Suppose that your primary table in the Browser Controls window is Territory Information, and that you deleted the Aggregation Level column. Into the Territory Information table you copied the Fiscal Year column from the Periods table. Look at the category window and notice the following items:

   • The Territory Information table and the Periods table have no columns in common.

   • There is, however, one table that has a column in common with each of those other two tables: the Territory Size table.

2. Copy any column from the Territory Size table (for example, you can use the Territory Size column) into the Territory Information table in the Browser Controls window.

3. In the Browser Controls window, select the Territory Information table and open the Table Options window.

4. In the `Select` field, notice the internal names of the columns from the three tables:

   ```
   T1.terrnum, T1.territory, T2.fiscyear, T3.terrsize
   ```

   From this list, you deduce that Table 1 is Territory Information, Table 2 is Periods (the second table from which you copied a column into the Browser Controls window), and Table 3 is Territory Size (the third table from which you copied a column).

5. In the `(Other)` field, write the following `WHERE` statement, and close the Table Options window.

   ```
   WHERE T1.terrnum = T3.terrnum and T2.period = T3.period
   ```

You have now formed a continuous connection between all three tables.

If you are using the Territory Size table only to connect the other two tables, and do not want any of its columns represented in your finished main Browser window, you must do two more steps:

   • Select the column that you copied in from the Territory Size table, and open the Column Options window.

- In the `Display` field, select `Hide Column`, and close the Column Options window.

To display your finished main Browser window, click `Apply`, close the Browser Controls window, or, if this browser has been used before, click `Get New Data` in the main Browser window. Your finished main Browser window should now resemble the one in Figure 28 on page 51.
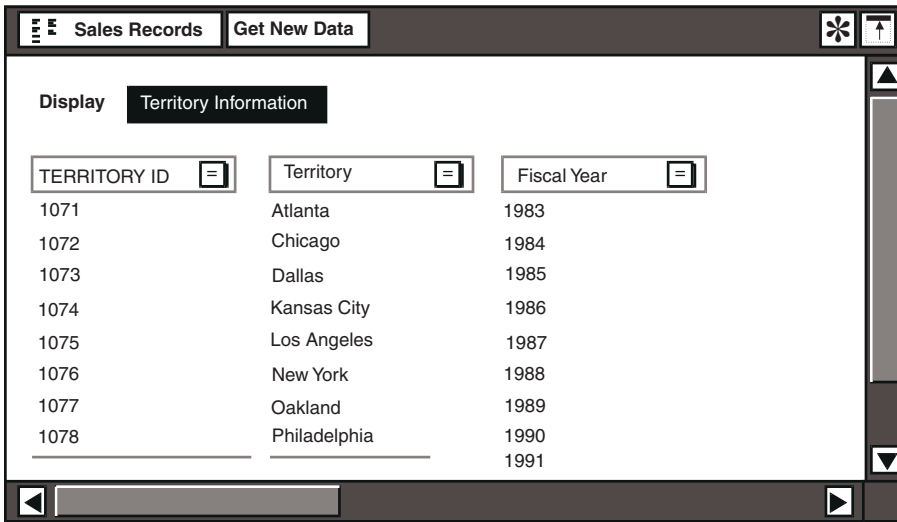
Figure 28. The main Browser window

Long Columns

Whether you are joining tables in a complex browser or retrieving columns from just one table in a simple browser, displaying a long column can have an effect on a Browser's response time.

Depending on conditions in your own data-processing environment, retrieving columns from fact tables, which often are very long, can slow response considerably. You might want to consult your system administrator if a particular browser retrieves data slowly. More details are given in "Avoiding Problems with Long Columns" on page 40.

Chapter 5.   The Query Tool

The Query tool allows you to retrieve data that is stored in your company's databases. Using your mouse, you can select the tables you want to access, and then specify various types of selection criteria. Query is a powerful tool that users at all levels of expertise can employ to:

- Specify the databases that you want to access
- Choose the type of information you need
- Apply constraints to further define the data to suit your needs
- Create calculated columns of retrieved data

Because the Query tool is based on objects that are selectable with a mouse, you can build elaborate sequences of operations without using Structured Query Language (SQL) statements. For advanced users, SQL-based editing capability is available and can be used with expert functions.

Retrieved query data can be included in a text document, formatted into a free-form report, passed to a spreadsheet, or graphically charted using the Plot tool. In addition to its basic features, you can use the Query tool to perform calculations, and combine various types of data for comparison and analysis. Calculated results can also be sent to other tools, such as the Spreadsheet, Text, and Plot tools.

Table 11. Using Query with other Meta5 tools

Using Query and	You can perform the following tasks
Capsule applications	Database retrieval.
	Transfer data to other tool icons to automate the data access, data analysis, and desktop management sequence.
Layout	Transfer data and format it into a free-form report.
Plot	Show the retrieved data in a graphic representation.
	Print the charted results.
Spreadsheet	Perform analysis and complex computations.
	Print results.
	Edit a database.
Text	Format your data for presentation or inclusion in a document.
	Print the results.

Table 11. Using Query with other Meta5 tools

Using Query and	You can perform the following tasks
Transformer	Manipulate the retrieved data.
	Sort or remove null values.
Xlaunch	Export your results to an Excel spreadsheet

Querying a Database

The Query tool provides a view of the databases your company uses. A typical database might list consumer packaged goods, personnel information, or products that your company produces. For example, you might need to query a database to discover what products netted greater sales in a three-month period. A sample output for such a Query is shown in Figure 29 on page 54.

Figure 29. Sample output for a Query

Your company might use this type of database query frequently, although some of the parameters for a query might change from month to month. For repetitive processes, you can save a database query view so that you can retrieve that data again without having to rebuild the query.

If you are a database administrator and you sometimes need to make minor modifications to your company's databases, you can use a Query icon combined with a Spreadsheet icon to read data into a database. You can perform this

administrative function from your desktop, providing you have the required privileges for doing so.

Placing a Query icon inside a capsule application permits you to retrieve data each time you click on the `Run` button. You can also take advantage of the variables used in the Capsule tool's control window.

A sample application using a Query as the first processed icon is shown in Figure 30 on page 55. In this application, a stand-alone Data Entry icon is used to read the variables from the capsule application. The Query tool retrieves the data, then transfers it to the Spreadsheet tool for analysis. The data is then sent to a Plot tool which is set up to chart appropriate analysis trends, and finally, the results of this application are placed into a folder as a permanent record. You could add a mail tray icon to this sequence and mail your results to another user.
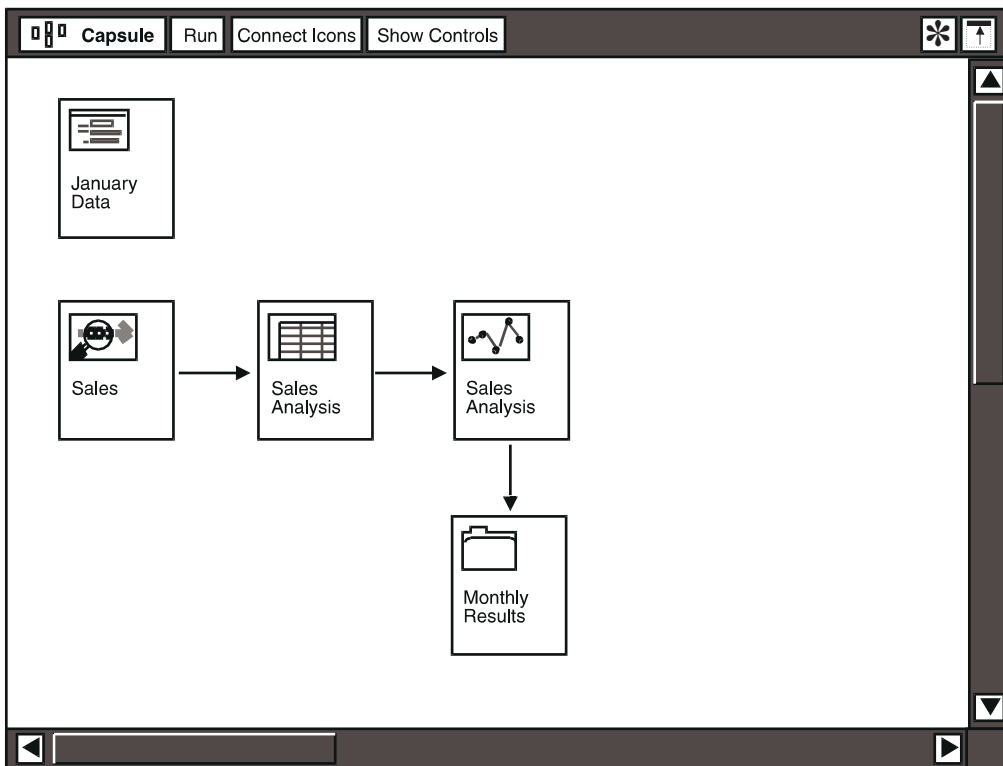
Figure 30. A sample application using a Query as the first processed icon

Formatting and Presenting the Results

After you run the capsule application, transferring the query data to a Text tool, you can view your results and send them to another user. If you want, your data can be copied to other Meta5 tools for printing. For example, if you want to chart the data, send it to a Plot icon, then print the resulting chart. Or, you can set up

regions in a Text window and format the transferred query results in any way you choose. To create a free-form report using Query data, you can connect the Query to a Layout icon.

Figure 31 on page 57 shows a Text icon that contains the results of the 3-month analysis for DrinkWell soda sales. The regions in this report are defined using @-variables which can be modified at the capsule level whenever needed. If sales trends change, the data might require a different report and you could present the same items with a different summary in the Text document.

To graphically depict the discrepancy between product sales trends, you could transfer the data to a Plot icon and display the results in a pie chart. See Figure 31 on page 57 for query results displayed in a document and in a pie chart.

The window titled "Sales Results" with "Show Document Controls" shows:

⌈Fourth⌋ Quarter Sales Comparison for
⌈DrinkWell Soda⌋ Product

The following data shows how well the three product sold in the ⌈Southern Region⌋during one quarter.

⌈Product	Sales Units
DrinkWell Sparkling Soda	143
DrinkWell Cherry Soda	151
DrinkWell SportAid	119 ⌋

As a result of this report, we recommend discontinuing the sales promotion for the sports drink SportAid in the Southern region.

Sales Comparison
of
DrinkWell Products in Fourth Quarter

DrinkWell SportAid
23%

DrinkWell Sparkling Soda
28%

DrinkWell Cherry Soda
49%

Figure 31. Analysis of DrinkWell soda sales

Chapter 6. Getting Started with the Query Tool

Before you can use a Query icon, it must be configured to an appropriate database. After you have a configured icon, you need to know how to use the Query windows. The following subjects are discussed in this chapter:

- Configuring a Query icon
- Securing a Query icon
- Navigating through Query windows
- Understanding associated windows

Configuring a Query Icon

After you copy a Query icon from the *Blank Icons file drawer, you must configure it for a specific database before you can open it. To configure the icon, you must know the password and the name of the database you want to access. You also need to know which fields are required for your specific case. If you do not have this information, consult your system administrator or database administrator.

To configure a Query icon:

1. Select a Query icon and open the Icon Options window.
2. Select `Other Data` in the `Display` field to display the Other Data page.
3. Using the guidelines provided in Table 12, enter the required information into the text fields and select the appropriate choices in the other fields.

Table 12. Icon Options window fields

Field	Type of input	Required / Optional
Gateway	Type the name of the database gateway to which you want your data access icon to have access. If the service is on a different realm from the one you are on, immediately follow the gateway name with a colon and then the realm name. For example: `mydbs:HQ`	Required

Table 12. Icon Options window fields

Field	Type of input	Required / Optional
Database Name	Type the name of the database that contains the category needed for this data access icon. If your server stores more than one physical database, you must identify the database to which you want access. It is unnecessary to supply a database name if only one physical database exists, or if you want access to a default database. For DB2 for MVS databases, type the name of the DB2 subsystem you want to access. For DB2 for VM databases, type the name of the virtual machine running DB2 for VM. For AS/400 databases, you do not need to enter anything in this field, because the AS/400 is a single-database system. To connect to a supported remote IBM database using Distributed Relational Database Architecture (DRDA), immediately follow the local database name with a period and then the name of the server through which the connection is being made. For example: `DSN.TD1` To connect to a remote SYBASE or Red Brick database, immediately follow the SQL Server name with a vertical bar and then the name of the database you want to access. For example: `SYBSERVER2|SYBPROD`. To connect to a remote ORACLE database, specify the full database name or its alias. For the full database name, specify the standard single-character prefix used for the remote connection (such as T for TCP/IP), followed by a colon, the name of the target host followed by another colon, and finally the system ID (SID) of the target ORACLE database. For example: `T:host1:DBS` If you have questions about the database name, consult you database administrator.	Required
Category	Type the print name or the internal name of the database category needed for this data access icon. The name you enter is displayed in the window header of the category window.	Required
WTDD Owner	If the icon is configured for access to a database that supports multiple WTDDs and qualified table names, type the name of the owner of the WTDD tables. If you enter a value in this field, you do not have to drop and recreate synonyms whenever you want to access a different WTDD within the same database.	Might not apply in your installation

Table 12. Icon Options window fields

Field	Type of input	Required / Optional
SQL ID	If you are using DB2, type the table qualifier name. The ID entered in this field overrides the default table qualifier name, which is the name entered in the `User Name` field. If you have questions about the table qualifier name, consult your database administrator.	Might not apply in your installation
Database Logon	Select `Specified Here` if you want database access to be based on information you type in the `User Name` and `Password` fields. Select `From Data Access Controls` if you want access to be based on information in the desktop's Data Access Controls window. If you have questions about security, consult your database administrator.	Optional. The default value is `Specified Here.`
Secured	Select `Yes` to set the icon's `User Name` field to the user ID of the desktop on which the icon resides. This is an irreversible operation. Before you select `Yes`, see "Securing Your Icon" on page 25 for important information.	Optional. The default value is `No`.
User Name	Type a valid user ID. This might be the same as your desktop user ID, depending on how your database security is set up. When the data access icon connects to the RDBMS, this is the user ID sent to the RDBMS. If you are using the DB2 for OS/2 DRDA gateway to connect to a DRDA server, and your DB2 for OS/2 user ID is different from your DRDA server user ID, you must specify both user IDs separated by a period. For example: `DB2 for OS/2_userid.DRDAID`	Required
Password	Type the database user's password. This password might be the same as your desktop password, depending on how your database security is set up. For security, the password is never displayed. If you are using the DB2 for OS/2 DRDA gateway to connect to a DRDA server, and your DB2 for OS/2 password is different from your DRDA server password, you must specify both passwords separated by a period. For example: `DB2 for OS/2_password.DRDA_password`	Required

Sometimes your database administrator will configure icons and store them in a file drawer for your use. Configured icons are usually named to indicate the type of data or database category they use.

Securing a Query Icon

When you have built a database query that you want to protect, you can secure the Query icon so that only those users who are authorized to use the specified database can open the icon. When you secure a Query icon in the Icon Options window, the user ID of the desktop where the icon resides becomes the value in the `User Name` field. When a secured icon is mailed, the value in the `User Name` field changes to the user ID of the recipient. The icon cannot be opened or used by the recipient unless his or her user ID has the appropriate privileges for the database. You cannot change the `User Name` field of a secured icon.

If you receive a secured icon from another user and the database does not recognize your user ID, you will not be able to open the icon.

Important:

Securing an icon is an irreversible operation. Before you secure an icon that you plan to distribute to other users, check with your database administrator to ensure that their user IDs are authorized to use the specified database.

The preferred way to secure a Query icon is to configure it to read the user ID and password setting from the desktop's Data Access Controls window. For more information about the Data Access Controls window, see *Getting Started with the Meta5 Developer's Desktop*, or consult your system administrator.

Navigating Through Query Windows

To look at the Query windows, select a preconfigured Query icon. If there are no preconfigured Query icons in the *Query Icons file drawer, consult your system administrator. When you open a new Query icon, three windows are displayed: the Query window, the Query Catalog window, and the Query Control window.

If only one window is displayed when you open the Query icon, click on the `Show Controls` button in the Query window, then click on the Query Control window.

When you open a Query icon, the tool must access the database, so it takes a few moments for the windows to open. If you are opening a preconfigured icon for the first time, the windows usually open with the Query Control window in front. When opened, the windows can be sized, moved, and repositioned individually.

If you close the Query window, all three windows close. Whenever you reopen a Query icon, the windows are displayed in the same configuration that you last viewed them. That is, if you previously closed the Query Control and Query Catalog windows, reopening the Query icon causes the Query window to be displayed by itself. When the Query window is displayed by itself, its window

header contains a button labeled `Show Controls`. Click on this button to reopen the other two windows.

The following sections provide more detail about the specific components of each window. The Query Control window provides the blank area where you build the database query. The Query Catalog window provides the column names from which you select or copy. Finally, the Query window is where you view the results and modify the retrieved data.

Query Control Window

The Query Control window is where you create a depiction of the database query. Its window header buttons are described in Table 13.

When you have finished selecting data for your query, you can close the Query
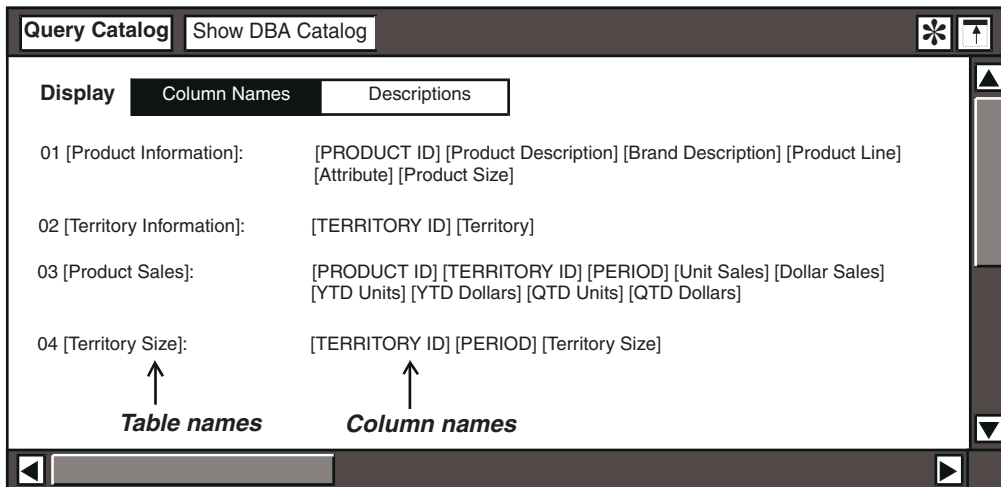
Table 13. Query Control window buttons

Button	Function
Show Query	Click on this button to display the column names you have chosen from the tables in the user catalog. When you click on the `Show Query` button, your selections are placed in the Query window and in the Query Control window. For more information about showing the structure of your query, see "Chapter 7. Building a Query," on page 71.
Clear Query	Click on this button to delete the contents of the Query window. This button functions whether or not you have already retrieved data. For more information, see "Chapter 10. Working with Query Data," on page 103. Clicking on the `Clear Query` button is an irreversible operation. Be aware that the query setup and data are removed after you click on this button.

Catalog and Query Control windows so that just the Query window is open on your desktop. To reopen the Query Control window, click on the `Show Controls` button that is displayed in the Query window header.

Query Catalog Window

The Query Catalog window displays the column names used to build a database query. The window header contains one button that reflects the type of catalog displayed. The Query Catalog usually shows the user catalog, containing the information in a particular database category. This catalog is the one you are most likely to use and most descriptions in this guide refer to the user catalog page unless otherwise stated. The window header contains the `Show DBA Catalog` button that you use to view the entire database administration catalog for your company. If you click on the `Show DBA Catalog` button, the `Show User Catalog` and `Reset` buttons is displayed in the window header.

The Query Catalog window provides two display choices: `Column Names` and `Descriptions`. Selecting one of these choices determines whether `Column Names` or `Descriptions` are displayed in the user catalog, and whether `Table Names` and `Descriptions` are displayed in the DBA catalog.

Query Catalog	Show DBA Catalog	✳ ⬆

Display | Column Names | Descriptions

01 [Product Information]:   [PRODUCT ID] [Product Description] [Brand Description] [Product Line]
                             [Attribute] [Product Size]

02 [Territory Information]: [TERRITORY ID] [Territory]

03 [Product Sales]:   [PRODUCT ID] [TERRITORY ID] [PERIOD] [Unit Sales] [Dollar Sales]
                             [YTD Units] [YTD Dollars] [QTD Units] [QTD Dollars]

04 [Territory Size]:   [TERRITORY ID] [PERIOD] [Territory Size]

            ↑   ↑
      Table names   **Column names**

Figure 32. Query Catalog window displaying user catalog column names

In Figure 32 on page 64, the default choice, `Column Names`, is selected. Choosing `Descriptions` displays database descriptions. Generally, database table descriptions are defined only by the database administrator; you cannot change them from within the Query tool, except when you are saving a Query view. Saving views is described in "Chapter 11. Using Query Views," on page 109.

Figure 33 on page 65 shows the user catalog with the column descriptions displayed.
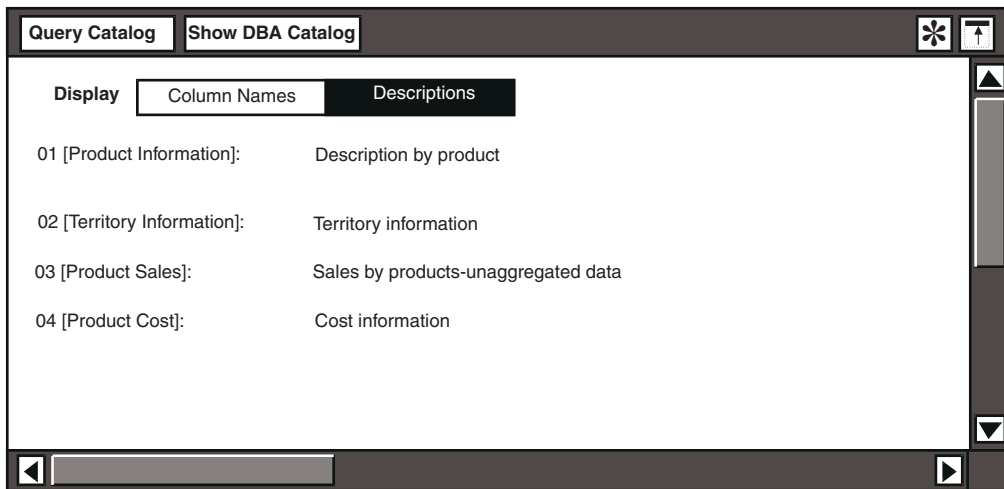
Figure 33. Query Catalog window displaying user catalog descriptions

Below the `Display` options are, from left to right, a column of table numbers, the table names that you can choose from, and descriptions or column names that pertain to these tables.

The table numbers are not selectable; they are shown to remind you how many tables are available for the query. The table and column names are selectable. Use these items to build your query. Think of this portion of the window as a selection area. You cannot change options for any of these items until you have copied them into the Query window or the Query Control window. In the user catalog, you can:

- Select and copy single or multiple tables into the Query Control or Query window
- Select and copy single or multiple columns into the Query Control or Query window
- Change the `Display` option so that it displays table descriptions instead of column names
- Add data to or edit data in the database

The first two techniques are described in "Chapter 7. Building a Query," on page 71. Procedures for changing the `Display` option are described in "Chapter 11. Using Query Views," on page 109. Adding or editing data in the database is discussed in "Inserting Rows of Data" on page 133.

The Query Control window is where you create a picture of your query by copying table and column names from the user catalog, or by selecting one or more items in the user catalog. Figure 34 on page 66 shows a Query Control window with information already in it.
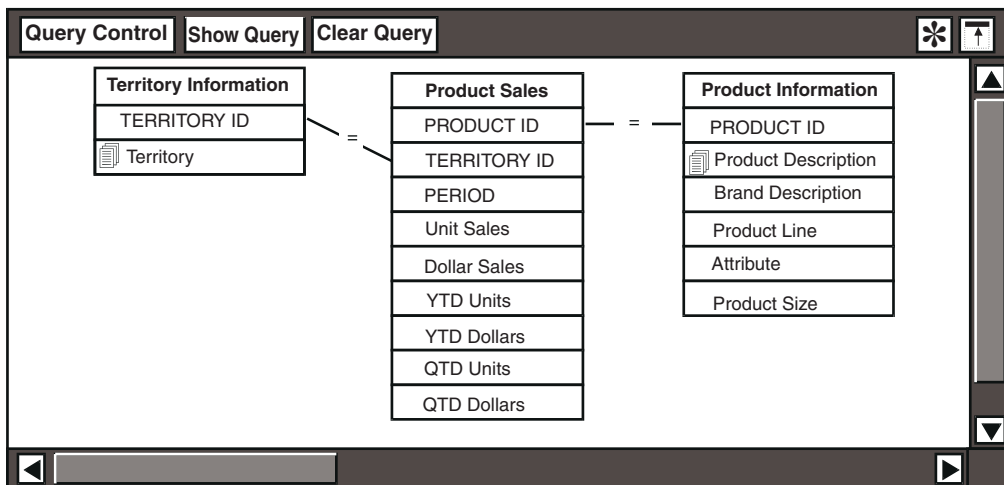
Figure 34. Query Control window

In this window, you can:

- Copy column names or tables names
- Edit or delete constraints
- Create manual joins between columns
- Display a depiction of a view that you have created and saved

Techniques for copying column and table names are described in "Chapter 7. Building a Query," on page 71. The procedures for editing or deleting constraints are described in "Chapter 8. Constraining Data," on page 79.

You cannot control the layout of the Query Control window's depiction area. Whenever you add new items and click on the Show Query button, the layout of the depiction area is reorganized for maximum efficiency. However, if the area contains many tables, you might have to scroll to see the entire contents.

Query Window

The window behind the Query Control window is called the Query window. Its title block contains the name of the Query icon. The top portion of the Query window contains two buttons, Change Sort Settings and Unique Rows, which can be used to arrange the data in your query. These buttons are discussed in "Chapter 9. Editing a Query," on page 97.

This area of the window is also used to display system messages. When you use the Query tool, informational messages might inform you that the system is acting upon the function you have selected, or indicate when the operation is complete. For example, when you click on the Show Data button, you see a message

informing you that the Query tool is awaiting data from the database server. Another message tells you that the items have been retrieved.

The results of the query are displayed below the horizontal line, displayed in rows and columns, similar to the format used by the Spreadsheet tool. This area also contains the Select All button, which is useful when you want to transfer data columns into another tool, such as a Spreadsheet tool. Figure 35 on page 67 shows a Query window with retrieved information about one product line.
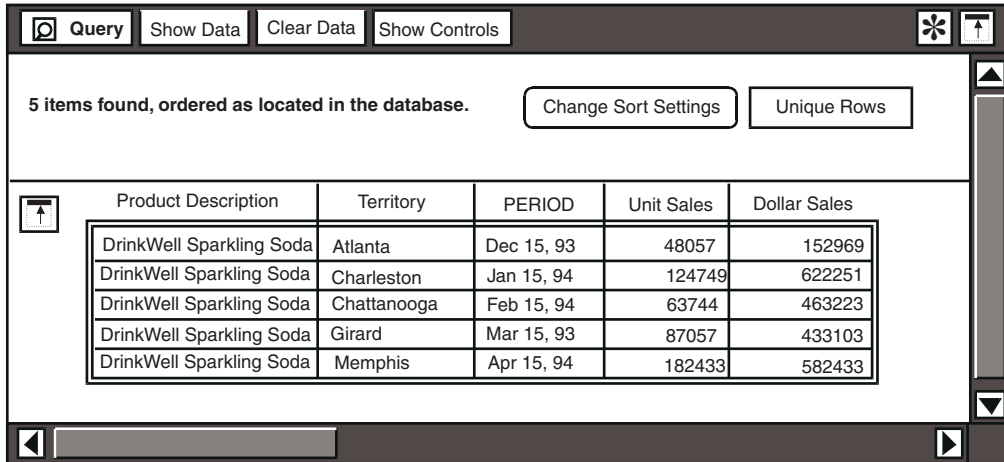
Figure 35. Query window with retrieved data

Within the Query window, you can perform the following functions:

- Copy column headings from the user catalog or the depiction area
- Delete or modify column headings
- Display only unique rows of data
- Sort column data
- Copy the results of a query into another tool

A prebuilt Query icon can contain different buttons and fields than those previously described. For example, another user might have chosen to add expert functions to the Query tool. In this case, a button labeled Create Column is displayed in the Query window header and two blank fields are added to the Query Control window. These features are described in "Chapter 13. Using Expert Functions to Constrain Data," on page 121.

The standard Query window buttons are described in Table 14

Table 14. Query window buttons

Button	Use to
Show Data	Retrieve the data you have specified in the Control window. For more information about showing the structure of your query, see "Chapter 7. Building a Query," on page 71.
Clear Data	Remove the retrieved rows of data. For more information about manipulating data, see "Chapter 10. Working with Query Data," on page 103.
Show Controls	Reopen the Query Control window if you previously closed it.

Understanding Associated Windows

Table 15 on page 68 provides a summary of all the windows associated with the Query tool. Refer to this table when you need to know how to display a specific window, or how to perform a particular task. Use the table to direct you to a chapter where you can find more complete information about each window and its function.

Table 15. Windows associated with Query functions

Window name	How to display	How to use
Choices	Click on the `Show All Choices` or `Show Constrained Choices` buttons in the Comparison Options window.	Use the Choices window to view and select constraint values. For more information, see "Chapter 8. Constraining Data," on page 79.
Column Options	Select a column name in the results area of the Query window, and open the Options window.	Use this options window to change a column heading. See "Chapter 9. Editing a Query," on page 97 for more information.
Comparison Options (for column names)	Select a column name in the depiction area, and open the Options window.	Use this options window to apply constraints. See "Chapter 8. Constraining Data," on page 79 for more information.
Comparison Options (for joins)	Select a join line in the depiction area and open its options window. You can also select a column name, extend your selection to a second column name, then open the options window.	Use this options window to set options in joins. See "Chapter 8. Constraining Data," on page 79 for more information.

Table 15. Windows associated with Query functions

Window name	How to display	How to use
Computed Column Options	Click on the `Create Column` button in the Query window header.	Use this options window to create computed columns. See "Chapter 12. Performing Calculations," on page 115 for more information.
New View Options	Click on Query Control window.	Use this options window to create a view of a query. See "Chapter 11. Using Query Views," on page 109 for more information.
Query Catalog	Open the Query icon or click on the `Show Query Catalog` button in the Query Control window header.	Use this window to copy column headings into the `Query Control` or `Query` windows. See the section of this chapter titled "Query Catalog Window" on page 63 for more information.
Query Control	Open the Query icon or click on the Query window header.	Use this control window to build a database query depiction. See "Query Control Window" on page 63 for more information.
Query Log	Click on `Capture SQL` in the `Special` menu of the Query window.	Use this capture window to contain a record of the SQL for a query. See "Chapter 10. Working with Query Data," on page 103 for more information.
Sorting Options	Click on the `Change Sort Settings` button in the system area of the Query window.	Use this options window to change the sorting sequence of retrieved data. See "Chapter 9. Editing a Query," on page 97 for more information.

Chapter 7. Building a Query

This chapter explains how to construct a database query and manipulate the retrieved data within the Query windows. It covers the following topics:

- Selecting items from the user catalog
- Retrieving one table
- Retrieving several columns
- Joining tables

Selecting Items from the User Catalog

Using the Query tool, you can select and copy the data items into the Query Control window, and then see a visual representation of your database query before you actually retrieve data. The user catalog, introduced in "Chapter 6. Getting Started with the Query Tool," on page 59, displays an index of information for a particular database category. By clicking on items in the user catalog, you can choose any combination of column data to build your query.

To select column data from the user catalog:

1. Open a Query icon.
2. In the Query Catalog window, click on the desired name from the user catalog.
3. Click on any other column names you want to include and copy them to the Query window.
4. Click on the `Show Query` button in the header of the Query Control window.

Figure 36 on page 72 shows the Query windows after you click on the `Show Query` button.
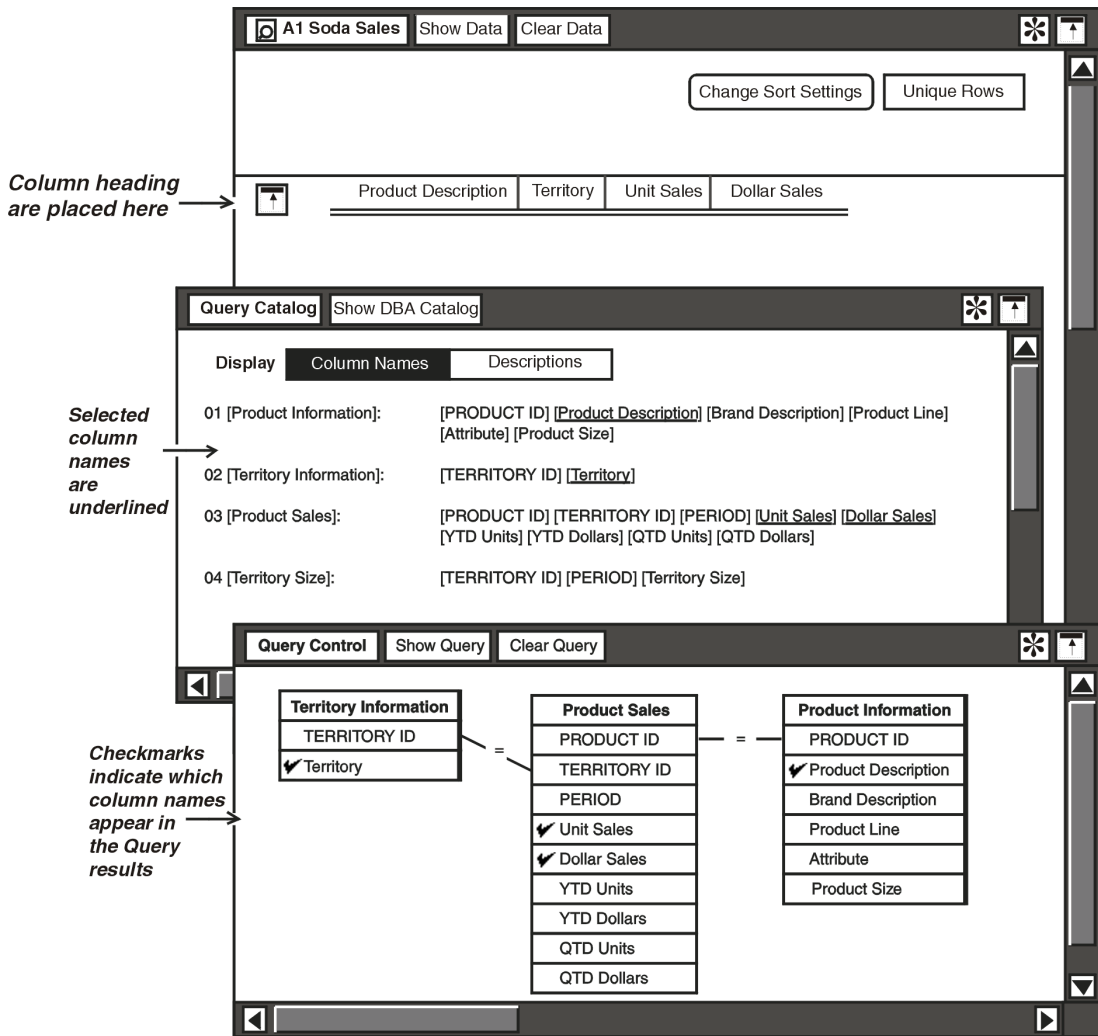
A1 Soda Sales | Show Data | Clear Data

Change Sort Settings | Unique Rows

Column heading are placed here →

Product Description | Territory | Unit Sales | Dollar Sales

Query Catalog | Show DBA Catalog

Display | Column Names | Descriptions

Selected column names are underlined →

01 [Product Information]: [PRODUCT ID] [Product Description] [Brand Description] [Product Line] [Attribute] [Product Size]

02 [Territory Information]: [TERRITORY ID] [Territory]

03 [Product Sales]: [PRODUCT ID] [TERRITORY ID] [PERIOD] [Unit Sales] [Dollar Sales] [YTD Units] [YTD Dollars] [QTD Units] [QTD Dollars]

04 [Territory Size]: [TERRITORY ID] [PERIOD] [Territory Size]

Query Control | Show Query | Clear Query

Checkmarks indicate which column names appear in the Query results →

Territory Information
TERRITORY ID
✔ Territory

=

Product Sales
PRODUCT ID
TERRITORY ID
PERIOD
✔ Unit Sales
✔ Dollar Sales
YTD Units
YTD Dollars
QTD Units
QTD Dollars

=

Product Information
PRODUCT ID
✔ Product Description
Brand Description
Product Line
Attribute
Product Size

Figure 36. Query windows after clicking on the Show Query button

Look at the Query Control window again. Within the tables, each individual selection is checkmarked, and selections in the user catalog are underlined. Column headings are displayed in the results area of the Query window. The only thing left to do is retrieve your data by clicking on the Show Data button in the Query window header. But first, the following section describes more specific ways of getting column information into the Query window's results area.

Retrieving One Table

There are two ways to retrieve data for one table of information. You can either copy the table name from the user catalog directly to the results area of the Query

window, then click on the `Show Data` button, or you can select the table in the user catalog and select the Query window header. Both methods are described below.

To copy the table name into the Query window:

1. Select the table name and copy it into the results area of the Query window. The columns are displayed in the same order as the one in the user catalog.

2. Select the Query window header to retrieve data from the table.

You should only do this with small tables or when you really need all the information contained in a large one. Otherwise, such a query could take a long time to return data. In the example in Figure 37, the table only contains two columns.

To get the same results by retrieving data in the Query window:

1. In the Query Catalog window, select the table name in the user catalog.
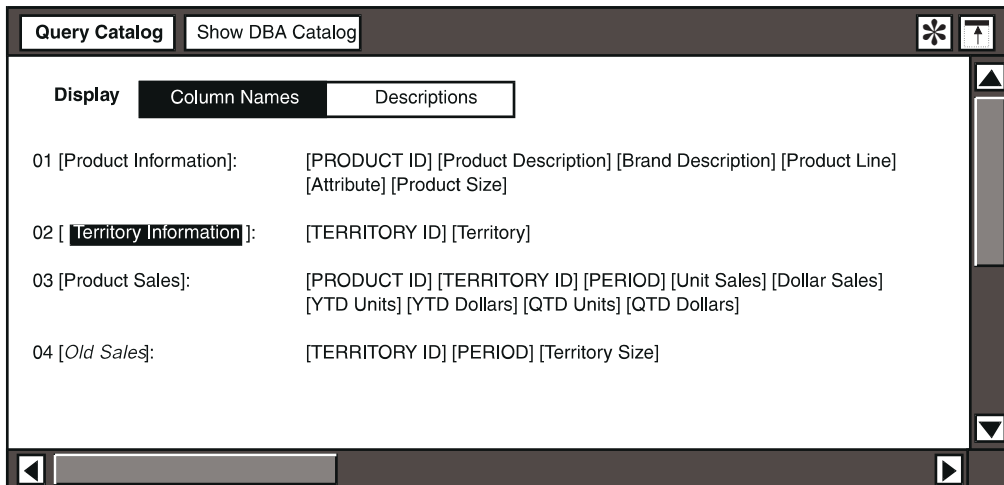
Figure 37. Retrieving a whole table from the user catalog

2. Select the Query window header.

Both selection methods provide the same results. Regardless of the method you use, selected entries are automatically duplicated in the Query Control window, resulting in a copied table like the one shown in Figure 38.   The order in which the columns are displayed is determined by the order in which you selected them. Notice that column names are checkmarked to show that they have been included in the results area of the Query window. The same names are also underlined in the user catalog as if you had selected them individually.

Territory Information
▤ TERRITORY ID
▤ Territory

Figure 38. Table as it is displayed in the Query Control window

Retrieving Several Columns

You can copy several columns to the Query window, either by copying them one at a time or by copying several at once. Both methods are described below.

Copying Columns One at a Time

The advantage of copying columns one at a time is that you can specify in what order the headings are displayed as you go along.

To copy columns one at a time:

1. Select the first column name in the user catalog.

2. Copy it into the results area of the Query window. The first name is displayed in the leftmost position.

3. Repeat steps 1 and 2 for each additional column.

This method permits you to change the order of the columns, after you have placed the first two. For example, suppose you placed two columns in the Query window, and decide that you want to insert a column between the first and second one. To insert a column between two others:

1. Select the new column name in the user catalog.

2. Copy it directly on top of the first column in the Query window. The new column is displayed in the second position from the left.

You cannot use the copy method described in the previous set of steps to replace the column in the first or leftmost position. To insert a column immediately to the right of the `Select All` button, you must duplicate the leftmost column, insert the column you want to replace it with between the duplicate columns, then delete the first duplication.

Copying Several Columns Together

Copying several columns together is more efficient but requires you to specify the columns in the order that you want them displayed.

To copy several columns together:

1. Select the first column name in the user catalog.

2. Extend (hold down to the next column that you want to include in your query, and copy the column or columns into the results area of the Query window.

The column headings are displayed in the window in the order that you selected them in the user catalog. The selected column names are then underlined in the user catalog portion of the Query Control window.

The table from which columns are selected is displayed in the Query Control window. The selected column names are checkmarked in the listing to show that they are included in the Query window, as shown in Figure 38 on page 74.

You can delete items that are displayed in the Query depiction, but you cannot move them around in the window. When you click on the `Show Query` button, the tables are often rearranged by the tool so that all your selections are visible.

Joining Tables

In a database, the column names are often duplicated in several of the tables. This allows the system to match columns of the same data type. The ability to store and maintain data in separate tables, and to link those tables during data retrieval, is one of the most important features of a relational database system.

Common items can have different column names in the different tables (for example, div number, division #). However, they are both numerical values representing the same item. Figure 39 on page 75 shows an example.
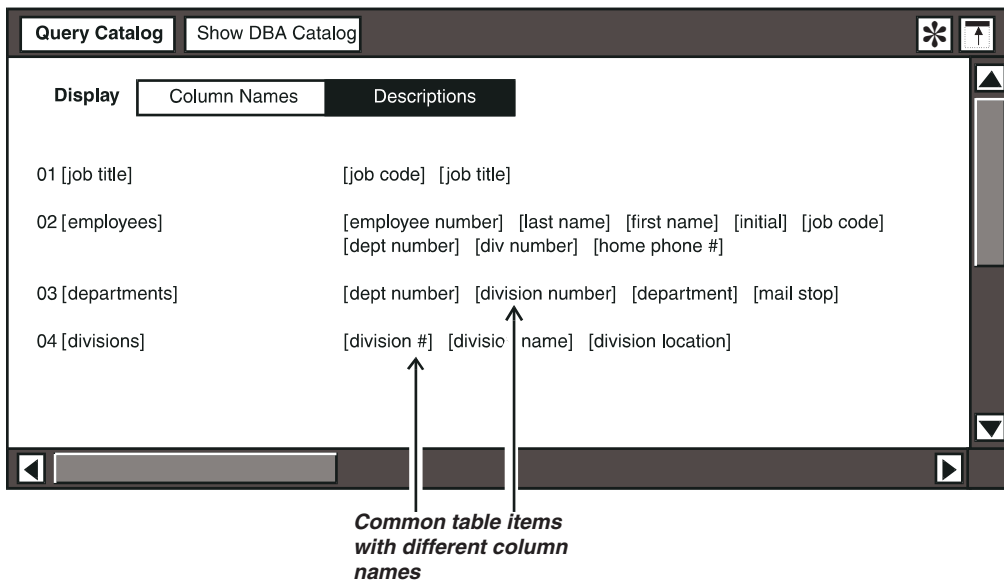

Figure 39. User catalog showing common items with different names

The query can match up an employee's last name with the name of the division she works in by matching them through the division number contained in both tables.

Two types of joins are used in the Query tool: default joins and manual joins. These joins are described in "Default Joins" and "Manual Joins".

Default Joins

When you select the Query Control window header, a line connects the two tables through the data column. This line usually contains an equal sign (=) and is called a `default join`. Using the database category shown in Figure 39 on page 75 as an example, the line represents the path that the system takes to find the department name that is associated with the last name. The Query tool creates the default joins between tables using the following procedure:

1. The system finds the *last name* and the *dept number* in the employees table.
2. It matches the *dept number* with the same *dept number* in the departments table.
3. It then retrieves the *dept name* that matches that number.

The specification for default joins is usually set by the database administrator or someone who has access to the DBA tool. For more information about using the DBA tool to create default joins in a database, see *Administering Databases with Meta5*.

Manual Joins

Depending on the design of your database, there are some cases when you might need to create a manual join. For example, the database can be set up so that a default join does not occur between certain tables. Then you must create the join manually in the Query Control window.

To create a manual join:

1. Select the appropriate column name in the first table.
2. Extend to the matching column name in the second table. The join line is drawn between the two column names.

You might also need to create a manual join to improve the performance of the Query tool. Creating manual joins improves the performance of the Query tool because it eliminates the time needed to search a table for the related column name. Manual joins are also required when you are using two or more views (a predefined query) in a single query. For more information, see "Chapter 11. Using Query Views," on page 109.

For example, a database might be set up so that a default join between a departments table and a divisions table occurs through the employees table as shown in Figure 40 on page 77.
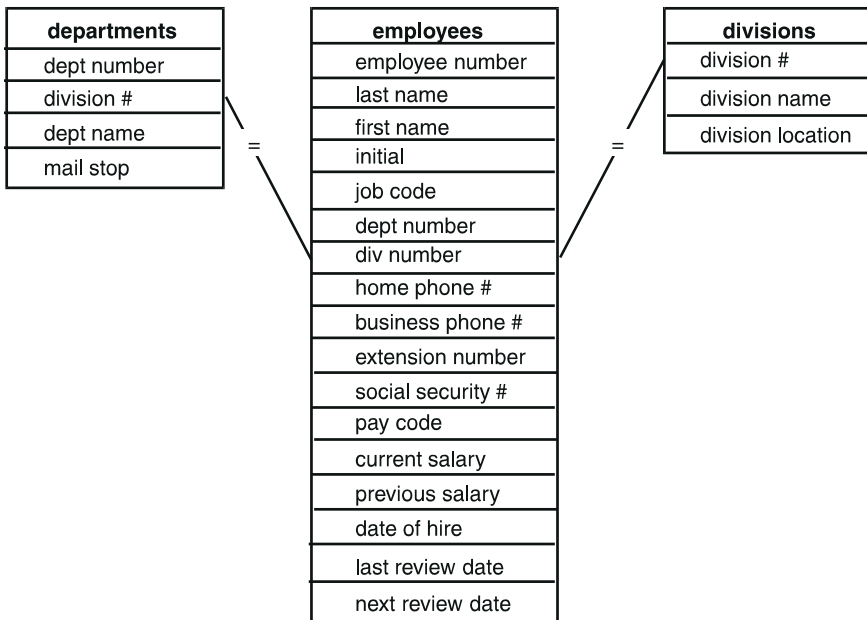
Figure 40. Default joins between three tables

If you do not need the employees table information in your query results, you can delete that table from the Query depiction, then manually connect the remaining tables through the division number column using the right and left mouse buttons.

To delete an unwanted table and create a manual join:

1. In the Query depiction, delete the heading of the unwanted table.

   If you have already clicked on the `Show Data` button in the Query window, you cannot delete the table from the Query depiction. You must first click on the `Clear Data` button, then individually delete any column headings in the Query window's results area that are associated with that table.

2. In the departments table, select the column name you want, and extend to the column name you want to join it to in the divisions table. A join connects the two column names, as shown in Figure 41.
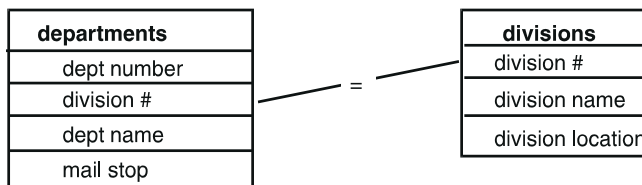

Figure 41. Manual join after deleting unwanted table

If you make a mistake or need to delete a join:

1. Select the join line. Both ends of the line become highlighted.
2. Delete the join by pressing the Delete function key or by using the pop-up function pad.

Chapter 8.   Constraining Data

The Query tool permits you to limit retrieved data by applying `constraints`. A constraint is a technique used to retrieve data that meets a certain criteria. For example, you might want to retrieve all data about a single product or all data about that product during a specific time period.

You constrain your data to specific values in the selected columns by using a Comparison Options window associated with each column name. You can restrict the range for any column of data whether or not it is to be displayed in the Query window. This chapter discusses the following topics:

- Understanding constraint types
- Applying constraints
- Specifying the constraint source
- Changing or removing a constraint
- Using more than one constraint
- Setting options in joins

Constraint Types

The Query tool provides a variety of constraint options for making your data more specific. You can:

- Constrain data to a single value
- Set constraints to multiple values
- Use wild cards to search for matching pattern strings
- Constrain using date arithmetic expressions
- Insert user-defined variables

Constraints are displayed in the depiction area attached to the column name you want to limit. The first item in the constraint string is always the operator, and the default operator is an equal sign. This tells the system to retrieve all data for the item that is equal to the constraint you have chosen. In "Applying Constraints" on page 83, specific procedures for limiting your query are described.

Constraint types are described in more detail in subsequent chapters; this section is intended to give you a brief introduction to each one, and show you how each constraint type is displayed in the depiction area. A more detailed description of constraint operators can be found in "Selecting an Operator" on page 86. Figure 42 on page 80 shows a Query depiction with some sample constraint types.
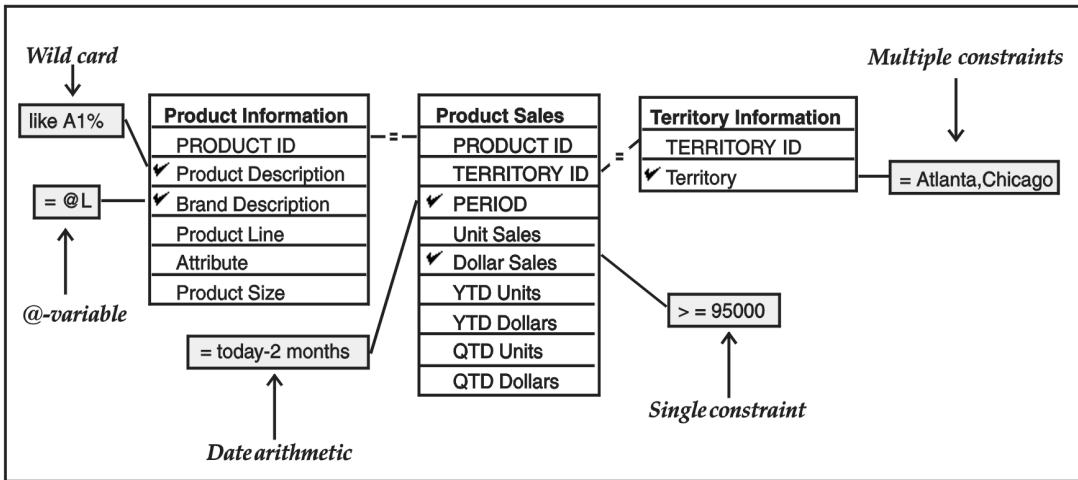
Figure 42. Constraints types

Single Values

The simplest way to retrieve data is to set up the Query tool to retrieve all data of a certain kind. For example, you can request all information about one particular product, such as A1 Soda, by applying that constraint to `Product Description`. Figure 43 shows a constraint that specifies a single value. This type of constraint is described in "Applying Constraints" on page 83.
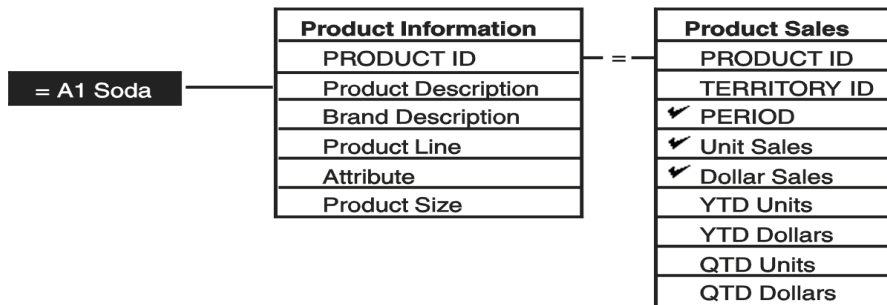

Figure 43. Constraining to a single value

Multiple Values

You can obtain information about several products by putting multiple values in a constraint. For example, you could set the constraint on `Product Description` to retrieve information about A1 Soda, Diet Soda, and Diet Seltzer.

Figure 44 on page 81 shows an example of a multiple constraint on `Product Description`. Notice that you indicate multiple constraints by including separating commas. If you type the constraints, you must also type these commas. However, if you select constraints from a list of displayed values, the system inserts commas for you. The ability to select constraints from a list of choices is described in "Applying Constraints" on page 83.
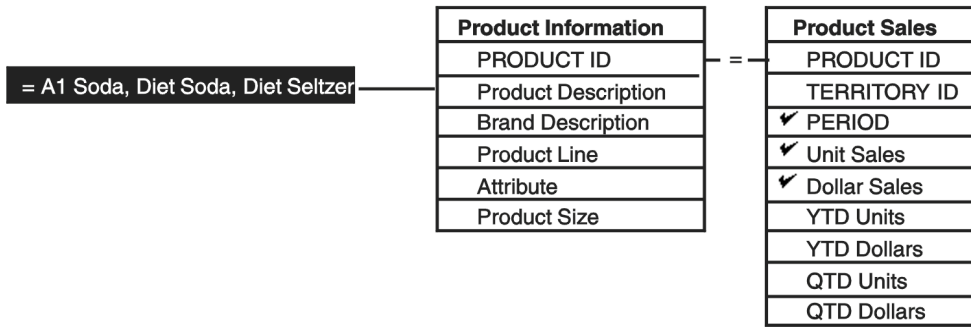
```
= A1 Soda, Diet Soda, Diet Seltzer

Product Information              Product Sales
  PRODUCT ID          — = —       PRODUCT ID
  Product Description             TERRITORY ID
  Brand Description             ✔ PERIOD
  Product Line                  ✔ Unit Sales
  Attribute                     ✔ Dollar Sales
  Product Size                    YTD Units
                                  YTD Dollars
                                  QTD Units
                                  QTD Dollars
```

Figure 44. Constraining to multiple values

Wild Cards

SQL statements permit the use of wild card characters to search for items that match a particular character pattern. The Query tool permits you to use two wild card characters: the percent sign (%) and the underscore (_). The percent sign permits you to search for a sequence of characters. The underscore matches a single character.

To search for all products in the database that begin with the letters A1 and end with the word Soda, constrain `Product Description` to `A1%Soda`. Use the underscore when you want to search for any single character in a value.

A wild card character can be used anywhere in the character string. For example, constraining `Product Description` to `%Diet` would retrieve information for all products whose names end with Diet.

You can also use the percent character to specify a range of values, which is often a useful shortcut to typing lengthy names. However, if you combine the wild card character with the `Between` operator to specify a constraint, be careful to ask for the exact data you need. For example, if you use the wild card character to specify a range between `A%` and `D%`, the query returns only data names that begin with the letters A, B and C. In other words, combining the wild card character with the `Between` operator tells the Query tool to retrieve data for only those items whose names begin with A, B, and C, and not for any items named D. If you were constraining territories, your data would then omit any information about Dallas or Denver. To retrieve information up to and including all territories beginning with the letter D, you would need to constrain between `A%` and `E%`. See "Using More

than One Constraint" on page 92 for more information about using the `Between` operator.

Date Arithmetic

Instead of just specifying a single date or range of dates, you can perform date arithmetic when setting constraints. Since the Query tool stores the current date, it can recognize the following word combinations in constraints:

*   today
*   this week
*   this month
*   this quarter
*   this year

With this capability, you can constrain `PERIOD` to `this month`, and reuse the query indefinitely, since it would always retrieve data for just the current month. You could also add an operator, and write constraints that tell the Query tool to retrieve information for `today - 1 month`. The tool evaluates an expression in a constraint date. Table 16 shows how date arithmetic expressions work if the month is August, 1994.

Table 16. Date arithmetic expressions

Constraint date	Results
this month - 1 month	July, 1994
this month - 6 months	February, 1994
>this month - 6 months	February, 1994 onward
between this month - 1 year and this month	August, 1993 through August, 1994

@-Variables

User-defined variables can be employed across applications for purposes of convenience and efficiency. In Meta5, @-variables are used as a shortcut to typing and to make the data more portable to other tools. Specifically, @-variables are used in tools that you use inside capsule application windows where they take values from the capsule application's control window.

For example, if you know that the variable @L always stands for Brand Description in your capsule application, you can use this as a typing shortcut. Additionally, you can use the same @-variable many times over, but assign different values each time. If @A is always defined as Territory, and you assign it the value Buffalo, then assign the value Diet Soda to @L, running the query tells you how well that particular brand is selling in Buffalo. You can then change the

value of @L in the capsule application's control window, perhaps so that it retrieves Tropical Nectar information, and run the query again. This time you get all information available for the brand Tropical Nectar in the territory Buffalo.

You can combine @-variables in date arithmetic constraints, such as specifying `@F - @G weeks.`

Be sure to add a space between the value and the first letter of the date arithmetic expression, otherwise a single-letter @-variable will be interpreted as two-letter variable. For example, `@Gweeks` would be interpreted as @GW followed by the word eeks.

Figure 45 on page 83 shows a depiction area with two constraints containing @-variables where @L specifies a brand description, and @A tells the Query tool to look for all information about a specific territory.
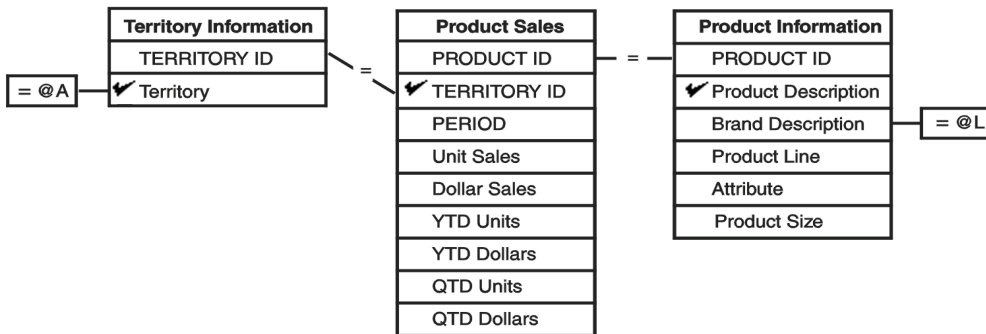
Figure 45. Constraints using @-variables

The values for @-variables are generally specified in the capsule tool's User Input Control window. You might also want to check with your database administrator for a list of @-variable values. For more information about how @-variables can be used across tools, see *Capsule User's Guide*.

Applying Constraints

Before you can apply any constraints, you need to open the options window for the item you want to constrain. To open the options window, select a column name in the depiction area and display its options window.

Figure 46 on page 84 shows a Comparison Options window. The name of the selected column is displayed in the `Label` field; in this example, the column name is Territory.
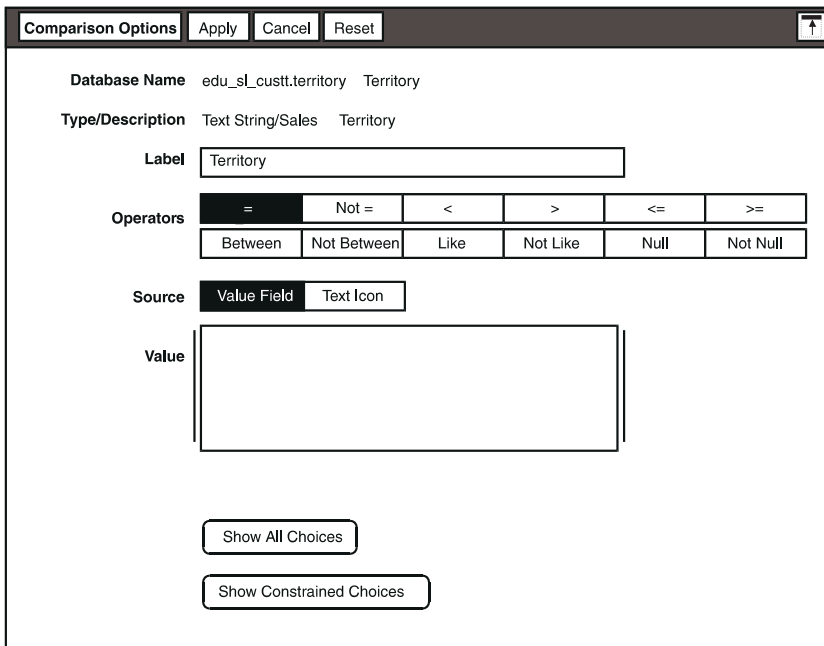
Figure 46. Comparison Options window

To constrain Territory, you enter a value for the selected column and then close the Query Control window. Notice that a small rectangle is now attached to the column name Territory. The rectangle contains the constraint value you entered in the `Value` field. The constraint frame remains highlighted until you deselect it. Notice that the default selection in the `Operator` field, the equal sign, is also displayed in the constraint.

After you specify the value, the constraint is attached to the specified item wherever it fits most conveniently in the available space.

Specifying the Constraint Source

When you open the Comparison Options window, you can choose to set constraints equal to or like those in a value field, or in a Text icon. The default choice is to use the `Value` field. If you are entering values just once in a specific Query icon, or if you are entering just a few values, it is easier to use the `Value` field.

However, if you are entering many values or if you want to save the values that you use frequently, select a Text icon as your source.

The Text icon should be placed in the same container, capsule application, or folder, as the Query icon. If the Query icon is on the desktop, place the Text icon on the desktop or enter the entire path name for the Text icon in the `Text Icon`

`Name` field. When you use a Text icon as the source, the search strategy for the source icon is:

1. The container where the Query icon resides is searched first.
2. Next the desktop is searched.
3. Finally, the search continues at the System|File Drawers level.

If the Query icon that uses the values is located in a capsule application, the path name might look like:

Source	Value Field	Text Icon
Text Icon Name	Monthly Capsule|Territories	

Figure 47. Constraint operators

To create a Text icon that can be used as a source for constraint values:

1. Copy a blank Text icon to your desktop or into the container where your Query icon resides.
2. Open the Text icon and type the constraint values for the column, separated by commas. For example:

   ```
   Los Angeles, San Francisco, Seattle
   ```
3. Close the icon and enter a unique name in the `Text Icon Name` field.

The sections that follow provide detailed information about the other fields and buttons in the Comparison Options window.

Working in the Comparison Options Window

The first two fields in the Comparison Options window are read-only fields. These fields identify the column name in two ways. The `Internal Name` is the unique internal name of the table and its associated column. The database server only understands internal names, and not the user-specified label.

The `Type/Description` field provides the type of data presented in the column (for example, date, text string, amount) and a description of the column which corresponds to the column name. Even if you change the name in the `Label` field, this name remains unchanged. It is uniquely defined by the column name you selected before opening the Comparison Options window.

Renaming the Column

The `Label` field contains the column name as the default when you first open the window. You can delete the default name and enter one of your own choosing. You can enter a name consisting of up to 30 characters. If you change the name,

that change also takes effect in both Query windows. For example, you might want to change the name Territory to something more specific, such as Query window.

Selecting an Operator

The `Operator` field is displayed with the equal sign highlighted as the default. You can change the operator at any time by selecting the one of your choice. Use the `Operator` field to set an operator for the constraint, then enter a value, as discussed in "Entering a Value" on page 86. For example, if you select the `not=` operator, and then type `Atlanta` in the `Value` field, the Query tool would return all cities within the territory except Atlanta.

The `Between` operator returns a range of values, including the starting and ending values you specify.

When you use the `Like` and `Not Like` constraint operators, you can use the percent sign (%) and the underscore (_) as wild card characters. The percent sign represents multiple characters and the underscore represents a single character.

Table 17 lists the operators and their respective functions.

Table 17. Operator functions

Operator	Returns data that
=	Equals the value(s) entered
Not =	Does not equal the value(s) entered
<	Is less than the value entered
>	Is greater than the value entered
<=	Is less than or equal to the value entered
>=	Is greater than or equal to the value entered
Between	Is within the range of values entered
Not Between	Is not within the range of values entered
Like	Matches the string data entered in conjunction with a wild card
Not Like	Does not match the string data entered in conjunction with a wild card
Null	Is specified as null in the database
Not Null	Is not specified as null in the database

Entering a Value

When you first open the Comparison Options window, notice that the insertion point is in the `Value` field. You are expected to enter a text variable for the

operator to act on. Another way to enter a value is to click on Choices window. This feature is discussed in "Selecting Values from the Choices Window" on page 88.

Typing the Value into the Field

If you select `Between` as the operator, two value fields are displayed, labeled `Beginning Value` and `Ending Value` so that you can specify a range of values. For example, to constrain the column name `Last Name`, you can select the `Between` operator, type `Evans` in the `Beginning Value` field, and type `Leone` in the `Ending Value` field. The Query tool returns only those names that occur alphabetically between the two that you entered, assuming the values are sorted alphabetically. An exception might be the months of the year, sorted in chronological order.

Be sure to specify beyond the range of values if you use a wild card in constraints that contain a range of values.

Typing Multiple Values

You can specify multiple values by placing commas between them. When you use a comma as a thousands separator or a decimal separator, always use a comma and a space between values. Otherwise, the value is interpreted incorrectly. For example, to constrain the column name division number, you can select the `Equals` operator and enter the values as `231, 345`. The Query tool returns only data related to those divisions and ignores any data related to the other division numbers.

The Set Preferences window lets you specify the number format for your desktop. For more information about choosing a number format, see *Getting Started with the Meta5 Developer's Desktop*.

Entering Date Values

Date values that you type directly are case-insensitive. The date you enter into the `Value` field can change format depending upon the settings for your particular desktop.

Table 18 shows some sample formats for entering dates directly into the field.

Table 18. Date formats

To specify	Formats
Day	January 15, 1995; Jan 15, 1995; Jan 15, 95; Jan 15 95; 15 Jan 95; 15 January, 1995
Month	January, 1995; Jan, 1995; January, 95; Jan, 95; Jan 95
Year	1995; 95

Table 18. Date formats

To specify	Formats
Odd-Bimonth	DJ, 1995; DJ 95
Even-Bimonth	JF, 1995; JF 95
Quarter	1Q95

While all date resolutions can be displayed, for non-numeric data types, the date resolutions `Week`, `Quad Week`, and `Qtr` do not translate correctly to date format when used as a constraint in the Query tool.

Selecting Values from the Choices Window

You can select the `Show All Choices` button near the bottom of the Comparison Options window to display all the valid choices for the `Value` field. Using this method is advantageous because it lets you select the values from a list, thereby minimizing typing errors and eliminating the need to memorize all the possible values in your database.

To select values from the Choices window:

1. Open the Comparison Options window and click on the `Show All Choices` button.

2. Select one or more of the displayed values and close the Choices window.

When you click on the `Show All Choices` button, you might see a message in the message area indicating that the request has been sent to the database. Depending upon the number of choices in that particular list, the window can take a few moments to open.

In the Choices window, values are always listed alphabetically for character data, in ascending order for numeric data, and in chronological order for dates. You can select the values from the displayed list in any order that you want.

If you are working with query views, described in "Chapter 11. Using Query Views," on page 109, you cannot see the buttons that display the Choices window. A view is a predefined query that has already been constrained. Therefore, the `Show Choices` and `Show Constrained Choices` buttons are not available.

Selecting Multiple Values

If you choose more than one value, your choices are separated by commas and spaces. Remember that no values are displayed in the Choices window:

1. Select the first choice.

2. Continue to highlight choices by clicking the right mouse button. You can highlight choices in succession, or select random choices in the list.

3. Close the Comparison Options windows.

When you close the Choices window, the values you selected are displayed in the `Value` field in the order that the Choices window uses, which can be alphabetical, ascending or descending, or chronological, depending on the data type. If you select randomly in the Choices window, perhaps by choosing Los Angeles first, then Dallas, and then Kansas City, the `Value` field lists the names in the order you used to select the cities, as shown in Figure 48 on page 89.

Figure 48. Value field reflects Choices window order

Appending Additional Values

To include additional values, you can type the values in manually. You can also copy them from the Choices window by selecting one or more values and closing the window, or by copying them directly from the window.

To append a value by typing or copying it into the `Value` field:

1. Open the Comparison Options window and do one of the following tasks:

   • Type a separating comma after the existing values in the `Value` field, then type the new value.

- Display the Choices window and select the value or values you want to add. The comma is added after the existing values.

2. Close the Comparison Options window.

Notice that the Query tool does not sort the appended value with the others in the `Value` field. The value is simply added to the list of values. Accidently selecting the same value twice cannot adversely affect your results. The Query tool does not retrieve duplicate rows of data when you are selecting choices.

Deciding When to Display All Choices

You should have a rough idea of how many choices might be available for a particular value before using the `Show All Choices` button. Even though displaying all choices provides a typing shortcut, there might be several hundred choices to display for a particular item. In such cases, it takes a long time for the Query tool to display the list. An additional button, named `Show Constrained Choices` provides a way to avoid displaying unwanted information. This button is described in "Displaying Constrained Choices".

Interrupting the Choices Display

If you select the `Show All Choices` button and decide you do not want to wait for all the values to be returned, you can stop the search by pressing Stop. Doing so does not affect the Query data you have already specified in the Comparison Options window.

Displaying Constrained Choices

The `Show Constrained Choices` button at the bottom of the Comparison Options window lets you display a list of choices based on the constraints you have already applied to one table. This feature allows you to limit the database query to just those values that you want to see.

Using the `Show Constrained Choices` button invokes a Choices window similar to the one that is displayed when you click on the `Show All Choices` button. However, if you have already applied constraints, the Choices window might display fewer choices, and therefore, values are easier to locate.

Suppose you want to retrieve information about a product named Sparkle-Slim Soda, but you only want to find out about which product sizes sell best. You might build a query as in the following example:

1. Select Product Description in the Product Information table in the depiction area.

2. Constrain Product Description to just the product varieties you want to know about. For example, you might choose two popular soda flavors, such as Lemon-Lime and Cherry.

After you have built the query and applied constraints, you can look at a list of constrained choices:

1. Select Product Size in the depiction area.

2. Open the Comparison Options window.

3. Click on the `Show Constrained Choices` button to display a list of available product sizes for the two soda flavors Lemon-Lime and Cherry.

Instead of a complete list of all the products that exist in the Product Information table, the Choices window displays a list of values that are more pertinent to your needs.

If you click on the `Show Constrained Choices` button before applying any constraints, the Choices window lists all available choices just as if you had clicked on the `Show All Choices` button.

You can copy the constrained values into the Comparison Options window by selecting its title block, or by closing the Comparison Options window.

Changing or Removing a Constraint

After you have closed the Comparison Options window, a constraint containing the value you entered is displayed for a single column name in the depiction area. A line connects the constraint to the column name box. After clicking on the `Show Data` button in the Query window, you might want to run the same query again, but with a different constraint. For example, you might decide to change the constraint on the column name Territory from Buffalo to Philadelphia.

To change an existing constraint:

1. Select the constraint frame so that it becomes highlighted, as shown in Figure 49.

2. Open the Comparison Options window using the pop-up function pad or by pressing the Options key.

Product Information
PRODUCT ID
Product Description
Brand Description
Product Line
Attribute
Product Size

— =

Product Sales
PRODUCT ID
TERRITORY ID
✔ PERIOD
✔ Unit Sales
✔ Dollar Sales
YTD Units
YTD Dollars
QTD Units
QTD Dollars

=

Territory Information
TERRITORY ID
Territory

= Buffalo

= January 1994
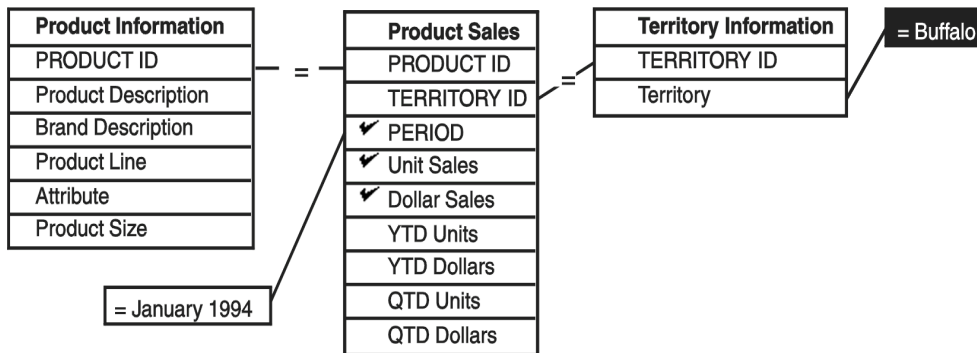
Figure 49. Changing the constraint

The Comparison Options window opens, just as if you had selected a column name. You can remove, change, or add values to the `Value` field, and you can change the operator. Constraints can be removed by simply selecting and deleting them. Each time you make a change, then close the window, the new changes are reflected in the depiction area.

Using More than One Constraint

Occasionally, you might want to add a separate constraint on the same column name. For example, suppose you want to constrain Territory to all cities listed alphabetically between Chicago and Los Angeles, but also include Philadelphia. You can do this by selecting individual city names and putting them in one constraint, then selecting the next territory and adding it as a second constraint.

First, specify the range of choices:

1. In the depiction area, select the column name Territory.

2. Open the Comparison Options window.

3. In the `Operator` field, select `Between`. Two value fields are displayed.

4. Type a value, such as `Chicago`, in the `Beginning Value` field.

5. Select inside the `Ending Value` field (to move the insertion point), and type a second value, such as `Dallas`.

6. Close the Comparison Options window by selecting its title block.

The constraint is displayed as shown in Figure 50 on page 93. Notice that the range of values is shown with dots between the two names in the constraint.
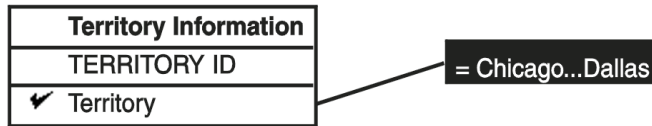
Figure 50. Appearance of the constraint

If you combine a wild card with the `Between` operator in a constraint, remember that the placement of the percent sign delineates the items you are requesting. Therefore, you need to constrain the query to retrieve all data between C% and M%, not just C% and L%. Doing so ensures that you get data for Los Angeles.

Now you can apply a second constraint to include one of the values that falls outside the range you specified.

To apply the second constraint:

1. Select the column name Territory. Do not select the constraint on Territory.

2. Open the Comparison Options window and select the `Equals` operator.

3. Type a value, such as `Philadelphia`, in the `Value` field.

4. Close the Comparison Options window.

Your depiction area now has two constraints attached to Territory. Notice that the constraint frames have been rearranged by the system to allow the second constraint to fit.
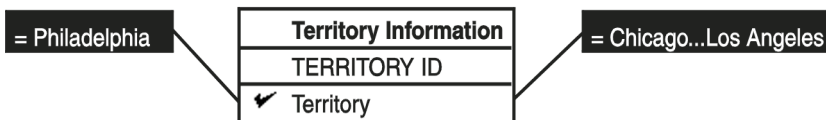
Figure 51. Adding a second constraint

These two constraints return territories that include Chicago and Dallas, and also Los Angeles. Other territories are excluded from retrieved data.

Setting Options in Joins

You can use the Comparison Options window to constrain a join between tables. Suppose you need to specify a relationship between columns in different tables. For example, you might have a column named $ sales in one table and a column named forecast $ sales in another table. You first create a join between these two columns. Then open a Comparison Options window, and select the `<` operator to depict only those cases where the total for $ sales is less than forecast $ sales.

To open this type of Comparison Options window:

In the depiction area, select the join connecting the two column names that you want to compare, and display its options window. Figure 52 shows the Comparison Options window for joined columns.

Comparison Options	Apply	Cancel	Reset	⬆

Internal Name DB3

Type/Description Amount/Integers

Label Integers

Operator	=	Not =	<	>	<=	> =

Internal Name QcarA.Integers0

Type/Description Amount/Integer numbers

Label Integers

Figure 52. Comparison Options window for joined column names

The Comparison Options window for a join is similar to the one you use to constrain a single column name, except this window is divided into three sections.

- The first section gives the `Internal Name` and the `Type/Description` for the leftmost column name and first `Label` field.
- The second section allows selection of an operator. In this window, the `Between` operator is not included. (Notice that there are no `Value` fields.)
- The third section is identical to the first section, except that its contents apply to the rightmost column name.

If you created a join between two tables as suggested in the first part of this section, then select the `Less than` operator to indicate where the total for $ sales is less than forecast $ sales, the join line in the depiction area is displayed with the < symbol instead of the more common equal sign. Figure 53 shows an example.

Sales Information		**Product Information**
📄 $ Sales		📄 Product Description
📄 Unit Sales	<	📄 forecast $ sales
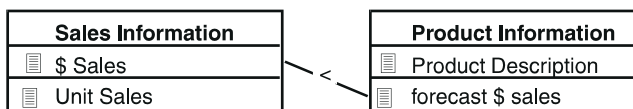
Figure 53. Example of a constrained join between tables

You can change join options using the same basic steps you used to set them. For example, if you wanted to make a comparison between the $Sales and

forecast $ sales shown in Figure 53, you simply select the current join, and delete it and then use the right and left mouse buttons to create the desired join. However, the easiest way to change an operator in a join is to keep the join intact, and select a new operator in the Comparison Options window. To change the operator in a join:

1. Select the join and display its options window.

2. In the Comparison Options window for joins, select a new operator from the `Operator` choices.

3. Close the Comparison Options window. The new operator is displayed in the join line in the depiction area.

For more information about joins, see *Administering Databases with Meta5*.

Chapter 9.   Editing a Query

This chapter shows you how to rearrange retrieved data to make it easier to work with. The following topics are covered:

- Rearranging Query data
- Changing a column heading
- Using a different database category

Rearranging Query Data

The two buttons in the upper section of the Query window allow you to arrange the data in your query in an order that makes analysis easier: the `Change Sort Settings` button and the `Unique Rows` button.

Sorting Data

The retrieved data in the columns is arranged in the same sequence as in the database. You can change this sequence by using the `Change Sort Settings` button. Selecting this button displays the Sort Controls window.

This window allows you to set the sorting sequence for up to seven data levels. For each level, the options are:

- A sequence setting to let you select ascending sorting order (0-9, A-Z) or descending sorting order (Z-A, 9-0)
- Column name fields where you copy the name of the column to sort

To select the column name for sorting:

1. Select the `Change Sort Settings` button in the Query window to open the Sort Controls window.

2. In the Query Catalog window, select a column name from the user catalog, or select a column in one of the tables in the Query Control window. If you select from the user catalog, the selection must be one that is already included in the depiction area's tables.

3. Copy the selected column into the Column field of the sorting level you want to change.

The internal name of the selected column is displayed in the field. You can sort up to seven columns in one database query. In Figure 54 on page 98, a name has already been copied into the Column field.
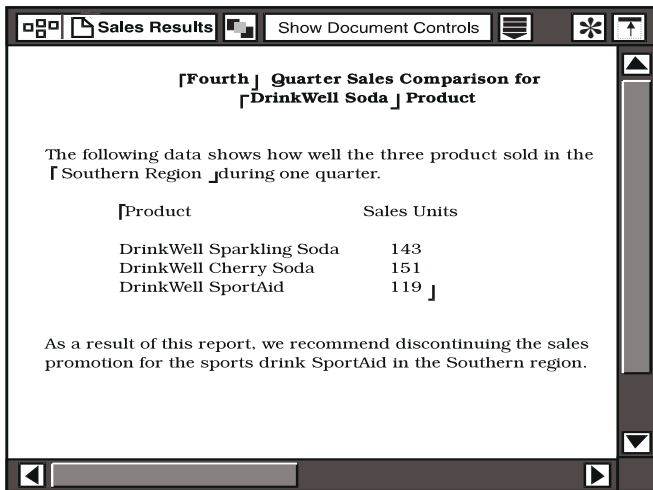
Query results shown in two different forms of presentation a document and a pie chart.
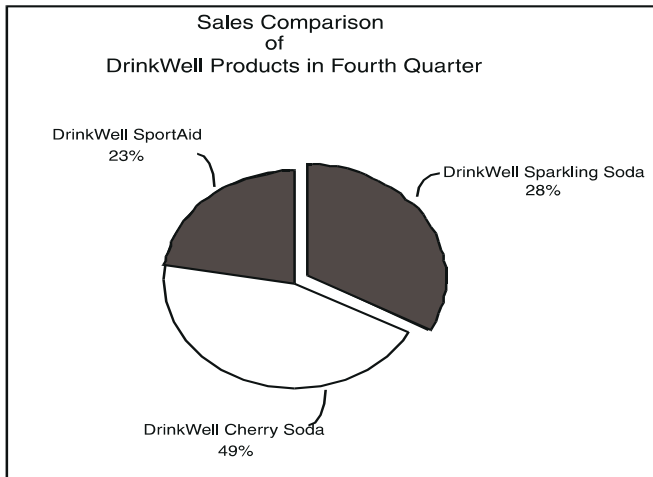
Figure 54. The Sort Controls window

As soon as you apply the new sort setting, a message is displayed in the system area of the Query window, just above the horizontal line, indicating that a sort is in effect.

Removing a Sorting Level

To remove a sorting level, select the column field in the Sort Controls window and delete it. If you have set sort controls for more than one column, the column at the lower level moves up to the next higher level. For example, if you delete a column name at Sorting Level 1, the column name at Sorting Level 2 moves up to the Sorting Level 1 position. You see this change only after closing and reopening the window.

When you remove a sorting level, and return to the default sorting sequence, the `Sort in effect` message is removed from the top portion of the Query window.

Looking at the New Sorting Order

If you have retrieved the data before clicking on the `Change Sort Settings` button, you must reselect `Show Data` for the data to be displayed in the new sorting order. Your changes will not be reflected by merely closing the Sort Controls window.

Eliminating Duplicate Rows

The `Unique Rows` button allows you to eliminate duplicate rows of data from the Query window's results area. Doing so helps to improve the performance of the Query tool, and ensures that you get only the data you have specified.

For example, suppose you retrieve data and the row for `Brand Description` is repeated three times, because there are three sizes of A1 Diet Seltzer in the database. Because each brand probably has a similar range, the Query tool must retrieve six items from the database. Since this is information you do not need, you can condense the `Brand Description` information into just one row.

When you are removing duplicate rows, be careful that you do not accidentally eliminate important data. Before clicking on the `Unique Rows` button, run the Query tool and check the returned data to determine whether or not to use this button. You should always take this precaution before eliminating columns from the results area. For example, if you have two people in your personnel database with the same last name, using the `Unique Rows` button can remove one instance of the name.

To eliminate unnecessary data and show only unique rows:

1. In the Query window, click on the `Unique Rows` button.

2. Click on the `Show Data` button again.

When you use this procedure, you are asking to see only the unique rows of data, and the Query tool responds by eliminating duplicate rows.

Changing a Column Heading

Occasionally, you might want to change the heading of a column in the Query window. The changed name does not affect the data that is retrieved for that column because the data still reflects the internal name that is displayed in the first field of the Column Options window.

To change a column heading in the Query window:

1. Select the column heading. The entire column is highlighted.

2. Open the Column Options window.

3. Delete the old column name in the `Label` field.

4. Type the new name in the `Label` field. The `Label` field has a 30-character limitation.

5. Close the Column Options window.

The renamed column is displayed in the Query Control window.

Using a Different Database Category

To access another database category, click on the `Show DBA Catalog` button in the Query Catalog window. The DBA catalog page of the Query Catalog replaces the user catalog.

Looking at the DBA Catalog

The DBA catalog is similar to the window shown in Figure 55 on page 101.
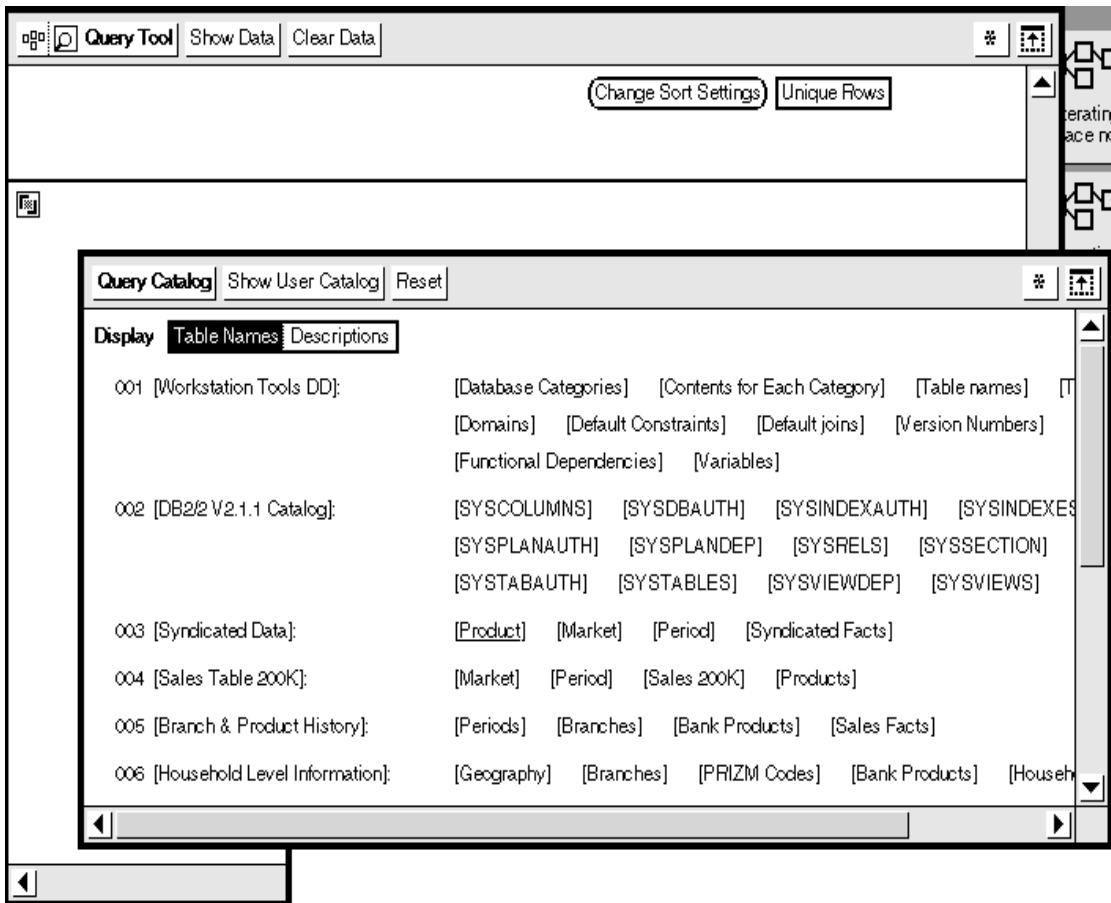
Figure 55. DBA catalog displayed in the Query Catalog window

Notice that the `Display` option now shows `Table Names` instead of `Column Names`. When the DBA catalog is displayed, you can scroll the window to see all entries in the database catalog, and you can use the mouse buttons to choose from the database contents.

Selecting a New Database Category

To display the database catalog and select to a new category:

1. Click on the `Clear Query` button to clear the current selections in the user catalog and the depiction area.

2. Click on the `Show DBA Catalog` button. The DBA catalog opens, displaying all the categories available to you.

3. Choose a different database category from the catalog. You can select an entire table name, or just specify individual column names from the new category.

4. Click on the `Return to User Catalog` button to display the new items you just selected in the user catalog. To return to your original category, click on the `Reset` button.

Depending on the number of categories available, this process could take some time.

When changes have been made to the database structure, the DBA usually updates a table that informs a Query tool, as it is being opened, that changes have occurred. In this situation, you will see the following message as the Query tool updates its information:

```
Reading DBA Catalog from Database Server. -- Please wait.
```

As when you select additional database categories, this process could take some time.

Occasionally the DBA might change the database structure without updating the appropriate table. If you suspect that this situation has occurred, you can click on the `Read DBA Catalog` button from the `Special` menu of the Query Catalog window while it is displaying the DBA catalog. The Query tool updates its information and displays the message shown above about reading the DBA Catalog.

Chapter 10.   Working with Query Data

This chapter explains how to retrieve and manipulate query data. Topics covered are:

- • Retrieving data from the database
- • Capturing the SQL output for a query
- • Saving query data
- • Removing query data
- • Printing query data

Retrieving Data from the Database

After you have finished building your query, use the Query window to retrieve your data. The buttons in the Query window header permit you to retrieve data, clear data from the results area, and either display or hide the Query window. You should leave the Query Control window open on your desktop.

Displaying the Query Data

After you have constructed the query, you can retrieve the information from the database:

1. Move the Query window in front of the Query Control window.

2. Click on the `Show Data` button in the window header of the Query window.

When the query is complete, the data is displayed in the results area.

The data is arranged in columns and rows, just like a spreadsheet. If you build your query without selecting Query Control window, clicking on the `Show Data` button causes the depiction in the Query Control window to be updated, just as if you had clicked on the `Show Query` button.

Stopping the Query

There are three methods for stopping a query after you have clicked on the `Show Data` button:

- • Click on the `Stop Query` button in the `Special` menu of the Query window to halt the query without closing either window. This method of stopping the query takes more time because you have to display the `Special` menu. Use it when you change your mind about retrieving the data, or when you want to add constraints.

- Press the Stop function key to halt the query process at any time. This method is the fastest way of halting a retrieval process. You might press the Stop function key when you realize that the query is trying to retrieve too many records.

- Close the Query window.

All methods of stopping the process produce incomplete results. Although some data might be returned, you need to run the process again to be sure your results are correct.

Capturing the SQL Output for a Query

By using the `Capture SQL` item in the `Special` menu of the Query window, you can save all communications with the database server. This is a useful technique for keeping a record of your Query session.

| Add Expert Functions |
| Enable Edits |
| Capture SQL |
| Stop Query |
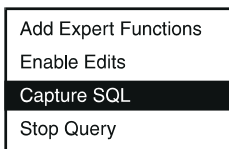
Figure 56. The Special menu

Suppose you have built a query, added constraints, and now you want to view the results. To capture the SQL output for your query:

1. Display the `Special` menu and select `Capture SQL`.

2. Click on the `Show Data` button to begin the database query.

A window called the Query Log opens in the lower right corner of your desktop. While the Query tool accesses the database, the SQL information is displayed in the Query Log window. The information in the Query Log is recorded using the internal names for the data columns you requested.

Using the Contents of the Query Log Window

The Query Log window is a capture window that provides all the same functions as the Text tool. Each time you use the `Capture SQL` item to record a Query process, a separate Query Log window for that session is added to your desktop. This time-stamped window is unique to each Query process.

A sample `Query Log` is shown in Figure 57 on page 105. Notice that the title block in the window header contains the current date and time, marking the exact second when the `Query Log` opened.
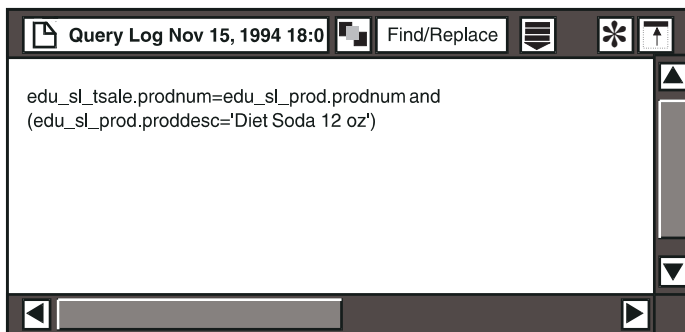
Figure 57. Query Log window

Figure 57 shows the Query Log window that is displayed after you select `Capture SQL` and then click on the `Show Data` button. The window's default size does not permit you to view the entire contents, but like any Text window, it can be moved, enlarged, and reformatted. To see the entire contents of the window, you might need to resize the window, then scroll up to view the beginning of the captured SQL.

You can record the SQL output for multiple Query processes by leaving the Query Log window open. For example, you might want to perform a query, change a constraint, then run the same query again. The SQL information for the second query is appended to the information you captured when you ran the first query. The Query Log window continues to record the SQL output for each query as long as the Query Log window and the Query window remain open on your desktop. Remember, however, that the time in the Query Log window title block always reflects the exact second when the Query Log window first opened, and does not record the start time of subsequent database queries.

Date constraints in the Query Log window use the same format as the database.

You can close the Query Log independently of the Query window, or you can select the Query window's title block, and both windows close. After you close the Query Log the capture process stops. The Query Log icon remains on your desktop until you delete it.

You can expand the Query Log icon to view the date and time of the capture.

Stopping the SQL Capture

To stop the capture process, select the title block of the Query Log window. The Query Log window immediately closes, and its contents reflect whatever the capture gathered up to the second you selected the window title.

Saving Query Data

Query data is not stored in the Query icon when you close and reopen it. However, you can save query data by copying it to a Plot, Text, Layout or Spreadsheet icon. You can copy:

- Any rectangular block of information (like selecting a range of cells in a spreadsheet)
- Individual or multiple columns or rows
- The entire results area by selecting the Query window

Removing Query Data

There are three ways of removing data from your query. You can:

- Clear only the retrieved data but retain column headings and the depiction area information
- Clear the entire query, including the results and depiction areas
- Delete specific items from both Query windows

You perform these operations by using the `Clear Data` button, the `Clear Query` button, or by deleting selected data. Each of these methods is described in the sections that follow.

Clearing Retrieved Data

Click on the Clear Data Button in the Query window header to remove all data, but retain column headings and depiction area information.

Clearing the Query

Click on the Clear Query Button in the Query Control window header to completely erase the query depiction in the Query Control window. Clearing a query removes retrieved data and the table and column names from the Query window.

Clicking on the `Clear Query` button deletes your work and it cannot be retrieved. To save a copy of the query setup, save it as a view.

Deleting Parts of a Query

You can delete items that you are sure you no longer need, or even an entire query. To protect you from accidentally deleting important data, you cannot delete a column heading from the results area of the Query window if it is associated with:

- Computed headings

- Columns from other tables
- Columns from any saved views

Deleting All Column Headings

To delete all column headings in the results area of the Query window:

1. If data is present, click on the `Clear Data` button.
2. Click on the `Select All` button in the results area and delete all the selected column headings.

Deleting Individual Column Headings

To delete individual column headings in the results area of the Query window:

1. If data is present, click on the `Clear Data` button.
2. Select one or more column headings and delete.

Deleting columns in the Query window removes the checkmarks from the column names in the Query Control window. You can still request a database query after you have deleted columns.

Deleting Columns or Tables in the Query Depiction

The depiction area's contents can only be deleted after the contents of the results area have been deleted, or if the table's columns are not being used in the Query window results area; that is, there are no checkmarks next to the column names.

To delete items in the Query depiction:

1. In the Query Control window, select the table name and delete it.
2. Continue selecting and deleting tables as needed.

Printing Query Data

The Query icon cannot be copied to a Printer icon, so you must use other tools to print Query tool results. Data can be copied to a Spreadsheet, Plot, Layout, or Text icon for printing.

Chapter 11. Using Query Views

A *view* is a predefined database query that you can list in the user catalog.
Saving a Query view allows you to capture a particular query, assign a meaningful
name to it, and use it later.   Saved views can be used many times to retrieve the
same type of Query data. Because you are not working with the whole range of
database tables, selecting a view to work with provides a convenient shortcut.
You can also use a view as a template, modify it by adding different constraints,
then save it under a different name. Views also allow you to perform some
calculations without using spreadsheets. This chapter provides information about
creating, naming, and using views.

Creating a View

When you have a particular query that you want to use later, you can save this
query as a view. This feature lets you set up specialized query templates; that is,
queries that look at specific, predefined items in the database. For example, if
you want to look at just the sales information for one brand of product, you can set
this constraint in your view, and use the saved view every time you need it. The
Query Control window lets you create and name reusable Query views.

To create a view:

1. Set up your database query and test it. Ensure that it retrieves the data you
   want.

2. In the Control window, select `Save As View` from the `Special` menu. The
   New View Options window opens.

3. Enter a name for the view in the `Label` field. The name should be associated
   with the specific data you are focusing on.

4. Select in the `Description` field and add a comment describing the contents
   of that view. This step is optional, but recommended. Entries in the
   `Description` field can be useful to others who might use the database
   query.

5. Close the New View Options window.

When you close the New View Options window, a message is displayed in the
message area of the Query window informing you that the new view has been
added to the end of the user catalog in the Query Catalog window. The name of
the new view is displayed in italics at the end of the list of categories in the user
catalog. If the user catalog is a large one, you might have to scroll that section of
the window to see the last item.

If you added comments in the `Description` field, you can look at that information by clicking on the `Descriptions` button in the `Display` option, as shown in Figure 58 on page 110.
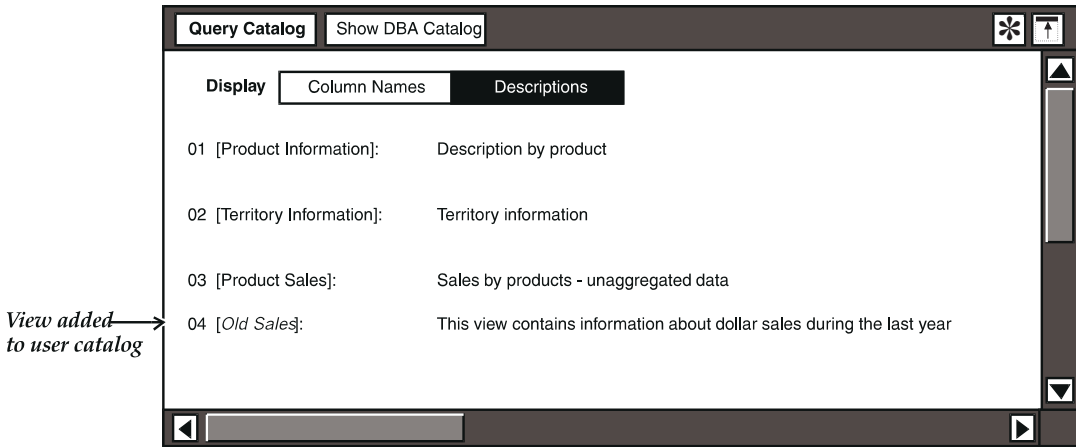
Figure 58. A saved view and its description

Data retrieved for the view is not saved with the view. Only the table and column names are saved. If you previously changed the sort settings, or chose to display only unique rows, those changes are not saved with the view.

Changing a View

You might want to use a view to build and test a new database query setup, or you might want to simply change the query specifications of an existing view. To change a view:

1. Select the name of the view in the user catalog.

2. Click on `Show View` in the `Special` menu of the Query Catalog window. The saved view is displayed in the depiction area and in the Query window. At this point, you can choose to perform any of the following modifications:

   • Add a column by selecting an item in one of the tables in the depiction area, and copying it into the results area.

   • Delete a column.

   • Change a constraint by selecting the constraint in the depiction area and editing the constraint in the Comparison Options window.

3. Select `Save As View` in the `Special` menu of the Query Control window. The New View Options window is displayed with the `Label` field highlighted.

4. Close the New View Options window without changing anything in the `Label` field.

After you complete these steps, a message is displayed in the message area telling you that the old view has been replaced with the new one. The name is still displayed in the user catalog, but any changes you made to that view are reflected in the Query window.

If you want to keep the original version of the view, you must enter a new name for the new view in the New View Options window. You then have two views: the original, and the new one with the new name. The Query tool prevents users from creating two views with the same name.

When changing a view, you cannot display constraint choices by clicking on the Comparison Options window. These buttons are not available when you are working in a view.

To delete a view, select the view in the user catalog and delete it.

Using Multiple Views

You can use multiple views in a database query. You might do this if you are building and testing a query to see if it retrieves the exact data you need. Or, suppose you want to look at how well a particular product sells during the holiday season, and perhaps compare two or more holiday sales periods side-by-side. There are three possible ways of performing this kind of analysis:

- Use the Reporter tool to retrieve all the data and display it in a report. See Part 3, "Reporter User's Guide," on page 145 for more information on how to do this.

- Create a query for each holiday period, then combine the data in a spreadsheet. See *Spreadsheet User's Guide* for more information about performing analysis with a spreadsheet.

- Create two views in a single query. Instructions for doing this are provided in "Creating Two Views".

Creating Two Views

Suppose you want to look at the sales for certain kinds of soda during the months of November and December. You would need to create a query that looks at A1 Soda, and constrain the period to between November, 1995 and December, 1995. Now save that query as a view named `Current Sales`.

In the depiction area, change the constraint on period to between November, 1994 and December, 1994. Save it again. In the New View Options window, save the new view as `Old Sales`. Figure 59 shows you what the user catalog should look like.
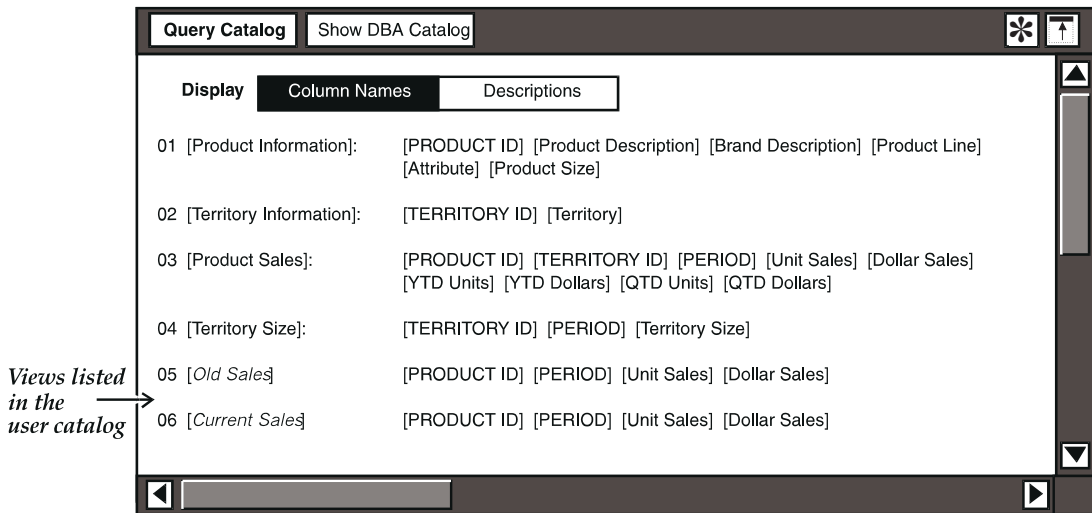
Figure 59. The user catalog with two saved views

Important:

> If you are using multiple views in a query, perhaps to test data retrieval, or to create different versions of a similar query, be sure to save each iteration as you make changes. You should also be aware that, while building a Query depiction, clicking on the `Show View` button deletes the depiction that you have just created. You can compare two views in the same depiction, but you cannot display a view and still retain an unsaved Query depiction.

Comparing Views

To look at both views side-by-side using the same views shown in Figure 59 on page 112:

1. Scroll the user catalog upward so that you can see both views clearly.

2. Select the view named `Old Sales`, and copy it into the results area of the Query window.

3. Select the view named `Current  Sales` and copy it into the results area of the Query window.

   Both sets of columns are displayed in the results area side-by-side. In the Query Control window's depiction area. The two views are displayed as separate tables with no joins between them.

4. To manually join the two tables, select `Territory` in the Current Sales table, and extend to `Territory` in the Old Sales table.

Performing Calculations with Views

The Query tool's ability to perform calculations is limited by the inherent structure of relational databases. However, some of these limitations can be overcome by using different views of a query. You can do this by creating a query with the basic computed column, then saving this query as a view so that you can perform further calculations on the data. In effect, you are setting up a query with computed columns whose formula contains other computed columns.

To use views for performing calculations:

1. Create a view with the first set of calculations.

2. Save the view to the user catalog.

3. Display the view in the depiction area, and create a computed column to perform the final calculation.

For more information on performing calculations, see "Chapter 12. Performing Calculations," on page 115.

Chapter 12.   Performing Calculations

You can perform a variety of calculations using the Query tool. This chapter describes:

- Creating a computed column
- Changing the calculation

Creating a Computed Column

Many of the steps below use techniques introduced in previous chapters. You already know how to select data from the database and constrain it, so those procedures are not described in detail. The steps for creating a computed column are provided in two parts. First you build the query, and then you must set up the calculation.

Building the Query

To set up your query:

1. Construct the query to retrieve only the non-calculated columns.

2. Constrain the tables for all the values you want to use for your calculations.

3. Select Query window header (if you have retrieved data after constructing the query).

4. Delete any columns in the results area that you do not want to see in your results.

5. Select `Add Expert Functions` in the Query window's `Special` menu. When you add expert functions, two new fields are displayed in the depiction area of the Query Control window. "Chapter 13. Using Expert Functions to Constrain Data," on page 121 explains how to use expert functions. A new button, the `Create Column` button, also is displayed in the Query window header.

6. Click on the `Create Column` button that is displayed in the Query window header. The Computed Column Options window opens.

Understanding the Computed Columns Options Window

When the Computed Columns Options window opens, the `formula` operator is always highlighted, because that is the default. If you choose to enter a formula, you can leave this operator highlighted, enter your label into the `Label` field, then move the cursor to the `Formula` field, and click the left mouse button. This will

cause the insertion point to move so that you can either enter your formula into that field.

If you select any of the first five operators, `sum`, `count`, `average`, `min`, or `max`, a field labeled `Grouped By` is added at the bottom of the window. Figure 60 on page 116 shows the field that is displayed when you select the `sum` operator.

| Computed Column Options | Apply | Cancel | Reset | ✳ 🔝 |

Database Name	Sales Tracking
Type/Description	Computed Column/None
Label	

| **Operator** | sum | count | average | min | max | formula |

| **Formula** | |

| **Grouped By** | edu_sl_custt.territory_edu_sl_tsale.units, edu_sl_tsale.dols |
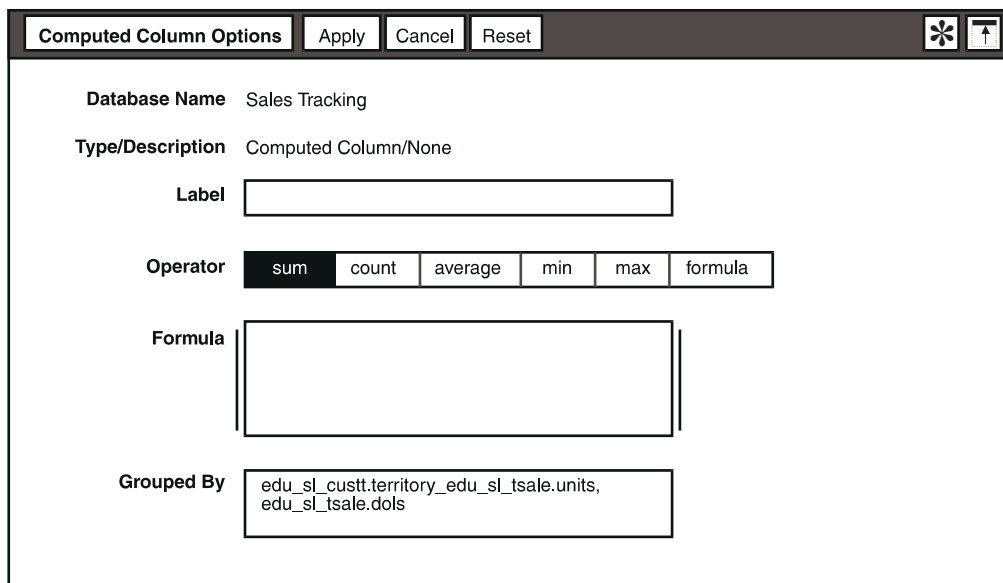
Figure 60. Computed Column Options window for a sum operation

The internal names in the `Grouped By` field are displayed when you select the `sum` operator, and represent the columns in the Query window. Table 19 describes the fields in the Computed Column Options window.

Table 19. Computed Column Options window fields

Field	Use to
Database Name	This read-only field gives the unique database name of the column. When you open the Computed Column Options window for the first time, it reads `Not Yet Assigned` and changes to the name of the database to which the Query icon is configured.
Type /Description	This read-only field tells you that the column type is `Computed Column` and the description is `None`.
Label	Enter a name for the new column. You are allowed up to 30 characters. If you change the name, that change also takes effect in the results area and the column is renamed.

Table 19. Computed Column Options window fields

Field	Use to
Operator	Select a function from the choices in this field. If you selected a column prior to clicking on the `Create Column` button, the `sum` operator is the default. Otherwise, the `formula` operator is the default.
Formula	Enter a formula for the operator to act upon.
Grouped By	This field is displayed for all operators except `formula`. It specifies how to break out the values from the data. The Query tool copies all non-calculated column names that are in the results area into this section.

Column names must be internal names (that is, table.column) for all text fields in this options window. However, since these names are displayed when you copy a column name into a field, you do not need to know the SQL syntax to use the Computed Column Options window. You can also select the column heading, then click on the `Create Column` button, and the internal name is displayed.

Setting Up the Calculation

You must now specify the data you want to use for your calculations. To create a computed column:

1. In the Computed Column Options window, enter a heading name for the calculation in the `Label` field.

2. Select the operator from the list in the `Operator` field. For this example, the `sum` operator is selected.

3. Select a column heading in the depiction area.

4. Copy the heading into the `Formula` field of the Computed Column Options window. The internal name for the heading you select is displayed in the `Formula` field is shown in Figure 61 on page 118.
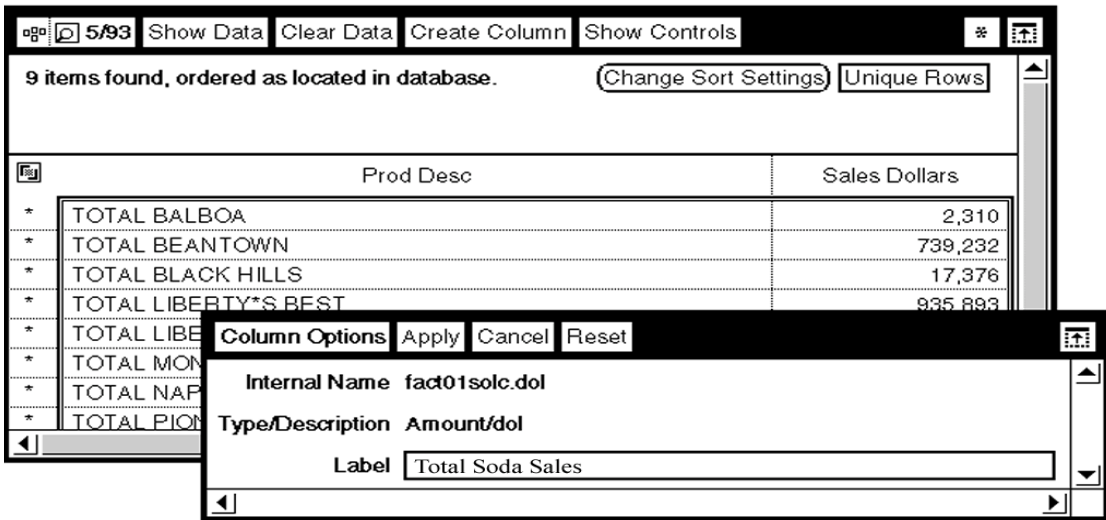
Figure 61. Computed Column Options window after copying the heading

> 5. Close the Computed Column Options window.

A new column heading with the name you specified in the `Label` field is displayed in the Query window. When you click on the `Show Data` button, the Query tool retrieves the calculated data you request and places it in the new column, as shown in Figure 62 on page 118.
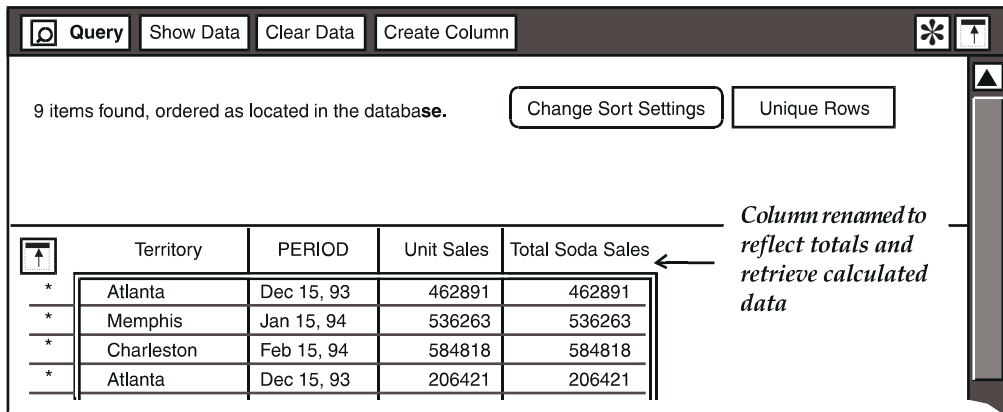
Figure 62. Query window showing the computed column

Using Decimal Arithmetic to Calculate Results

When you set up a calculation that involves data stored as whole numbers (like Unit Sales), the results are calculated as whole numbers. However, when you

multiply or divide two values in the database, you might want your results calculated to two places of decimal precision. If you need decimal precision in your results, simply multiply the first column name from the `Formula` field of the Computed Column Options window by 1.0.

You cannot calculate results to more than two decimal places. Although the Query tool transfers full decimal precision, it only displays two decimal places of the calculated results.

A sample Computed Column Options window is shown in Figure 63 on page 119. Notice that the `formula` operator is used for this calculation, and therefore the `Grouped By` field is not displayed in the window.

Computed Column Options	Apply	Cancel	Reset			✳	⬆

Database Name   Sales Tracking

Type/Description   Computed Column/None

Label   Total Sales

Operator | sum | count | average | min | max | **formula** |

Formula   edu_sl_tsale.units*1.0/edu_sl_tsale.dols

Figure 63. Computed Column Options formula for calculating decimal arithmetic

Changing the Calculation

The method you use to change a calculation depends on whether you have already retrieved the computed data. If you have not, then you need to delete the contents of the `Formula` field. If you have already retrieved data, then you must clear the data and reopen the Computed Column Options window. These procedures are described in "Before Retrieving Computed Data" and "After Retrieving Computed Data" on page 120.

Before Retrieving Computed Data

To delete or change the contents of the Computed Column Options window while it is still open:

1. Place the cursor anywhere inside the field, and click mouse button 1 four times. This selects the entire contents of the field.

2. Delete the selected contents.

The information in the field is erased. You can now add your new selection using the instructions provided at the beginning of this chapter.

After Retrieving Computed Data

To change the computation after you have closed the Computed Column Options window and clicked on the `Show Data` button in the Query window:

1. Click on the `Clear Data` button.

2. In the Query window, select the computed column you previously created.

3. Display the options for the computed column and then change the contents of the fields.

Chapter 13.   Using Expert Functions to Constrain Data

"Chapter 8. Constraining Data," on page 79 describes the various types of constraints you can apply to limit a query. However, the Query tool permits you to apply constraints in a more specific way using SQL statements. All operations described in this chapter use the SQL names for data items. This chapter explains how to use expert functions to add more advanced constraints. The following topics are covered:

- Adding expert functions
- Using the `General Qualifier` field

Adding Expert Functions

Expert functions allow you to perform more elaborate queries. In "Chapter 12. Performing Calculations," on page 115, you used the `Add Expert Functions` menu item to create a computed column. You need to select the same item to add the `General Qualifier`.

When you select `Add Expert Functions`, a new button is displayed in the Query window header. Notice the change in the Query window header after you select `Add Expert Functions`. The `Show Controls` button is still there, because the Query Control window is not displayed, but the `Create Column` button has been added. If you were to display the `Special` menu again, you would see that `Remove Expert Functions` has been added to the list of items in the menu. You select `Remove Expert Functions` when you want to remove the fields from the depiction area.

Now look at the Query Control window. When you select `Add Expert Functions` in the `Special` menu of the Query window, the `General Qualifier` fields are displayed in the top section of the Query Control window. Any tables already in the query depiction are automatically repositioned to make room for the new fields.

This expert function field is displayed whenever you select `Add Expert Functions`, and the field remain in the Query Control window until you remove it.

The `General Qualifier` field can be used by everyone. The sections that follow explain how to use these expert functions.

Using the General Qualifier

The `General Qualifier` is a text field that allows you to constrain the query in ways that are not possible using the constraint operators in the Comparison

Options window. To do this, you use SQL. The `General Qualifier` allows you to specify a logical `or` between values on different columns (the statement is true if either value is true), a logical `and` for values within a column (the statement is true only if both of the values are true), and a percent. For example, to get data on employees with pay codes not equal to zero or to retrieve names of employees in department 7000, enter the following statement in the `General Qualifier` field:

```
not &SQLNAME(edu_emp.pc)=0 or &SQLNAME(edu_emp.dept)=7000
```

In this SQL string, edu_emp.pc is the internal name for the pay code column and edu_emp.dept is the internal name for the employee department. The &SQLNAME keyword instructs the system to substitute the correct SQL name. If you already know the SQL name for the column you want to constrain, you do not need to use the &SQLNAME keyword. This keyword allows you to take advantage of table names or column names without having to know the exact SQL names.

You can enter a maximum of 4096 characters in this field. Although you can enter more than this number, the Query tool will accept only the first 4096 characters. The number of characters you can actually see in the field depends on the font you select in the Set Preferences window.

If you enter more than one line of input in the `General Qualifier` field, you can use the up arrow or down arrow on your keyboard to scroll between lines.

Entering Text Strings

SQL text strings must be entered with care, duplicating exactly those names that are stored in the database. Typing errors can easily occur, and such errors usually prevent the query from running correctly. For this reason, it is recommended that you copy the internal names rather than typing them.

You can enter any combination of characters in a date string providing your entry is in the correct database format. If the format is not valid, you receive a syntax error message when the query is sent to the database.

To copy a name into the `General Qualifier` field:

1. Select the column name.
2. Copy the selection into the `General Qualifier` field.

The internal database name replaces the column name.

Using Wild Cards

You can embed wild card characters in the text strings in the `General Qualifier` field. You do so by using the &SQLNAME keyword with the wild card character. For example, to retrieve all products whose number starts with 12, enter the following string into the `General Qualifier` field:

```
&SQLNAME(edu_sl_prod.prodnum) like '12%'
```

Note that the wild card string must be enclosed in single quotes.

Specifying Embedded Blanks

When you are copying SQL names into the `General Qualifier` field, the Query tool does not furnish punctuation in the form of separating commas, and embedded blanks must be treated in a special way. When you are using SQL strings you must add spaces around your operator (`and`, `or`), and use single right quotes to delineate your text constraints. For example, if you copy the table name Product Line into the `General Qualifier` field, the Query tool displays:

```
edu_sl_prod.prodline
```

If you want to specify that Product Line in this case is equal to A1:

1. Type the keyword `&SQLNAME` and place parentheses around the copied table name.
2. Type `=` to put the equal sign after table name.
3. Type `A1` at the end of the line. Be sure to include the single right quotes.

The SQL string should look like the following example:

```
&SQLNAME(edu_sl_prod.prodline) ='A1'
```

If you want to use the `or` operator in your constraint, type a space, the word `or`, and another space. Then copy another table name into the field, making sure to add a space between the `or` operator and the new name, and type `=` followed by `'Total'`, making sure to include the single quotes. This combination of copying and typing results in the following SQL string:

```
&SQLNAME(edu_sl_prod.prodline) ='A1' or &SQLNAME(edu_sl_proddesc)
='Total'
```

This entry in the `General Qualifier` field tells the database to retrieve all products that are either in the A1 product line, or are product description totals.

Chapter 14. Using the Query Tool in Capsule Applications

This chapter explains how to link the Query tool with other tool icons to create automated capsule applications. The Query tool provides the database retrieval function and tools like Layout, Text, Plot, Spreadsheet, and Transformer are used to format, calculate, chart, and report the results of the application process. Detailed instructions for using these tools can be found in their respective user's guides. See "Meta5 Publications" on page 271 for a list of the Meta5 tool guides and their order numbers.

Specific topics covered in this chapter are:

- Setting up the application
- Controlling the data flow
- Controlling nested capsule applications

Setting Up the Application

The usual order for a capsule application's processing sequence is from left-to-right or from top-to-bottom. If the Query icon is the first to be run, you would normally place it in the first position of the capsule application's sequence. Any @-variables that you have used in the Query tool setup will obtain their values from the capsule application's controls window. For information about how to set @-variables, see the *Capsule User's Guide*.

Figure 64 on page 126 shows a sample application and describes the processing sequence that occurs when you click on the Run button in the capsule tool's window header. The process is very much like a functional flowchart where the arrow connecting the tool icons control the direction and flow of data or controls.
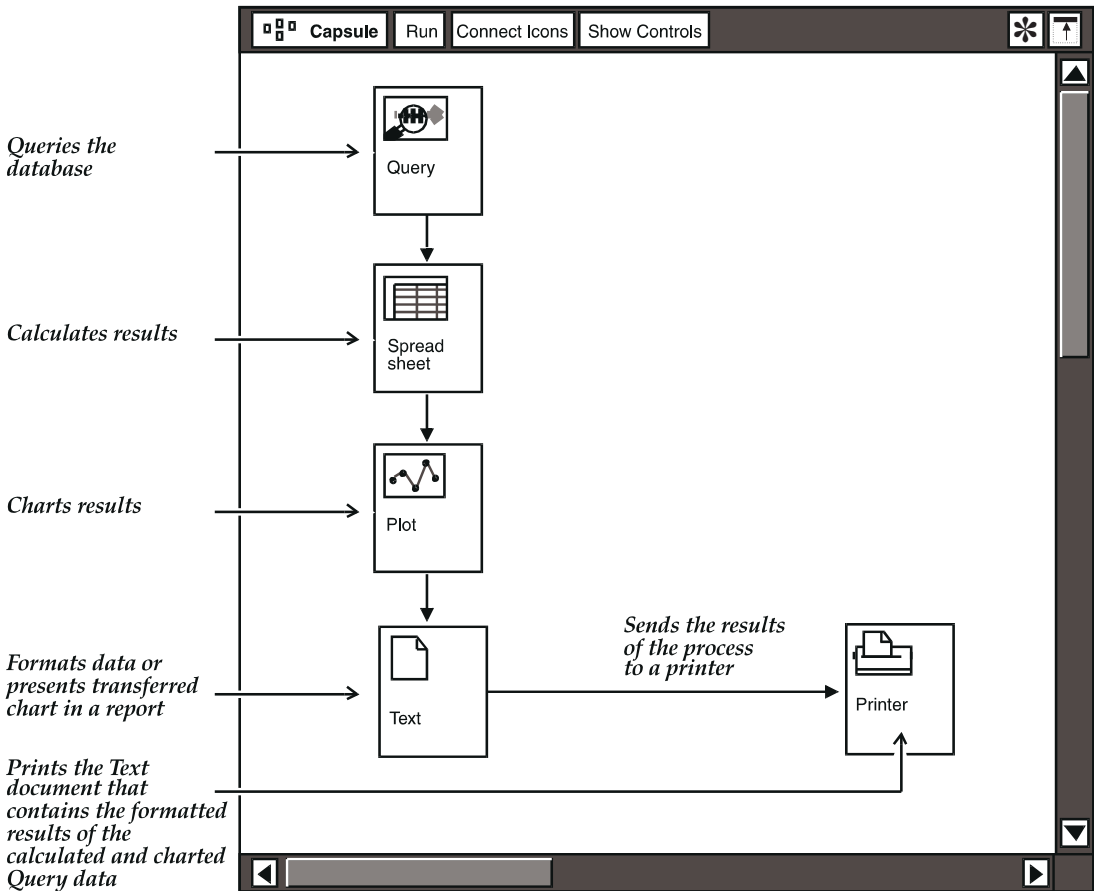
Figure 64. Processing sequence for a sample application

In this example, all icons to the left of the window are source and destination icons, meaning they can both send and receive data. The arrows between the icons actually control the processing.

Arrow settings for the Query icon are described in the next sections. For more detail about capsule application processing and arrow settings, see the *Capsule User's Guide*.

Controlling the Data Flow

After you connect a Query icon to another icon in a capsule application window, you need to specify where the Query data will go. The Query icon is typically used to provide source data for Text, Spreadsheet, Layout, Plot and Folder icons, and can also be used to control nested capsule applications.

Stopping the Data Flow

The first section of the Arrow Options window displays options for stopping the flow of data and choosing whether to transfer data attributes. Figure 65 on page 127 shows the fields and default settings that are displayed when data is being transferred from a Query icon.

Stop Before Transfer	Yes · No
Stop on Null Data Transfer	Yes · No
Transfer Data Attributes	Yes · No
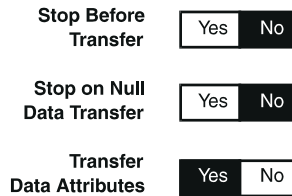
Figure 65. Fields and default settings for data transfer

Before Transfer to the Next Icon

If you set the `Stop Before Transfer` option to `Yes`, processing stops at the arrow leading from the Query icon (before data is transferred to the next icon). When the capsule application stops, you can open the Query icon, check the contents, close the icon, and restart the capsule application process.

If the Source is Null

With `Stop on Null Data Transfer` set to `No`, an attempt to transfer an empty data stream between icons will not cause the capsule application's processing to stop.

However, when the field is set to `Yes`, the capsule application's process halts if the source icon is sending null data. This setting is useful if you have a Query icon that fails to retrieve data. You can debug the problem at the source before the entire application runs.

Transferring Data Attributes

If the destination icon can receive data attributes from a source icon, the `Transfer Data Attributes` field is displayed in the Arrow Options window between the two icons. The default setting for this field is `Yes`, so you must set the field to `No` if you do not want to transfer attributes. Query icons can transfer decimal precision to destination icons such as Text and Spreadsheet.   If the destination icon cannot receive attributes, the field is not shown when you display the options for the arrow between the two icons.

Specifying a Destination for Query Data

A Query icon cannot transfer portions of data, but the destination icon can be set to receive that data in different ways. A Plot icon receives all of the data, while a

Spreadsheet or Text icon can place the transferred data into a specific region. Figure 66 on page 128 shows how the Arrow Options window looks when you transfer results of a query to a named Text region.

Copy Data To	Text	
Destination Area	All Data	Other
Region Name	data5	

Figure 66. Arrow Options window

Selecting a Function for the Source Data

The fourth section of the Arrow Options window contains options that are visible only when the destination icon is a spreadsheet and when the `Destination Area` option is set to `Other`. Figure 67 on page 128 shows that part of the Arrow Options window.

Copy Data To	Spreadsheet	
Destination Area	All Data	Other
Region Name	data2	

Source Data Should	Replace	Append Columns To	Append Rows To	Add To	Subtract From

Figure 67. Other options for sending Query data to a spreadsheet

The `Source Data Should` option allows you to choose how you want to incorporate the Query data into the specified spreadsheet region.

Controlling Nested Capsule Applications

You can create nested capsule application routines that are dynamically controlled by the results of a query.

Using Queries to Set Controls in Capsule Applications

The Query tool can be used in a capsule application to set @-variables in the User Input Control window, and to control nested capsule applications. The sections that follow describe these procedures.

Getting @-Values from the Database

You can use a combination of the Query and Spreadsheet icons to automatically retrieve certain values from your database. This is useful if you are running applications and want to take advantage of frequent database updates.

Setting Up a Query

To use a Query tool to control a nested application, set up the results area so it looks like Figure 68 when the data is retrieved. Notice that the Query tool's column headings must be used to indicate the @-value designation.
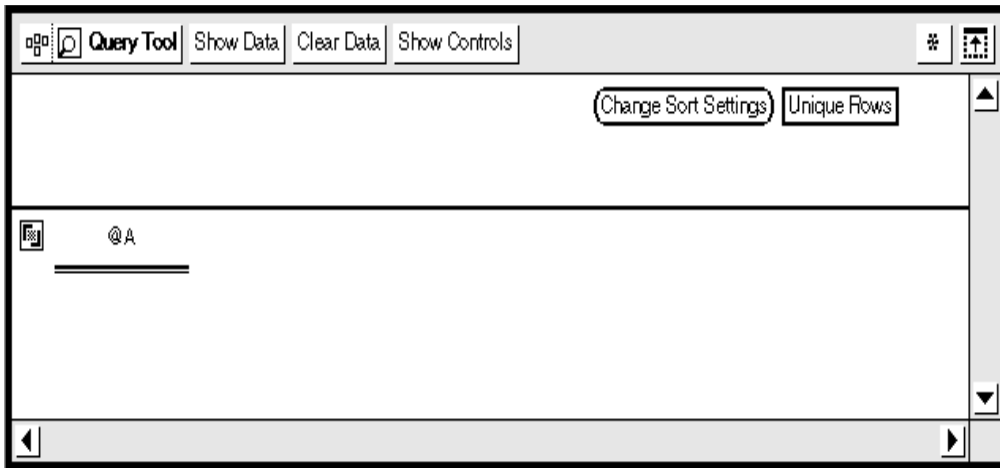
Figure 68. Query tool's iteration setup

Connecting a Query to a Nested Capsule Application

To connect a Query icon to a nested capsule application:

1. Connect the query to the nested capsule application by selecting `Connect Icons`.

2. In the Arrow Options window, type `controls` as the name of the destination area.

For more information about using the Query tool in capsule applications, set the *Capsule User's Guide*.

Chapter 15. Modifying the Database

This chapter provides some techniques for the advanced Query user or database administrator. The Query tool can be used to modify the database if you have the access keys to perform such tasks. Although the Data Entry tool is commonly used for updating and entering data into your database, the Query tool also lets you perform some modifications. This chapter explains how to:

- Insert or update data
- Delete data

It is important to remember that any modifications you make to the database can affect the work of others. This capability should be used carefully.

Each record in the database has a set of fields that contain unique identification keys. This set of fields allows a record to be individually selected, deleted, or updated. Keys are assigned by the database administrator. When the data is copied back into the Query icon, the old records in the table are replaced by the new records. If the record has a blank field, that field is assigned a default value (the N/A value if it exists, or a zero, or an empty string). The copy process is stopped if a key field is blank.

If the record includes a change that is in a key field, that change is not implemented. Instead, the record is appended to the database as a completely new record. You must then delete the old record from the database. In other words, you cannot change any values that are in a key field.

You cannot delete rows in the Query tool. When data is copied into the table, all records are appended to the existing table, regardless of whether it is revised or newly entered data.

Editing the Database

To update database records using the Query tool, you use a Spreadsheet icon to contain the data tables. You select the records you want to update from the Query user catalog, retrieve them so that they are displayed in the results area, then copy them from the Query window to the spreadsheet. You make the modifications to the records while the data is in the spreadsheet, then copy the new data back into the user catalog of the Query Control window. There are some rules to remember before you begin.

- Data types for the records you insert must match the data types defined in your database.
- The spreadsheet must have all the columns in the table in the correct order as the title line. One way to ensure this is to copy the title line (the row of column headings) from the Query window results area.

- You must fill in all the fields, even those that you do not want to change. If you simply want to replace one column name in a table, you must duplicate the table structure when you edit the database. Therefore, to change the table in Figure 69 on page 132:

Territory Information
TERRITORY ID
Territory

Figure 69. Sample spreadsheet column

  to one where TERRITORY ID reads TERRITORY ID, Territory #, and Territory, you would have to select all three items.

- If data keys already exist in the table, records are updated, but if the keys do not exist, your edit inserts data.

If you try to edit data using the procedures provided here and receive an error message, you have not been granted editing privileges by the database administrator. This privilege is not available to everyone because of the potential danger for accidentally deleting the database tables.

To edit the database using the Query tool, you must first copy the data to a spreadsheet. You can then edit data on a row-by-row basis. Select `Disable Edits` in the `Special` menu to end database editing and return to normal functions, or close the Query tool. (Whenever you open the Query icon, editing is disabled by default.)

To modify one or more rows of data:

1. Select `Enable Edits` in the `Special` menu of the Query window. This menu item allows your actions to be interpreted as database edit functions to update the source data on the database.

2. Select a table name from the user catalog and copy it to the Query window.

3. Apply the necessary constraints to limit the number of records that you desire.

4. Click on the `Show Data` button.

5. Click on the `Select All` button and copy the query information into a blank spreadsheet. You can also select a range of rows if you do not want to edit all of the data.

   If you move the data instead of copying it, that data is then deleted from the Query tool and from the database server.

6. Select the information in the spreadsheet that you want to edit and make the appropriate changes.

7. Select the edited records in the spreadsheet and copy or move them to the table name in the user catalog of the Query Control window. You are moving the edited records back to the table from which they originated.

   If the database table you are editing consists entirely of character columns, do not include the first row (that is, the title) of the spreadsheet when you are

selecting records to be copied back into the Query window. If you do so, your titles are copied into the table as an additional row of data.

8. In the Query window, select Show Data to see the updated data.

The database replaces the original records with the edited ones. If any modified record is considered illegal by the database, the process stops and the message area indicates the record number and field of the invalid record, as well as a database server error code. The number of records successfully updated is posted in the message area.

Deleting Rows of Data

To delete one or more rows of data:

1. Select Enable Edits in the Special menu.

2. Select the desired table from the user catalog and copy it to the Query window.

3. Click on the Show Data button.

4. Select the rows in the Query window and delete them.

There are some restrictions on which data can be deleted. You cannot delete a record that contains data from more than one table. If you attempt to do so, you will receive an error message.

Inserting Rows of Data

Data is inserted into the copied data on the spreadsheet. To insert one or more rows of data:

1. In the Query window, click on the Show Data button to display the table you want to modify.

2. In the Spreadsheet window, copy a blank row to the location where you want to insert the new data.

3. Select the new records in the spreadsheet.

4. Move or copy the new records to the table name in the user catalog. That is, move the records on top of the table name from which the data originated.

5. Click on the Show Data button to see the updated data in the Query window.

Chapter 16. Troubleshooting

In some instances, sending a database query can produce unexpected results. This chapter lists some of the more common problems you might encounter, and provides recommendations. It also tells you how to use the Query tool for maximum performance and efficiency.

If the problem you are experiencing is not listed here, or if a recommendation does not seem to work, contact your database administrator. This chapter does not cover all possible situations that could affect your database query. For more detailed information about system error messages, see *Messages and Codes*, or ask your system administrator.

This chapter provides troubleshooting help for the following tasks:

- Retrieving data
- Viewing retrieved data
- Verifying retrieved data
- Opening a Query icon
- Working with views
- Enhancing performance of database queries

Retrieving Data

This group of circumstances can occur after you have clicked on the `Show Data` button in the Query window header.

`The query returns no data.`

This can occur if the wrong case is used in a value, if contradictory constraint values are entered, or if incorrect logic is detected in date arithmetic expressions. Verify your query by checking the following items:

- Be sure you match the case used in the database when you type the value. To verify the case, show all the choices from the Comparison Options window.
- Check the query depiction for contradictory constraints. If you use @-variables in constraints, open the Comparison Options window and check each constraint.
- Correct the constraint. Date constraints that use the `Between` operator must always go forward in time.
- Check the logic in your date arithmetic expression to ensure that it specifies a formula without contradictions. For example, to retrieve data for a three

month period ending on a given month, you might insert a constraint that uses the `Between` operator:

```
@F-2 months ... @F
```

If you accidentally transpose the variables as shown in this example, no data will be returned:

```
@F ... @F-2 months
```

```
The query returns no data and an important message is
displayed.
```

A date constraint might have been entered incorrectly.   The message is displayed when you attempt to show data. Usually, the message explains that the date format is unrecognizable. Use one of the following methods to find and correct the incorrect constraint:

- Look in the depiction area for obvious mistakes such as missing commas between the month and year. Then display the constraint's options window for the incorrect constraint and correct the entry.

- Display the Constraint Options window and show all the available choices. Then delete the constraint and copy the entry from the Choices window.

- Refer to the Table 20 for the correct date entry format.

- Check the desktop preferences window settings to see if the date format has been changed.

Table 20. Acceptable date entries

Date	Correct formats
Day	January 15, 1995
	Jan 15, 1995
	Jan 15, 95
	Jan 15 95
	15 Jan 95
	15 January, 1995
Month	January, 1995
	Jan, 1995
	January, 95
	Jan, 95
	Jan 95
	95 January

Table 20. Acceptable date entries

Date	Correct formats
Year	1995
	95
Odd-Bimonth	DJ, 1995
	DJ 95
	95 DJ
Even-Bimonth	JF, 1995
	JF 95
	95 JF
Quarter	1Q95

```
The query retrieves too much data.
```

The Query tool might take a long time to retrieve data, or the message in the Query window indicates that too many items have been retrieved. Look at the query to see if any of the following problems exist:

- The query can be set up to retrieve duplicate rows of data.
- Check the depiction area to see if the constraints are restrictive enough to limit the data, then check for duplicate columns of data in the results area of the Query window. If you find duplicate rows, click on the Query window to ensure that only unique rows are returned.
- Check to ensure that you constrained tables as needed.

```
You need to stop a database query.
```

A complex query will take a long time to return results. If you have clicked on the `Show Data` button and need to stop the Query tool:

- Select `Stop Query` in the `Special` menu of the Query window header if you know the query is complex and will take a long time.
- Press the Stop function key if you believe the query can return data quickly. This is the fastest way to stop a database query.

Either of these methods will cause the database query to be incomplete. You must click on the `Show Data` button again to return results.

Viewing Retrieved Data

```
You cannot see all of the items in the user catalog.
```

The window might be too small or there might be many items in the user catalog. Do one of the following actions:

- Resize the window.
- Scroll the window to see all of the items.

`You cannot see all the tables in the query depiction.`

The window might be too small or there might be many items in the depiction. Do one of the following actions:

- Resize the window.
- Scroll the window to see all of the items.
- Click on the `Show Query` button to rearrange the query depiction.

`You cannot see all the constraints in the query depiction.`

Do one of the following actions:

- Resize the window.
- Scroll the window to see all of the items.
- Click on the `Show Query` button to rearrange the query depiction.

`Default joins are missing from the query depiction.`

This omission can occur when redundant joins have been created using the DBA Tool. When you are joining tables using the DBA Tool, and you have numerous joins, some of which are redundant, the Query tool will often display just those joins that it deems essential to perform the query. Occasionally, the wrong joins might be selected. There are two options:

- If you have access privileges to the DBA Tool, you can remove the redundant joins.
- Use the Query tool instead of the DBA tool to create manual joins that reflect the query you want to perform. "Chapter 7. Building a Query," on page 71 tells you more about creating manual joins.

`The user catalog area contains strange pieces of text.`

If you create a view in a Query icon and give it a very long description, such as 75 characters, when you switch back to display Column Names, a portion of the description you entered remains in the window.

Click on `Refresh` in the `Special` menu.

Verifying Retrieved Data

`A query returns erroneous results.`

If you send a query that contains an embedded view, and both the view and the query contain the same constraint, you can retrieve incorrect results.

Remove the duplicate constraint from the view to fix this problem.

There can be a conflict between what is actually contained in the fields in the Workstation Tools Data Dictionary (WTDD), and the way the query is requesting that it be displayed. If this happens, you might see columns displaying a zero, or incorrect values for character data.

Consult your database administrator.

```
Performing a calculation using computed columns causes an
error message to be displayed.
```

If the query is a complex one containing many columns of data, you might have exceeded the Query tool's capability to perform this function.

Check your calculations. If everything looks correct, consult your database administrator.

```
Items in the user catalog, results area, or query depiction
have overstrikes through them.
```

This occurrence is usually signaled by an important message indicating that phantoms exist in the WTDD. A phantom can occur when the database administrator deletes or renames a category, table, or column, and needs to update your Query tool with the changes. If this happens, the Query tool leaves each item that has been deleted or renamed in the DBA catalog, with an overstrike through its name.

If you want to retain the query setup, copy the Query icon before you try to delete the phantoms.

To delete phantoms:

1. Copy the Query icon containing the phantoms.
2. In the original icon, select and delete the phantom tables from the query depiction.
3. Select and delete the phantom tables in the user catalog.

You can now use the copy you made of your query to help recreate the original setup.

Opening a Query Icon

```
Query icon does not open and an error message is displayed.
```

Ensure that you used the correct user ID and password. Then check your system messages. The file server could be offline or the database server might be unavailable. Consult your system administrator.

The icon might have been secured by another user. It is possible to secure a database access tool icon so that it can be opened only by an authorized user. You might receive one of these icons in the mail, but find that you cannot open it.

Check the Icon Options window to see if the icon is secured, then contact the icon's owner, or consult your database administrator.

Working with Views

A query depiction is lost while you are trying to copy new tables into the depiction area.

If you are using multiple views in a database query, perhaps to test data retrieval, or to create different versions of a similar query, be sure to save each iteration as you make changes. If you forget to do so, copying tables into the depiction area while you are working with views can cause an in-process view to be lost.

You are unable to display the Choices window.

SQL prohibits a query view to reference other tables in the database. A query view groups items from the database according to your specifications. Those groupings do not really exist in the database. Therefore, when you are working with query views, the Show Choices and Show Constrained Choices buttons are not displayed in the Comparison Options window.

Enhancing Performance

The database query takes a long time to retrieve data.

Consider rebuilding the query so that it selects from smaller tables rather than larger ones.

The Query tool returns more data than you expected.

Check to ensure that you have constrained the data properly:

- Have you added constraints to return just the data you need?
- If you are running the query in a capsule application and using @-variables to constrain data, make sure your constraints match the values in the User Input Control window. If you add an @-variable constraint and the corresponding value field in the capsule tool's control window is left blank, the Query tool will retrieve all data just as if you left the table unconstrained.

A capsule application containing several Query icons takes a long time to finish processing.

If appropriate, construct an iterating application instead of using multiple Query icons.

Chapter 17. The Reporter Tool

The Reporter tool retrieves and performs calculations on data from a designated database and displays the data in a format you specify. This report can be printed or transferred to other tools such as the Spreadsheet, Plot, or Text tools.

The Reporter tool uses a basic column and row format, but you determine how the columns and rows are arranged, the types of calculations used, and whether or not special formatting is used to highlight data.

For example, the creator of the following report chose to use bold to highlight data that showed a dollar sales increase of more than 10%. When the data was returned, 13.02% was shown in bold because it met the special case requirements specified by the creator. Notice that the creator of this report chose not to use a dollar sign in the dollar sales columns and also chose to round off dollars rather than show cents. In this report, the parentheses indicate negative values.

Snack Right Chips

	June 1992 Dollar Sales	June 1993 Dollar Sales	Change
Atlanta	310, 918	176,624	(43.19)%
Chicago	277,552	288,425	3.92%
Dallas	247, 921	280,208	**13.02%**
Total	836,391	745,257	

Figure 70. A sample report

In the following report, the creator performed two calculations on the dollar sales data. The creator then annotated the report to show how those figures were calculated.

Snack Right Chip Sales for West Coast Region

First Quarter 1993

	Sales Dollars	2nd Quarter Sales Quota	Bonus Level Sales
Los Angeles	$789,668	$868,635	$947,602
Portland	$107,690	$118,459	$129,228
San Diego	$107,395	$118,135	$128,874
San Francisco	$356,304	$391,934	$427,565
Seattle	$164,101	$180,511	$196,921
TOTAL FOR REGION	$1,525,158	$1,677,674	$1,830,190

Second quarter quotas are based on a 10% increase
Bonus level sales are based on a 20% increase

** Report contains aggregated facts

Figure 71. A sample report including calculations and annotations

When you are creating reports, you can customize them for various audiences by using number formatting and currency options. For example, you can specify that monetary values be shown with $, ¥, £, or any other currency symbol available on your keyboard. You can also change the decimal and thousand separators to match different cultural expectations; for example, 1,000.00 or 1.000,00 or 1'000.00.

The following report shows the national U.S. Snack Right Chip sales for the first quarter as reported to Snack Right's British headquarters office. The second column, labeled Sales, is a calculation that converts U.S. dollar values into British pound values.

US National Snack Right Chip Sales

First Quarter 1993

	Sales U.S. $	Sales £
West Coast	$2,836,794.29	£1,525,158.22
East Coast	$2,311,707.66	£1,242,853.58
Midwest	$1,722,164.38	£925,894.83
South	$3,328,328.29	£1,789,423.81
TOTAL	$10,198,994.62	£5,483,330.44

Exchange rate at deposit: $1.86 to £
** Report contains aggregated facts

Figure 72. A sample report showing sales in U.S. dollars and British pounds

Chapter 18.   Getting Started with the Reporter Tool

A Reporter icon must be configured for a specific database service, category, user, and password before it can be used. Typically, the database administrator creates and configures Reporter icons, but you can configure your own icon by following the instructions in this chapter.

The Reporter icon is displayed as a small labeled picture of an oblong spiral tablet. If the icon has already been configured, the label usually describes the subject matter of the report, so it is unlikely that any of your configured Reporter icons are actually named Reporter.

This chapter describes:

- How to configure a Reporter icon
- The setup and report windows

Configuring a Reporter Icon

After you copy a Reporter icon from the *Blank Icons file drawer, you must configure it for a specific database service before you can open it. To configure the icon, you must know the password and the name of the database or DB2 subsystem you want to access. If you do not have this information, consult your database administrator.

To configure a Reporter icon:

1. Select the Reporter icon and open the Icon Options window.
2. Select `Other Data` in the `Display` field. The Other Data settings are displayed in the window as shown in Figure 73 on page 146.

145

Icon Options	Apply	Cancel	Reset	

Display	Name and Size	Printing	**Other Data**

Gateway	mydbs:HQ
Database Name	information
Category	sales
WTDD Owner	
SQL ID	
Database Logon	**Specified Here** / From Data Access Controls
Secured	**No** / Yes
User Name	guest
Password	

Figure 73. The Other Data page

Using the guidelines provided in Table 21, enter the required information into the text fields and select the appropriate choices in the other fields.

Table 21. Icon Options window fields

Field	**Type of input**	**Required / Optional**
Gateway	Type the name of the database gateway to which you want your data access icon to have access. If the service is on a different realm from the one you are on, immediately follow the gateway name with a colon and then the realm name. For example: `mydbs:HQ`	Required

Table 21. Icon Options window fields

Field	Type of input	Required / Optional
Database Name	Type the name of the database that contains the category needed for this data access icon.	Required
	If your server stores more than one physical database, you must identify the database to which you want access. It is unnecessary to supply a database name if only one physical database exists, or if you want access to a default database.	
	For DB2 for MVS databases, type the name of the DB2 subsystem you want to access. For DB2 for VM databases, type the name of the virtual machine running DB2 for VM. For AS/400 databases, you do not need to enter anything in this field, because the AS/400 is a single-database system.	
	To connect to a supported remote IBM database using Distributed Relational Database Architecture (DRDA), immediately follow the local database name with a period and then the name of the server through which the connection is being made. For example: `DSN.TD1`	
	To connect to a remote SYBASE or Red Brick database, immediately follow the SQL Server name with a vertical bar and then the name of the database you want to access. For example: `SYBSERVER2|SYBPROD`.	
	To connect to a remote ORACLE database, specify the full database name or its alias. For the full database name, specify the standard single-character prefix used for the remote connection (such as T for TCP/IP), followed by a colon, the name of the target host followed by another colon, and finally the system ID (SID) of the target ORACLE database. For example: `T:host1:DBS`	
	If you have questions about the database name, consult you database administrator.	
Category	Type the print name or the internal name of the database category needed for this data access icon. The name you enter is displayed in the window header of the category window.	Required
WTDD Owner	If the icon is configured for access to a database that supports multiple WTDDs and qualified table names, type the name of the owner of the WTDD tables. If you enter a value in this field, you do not have to drop and recreate synonyms whenever you want to access a different WTDD within the same database.	Might not apply in your installation

Table 21. Icon Options window fields

Field	Type of input	Required / Optional
SQL ID	If you are using DB2, type the table qualifier name. The ID entered in this field overrides the default table qualifier name, which is the name entered in the `User Name` field. If you have questions about the table qualifier name, consult your database administrator.	Might not apply in your installation
Database Logon	Select `Specified Here` if you want database access to be based on information you type in the `User Name` and `Password` fields. Select `From Data Access Controls` if you want access to be based on information in the desktop's Data Access Controls window. If you have questions about security, consult your database administrator.	Optional. The default value is `Specified Here`.
Secured	Select `Yes` to set the icon's `User Name` field to the user ID of the desktop on which the icon resides. This is an irreversible operation. Before you select `Yes`, see "Securing Your Icon" on page 25 for important information.	Optional. The default value is `No`.
User Name	Type a valid user ID. This might be the same as your desktop user ID, depending on how your database security is set up. When the data access icon connects to the RDBMS, this is the user ID sent to the RDBMS. If you are using the DB2 for OS/2 DRDA gateway to connect to a DRDA server, and your DB2 for OS/2 user ID is different from your DRDA server user ID, you must specify both user IDs separated by a period. For example: `DB2 for OS/2_userid.DRDAID`	Required
Password	Type the database user's password. This password might be the same as your desktop password, depending on how your database security is set up. For security, the password is never displayed. If you are using the DB2 for OS/2 DRDA gateway to connect to a DRDA server, and your DB2 for OS/2 password is different from your DRDA server password, you must specify both passwords separated by a period. For example: `DB2 for OS/2_password.DRDA_password`	Required

Securing a Reporter Icon

When you secure a Reporter icon in the Icon Options window, the user ID of the desktop where the icon resides becomes the value in the `User Name` field. When a secured icon is mailed, the value in the `User Name` field changes to the user ID of the recipient. The icon cannot be opened or used by the recipient unless his or her user ID has the appropriate privileges for the database. You cannot change the `User Name` field of a secured icon.

If you receive a secured icon from another user and the database does not recognize your user ID, you will not be able to open the icon.

Attention:
Securing an icon is an irreversible operation. Before you secure an icon that you plan to distribute to other users, check with your database administrator to ensure that their user IDs are authorized to use the specified database.

An alternate way to secure a Reporter icon is to configure it to read the user name and password setting from the desktop's Data Access Controls window. For more information about the Data Access Controls window, see *Getting Started with the Meta5 Developer's Desktop*, or consult your system administrator.

Accessing the Reporter Windows

The setup window and the report window are the main Reporter windows. The other Reporter windows are option windows that enable you to set constraints, format data, and add text and patterns to your finished report.

Use the setup window to create a report and the report window to view a completed report. You can only view one of these two windows at a time. The `Show Report` and `Show Setup` buttons in the window header enable you to switch between the two windows as you design and build your report. You cannot switch to the report window until you have retrieved data.

Figure 74 shows the relationship between the two main windows and the six options windows.
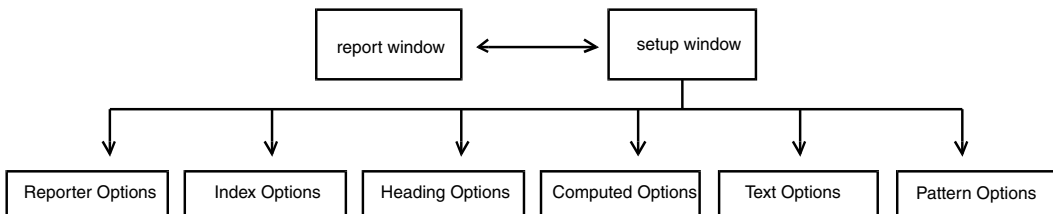
Figure 74. Window heirarchy

The Setup Window

When you open a new Reporter icon, the setup window is displayed first. If the icon has been opened and used before, the window that was active when the icon was closed is displayed first.

To display the setup window:

1. Open a Reporter icon.
2. If the Reporter icon opens to the report window, select `Show Setup` in the window header. The setup window opens and the report window closes.

The setup window consists of two main areas: the index area and the setup area. The index area is located in the lower-right portion of the setup window and consists of the DIMENSIONS INDEX and the FACTS INDEX tables. You might need to scroll to see all of the index tables. The setup area is located in the top-left portion of the setup window and contains the COLUMN HEADINGS and ROW HEADINGS indicators.

The Index Area

Reporter icons are preconfigured for specific database categories. When you open a Reporter icon, the names of the tables and columns in the database category are displayed in the index area as Reporter table names and column names. The table names are located at the top of each Reporter index table and are displayed in boldface.

Underneath the table names are Reporter column names that list information describing the type of data that is stored in each database column.

Key fields, such as PRODUCT ID, TERRITORY ID, and PERIOD as shown in Figure 75, are displayed in the DIMENSIONS INDEX but not in the FACTS INDEX.

Use the Reporter index tables to set global constraints and to create report headings by copying the column names into the setup area.

Each of the indexes serves a specific function in the overall design of a report.

DIMENSIONS INDEX
Dimensions describe attributes of a fact or data item. Dimension data consists of descriptive labels for items such as periods of time, products, and market locations. Dimensions are used to define both column and row headings.

FACTS INDEX
Facts make up the body of the report. Fact data consists of measures such as unit price or volume. The fact data retrieved in a report is dependent on the dimension headings that you specify in the setup area or the dimension index area. Facts can be displayed as either column headings or row headings, but not both.

The Setup Area

The setup area is where you create column and row headings and determine the layout of a report. To create headings, you copy column names from the index area and arrange them under COLUMN HEADINGS and ROW HEADINGS in the setup area. Figure 75 shows the setup area for a simple report.
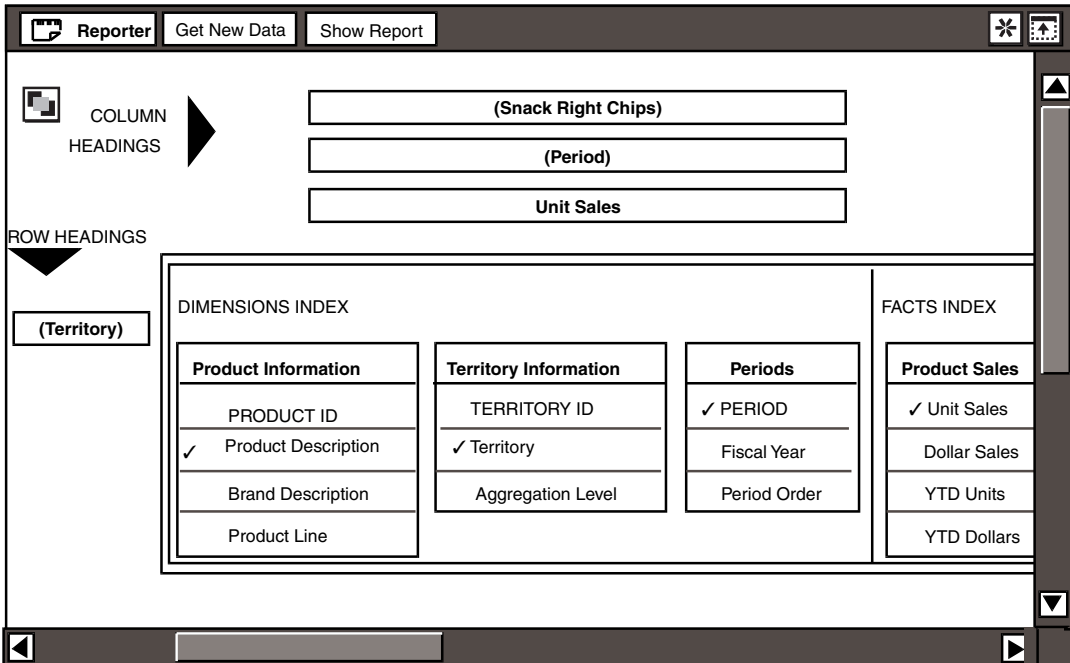
Figure 75. Setup window with headings in setup area

Heading names shown in parentheses have been constrained to specific values. For example, Product Description is constrained to Snack Right Chips, as shown at the top of the COLUMN HEADINGS area, and the Period heading is constrained to retrieve only information for the first six months of 1993. The three types of constraints are described in "Chapter 19. Designing an Effective Report," on page 153.

The checkmarks in the index area denote that those column names have been copied into the setup area to form column or row headings.
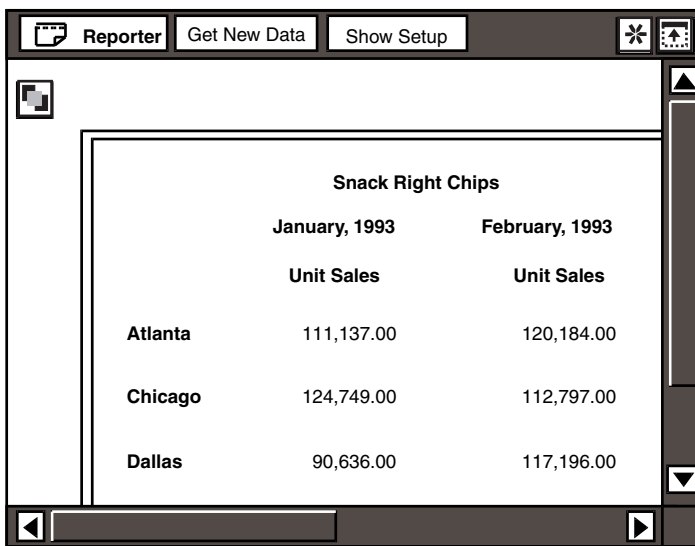
The setup area shown in Figure 75 on page 151 produced the report shown in Figure 76.

The Report Window

After you request data from the database, the report window opens. You cannot view the report window until the Reporter tool retrieves information from the

database. However, once the report contains data, you can switch back and forth between the setup and report windows.

To display the report window, select `Show Report` in the window header of the setup window. The formatted report is displayed, and the setup window is hidden, as shown in Figure 76.

Figure 76. Report window

Use the report window to check the design, results, and format of a report as you build it. When you are content with the appearance of the report in the report window, you can print it, copy it to another tool such as Text, Plot, or Spreadsheet, or use a capsule application to transfer the data to other tools.

If you return to the setup window or close the Reporter icon, the Reporter tool stores the report and its format. When you reopen the icon, this report can still be viewed until the next time you retrieve new data from the database. See "Chapter 23. Retrieving New Data," on page 173 for more information about generating the report.

Saving Your Reports

To save a report, you need to save the Reporter icon. Changing the setup window does not change the report until you click on the `Get New Data` button. One solution for saving reports is to create a Saved Reports folder. Place Reporter icons that you want to keep inside this folder. When you want to make a slight adjustment to a report, you can copy the icon from the folder to your desktop and work on the copied icon. This way, you do not risk overwriting a report that you might need to refer to in the future.

Chapter 19. Designing an Effective Report

Before you begin creating a report, ask yourself the following questions to assure that the report you create meets your needs now and in the future.

- • Who is the intended audience?
- • What is the purpose or message of the report?
- • What do you want to see as the output?
- • Are there facts you want to emphasize?
- • Do you need to perform calculations on the data?
- • Will you need to create similar reports in the future?

After you answer these questions, you might want to sketch on paper the column and row headings you envision and think about how different arrangements of data call attention to different information and affect the usability of the data.

Overview of the Report Setup Process

When you have a clear plan for the report, begin building it in stages.You should get new data after you set up each column or row and check your results periodically so problems become obvious immediately.

Setting up a report consists of the following basic tasks.

1. Configure a Reporter icon if one is not available for you.

2. Set global constraints in the index area of the setup window to limit data for the entire report without placing the related column name in the report as a heading.

   Global constraints are optional. They can simplify the setup process and make your reports easier to maintain.

3. Copy column names from the index area into the ROW HEADINGS and COLUMN HEADINGS areas of the setup window to provide a structure for your report. Facts must be displayed at the lowest level of the report, and facts must be either all row headings or all column headings.

   Do not copy a column name to the setup area if it has already been constrained globally. If you feel you need to copy a globally constrained column to the setup area, re-evaluate the use of a global constraint on that column. See "Chapter 20. Setting Global Constraints," on page 155 for more information.

4. Set local constraints within a specific heading frame (in the setup area) to limit the data that is displayed in that particular column or row.

After setting each local constraint, retrieve new data to check for potential problems.

5. Create any calculations necessary for your report. For example, you might want to calculate the average unit price for a product or the West Coast region's percentage of total dollar sales.

6. Adjust number and currency formatting to meet your audience's needs.

7. Set special cases to highlight data values that meet specific requirements. For example, you can automatically show unit sales of over 500,000 in bold or italics to highlight markets that are doing well. Or, in a column where you have calculated market growth over the past year, you might want to replace improvement figures of less than 1% with the word `None`.

8. Retrieve new data.

9. Fine tune the formatting by adjusting column width or row height and adding page breaks, annotations, or patterns as desired.

10. Print the report, distribute it electronically, or transfer the information into another tool, such as a Spreadsheet, Plot, or Text tool, for further analysis or formatting.

Report Maintenance

Many users find that they want to create similar reports on a weekly or monthly basis. Or, that they want to create similar reports for a variety of different products or regions. If you want to be able to reuse reports easily, keep in mind the following design considerations when creating a report.

- Create a separate Reporter icon for each basic type of report you want to run repeatedly, and name the icons by topic.

- Use @-variables when setting constraints, and run the Reporter tool within a capsule application. See the *Capsule User's Guide* for more information.

- Annotate your report if data could be ambiguous or if you want to leave reminders to yourself for the next time you run the report.

Chapter 20.   Setting Global Constraints

Setting global constraints is practical if you repeatedly create reports for a specific type of data or if you want to constrain an index column that will not be shown in the report.

This chapter describes:

- When to use global constraints
- The various constraint operators
- Two places to enter constraint values
- How to copy constraint values from a Choices window
- How to change and delete global constraints

Global constraints are set on column names in the index area of the setup window. When setting global constraints, use the Index Options window to narrow the range of data in a report.

Always set global constraints in the index area before setting individual heading constraints. Then each time you set up or reorder the report headings, the column names are already limited to specific information and you need not reset constraints for every report.

It is better not to constrain a field globally if you are going to copy it to the setup area. Otherwise, you might eventually have the same column name constrained both globally and locally, which can lead to problems, such as conflicting constraints when retrieving data. See "Chapter 22. Setting Local Constraints," on page 169 for information on constraining individual headings after they have been copied into the setup area.

To open the Index Options window:

1. Select a column name in the DIMENSIONS INDEX or FACTS INDEX.
2. Open the Index Options window by pressing the Options function key or using the pop-up function pad. If you select a column name from the DIMENSIONS INDEX, the Index Options window is displayed as shown in Figure 77 on page 156.

Figure 77. Index Options window for a dimension column name

At the top of the Index Options window are two fields that provide information about the data. The `Database Name` field shows the internal table name and the column name separated by a period (`edu_sl_custt.territory`) and the print name (`Territory`). The second field, `Type/Description`, provides information about the type of data found in that column of the database.

The Index Options window also displays the `Operators` field, the `Source` field, and the `Value` field. The `Operators` field lets you designate the range of data you want to retrieve. The `Source` field lets you use values stored in a Text document, or those you specify in the `Value` field, which lets you specify the value of the constraint. In Figure 77 on page 156, for example, the Territory column is being constrained to Seattle, Tacoma, and Portland.

Because you selected a column name from the DIMENSIONS INDEX, the `Show All Choices` and `Show Constrained Choices` buttons are displayed near the bottom of the Index Options window. These buttons let you view a list of valid constraints for the index column name you have selected and are discussed in "Selecting Values from a List" on page 161. These buttons are not displayed in the options window when you are constraining column names from the FACTS INDEX.

Selecting an Operator

The Index Options window lets you set constraints on the range of data you want to retrieve. Table 22 on page 157 outlines each Operators choice and its function.

Some operators let you enter more than one value in the `Value` field. The operators **=** and **Not =** let you enter multiple values separated by a comma and a space.

Table 22. Constraint operators

Operator	Returns data that
=	Equals the value(s) entered
Not =	Does not equal the value(s) entered
<	Is less than the value entered
>	Is greater than the value entered
<=	Is less than or equal to the value entered
>=	Is greater than or equal to the value entered
Between	Is within the range of values entered, inclusive
Not Between	Is not within the range of values entered
Like	Matches the string data entered in conjunction with a wild card (see "Constraining with Wild Cards" on page 160 for more information)
Not Like	Does not match the string data entered in conjunction with a wild card (see "Constraining with Wild Cards" on page 160 for more information)
Null	Is specified as null in the database
Not Null	Is not specified as null in the database

The **Between** operator requires that you specify a value range using two fields: `Beginning Value` and `Ending Value`. When you use this operator, the Reporter tool retrieves data that is inclusive of the values specified in the fields. If you constrain a report as shown in Figure 78, the Reporter tool retrieves data for March, 1993 through December, 1993.

Operators						
=	Not =	<	>	<=	>=	

Between	Not Between	Like	Not Like	Null	Not Null

Beginning Value mar 93

Ending Value dec 93

Figure 78. Reporter tool retrieves data inclusively

In addition, you can enter @-variables into the fields for any operator. See the *Capsule User's Guide* for more information about using @-variables.

Entering Constraint Values

Constraint values can be characters, numbers, or dates depending on the column name selected. These values must match the data type of the column name. For example, there are many different ways to enter dates, but your database can be customized to accept a particular date format.

There are several ways to enter constraint values. You can:

- Type values directly into the `Value` field
- Type wild card constraint values using the `Like` and `Not Like` operators
- Select values from a Choices window
- Select values from a constrained Choices window

Selecting a Constraint Source

Constraints can be entered two ways. If you are entering only a few values or if you are not going to reuse the same set of values, it is easiest to use the `Value` field.

If you have a great number of values or frequently use the same set of values, it might be easier to create a Text document that contains the values.

If you choose to use a Text icon to enter values, the Text icon should be placed in the same container, capsule or folder, as the Reporter icon. If the Reporter icon is on the desktop, place the Text icon on the desktop or enter the entire path name for the Text icon in the `Text Icon Name` field.

Whether you are entering constraint values in the `Value` field or in a Text document, the following rules apply:

- A comma and, optionally, a space must be placed between each value.
- Values are case sensitive. If you are unsure of the correct capitalization, check the Choices window.

Entering Numbers

Use a comma and a space to separate each number in a series. When entering numbers by typing them, you must use the same number format as you have chosen in the Set Preferences window for your desktop. If you mail a Reporter icon to someone and they have chosen different number formats for their desktop, the Reporter icon cannot get new data until they either change their desktop preferences or change the format of the numbers entered in the `Value` field.

Entering Dates

All date formats are case insensitive. For example both `Jan 94` and `jan 94` are acceptable. Table 23 on page 159 lists acceptable date formats.

Table 23. Acceptable date formats for direct entry

Date type	Correct formats for direct entry
Day	January 15, 1994
	Jan 15, 1994
	Jan 15, 94
	Jan 15 94
	15 Jan 94
	15 January, 1994
	1/15/94
Month	January, 1994
	Jan, 1994
	January, 94
	Jan, 94
	Jan 94
	94 January
	1/94
Year	1994
	94
Odd-Bimonth	DJ, 1994
	DJ 94
	94 DJ
Even-Bimonth	JF, 1994
	JF 94
	94 JF
Quarter	1Q94

In addition to specifying exact dates, you can use date arithmetic. For example, you can enter `January 7, 94 - 2 months` or `february 7 94 + 3 days`.

When you enter more than one constraint value in the `Value` field, each entry must be separated by a comma. Although the Reporter tool reads a comma as the end of an entry, date strings can include commas between their month, day, and year elements. The commas within date strings are ignored by the Reporter tool.

To enter information directly into a blank field:

1. Select the operator you want to use.

2. Type your data constraints into the `Value` fields that are displayed, depending on the type of operator you selected.

   For example, to constrain a report to return data for only April 1994, select the `Equals` operator and type `April, 1994` in the `Value` field.

   When you constrain a column name in the index area, a set of parentheses is displayed around the column name indicating that it has been constrained.

3. Close the Index Options window.

Only data for the specified constraint will be retrieved. In this example, only data for April, 1994 is retrieved. Applying global constraints in a report is useful because it allows you to reduce the number of headings and thus simplify the report setup area.

If you are setting constraints in the DIMENSIONS INDEX and you do not know the acceptable data format for the column name you have selected, you can view the valid choices currently in the database. See "Constraining with Wild Cards" on page 160 and "Selecting Values from a List" on page 161 for more information.

Parentheses always indicate that an index column name has been constrained. When parentheses show in the index area of a newly opened Reporter icon, this indicates that the database administrator has preset constraints for that column name.

Constraining with Wild Cards

The percent sign (%) and the underscore (_) are used as *wild card* characters with the `Like` and `Not Like` operators. A wild card character lets you search for constraint values that match a particular character pattern.

The percent sign can take the place of multiple characters. The underscore can take the place of a single character.

For example, you could constrain `Product Description` to `Snack%`. Then when you retrieve data, the Reporter tool searches for all products in the database that begin with Snack.

The wild card character can be used anywhere in the character string. For example, constraining `Product Description` to `%Pretzel` retrieves information for all products whose names end with Pretzel.

Another possibility is to specify a constraint such as `Snack%12 oz`, so that the data retrieval process returns all products whose names begin with Snack and end with 12 oz.

Selecting Values from a List

The `Show All Choices` and `Show Constrained Choices` buttons both provide access to lists of acceptable constraint values for the selected dimension column name. The lists are displayed in a Choices window.

The `Show All Choices` button accesses a list of all the valid choices. For example, all cities in the database would be displayed in the Choices window for the Territory column regardless of any constraints previously set.

The `Show Constrained Choices` button accesses a list of all the valid choices that meet the current constraints on the selected table. For example, if the Region column was already constrained to West Coast, using the `Show Constrained Choices` button to constrain Territory would provide a list that contains Portland, Sacramento, San Diego, San Francisco, and Seattle, but not New York or Chicago.

There are two ways to copy constraint values from a Choices window to the `Value` field:

- Copy one or more constraint values to the `Value` field
- Select one or more constraint values from the list and close the Choices or Index Options window

To enter constraint values using either the `Show All Choices` or `Show Constrained Choices` button:

1. Click on either the `Show All Choices` or `Show Constrained Choices` button at the bottom of the   Index Options window. A Choices window opens and displays a list of valid values for the selected index column name.
2. Select one or more constraint values from the list.
3. Close the Choices window. The constraint values you selected are displayed in the `Value` field, including separating commas and spaces if you chose multiple constraint values. You can also select a constraint value in the list and copy it into the `Value` field if you want to keep the Choices window open.
4. To include additional constraint values, repeat the previous steps, or enter the constraint values directly. The newly selected constraint values are appended to those already listed when you close the   Choices window.

   When you add constraints to an existing list or type constraints rather than copying them from the Choices window, be sure to add a comma and a space between each of the constraint values.

5. Close the Index Options window.

Changing or Deleting Global Constraints

You can change or delete global constraints in the index areas. You can delete individual global constraints or all global constraints.

To delete or change individual global constraints:

1. Select the desired column name shown in parentheses.
2. Open the Index Options window.
3. Make any necessary deletions or changes to the current constraints listed in the `Value` field.
4. Close the Index Options window. If you deleted a constraint, the index column name returns to its original setting. If you changed the constraint, the index column name again shows parentheses indicating this new constraint.

When you change or delete constraints in the index area, these new constraints can affect the range of data available to previously constrained headings and index column names. Before generating a report, review all constraints to verify that they do not contradict one another. The `Show Constrained Choices` button offers an easy way to check valid constraint values.

Deleting constraints can also affect database performance. For example, suppose your report has been constrained to retrieve sales data for one month. If you delete this constraint, the Reporter tool can return data for an entire year. This data retrieval would take considerably longer than the previous one, because the period has changed from one month to twelve months.

If you want to create a new report using an existing icon, you can quickly delete the existing constraints and setup. This means, however, that you cannot rerun the existing report without rebuilding it. Generally, it is best to copy an existing icon before deleting existing constraints or the setup.

To delete all global constraints, along with all headings in the setup area, click on the **Select All** button in the upper-left corner of the setup area.

All headings are removed from the setup area, and all global constraints are cleared.

Chapter 21.   Setting Structural Constraints

The placement of headings in the setup area determines the structure of the report and also creates structural constraints.

This chapter describes:

- Rules for setting up heading hierarchies
- How to copy column names to the setup area to create headings
- How to move headings within the setup area
- How to delete headings

Creating Headings in the Setup Area

To create report headings, select column names from the DIMENSIONS INDEX and the FACTS INDEX and copy them to the setup area. See "The Setup Window" on page 150 for more information about the index and setup areas.

Headings can be layered and used as subheadings, up to four deep for columns and six deep for rows. The uppermost heading in the COLUMN HEADINGS area is a superheading. A superheading sets a constraint precedent for all subheadings below it. A constraint precedent means that any constraint set on a superheading affects all related subheadings. Similarly, the leftmost heading in the ROW HEADINGS area is a superheading and sets a constraint precedent for all subheadings indented below it.

Other aspects of constraining are described in "Chapter 20. Setting Global Constraints," on page 155 and "Chapter 22. Setting Local Constraints," on page 169.

To the right of the COLUMN HEADINGS indicator and below the ROW HEADINGS indicator are areas that accept new headings. The area that accepts row headings is level with the index area. If the COLUMN HEADINGS area contains multiple levels, the area for placing row headings might be an inch or so below the ROW HEADINGS indicator.

To copy a column name into the setup area:

1. If the setup window is not showing, select `Show Setup` in the window header.
2. Copy a column name in the DIMENSIONS INDEX or FACTS INDEX area that pertains to the information you want to include in the report.
3. Select either the `COLUMN HEADINGS area` or the `ROW HEADINGS area`, depending on whether you want the data to be arranged vertically or

horizontally. The column name that you copied now becomes a heading in the selected area.

4. Repeat steps 2 and 3 each time you want to add another heading.

   You can copy the same index column names into the setup area as many times as necessary for your intended report. However, only copy a column name as many times as is absolutely necessary, because each copy of the column name requires its own query and slows performance.

When you copy a column name from an index table, the copied item is checkmarked in the index area. This mark indicates that the column name is being used in the setup area.

Copying and Moving Headings

Heading placement is an important aspect of report design. For example, fact headings must be at the lowest column heading level or at the same level in a row hierarchy for the Reporter tool to retrieve data.

After headings have been created in the setup area, you can copy and move them as you refine the report. When copying or moving headings, different rules apply depending on whether you are placing the headings in a column or a row.

Working with Column Headings

You can copy or move headings in the COLUMN HEADINGS area both horizontally and vertically depending on how you want the report data to be displayed. Column headings can be layered up to four levels deep.

Positioning Horizontally

You can copy or move a new or existing heading in the COLUMN HEADINGS area to the right of an existing heading or to the left of the top left existing heading:

To place a heading to the right of an existing heading:

1. Copy or move the desired heading or index column name. In this example, select the YTD Dollars column name in the FACTS INDEX.

2. Select a heading on the same level that you want your new heading to be displayed. In this case, select Unit Sales.

COLUMN
HEADINGS

Product Description
PERIOD

Unit Sales	Dollar Sales
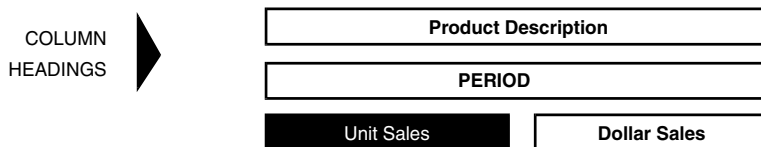
Figure 79. Display of same-level headings

The new heading is displayed to the right of the heading you selected in the COLUMN HEADINGS area, as shown in Figure 80 on page 165. Notice that the length of the superheading stretches to match the total length of subheadings.
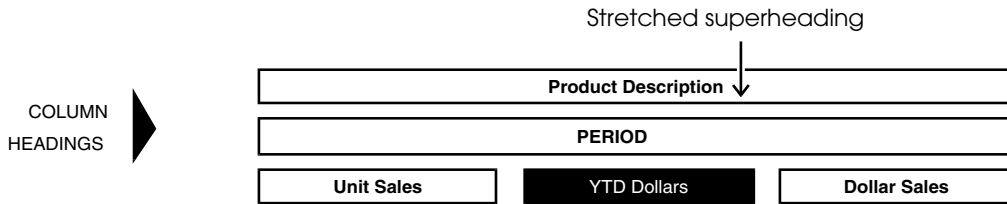
Figure 80. Adding COLUMN HEADINGS horizontally

Moving headings to the left of other headings in the COLUMN HEADINGS area is restricted. You can only copy or move a heading to the left of the top left existing heading.

To place a heading to the left of the top left existing heading:

1. Copy or move the desired heading. In this case, move `PERIOD`.

Figure 81. Selecting and moving headings

2. Select the area to the left of the existing heading. In this case, select the blank space to the left of the Product Description heading. `Period` is displayed to the left of Product Description, shown in Figure 82.

Figure 82. Headings are now on the same level

Do not move a computed heading to the left of a heading it uses in a calculation. If you do so, the result of the calculation will be incorrect. See "Chapter 24. Performing Calculations," on page 177 for more information on computed heading functions and requirements.

Positioning Vertically

Moving headings vertically in the COLUMN HEADINGS area is restricted. You can only move or copy a heading to the area below all other column headings.

To copy or move a heading below all existing headings:

1. Copy or move the desired heading. In this example, move `Product Description`.

COLUMN HEADINGS	**Brand Description**
	Product Description
	PERIOD
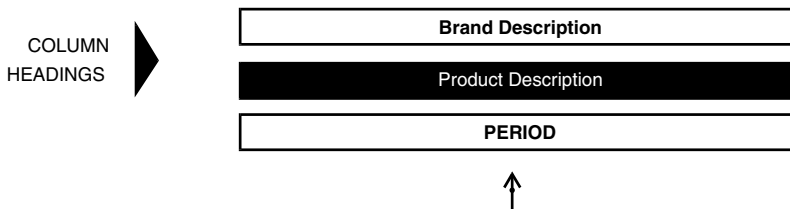
Figure 83. Original order

2. Select below all existing headings in the COLUMN HEADINGS area. In this case, select below the PERIOD heading. The Product Description heading is displayed below the other headings, as shown in Figure 84.

COLUMN HEADINGS	**Brand Description**
	PERIOD
	Product Description
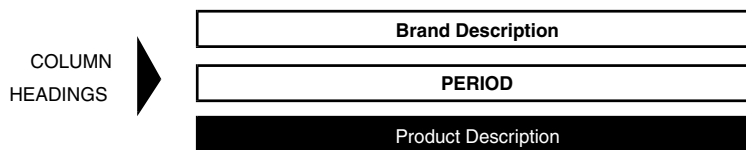
Figure 84. Changed order

Working with Row Headings

You cannot move or copy row headings horizontally adjacent to each other. You can add them only above or below existing row headings. After you have rows placed vertically, you can indent headings to provide hierarchy. Any constraints on a superheading will affect rows indented beneath it.

Positioning Vertically

You can copy or move a new or existing heading in the ROW HEADINGS area above all existing headings or below an existing heading.

To copy or move a heading above all existing headings:

1. Copy or move the desired heading. In this example, copy the Territory column name from the DIMENSIONS INDEX.

2. Select just above the topmost existing heading. In this case, select above the (Atlanta) heading and below the ROW HEADINGS indicator symbol.

ROW HEADINGS

(Atlanta)

Dollar Sales

(Chicago)

DIMENSIONS INDEX
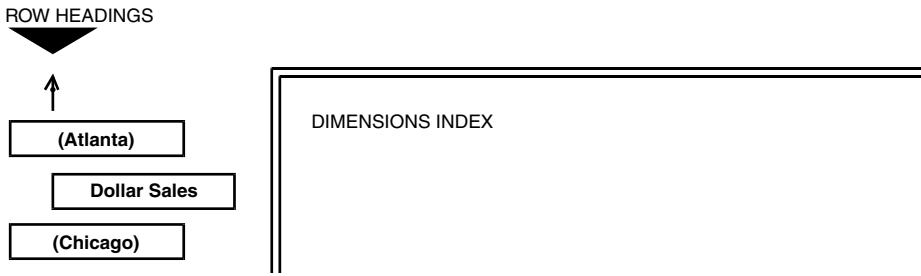
Figure 85. Adding a new ROW HEADING

The ROW HEADINGS area is displayed, shown in Figure 86 on page 167.

ROW HEADINGS

Territory

(Atlanta)

Dollar Sales

(Chicago)

DIMENSIONS INDEX
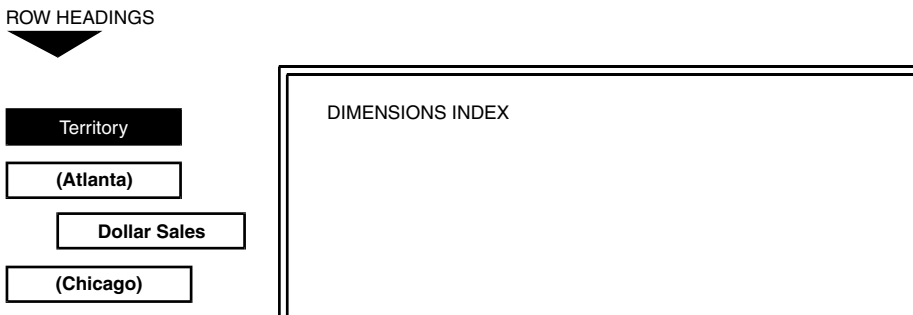
Figure 86. The new ROW HEADINGS area

To copy or move a heading below an existing heading:

1. Copy or move the desired heading. In this example, move `Dollar Sales`.

ROW HEADINGS

(Atlanta)

Dollar Sales

(Chicago)

DIMENSIONS INDEX
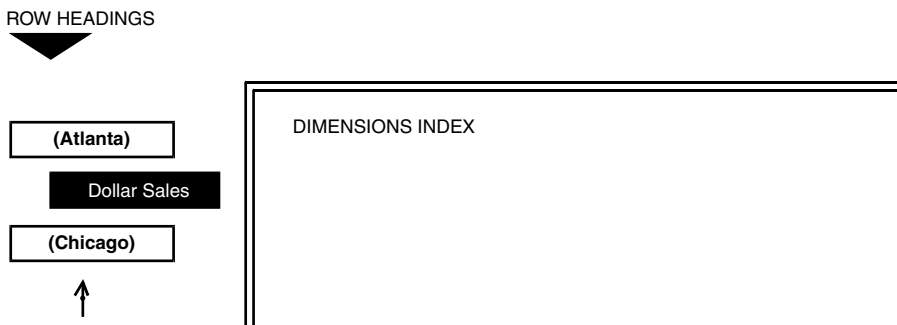
Figure 87. Moving a ROW HEADING

2. Select below the lowest existing heading. In this case, select in the area below the (Chicago) heading. `Dollar Sales` is displayed below all existing headings, shown Figure 88 on page 168.

ROW HEADINGS

| (Atlanta) |
| (Chicago) |
| Dollar Sales |
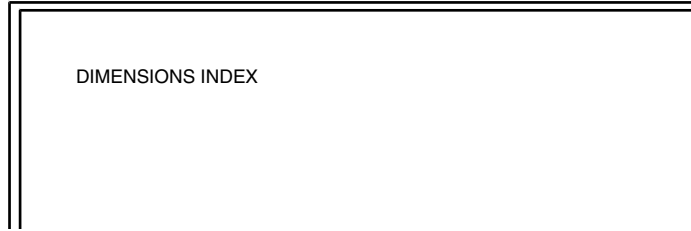
DIMENSIONS INDEX

Figure 88. The changed ROW HEADINGS

When you copy an indented heading, the indentation level is not retained. If you want the new heading to be indented, you must do it manually.

Indenting Headings

When you copy column names from the index area to the ROW HEADINGS area, all new row headings are displayed at the left margin of your report. To establish a hierarchy of row superheadings and subheadings, you need to indent selected headings.

Row superheadings set constraint precedents for all indented headings below them.

To indent a row heading:

1. Select the heading that you want to indent.
2. Press the Tab key.

To return a row heading one indentation level to the left:

1. Select an indented heading.
2. Press Shift+Tab.

Removing Headings

You can remove headings individually, or you can remove all of the headings in the setup area at once.

To remove a single heading from the setup area, select and delete the heading that you want to remove.

To remove all headings in the setup area, click the `Select All` button in the upper-left corner of the setup area and delete all the headings from the setup area.

Chapter 22.   Setting Local Constraints

A local constraint affects only the column or row where it is set.   Once you have copied the table column names from the index area into the setup area, you can use the Heading Options window to constrain headings individually.

Most fields on the Heading Options window Constraint page are similar to those in the Index Options window, which is described in "Chapter 20. Setting Global Constraints," on page 155.

This chapter describes how to:

- Set constraints on individual headings
- Name headings

Avoid applying local constraints to headings that already have global constraints assigned to their associated column name in the index area as this can cause conflicting constraint errors when retrieving data. See "Chapter 20. Setting Global Constraints," on page 155 for more information about constraining column names in the index area.

Understanding the Heading Options Constraint Page

Use the Heading Options window to constrain data you are retrieving and to establish a range restriction for that data, as you would in the   Index Options window. The difference here is that the restriction applies only to the data that is displayed for this heading and its subheadings, not to all data searched as with the global constraints set in the   Index Options window.

The fields listed on the Constraint page differ slightly depending upon whether you are constraining a dimension or fact heading. The fields of both windows are described in this section.

To display the Constraint page for a dimension:

1. Select a heading in the COLUMN HEADINGS or ROW HEADINGS area that came from the DIMENSIONS INDEX.
2. Open the Heading Options window.

   The Constraint page of the Heading Options window for a dimension is displayed, as shown in Figure 89 on page 170.

Database Name	edu_sl_custt.territory	Territory				
Type/Description	Text String/					
Label	Northwest Region					
Operators	=	Not =	<	>	<=	>=
	Between	Not Between	Like	Not Like	Null	Not Null
Source	Value Field	Text Icon				
Value	Seattle, Tacoma, Portland					

Show All Choices

Show Constrained Choices

Display Order of Heading Values	Alphabetic	Constraint List

Figure 89. Constraint page for a dimension heading

To display the Constraint page for a fact:

1. Select a heading in the COLUMN HEADINGS or ROW HEADINGS area that came from the FACTS INDEX.

2. Open the Heading Options window.

   The Constraints page of the Heading Options window for a fact opens.

Some of the fields contained in the Heading Options windows are not discussed in this chapter because they are not related to constraining a report. The `Display Order Of Heading Values` field, shown in Figure 89 on page 170, is described in "Chapter 25. Formatting and Printing a Report," on page 193. The `Report Facts As` and `Aggregate As` fields are described in "Chapter 24. Performing Calculations," on page 177.

For information about the `Operators`, `Source`, and `Value` fields, see "Selecting an Operator" on page 156 and "Entering Constraint Values" on page 158.

Using the Choice Window Buttons When Constraining Headings

If the heading is from the DIMENSIONS INDEX, the `Show All Choices` and `Show Constrained Choices` buttons are displayed near the bottom of the Heading Options window as shown in Figure 89 on page 170.

When you select the `Show Constrained Choices` button for a subheading in the setup area, the Reporter tool searches the superheadings and tables in the index area for constraints that apply to the same table. See "Selecting Values from a List" on page 161 for more detailed information on using the `Show Constrained Choices` button.

Naming a Heading

Naming headings enables you to provide information about how specific rows and columns have been constrained to return specific data. The heading name entered in the `Label` field only affects the heading frame in the setup window. Columns and rows in the report, except for calculations, get their names from the database.

The `Database Name` field displays the internal database name for a heading followed by the index column name.

Database Name	edu_sl_custt.territory	Territory
Type/Description	Text String/	

Figure 90. Syntax for Database Name

The database you are accessing might use internal names different from those shown in this document.

By default, the `Label` field initially displays the index column name. You can rename this to be more descriptive, perhaps naming the `Label` field to correspond to the data you request in the `Value` field.

To change the label of a heading in a report:

1. Select the desired heading.
2. Open the Heading Options window.
3. Delete the current label.
4. Type an informative label. Notice that the `Database Name` field retains the internal database name and the index column name when you change a heading label.
5. Close the Heading Options window. The heading is displayed in the setup area with a different name than the column name it relates to in the index area. In Figure 91, the row heading contains parentheses, indicating that the heading has been constrained to a specific territory.

ROW HEADINGS

(Northwest Region)

Dollar Sales
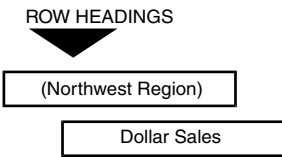
Figure 91. Naming a heading

Chapter 23. Retrieving New Data

When you select the `Get New Data` button, the Reporter tool queries the database for information you specified in the setup area. As you build and design your report, you can select this button at any time to update the data in the report.

This chapter describes how to:

- Request data
- Stop data retrieval
- Update database categories
- Capture the Structured Query Language (SQL) statements that are generated by the Reporter tool

Requesting Data

If you make changes in the setup area, or if the database is updated with more current information, you need to retrieve new data to update your report.

To retrieve new data, select the `Get New Data` button in the window header. Both the setup and report windows have a `Get New Data` button in the window header, allowing you to retrieve new data from either window.

Depending on the size and content of your report, the Reporter tool can take a few moments to retrieve data when you select `Get New Data`. Status messages are displayed in the report window while the Reporter tool does the following tasks:

- Sends queries to the database service
- Arranges the data according to the specified heading positions
- Performs any calculations that you have specified

Attention:
Each time you select `Get New Data`, data that was previously retrieved is replaced with the new report data. If you want to save a particular report, you must make a copy of the Reporter icon or copy the data to a Text, Spreadsheet, Layout, or Plot tool.

Stopping Data Retrieval

If you decide, after starting the data retrieval process, that you want to make more changes to a report, or do not want to retrieve new data, you can stop the data retrieval process.

To stop data retrieval, press the Stop function key on your keyboard at any time.

Attention:

Stopping a Reporter icon during the data retrieval process can cause incomplete or inaccurate results in the Report window.

Updating Database Categories

If you suspect that changes have been made to WTDD tables since the last time you opened a Reporter icon, you can use the `Update Category` button in the `Special Button` menu to read the Workstation Tools Data Dictionary (WTDD).

When you select the `Update Category` button, the Reporter tool reads the tables in the database categories and updates the setup window. This action updates the categories for the current Reporter icon only, leaving other Reporter icons on your desktop untouched. The `Update Category` button is primarily useful to database administrators and application developers who want to test changes they have made to the database categories before implementing them for use by the entire user group.

If the WTDD is successfully updated, the Reporter tool generates a confirmation message. If the WTDD cannot be updated, a message identifies the function that failed.

For more information about updating the database structure, see *Administering Databases with Meta5*.

Capturing SQL Statements

You can use the `Capture SQL` item in the `Special` menu of the setup window to save all SQL statements generated by the Reporter tool. Capturing SQL statements is useful for troubleshooting your report setup.

To capture the SQL generated by your Reporter tool:

1. Select the `Special` button in the setup window or report window header.
2. Select `Capture SQL` in the `Special` menu.
3. Click on the `Get New Data` button.

A Text icon is created and its window opens automatically in the lower right corner of your desktop. The name of this icon is `RptrLog` and includes the date and time the icon was created, as shown in Figure 92 on page 175.

Understanding the Contents of the RptrLog Window

The RptrLog capture window provides all the same functions as the Text tool. Each time you use the `Capture SQL` item to capture SQL statements, a separate RptrLog window is added to your desktop. When the Reporter tool sends SQL statements to the database, copies of these statements are displayed

in the RptrLog window. This window captures only SQL statements sent from the Reporter tool to the database and does not record error message information, query times, or query results.

A sample RptrLog window is shown in Figure 92 on page 175. Notice the title block in the window header contains the current date and time, marking the exact time when the RptrLog window opened.


```
select distinct edu_sl_prod.branddesc
from edu_sl_prod order by 1
select distinct edu_sl_custt.territory
from edu_sl_custt order by 1
select distinct edu_sl_priod.period
from edu_sl_priod order by 1
```
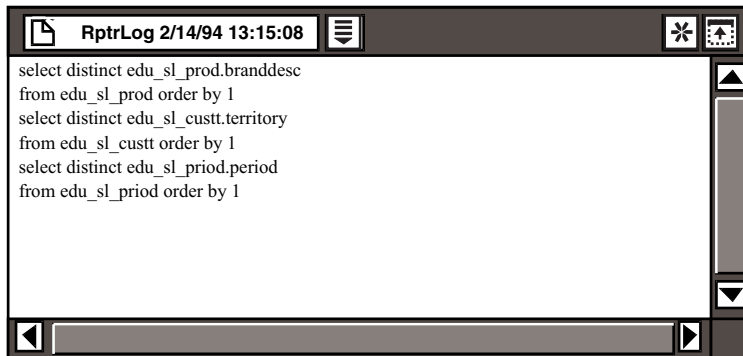
Figure 92. RptrLog window

You can capture multiple SQL statement sessions by leaving the RptrLog window open while you work in the Reporter windows. Once you close the RptrLog window, the capture process stops. The RptrLog icon remains on your desktop until you delete it, allowing you to retain records of each SQL statement session.

If your RptrLog window reaches the maximum size of a Text document, it closes automatically and a new RptrLog icon is created and opened on your desktop. This new RptrLog window has a new date and time stamp in its title block, reflecting the day and time it was created. All further SQL statements for the session are recorded in this new window.

Stopping the SQL Capture

To stop the capture process, close the RptrLog window. The RptrLog captures all the SQL statements gathered up to the time you close the window.

Chapter 24.   Performing Calculations

There are two ways to add calculations to a report. You can either specify that the Reporter tool aggregate individual values instead of returning them to the report, or you can add computed frames that display their results in labeled columns or rows. This chapter describes how to use both of these methods to add calculations to your reports. Specific topics include how to:

- Report facts as aggregates
- Design accurate computed frames
- Create computed frames
- Change the order of calculation in your report when necessary
- Suppress warning messages that print in a report

Reporting Facts as Aggregates

The `Report Facts As` field lets you specify how you want the Reporter tool to display fact values. Facts can be displayed as values or aggregates.

- Reporting facts as values returns one data value to each column and row intersection in your report.
- Reporting facts as aggregates returns the result of a specified operation on the multiple values returned to a column and row coordinate in your report. For example, totals and averages are aggregates. Totaling or averaging multiple values results in a single value.

If you choose `Values`, the Reporter tool returns one value per heading coordinate. If there is overlapping data, more than one value per column and row coordinate, the Reporter tool displays a highlighted box in the row or column that contains the number of values which were returned, instead of displaying the data itself. For more information about overlapping data, see "Correcting Reports that Return Overlapping Values" on page 219.

If you choose `Aggregates`, a series of choices are displayed.

Table 24. Heading Options window aggregated fact operators

Operator	Returns
Sum	The sum of all values
Average	The average of all values

Table 24. Heading Options window aggregated fact operators

Operator	Returns
Min	The lowest value
Max	The highest value
Count	The number of values

To calculate the Average value of facts data in a report:

1. Select `Aggregates` in the `Report Facts As` field.

2. Select `Average` in the `Aggregate As` field.

3. Close the Heading Options window.

4. Select `Get New Data`. The value displayed is the average of the multiple values returned.

When you create a report that contains aggregate values, the Reporter tool generates a message that displays in the report window after you select `Get New Data`. This message informs you that the report contains aggregated facts. You can suppress this message to prevent it from displaying and printing in your report. See "Suppressing Printed Warning Messages" on page 191 for more information.

Designing Accurate Computed Frames

When you set up a calculation in your report, that calculation is displayed as a computed frame in the setup area of your report.

Computed frames depend on other heading frames for data, so their location in the report is very important. Correct computed frame placement ensures that columns and rows are read in an order that yields accurate results. Additionally, careful placement assures that the computed data is displayed in a logical area in the formatted report. This section offers some tips to help you create accurate, useful computed frames.

- Retrieve data before you create any computed frames.

- Look at the report structure to see where the dimension and fact headings are placed in the setup area. The placement of existing headings can make a difference in where you place a computed frame.

- Use the   Computed Options window to select or enter the heading values that you want to calculate. The `Calculate` field displays several prompts, depending upon the operator that you select.

- Always determine the order of calculation for columns and rows. In the Reporter Options window, you can choose to calculate columns first or rows first. The order in which the Reporter tool performs calculations affects the report results. For information about changing the order of calculation in a report, see "Changing the Order of Calculation" on page 190.

- You can use calculated columns and rows that intersect, even when the rows and columns are calculated using different operators. See "Changing the Order of Calculation" on page 190 for more information.

Creating Computed Frames

After you have designed a report, you might want to make further calculations on the data that you have retrieved. For example, you might want to show each salesperson's total sales figures as a percentile share of the total figure for the entire territory. Or, when creating a comparison report, you might want to show the percentage of change between one set of figures and another. You can create these types of calculations and others using the Reporter tool's Computed Options window.

To display the Computed Options window, select `Add Computed Frame` from the `Special Button` menu of the setup window. The Computed Options window opens, as shown in Figure 93 on page 179.

Computed Options	Apply	Cancel	Reset	

Display Formula   Format   Special Cases

Label Total Unit Sales Q1 and Q2

Operators Sum | Average | + | - | * | / | Share -- % Of | % Change

Calculate ? (Value 1) plus ? (Value 2)

Value 1 Type Heading Constant   Value 2 Type Heading Constant

Select the target heading, then click here: Set Value 1

Enter Value 2

Headings to Exclude *None* Some

Exclude: ?
Select the target heading, then click here: Exclude
Select the target heading, then click here: Include

Figure 93. Computed Options window

After you set a formula, you can select any of the `Display` field choices at any time to alternate between pages. When you move to another page, any changes that you made on the previous page are automatically applied.

The procedures for formatting calculation results and setting options for special cases are the same as those used in the Heading Options window. See "Chapter 25. Formatting and Printing a Report," on page 193 for more information about formatting individual columns and rows of data.

Understanding Formulas

Use the Computed Options window, shown in Figure 93, to set calculations in a report.

The following steps provide an overview of the procedure for setting the formula for a computed frame. These steps are further explained throughout the chapter.

To set a formula:

1. Select `Formula` in the `Display` field.

2. Enter a name into the `Label` field. This name is displayed in both the setup area and in the formatted report.

3. Select an operator from the `Operator` field. See Table 25 on page 181 for a brief explanation of each operator.

4. Select the headings in the report setup area or enter constants that supply appropriate data for your intended calculation. Set these heading values in the calculation with the `Set Value 1` and `Set Value 2` buttons that are displayed in the `Calculate` field.

5. Select a choice from the `Exclude` field if applicable.

6. Close the Computed Options window.

   The Reporter tool places the computed frame in the setup area, either in the COLUMN HEADINGS or ROW HEADINGS area, depending on the headings with which it is associated. Within the setup area, you can manipulate computed frames by copying, moving, or deleting them or changing their options. The computed frame label is displayed in italics in the setup area.

7. Click on `Get New Data` in the setup window header to display the computed frame and its results in your report.

Labeling a Computed Frame

Label a computed frame by entering descriptive information or an @-variable into the Computed Options window. Then, when you open the report, you know exactly what the computed frame is calculating without having to open the Computed Options window. Labels entered here become column and row names in the report and also are displayed in the setup area frames. You cannot create a calculation without naming it. You can, however, hide a label. See "Hiding Data and Labels" on page 197 for more information.

Selecting an Operator

The operator you specify determines the type of calculation you are creating and sets the requirements for the `Calculate` field. Table 25 outlines each operator choice and its function.

Table 25. Computed Options window operators

Operator	Function
Sum	Ttotals values spanning a row or column
Average	Averages values spanning a row or column
+	Adds two rows, columns, or constants
-	Subtracts two rows, columns, or constants
*	Multiplies two rows, columns, or constants
/	Divides two rows, columns, or constants
Share -- % Of	Shows the values in one heading as a percentage share of the values in another heading
% Change	Shows the percentage of change between one value and another

Creating Sum and Average Calculations

This section describes the procedure for creating Sum and Average calculations in computed frames. The process is the same for both of these aggregate calculations.

Both the `Sum` and `Average` operators calculate a fact that spans another heading and require you to set a spanning value, Value 1, which must be a dimension. Value 2 must be a fact and be a subheading of Value 1 or share the same superheading as Value 1. When fact headings are in the opposite heading area from the span heading, all facts are automatically aggregated. For example, if the fact is a column heading and the spanning value is a row heading, as in Figure 95 on page 182, Value 2 is set automatically.

You can also return aggregated facts with the Reporter tool, by setting the Heading Options window of a fact heading. For more information, see "Reporting Facts as Aggregates" on page 177.

To total or average column or row results:

1. Select `Sum` or `Average` in the `Operator` field. The `Calculate` field is displayed as shown in Figure 94 on page 182.

Calculate   the sum of ? (Value2) spanning ? (Value1)

Select the target heading, then click here: Set Value 1

Select the target heading, then click here: Set Value 2

Figure 94. Sum calculation in a Computed Options window

The `Calculate` field requires values from the report setup area to calculate a total.

2. Select a dimension heading from the report setup area to represent Value 1, and click on the `Set Value 1` button in the `Calculate` field. Value 1 is the row or column heading that categorizes the data you want to sum. Value 1 must be a dimension heading not a fact heading.

3. Select a fact heading from the report setup area to represent Value 2, and click on the `Set Value 2` button. Value 2 is the fact heading that contains the data you want to sum.

In some cases, the Reporter tool automatically sets Value 2. If the Value 1 heading is constrained for multiple values, those values are all used in the calculation. In Figure 95 on page 182 for example, (Territory) is the only selected value for the `Sum` operator, producing a Dollar Sales total for all three territories that exist in that heading. The computed frame name is Total.

	Reporter	Get New Data	Show Report		

COLUMN HEADINGS

(Snack Right Chips)

ROW HEADINGS

(June, 1993)   (June, 1992)

Dollar Sales   Dollar Sales

(Territory)

Total

Snack Right Chips

	June, 1993 Dollar Sales	June, 1992 Dollar Sales
Atlanta	*176,624.00*	*310,918.00*
Chicago	*288,425.00*	*277,552.00*
Dallas	*280,208.00*	*247,921.00*
Total	*745,257.00*	*836,391.00*

Figure 95. Sum calculation in a computed frame and resulting report

The report in Figure 96 on page 183 is an example of how the `Average` operator can be used to calculate the computed frame. This report calculates the average

dollar amount spanning the Dollar Sales for all three territories. The computed
frame name is Average.

![Avg Sales]	Get New Data	Show Report	✳ ⬆

COLUMN HEADINGS ▶	(Snack Right Chips)

	(June, 1993)	(June, 1992)

ROW HEADINGS ▼

	Dollar Sales	Dollar Sales

(Territory)

Average

Snack Right Chips

	June, 1993 **Dollar Sales**	**June, 1992** **Dollar Sales**
Atlanta	*176,624.00*	*310,918.00*
Chicago	*288,425.00*	*277,552.00*
Dallas	*280,208.00*	*247,921.00*
Average	*248,419.00*	*278,797.00*

Figure 96. Average calculation in a computed frame

For Sum and Average calculations, an N/A value is treated as a zero.

Adding, Subtracting, Multiplying, and Dividing

This section describes binary calculations that use the +, -, *, and / operators in
computed frames. The calculation process outlined in this section is similar for
each of these operators.

The +, -, *, and / operators calculate the results by adding, subtracting,
multiplying, or dividing using two headings or one heading and a constant.

To add, subtract, multiply, or divide:

1. Select +, -, *, or / in the Operator field.

    You now have the option of selecting a heading or entering a constant as one
    of the values for the calculation.

2. Select a heading from the report setup area to represent Value 1, and click on
    the Set Value 1 button in the Calculate field, or select Constant as
    Value 1. A field opens where you can enter the Constant value.

    *   Guidelines for the Heading choice:

        —   If you select Heading, the data calculated varies, since the data for
            each heading changes as the database is updated. Heading is the
            default choice.

— If you select `Heading` for both values, they must have the same superheading and both must be either column headings or row headings. You can specify two separate headings as `Value 1` and `Value 2` even if they represent the same fact.

• Guidelines for the `Constant` choice:

— If you select `Constant` for one value, you must select `Heading` for the other.

— If you are using the Reporter tool within a capsule application, you can use an *@-variable* as a `Constant`. When using *@-variables* as constants:

— The Reporter icon must be inside the capsule window when you set the calculation.

— Set and apply the *@-variable* values in the capsule   User Input Controls window before placing *@-variables* in the report. If you do not apply the *@-variable* values first, you will receive an error message when you try to close the Reporter Computed Options window.

Refer to *Capsule User's Guide* for more information about setting *@-variables*.

3. Set Value 2 using the same guidelines discussed in the previous step.

The `Calculate` field displays your selections for Value 1 and Value 2.

Setting calculations for the subtract, multiply, and divide operators all follow the same procedure described here.

The report in Figure 97 on page 185 shows the use of the `/` operator in a computed frame. This report divides Dollar Sales by the number of sales people in each territory, giving a potential quota. Note that the names of the computed frames, such as `Sales / 4`, provide information about how each calculation is set up.
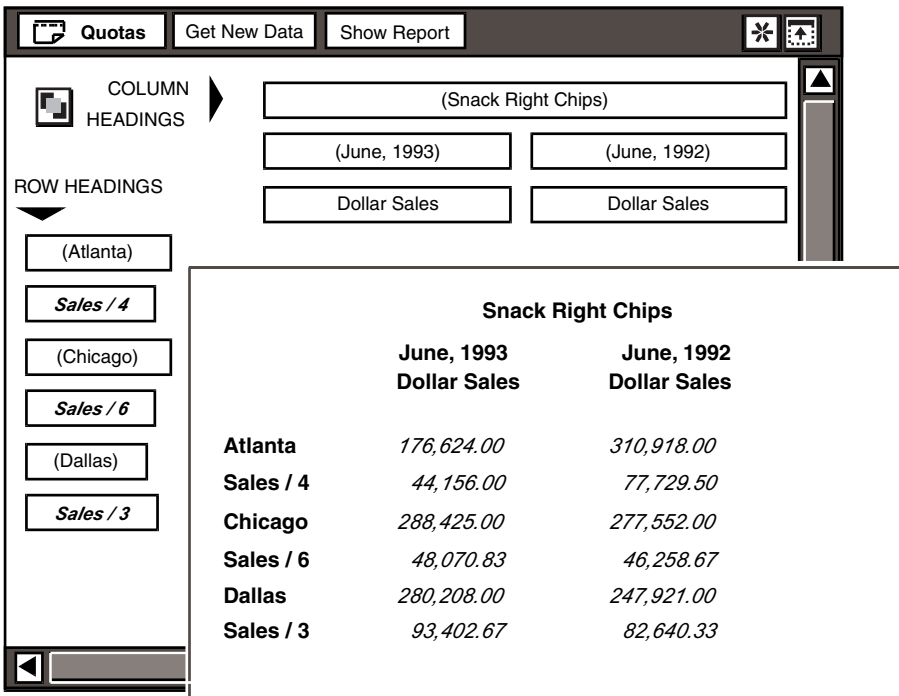
Figure 97. Division calculation in computed frames

Creating Share Calculations

The `Share -- % Of` operator shows the values in one heading as a percentage share of those in another.

To calculate a share:

1. Select `Share -- % Of` in the `Operator` field. The `Calculate` field is displayed, shown in Figure 98 on page 185.

Calculate   the items in Dollar Sales (Value 1) as a percentage of ? (Value 2)

Select the target heading, then click here: (Set Value 1)

Select the target heading, then click here: (Set Value 2)

Figure 98. The Calculate field

2. Select a heading from the report setup area to represent Value 1, and click on the `Set Value 1` button in the `Calculate` field.

3. Select a heading to represent Value 2, and click on the `Set Value 2` button.

   Only headings from the lowest level of a hierarchy can be used as value 2.

You can also use the same heading for both values. For example, you could calculate Unit Sales for each territory as a percentage of some Unit Sales total. To do this, set `Unit Sales` as `Value 1` and `Value 2`. The `Calculate` field then requests more information, because you are using the same heading for both values.

Calculate   the items in Unit Sales (Value 1) as a percentage of Unit Sales (Value 2)

Select the target heading, then click here: (Set Value 1)

Select the target heading, then click here: (Set Value 2)

Total for Value 2	Largest Item	Sum of Items	Selected Heading

Figure 99. The Calculate field

4. Select a choice from the `Total for Value 2` field. The selected choice tells the Reporter tool exactly how to calculate each share within the heading.

5. If you select `Largest Item`, share is calculated against the item with the largest value. For example, in Figure 100, Chicago has the largest value and is consequently the share base.

<div align="center">

Snack Right Chips

June, 1993

	Unit Sales	% Largest Market
Atlanta	*176,624.00*	*61*
Chicago	*288,425.00*	*100*
Dallas	*280,208.00*	*97*

</div>

Figure 100. Result of the share calculation against the largest value

6. If you select `Sum Of Items`, share is calculated against the total number for all items. The share base in the following report is the total of 176,624.00 + 288,425.00 + 280,208.00. However, the total number is not displayed in the report unless you have created a computed frame to sum the column of data, as shown in Figure 101 on page 186.

<div align="center">

Snack Right Chips

June, 1993

	Unit Sales	Share of Sales
Atlanta	*176,624.00*	*24%*
Chicago	*288,425.00*	*39%*
Dallas	*280,208.00*	*37%*
Total	*745,257.00*	*100%*

</div>

Figure 101. Result of the share calculation against the sum of all values

7. If you select `Selected Heading`, share is calculated against the total associated with another heading you select. In Figure 102 Atlanta was the selected heading, and would be shown in the `Calculate` field as the new heading for Value 2.

Snack Right Chips

June, 1993

	Unit Sales	Share Of Atlanta
Atlanta	*176,624.00*	*100.00*
Chicago	*288,425.00*	*163.30*
Dallas	*280,208.00*	*158.65*

Figure 102. Result of the share calculation against a selected heading

For `Share -- % Of` calculations, an N/A value always results in `N/A`. When using `Largest Item` or `Selected Heading`, you cannot use a total calculation in a row heading unless you change the order of calculation to compute row headings first.

Creating Percentile Calculations

The `% Change` operator shows the percentage of change between one value and another.

To calculate a percentage of change:

1. Select `% Change` in the `Operator` field. The calculate field is displayed, as shown Figure 103.

Calculate the percentage change of ?(Value1) from ? (Value2)

Select the target heading, then click here: ⬭ Set Value 1

Select the target heading, then click here: ⬭ Set Value 2

Figure 103. The Calculate field

2. Select a heading from the report setup area to represent Value 1, and click on the `Set Value 1` button.

3. Select a heading to represent Value 2, and click on the `Set Value 2` button. The `Calculate` field reflects your selections.

Figure 104 on page 188 shows Dollar Sales for 1993 calculated as a percentage of change from Dollar Sales in 1992. The Dollar Sales heading for 1993 is Value

1, and the Dollar Sales heading for 1992 is Value 2. The computed frame name is % Change.
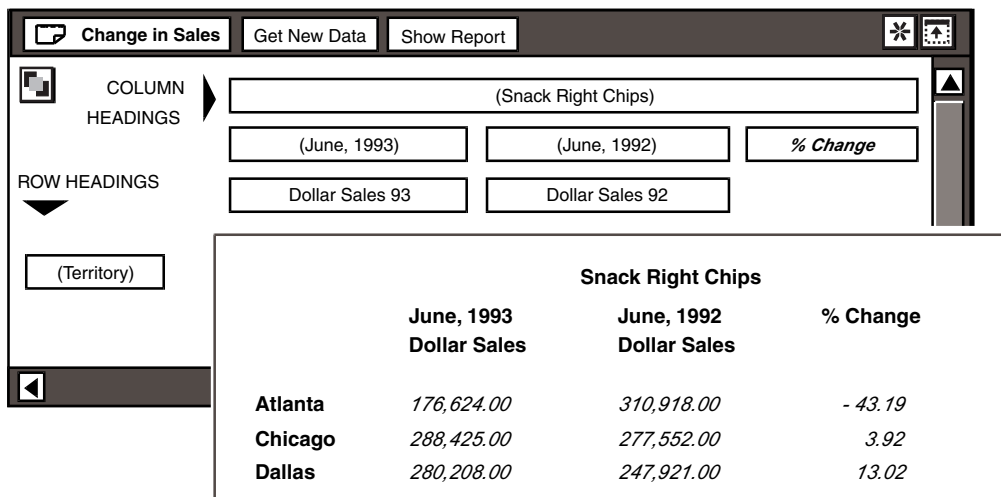
Figure 104. Percentage of change calculation in a computed frame

When an N/A value is encountered in a `% Change` calculation, the result is always N/A.

Excluding Data from a Calculation

The Computed Options window lets you specify which columns are included in the computed row calculation or which rows are included in the computed column calculation. Some columns and rows might not contain the appropriate data for the intended calculation. You can use this option to exclude them. For example, in calculating the projected total dollar sales for several products, you might want to exclude one product that will soon be taken off the market.

To include all columns or rows in a calculation, select `None` in the `Headings to Exclude` field as shown in Figure 105. `None` is the default setting.

Figure 105. The Headings to Exclude field

To omit specified columns or rows from a calculation:

1. Select `Some` in the `Headings to Exclude` field.

   A new field and two new buttons are added to the Computed Options window, as shown in Figure 106.

None   Some

Exclude: ?

Select the target heading, then click here:

Exclude

Select the target heading, then click here:

Include

Figure 106. Selecting the Some option of the Headings to Exclude field

If the computed frame is a column, the excluded headings must be rows and vice versa.

2. Select the heading of the column or row of data that you want to omit from the calculation, and click on `Exclude`. You can omit more than one heading.

As an example, in the report shown in Figure 108 on page 189, if you put a total on the Dollar Sales numbers for 1993, you could set up a `Sum` calculation for (Territory) and select `Some` in the `Headings to Exclude` field. As shown in Figure 107, you could then select Dollar Sales for 1992 and exclude this data from the calculation.

Headings to
Exclude

None   Some

Exclude: Dollar Sales

Select the target heading, then click here:

Exclude

Select the target heading, then click here:

Include

Figure 107. Excluding a specified heading in a calculation

This results in the report shown in Figure 108.

	Snack Right Chips	
	June, 1993 Dollar Sales	June, 1992 Dollar Sales
Atlanta	176,624.00	310,918.00
Chicago	288,425.00	277,552.00
Dallas	280,208.00	247,921.00
Total	745,257.00	

Figure 108. Example of excluding a heading from a calculation

Things to remember when you exclude a heading:

- The maximum number of excluded headings is 15.

- You can open the Computed Options window at any time and view the `Exclude` field to see what headings are currently excluded from the calculation. The Reporter tool lists all excluded headings in the `Exclude` field.

- If you exclude headings in a calculation, you can reopen the Computed Options window at a later date and re-include the heading in the calculation.

To re-include a heading in a calculation:

1. Select the relevant computed frame in the setup area.

2. Select `None` in the `Headings to Exclude` field to re-include all the headings, or select the frame of the heading you want to re-include.

3. Click on the `Include` button.

Changing the Order of Calculation

You can perform calculations on computed columns and computed rows that intersect, even when the rows and columns are calculated using different operators. The `Calculate Computed Frames` field lets you tell the Reporter tool to calculate either columns or rows first. The order in which the Reporter tool performs calculations affects the report results.

The `Calculate Computed Frames` field, shown in Figure 109 on page 190, are displayed at the bottom of the Reporter Options window.

Calculate Computed Frames	Columns First	Rows First

Figure 109. The Calculate Computed Frames field

By default, the Reporter tool calculates columns first. To change or reset the order of calculation, select `Columns First` or `Rows First` in the `Calculate ComputedFrames` field. The type of calculation operators used in your computed frame determines whether you must calculate the row or the column first.

Figure 110 and Figure 111 show the significance of calculating columns and rows in the correct order. In this report, the % Change column uses the `% Change` operator and the Total row uses the `Sum` operator.

	Snack Right Chips		
	Dollar Sales April, 1993	Dollar Sales April, 1992	% Change
Atlanta	*176,624.00*	*310,918.00*	*(43.19)*
Chicago	*288,425.00*	*277,552.00*	*3.92*
Dallas	*280,208.00*	*247,921.00*	*13.02*
Total	*745,257.00*	*836,391.00*	*(26.25)*

Figure 110. Calculating computed headings

By default, the Reporter tool calculates the computed % Change column heading first. In Figure 110, the values in parentheses indicate a negative change or decrease in value. The (26.25)% change for the Total row is an incorrect value, because the value shows the % Change for the three territories, when it should show the % Change of the total Dollar Sales. To show the correct value, you need to calculate the Total row before calculating the % Change column.

When the `Calculate Computed Frames` field is changed to `Rows First`, the correct report is generated, as shown in Figure 111.

	Snack Right Chips		
	Dollar Sales April, 1993	Dollar Sales April, 1992	% Change
Atlanta	176,624.00	310,918.00	- 43.19
Chicago	288,425.00	277,552.00	3.92
Dallas	280,208.00	247,921.00	13.02
Total	745,257.00	836,391.00	- 10.90

Figure 111. The report after changing to a Rows First calculation

Suppressing Printed Warning Messages

If N/A or aggregate values are returned from calculations in a report, the Reporter tool generates a warning message that is displayed in the report window and also prints in the report. If the N/A values are valid or if you intended to return an aggregated result and you do not want these messages to be displayed in the report, you can suppress them with the `Warning Messages to Suppress` field in the Reporter Options window.

Warning Messages to Suppress | N/A | Aggregated Facts |

Figure 112. The Warning Messages to Suppress window

To suppress a warning message:

1. Display the Reporter Options window.

2. Select the appropriate buttons in the `Warning Messages to Suppress` field.

   If both the N/A and aggregate facts messages are displayed in your report, you can select both choices to suppress both messages.

3. Close the Reporter Options window.

4. Select `Show Report.` The messages are no longer displayed in the report or any printed copy.

Chapter 25.   Formatting and Printing a Report

You can use two methods to format a report with the Reporter tool. You can either set format characteristics, such as data alignment and type attributes, globally with the Reporter Options window. If you want to make more specific formatting settings on a column or row basis, you can use the Heading Options window. As a general rule, it is more efficient to set global formatting first and then apply any specialized formatting by individual heading.

This chapter describes how to:

- Display the Reporter Options window
- Create and format a title in a report
- Specify alignment and type attributes of all data
- Format data by column or row
- Choose the order in which the headings display
- Enhance a report by adding page breaks, patterns, and descriptive text
- Set special cases so data that meets specific requirements is displayed in a distinctive way, for example, in a particular typeface
- Assemble multi-page printed reports

Setting Global Format Options

The Reporter Options window lets you globally manipulate data in a report. You can use this window to add a title and set the format of all data in a report (for example, specify that all data be displayed in italics). Unlike the Heading Options window, which lets you format the data in individual columns or rows, the Reporter Options window format settings affect the entire report.

To set global report formats and options:

1. Click on the `Select All` button in the top left corner of the setup area.
2. Display the Reporter Options window.

Figure 113. Reporter Options window

3. Set the desired fields and close the window. The global options available in this window are discussed throughout this chapter.

If the report data has been retrieved previously and you have not made any structural changes to the setup area, you do not need to reselect Reporter Options window settings affect the report window. You can simply select Show Report to see the new format.

Attention:

When set last, the Reporter Options format settings override any specific format settings made previously in the Heading Options windows. The opposite is also true; if you set Heading Options format settings last, those settings override any you have made in the Reporter Options window.

Creating the Report Title

You can name your report in the Reporter Title field and specify the typeface and location of this title. In addition to the report title, you can add headers and

footers to help your users identify the report content. For information about setting headers and footers, see *Getting Started with the Meta5 Developer's Desktop*.

To name a report:

1. Type a title in the `Reporter Title` field. If the Reporter icon is in a capsule application, you can use @-variables in the title.

   See the *Capsule User's Guide* for more information about @-variables. The `Reporter Title` field also recognizes the @-keywords @TIME, @DATE, and @USER. @TIME and @DATE record the time and date the report was generated. @USER records the desktop name of the person who generated the report.

2. Press Shift+Enter to insert a line feed at the end of each line. Only the first five lines of the title are displayed in the field, but you can enter more than five lines. If you have a lengthy title, it might be easier to type the title in a Text icon and then copy it to the `Reporter Title` field.

When you select `No Blank Rows`, and select `Compress` for the `Column Headings` field, the Reporter tool does not transfer the Reporter Title text. If you want the Reporter Title text to transfer, you must select the `Indented Sub-Rows` choice.

Setting the Typeface of the Title

The `Title Attributes` field lets you set a typeface for the Reporter Title. There are four choices available in this field.

To set the typeface, select one or more choices from the `Title Attributes` field.

Positioning the Title

The `Title Position` field lets you set the location of your report title.

To position the title, select a choice from each section of the `Title Position` field.

Assigning Global Data Formatting

The `Global Data Alignment` and `Global Data Attributes` fields enable you to set the alignment and typeface of data in the columns and rows of your report.

To globally set the data appearance:

1. Select a choice in the `Global Data Alignment` field to designate the positioning of data within columns.

2. Select any number of items from the `Global Data Attributes` field to designate the typeface of data in the report.

Formatting Headings and Data by Column or Row

The Heading Options window lets you set the appearance of the data and headings in your report on an individual basis. The options on this page function similarly to the global formatting options of the Reporter Options window, but the settings you choose affect only the data in the corresponding column or row, not in the entire report. You can use this page to specify whether or not the data or heading is displayed, align the data in individual rows and columns, set the typeface of the data, and specify the numeric precision of the displayed data.

To display the Heading Options window:

1. Select a report heading in the setup area.

2. Display the Heading Options window.

3. Select `Format` in the `Display` field. The Format page is displayed, as shown in Figure 114 on page 196.

Presentation Space	As Set Below		Hide Data	Hide Label Only	
	0.25	**Centimeters**			
Data Alignment	Flush Left		Centered	Flush Right	
Data Attributes	Bold		Italic	Underline	Double Underline

Display Symbol	As In Database	Currency	%		
Currency Symbol	$	£	¥	Other	Other
Currency Symbol Placement	$00.00	00.00$	00$00	Currency Negative Representation: -$40	$-40
Thousand Separator	1000	1 000	1,000	1.000	1'000
Decimal Separator	12.34	12,34			
Negative Representation	-123	123-	(123)	[123]	<123>
Decimal Precision	000000.	00000.1	0000.02	000.003	00.0004	0.00005

Figure 114. Heading Options and Computed Options windows Format page

In places where columns and rows intersect, data is displayed according to the last selections applied in the Heading Options window.

For example, in the report shown in Figure 115 on page 197, if you set the data column for Unit Sales to be displayed in italic typeface, then set the intersecting

row for Chicago to be displayed in bold, the data at the intersecting point is shown in bold.

COLUMN HEADINGS ▶

| (Brand Description) |
| Product Description |
| (PERIOD) |
| Unit Sales |

ROW HEADINGS ▼

| Territory |

| **Dollar Sales** |
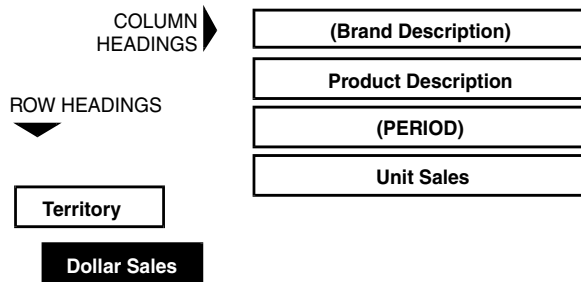
Figure 115. Intersecting format settings

If the data has already been retrieved, and you have made no structural changes to the setup, you do not need to reselect `Get New Data` to see the new format. You can simply select `Show Report`, and the report is displayed with the new format in place.

Setting the Presentation Space

The Heading Option window enables you to set the column width or row height for your report or to specify that data or heading labels be hidden.

Setting Column Width or Row Height

The `As Set Below` or `Hide Label Only` choices let you change the width or height of columns and rows in a report.

When you select either of these choices, the `Inches` or `Centimeters` field is displayed below the field, depending on your desktop settings, and you can then enter the desired number of units. Use this field to change the spacing in your report or to visually group data.

You can select `As Set Below` or `Hide Label Only` for any type of heading frame except text, pattern, and page break. See "Enhancing the Report" on page 200 for information about these items.

Hiding Data and Labels

To hide a specific column or row of data, its label, and any related subheadings, select the `Hide Data` choice in the `Presentation Space` field.

For example, you might want to use product and brand sales to compute share but show only the share data in the final report. When you select `Hide Data`, the labels and data remain in the report but are omitted from the display and from any printed copy. Because you have not made any structural changes to the setup area, you can select `Show Report` to view the revised report.

When you hide data and labels, the border surrounding the heading name in the setup area changes from a solid line to a faint dotted line, as shown in Figure 116.

```
┌─────────────────────────┐        ┌- - - - - - - - - - - - - - ┐
│   Product Description    │  ───▶  ¦   Product Description      ¦
└─────────────────────────┘        └- - - - - - - - - - - - - - ┘
```
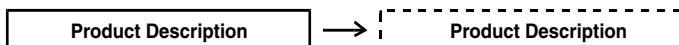
Figure 116. Border of heading with hidden data

Hiding Labels Only

To hide a heading label but display the associated data, select `Hide Label Only` in the `Presentation Space` field.

Suppose you create a report that shows unit sales in January for ten products in a product line. If you include January in the title, you might not want it to be displayed repeatedly in each column of your report. The heading and associated data remain in the report, but the label is omitted from the display and from any printed copy.

You can also adjust the width or height of the column or row associated with this label by changing the value in the `Inches` or `Centimeters` field. For more information about column and row spacing, see "Setting Column Width or Row Height" on page 197.

When you hide a label, the border surrounding the heading name in the setup area changes from a solid line to a dotted line.

Aligning Data and Setting Typeface

The `Data Alignment` and `Data Attributes` fields of the `Format` page let you specify the appearance of the data in individual columns and rows. Several format options are available.

To set the data format:

1. Select a choice from the `Data Alignment` field. This choice designates the position of data in the report row or column.

2. Select any number of choices from the `Data Attributes` field. These choices designate the typeface of the data in the row or column.

Displaying Symbols with Numbers

The fields in the bottom half of the Format page let you further enhance how numbers are displayed in a selected column or row.

To set the format for numbers:

1. Select a choice from the `Display Symbol` field:

   `As In Database` displays returned values with any symbols that are included in the database.

`Currency` enables you to set a variety of fields related to money. Additional fields are displayed only when `Currency` is selected.

`%` displays returned values with a % sign.

2. Set the `Currency` options if applicable.

3. Select a symbol from the `Currency Symbol` field.

Enter your own currency symbol using the `Other` choice and field.

1. Determine the placement of the currency symbol.

2. Set the `Currency Negative Representation`.

3. Set the `Thousand Separator` and `Decimal Separator` fields.

   These two fields are related. You cannot select the same type of separator for both fields. For example, if you choose a comma as the thousand separator you cannot choose a comma as the decimal separator.

4. Set the `Negative Representation` field.

   If you select a method of representing negative numbers that is not familiar to your audience, you might want to annotate your report to show your audience how negative numbers are being depicted.

Setting Decimal Precision

The `Decimal Precision` field lets you select the number of places you want to display after the decimal point in a number. The Reporter tool rounds off to the number of decimal places you specify. Numbers greater than or equal to five round up, and numbers less than five round down.

Rounding is only done when numbers are displayed. All calculations use the full value of numbers.

When you first open the Heading Options window, the default setting is 0000.02. To set numeric precision, select a choice in the `Decimal Precision` field. Table 26 on page 199 describes how each choice in the `Decimal Precision` field functions. The number 2.37519 is used as an example in this table.

Table 26. Numeric precision as specified in the Decimal Precision field

Choice	Displays number as
000000	2
00000.1	2.4
0000.02	2.38
000.003	2.375
00.0004	2.3752
0.00005	2.37519

When you transfer data from Reporter to another tool, regardless of the Decimal Precision display setting in the Reporter tool, the full value of every number is transferred to the new tool. The full value might not be displayed in the new tool. To find out how values containing decimals are displayed, see the documentation for the tool to which you are transferring data.

Choosing the Heading Display Order

The `Display Order of Heading Values` field on the Heading Options window lets you specify the order in which the dimension headings are displayed in your report.

Display Order of Heading Values	Alphabetic	Constraint List

Figure 117. The Display Order of Heading Values field

The `Display Order of Heading Values` field is active only when the `Equals` operator is selected and the selected heading is a dimension.

If you select `Alphabetic`, the constrained dimension headings are displayed in your report in alphabetic order (A-Z, 0-9). If you select `Constraint List`, the headings are displayed in the order you have designated in the `Value` field of the Constraint page.

The `Constraint List` choice is useful if you want the headings in your report to display in a particular order. For example, if you are constraining a Territory heading and you want to list the dimension headings geographically, not alphabetically, select `Constraint List` and use one of the following methods for entering constraints:

- Type the constraint values in the desired order in the `Value` field.
- Type the constraint values in the desired order in a Text tool window and set `Source` to `Text Icon`.
- Select the desired items in order from one of the Choices windows and then copy them into the `Value` field or into a Text icon, depending on how the `Source` field is set.

Enhancing the Report

The Reporter tool offers features that let you present data in the best possible format by beginning new pages at appropriate places, adding patterns to emphasize or separate data, and adding text to further explain comparisons or results.

These features are accessed through the `Special` menu in the setup window header.

This section describes how to use Add New Page, Add Pattern Frame, and Add Text Frame.

Adding a Page

If a report is too large to print on one page, the Reporter tool automatically makes a break in the report and prints remaining data on additional pages. Consequently, related data can be separated on different pages making the report difficult to use. Setting your own page breaks enables you to better group data for easy reading.

To add a new page:

1. Select `Add New Page` in the `Special` menu of the setup window header. A message is displayed in the message area.

   `Copying. -- Select destination.`

2. Select the column or row heading frame in the setup area after which you want the page break to occur. Placing the new page symbol after a column heading causes a vertical break in the report, and placing it after a row heading causes a horizontal break in the report.

A new page symbol indicates the location of the page break, as shown in Figure 118.
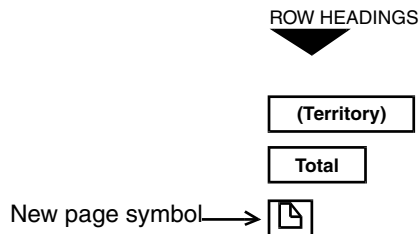
Figure 118. New page symbol in a report setup

Select `Get New Data` in the setup window header to display the page break. The report is displayed in the report window, as shown in Figure 119 on page 202.

A new page symbol and a dotted line in the report window indicate the page break location in the printed report. This symbol and dotted line are not displayed in the printed report. When you print a report, column and row headings are reprinted on all additional pages, even though they are not repeated in the report window.

	Snack Right Chips		
	June, 1993 Dollar Sales	June, 1992 Dollar Sales	% Change
Atlanta	176,624.00	310,918.00	(43.19)
Chicago	288,425.00	277,552.00	3.92
Dallas	280,208.00	247,921.00	13.02
Total	745,257.00	836,391.00	(10.90)
- -			
Los Angeles	355,000.00	260,045.00	27.00
New York	298,700.00	225,552.00	13.00

Figure 119. Page break indicated in a report window

When inserting a new page symbol in the ROW HEADINGS area, the indentation level determines exactly where the page break occurs in the report. Figure 118 and Figure 119 show the results of aligning a new page frame with a major row heading.

You can use page breaks to clarify information in your report. For example, if you want to generate a report that prints information for each territory on a separate page, you can insert new page symbols in the setup area, indented as shown in Figure 120.

(Territory)

(Sales Dollars)

(Sales Units)

(ARP)
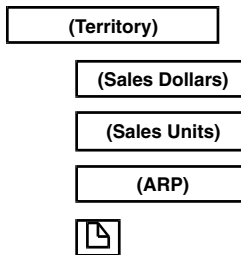
Figure 120. Inserting a new page symbol

When you place the new page symbol at the same indentation level as ARP, a page break occurs after every ARP calculation in the printed report, as shown in Figure 121.

**Snack Right
June 1993**

	PRETZELS	CHIPS
PORTLAND		
Sales Dollars	$1,312	$84,539
Sales Units	263	19,095
Average Retail Price	$4.99	$4.43
SAN FRANCISCO		
Sales Dollars	$260,531	$95,773
Sales Units	59,928	22,630
Average Retail Price	$4.36	$4.23
SEATTLE		
Sales Dollars	$26,530	$119,055
Sales Units	5,435	27,397
Average Retail Price	$4.88	$4.35

Figure 121. Adding page breaks after every ARP calculation

Within the setup area, you can also duplicate or change the position of new page frames by copying or moving the symbols.

Adding a Pattern

You can enter a repeating character pattern to draw attention to significant rows in a report. Patterns run horizontally in a report. The use of a pattern is shown in Figure 122 on page 203.

	June, 1993 Dollar Sales	June, 1992 Dollar Sales	% Change
Atlanta	176,624.00	310,918.00	(43.19)
Chicago	288,425.00	277,552.00	3.92
Dallas	280,208.00	247,921.00	13.02
	★★★★★★★★	★★★★★★★★	★★★★★★
Total	745,257.00	836,391.00	(10.90)

Figure 122. Pattern displayed in data columns

To add a pattern:

1. Select `Add Pattern Frame` in the `Special` menu. The Pattern Options window opens.

2. Enter the character series of your choice in the `Pattern` field. The character series is the pattern, and it is repeated for the length of the area specified in the `Pattern Placement` field. You can enter a single character or multiple characters. For example, you might enter a pattern consisting of a single asterisk, the results of which are shown in Figure 122 on page 203.

3. Select an item in the `Pattern Placement` field.

   • If you select `Data Columns Only`, only the columns of data in the row directly above the pattern frame are underscored with the pattern, as shown in Figure 122 on page 203.

   • If you select `Entire Page`, the pattern spans the page, as shown in Figure 125 on page 205.

4. Close the Pattern Options window.

5. Select the row heading frame directly above the location where you want the pattern to be shown in the report. In Figure 123 on page 204, (Territory) was selected, and the pattern is displayed directly below it in the report.

   You can also move or copy the pattern frame as you would any other heading frame in the setup area.
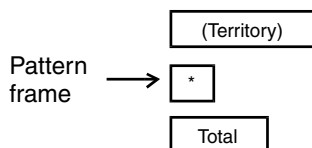
Figure 123. Pattern frame in a report setup

6. Select `Get New Data` in the setup window header to display the asterisk pattern in the report. The report is displayed as shown in Figure 122 on page 203, with the pattern below the Dallas territory.

   You must select the correct indentation level for the pattern frame in the setup area because frame placement determines where the pattern is displayed in the report. Figure 122 on page 203 shows the results of aligning a pattern frame with a major row heading. Within the setup area, you can also align pattern frames with subheadings by selecting the pattern frame and pressing the Tab key.

If you have a setup area similar to the one shown in the next illustration, and you want to create a pattern after each territory's information, set the pattern for `Entire Page` and place the pattern frame at the same indentation level as the ARP calculation.

```
        ┌─────────────────────┐
        │     (Territory)     │
        └─────────────────────┘
          ┌───────────────────┐
          │  (Sales Dollars)  │
          └───────────────────┘
          ┌───────────────────┐
          │  (Sales Units)    │
          └───────────────────┘
          ┌───────────────────┐
          │        ARP        │
          └───────────────────┘
              ┌───────┐
              │   *   │
              └───────┘
```
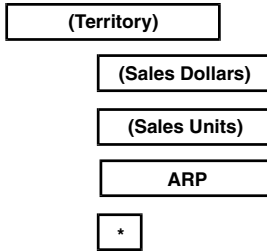
Figure 124. The pattern frame

In the report, the pattern spans the width of each column and repeats following
each ARP calculation, as shown in Figure 125 on page 205.

Snack Right
June 1993

	PRETZELS	CHIPS
PORTLAND		
Sales Dollars	$1,312	$84,539
Sales Units	263	19,095
ARP	$4.99	$4.43
**		
SAN FRANCISCO		
Sales Dollars	$260,531	$95,773
Sales Units	59,928	22,630
ARP	$4.36	$4.23
**		
SEATTLE		
Sales Dollars	$26,530	$119,055
Sales Units	5,435	27,397
ARP	$4.88	$4.35

Figure 125. Repeat pattern over entire page

Adding Descriptive Text

You can add comments or descriptive text as column or row headings in a report
by using the Text Options window.

To add text:

1. Select `Add Text Frame` in the `Special` menu. The Text Options window
   opens.

2. Enter up to 50 characters in the `Text` field. For example, you might enter the
   following text:

```
         Note: June 1993 contains only figures for June 1-20.
```

3. Close the window.

4. Select the location in the setup area where you want the text to be displayed.

   As with the new page and pattern frames, you must select the appropriate indentation level. Within the setup area, you can copy, move, delete, or reopen the Text Options window to edit the text frame.

   In Figure 126 on page 206, the setup area to the left of the (Snack Right Chips) heading was selected, and the remaining heading frames were moved below the text frame, so the text is displayed at the top of the report columns. You can also use text frames at the bottom of a report, to serve as footnotes.

Text frame

| COLUMN | Note: June 1993 contains only figures for June 1-20. |
| HEADINGS | (Snack Right Chips) |
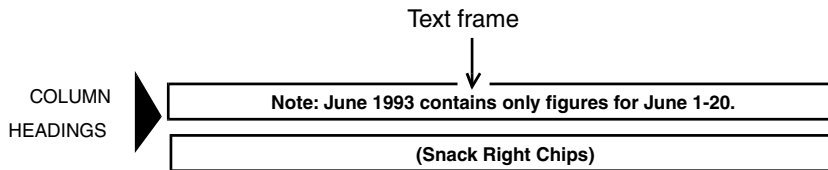
Figure 126. Text frame in a report setup

5. Select `Get New Data` in the setup window header. The report is displayed with the new text at the top, as shown in Figure 127.

Note: June 1993 contains only figures for June 1-20.

Snack Right Chips

	June, 1993 Dollar Sales	June, 1992 Dollar Sales	% Change
Atlanta	176,624.00	310,918.00	(43.19)
Chicago	288,425.00	277,552.00	3.92
Dallas	280,208.00	247,921.00	*13.02*
**			
Total	745,257.00	*836,391.00*	*(10.90)*

Figure 127. Added text as displayed in a report

To include the contents of a text frame when you transfer a report to a Spreadsheet or Transformer icon, you must select the `Indented Sub-Rows` and `Expand` choices in the Reporter Options window. If you do not want the contents of the text frame included in the transfer, select the `No Blank Rows` and `Compress` choice in the `Data Transfer`, `Row Headings`, and `Column Headings` fields in the Reporter Options window.

Setting Requirements for Special Cases

The `Special Cases` page lets you set range restrictions and appearance formats for conditional data. This option is useful if you want to call attention to

pertinent information in your report. For example, you might want to display all unit sales over 5,000 in italic typeface.

To display the Special Cases page:

1. Select a heading in the setup area.

2. Display the Heading Options window.

3. Select `Special Cases` in the `Display` field.

4. Select `Yes` in the `Act on Special Cases` field. New options are displayed, as shown in Figure 128 on page 207.

Figure 128. The Act on Special Cases field

5. Select an operator. The operator you select determines the fields and additional choices that are displayed. For example, if you select `Between` as the operator, two fields are displayed where you can enter a range of data.

   Most of the operators function identically to the constraint operators described in Table 17 on page 86. An additional operator, `NA`, is displayed on the Special Cases page. This choice tells the Reporter tool what to do when the database returns no data for that heading.

6. Enter the appropriate value in the field provided.

7. Select a choice from the `Data Display` field:

   • `Same Value` displays the data exactly as it is stored in the database.

   • `Replace Value` replaces the data with other information you provide. Enter any special data that you want to be displayed in place of the original data. To enter @-variables, see the *Capsule User's Guide* for more information.

   • `Replace With N/A` replaces the data with N/A, indicating that it is not available. For example, you might want to compare the sales figures for three different products for the past year, but one product has only been on the market for eight months. The first four months of data for the new

product displays as -999999, the database figure indicating that no data is available. This choice replaces the -999999 with N/A in the report.

Attention:

Special Cases settings only affect the way that the data is displayed. The original values are still used when calculations are performed within the Reporter tool. When you transfer results that include special case data from the Reporter tool to another tool, such as the Spreadsheet tool, the special case data is shown as Text type data, so it cannot be used in a calculation.

Formatting Special Case Data

You can set the appearance of specific data by making the appropriate selections in the Special Cases page. Special Cases settings always override any settings made on the Format page of the Heading Options window. Several format choices are available.

To set the data format:

1. Select a choice from the `Data Alignment` field to determine the placement of data in the row or column.

2. Select any number of choices from the `Data Attributes` field to determine the typeface of data in the row or column.

   For example, if you want to emphasize all sales data that is greater than $300,000 per month, you can specify that this data is underlined in the report. Figure 129 shows an example where Dollar Sales greater than $300,000 are underlined, and the column data is flush right.

	April, 1983	
	Dollar Sales	**Unit Sales**
Atlanta	<u>344,450.00</u>	69,222.00
Chicago	<u>569,184.00</u>	154,119.00
Dallas	269,184.00	30,119.00

Figure 129. Special Cases results displayed in a report

3. Close the Heading Options window when you are done. If the data has already been retrieved and you have not made any structural changes to the setup area, you do not need to use `Get New Data`. You can simply click on `Show Report`.

Printing a Report

This section provides printing information that is specific to printing the Reporter icon. For general information about printing an icon, see *Getting Started with the Meta5 Developer's Desktop*.

Reports are often large and print on multiple pages. When the report information reaches the edge of the paper, the next column or row of data is continued on a new page. The icon is said to be printed in panel form. This feature allows you to make a printout that has a larger width than the specified paper size.

To aid in assembling the printed copy, the Reporter tool generates and prints a panel page prior to printing the report. The panel page illustrates how the individual pages fit together to make a complete report, as shown in Figure 130.

page 1	page 2
page 3	page 4
page 5	page 6
…	…

Figure 130. Reporter panel page

Important facts to remember when printing a Reporter icon:

- If you want to include headers and footers on the printout, you must use a minimum margin of 0.5 inches. If you use smaller margin settings, the headers and footers do not print.

- When you print individual pages of a multi-page report, you must increment page numbers by one in the Printer icon's Printing window to allow for the panel page. For example, if you do not want to print the panel page, type *2* in the `Starting Page` field.

  If you specify page 1, the panel page prints. The panel page has a page number of 0 (zero), but is considered the first page of the printed document.

- Your printer might not support all the fonts available in Meta5. If you select a font that is not supported by your printer, Courier is used as the substitution font.

Chapter 26.   Using Reporter with Other Tools

You can copy or move data from the report window to another tool window, or you can transfer data from a Reporter icon to another tool icon in a capsule application. Certain formatting considerations apply when you are transferring data from a Reporter icon to another tool icon.

This chapter describes how to:

- Copy or move data from a report window to another tool window
- Use the Reporter tool in a capsule application and identify the Capsule Run Log icon
- Choose settings when transferring data to other tools
- Restrict data display and transfer
- Use the `Secured` field to prevent unauthorized users from accessing specified Reporter icons

Copying or Moving Data from the Report Window to Another Tool Window

You can copy data from the report window to another tool window, such as a Text, Spreadsheet, or Plot window. For example, to copy an entire report to a Spreadsheet icon:

1. Open a Spreadsheet icon on your desktop.
2. Open a Reporter icon.
3. Display the report window.
4. Click on the **Select All** button. All the data in the report is highlighted.
5. Copy or move the data to the Spreadsheet window.

`Decimal precision` display settings are not retained during data transfer operations between tools, such as from a Reporter tool to a Spreadsheet tool in a capsule application. Regardless of the `Decimal precision` display setting in the Reporter tool, the full value of every number is transferred to the new tool. The full value might not be displayed in the new tool. To find out how values containing decimals are displayed, see the documentation for the tool you are transferring data to.

Using a Reporter Icon in a Capsule Application

You can use a Reporter icon as a source icon in a capsule application to transfer data to other tools. See the *Capsule User's Guide* for more information about capsule applications.

When using the Reporter tool in a capsule application, you might want to use the @-keywords @TIME, @DATE, and @USER. @TIME and @DATE record the time and date the report was generated. @USER records the desktop name of the person who generated the reports.

In the Arrow Options window for the arrow that follows the Reporter icon, the `Transfer Data Attributes` field provides you with the option to send the cell, number, symbol, date, time, and font formatting with the data from the Reporter tool to the following icon.

Transferring Data to Other Tools

The Reporter Options window lets you determine the format in which data is transferred to another tool, such as a Text, Plot, or Spreadsheet tool. The field is displayed as shown in Figure 131.

Data Transfer	Indented Sub-Rows	No Blank Rows
Row Headings	Compress	Expand
Column Headings	Compress	Expand
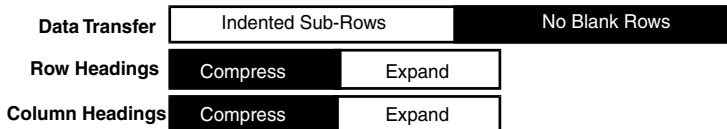
Figure 131. The Data Transfer field

Table 27. Transferring data to other tools

Tool	Recommended data transfer setting
Plot	No Blank Rows/Compress
Spreadsheet/Xlaunch	No Blank Rows/Expand
Text	Indented Sub-Rows

Indenting Sub-Rows

Indenting sub-rows in a report makes the data easier to read. To transfer headings and data with an indented format, select the `Indented Sub-Rows` choice in the `Data Transfer` field. This choice is the default format for the report. For example, if you choose to transfer data to a Text icon with indented sub-rows, the row titles do not run together into one column, but are displayed as shown in Figure 132.

	Snack Right Chips	
	Dollar Sales	**Unit Sales**
South US		
Atlanta	344,450.00	69,222.00
Miami	369,184.00	74,119.00

Indented sub-row ⟶ (pointing to Atlanta)

Figure 132. Indented sub-rows

Indenting sub-rows affects only the format of the data that is transferred from the report to other tools, not the data retrieved for the report itself.

Deleting Blank Rows

The `No Blank Rows` choice lets you delete blank rows when you transfer data to another tool such as Text or Plot. This changes only the transferred data; the original report is unaffected.

To delete blank rows, select `No Blank Rows` in the `Data Transfer` field and two additional choices are displayed.

Data Transfer	Indented Sub-Rows	No Blank Rows
Zeros	Compress	Expand
Zeros	Compress	Expand

Figure 133. Selecting No Blank Rows in the Data Transfer field

When you select `No Blank Rows`, the Reporter tool does not transfer the report title, patterns, or annotation text to a spreadsheet or transformer icon. If you want these items to transfer to these icons, you must select the `Indented Sub-Rows` choice.

Compressing Headings

You can select `Compress` to transfer a row or column heading and its subheadings to a plot as a single line or to a spreadsheet as a single cell.

For example, suppose you want to transfer the report shown in Figure 132 on page 213 to a spreadsheet. If you select `Compress`, all column headings are compressed into one cell and all row headings are compressed into one cell as shown in Figure 134.

	Snack Right Chips Dollar S	Snack Right Chips Unit Sa
South US Atlanta	344,450.00	69,222.00
South US Miami	369,184.00	74,119.00

Figure 134. Headings displayed incompletely in a spreadsheet

In some cases, as in the preceding illustration, the heading is displayed incompletely because it is too long to fit in the cell. For information about changing the size of cells, see the *Spreadsheet User's Guide*.

Expanding Headings

You can select Expand to transfer a row or column heading and its subheadings to a spreadsheet as several adjacent cells.

Using the report shown in Figure 132 on page 213 as an example, if you select Expand when transferring data to a spreadsheet, the column and row headings are displayed as shown in Figure 135:

		Snack Right Chips	**Snack Right Chips**
		Dollar Sales	**Zeros**
South US	**Atlanta**	344,450.00	69,222.00
South US	**Miami**	369,184.00	74,119.00

Figure 135. Using the Expand option when transferring data to a spreadsheet

You can also use the Compress Transformer tool when you want to compress only a few Reporter headings and subheadings, rather than all of the headings. This is particularly useful in a capsule application. See the *Transformers Guide* for more information.

Restricting Data Display and Transfer

The Do Not Show or Transfer If Contents Are Only N/As and or Zeros field is useful when your report contains a large number of zero or N/A values and only scattered data. N/A values are displayed in a report when the database contains no data for a value as presently constrained.

The Do Not Show or Transfer If Contents Are Only N/As and or Zeros field in the Reporter Options window lets you select two choices, either

individually or together, to suppress rows and columns that contain only zero or N/A values. When zero is a valid value in your report, do not use this field.

Do Not Show or Transfer If Contents Are Only N/As and or Zeros	Rows	Columns

Figure 136. Restricting display or transfer of data

Suppressing Rows

In Figure 137, there are two rows that contain only N/A values.

	actual amount	budget amount
Eastern Region		
Accounting	N/A	91.00
Advertising	N/A	N/A
Automobiles	1966.60	1800.00
Checking	34543.67	0.00
Savings	N/A	N/A
Commissions	6734.92	4500.00

Figure 137. Report with no rows or columns suppressed

In Figure 138, the Advertising and Savings rows from Figure 137 on page 215 are suppressed after selecting the `Rows` field.

	actual amount	budget amount
Eastern Region		
Accounting	N/A	91.00
Automobiles	1966.60	1800.00
Checking	34543.67	0.00
Commissions	6734.92	4500.00

Figure 138. Suppression of rows with N/A data

The Accounting and Checking rows remain because they each have at least one valid value.

If all values under a superheading are N/A or zero, the superheading and any subheadings are suppressed. For example, in Figure 139 on page 216, the Western Region subheadings both have only N/A values.

	actual amount	budget amount
Eastern Region		
Accounting	N/A	91.00
Advertising	N/A	N/A
Automobiles	1966.60	1800.00
Checking	34543.67	0.00
Western Region		
Advertising	N/A	N/A
Petty Cash	N/A	N/A

Figure 139. Report with no rows or columns suppressed

After selecting the `Rows` field, the Western Region heading and subheadings are suppressed, because all of the subheading values are N/A.

	actual amount	budget amount
Eastern Region		
Accounting	N/A	91.00
Automobiles	1966.60	1800.00
Checking	34543.67	0.00

Figure 140. Suppression of headings and subheadings with N/A data

Suppressed values are maintained as part of a report even though they are not displayed, printed, or transferred to other tools, so you do not save memory by suppressing them.

Suppressing Columns

Suppressing columns that contain only N/As and zeros enables you to quickly clean up your report by deleting columns that contain no useful information. If any value in a column is valid, that column of data remains in the report. For example, in Figure 141, the actual amount column has all N/A or zero values.

	actual amount	budget amount
Eastern Region		
Accounting	N/A	91.00
Advertising	N/A	20.00
Savings	N/A	N/A

Figure 141. Report with no rows or columns suppressed

After selecting `Columns`, the actual amount column is suppressed because all values are N/A or zero.

	budget amount
Eastern Region	
Accounting	91.00
Advertising	20.00
Savings	N/A

Figure 142. Suppression of column with N/A data

The budget amount column remains because it contains at least one valid value.

Chapter 27. Troubleshooting

Understanding how to prevent common problems using the Reporter tool helps streamline the report building process.

This chapter describes how to:

- Use the `Show Constrained Choices` button for troubleshooting constraint errors
- Correct reports that:
    — Return overlapping values
    — Have fact headings in both the COLUMN HEADINGS and ROW HEADINGS areas
    — Have fact and dimension headings at the lowest level in the setup area
    — Contain incorrect N/A values

Using the Show Constrained Choices Button for Troubleshooting

If you have constrained a report incorrectly, the Reporter tool might not be able to find the data you specified. Even a simple typing error can cause this problem. The best way to avoid such errors is to use the `Show Constrained Choices` button in the dimension Heading Options window. When you select this button, a Choices window opens that lists only the values that are valid for that heading, based upon the constraints set on other headings in the report. You can choose and copy values from the choice list directly into the `Value` field of the Heading Options window, preventing you from making typing mistakes. For information about the `Show Constrained Choices` button, see "Selecting Values from a List" on page 161.

Solving Common Problems with the Reporter Tool

When the Reporter tool cannot produce the report you have specified, an error message appears. Learning to identify and correct the problems that these messages describe helps you to better understand the Reporter tool and avoid potential inaccuracies in your own reports.

Correcting Reports that Return Overlapping Values

A request for new data might not return data in the form you expect. For example, your report can contain overlapping values (more than one piece of data per row and column coordinate). If you wanted single values instead of aggregates, and

your report is constrained incorrectly, the Reporter tool might return multiple values to one or more coordinates. These values are displayed in a shaded rectangle, as shown in Figure 143 on page 220.

Snack Right Chips

	Dollar Sales	Unit Sales
January, 1993	8	8
April, 1993	8	8
July, 1993	8	8

Figure 143. Example of a report that retrieved multiple values

Each rectangle contains numbers that represent the number of available values returned for that particular column and row coordinate, not the actual values themselves.

If you want to aggregate the returned values, you can specify this in the Heading Options window of a fact heading by selecting `Aggregates` in the `Report Facts As` field, and selecting one of the five aggregate operators offered. See "Reporting Facts as Aggregates" on page 177 for more information about returning aggregated fact values.

Figure 144 shows an example of the setup area of a report that was incorrectly constrained.
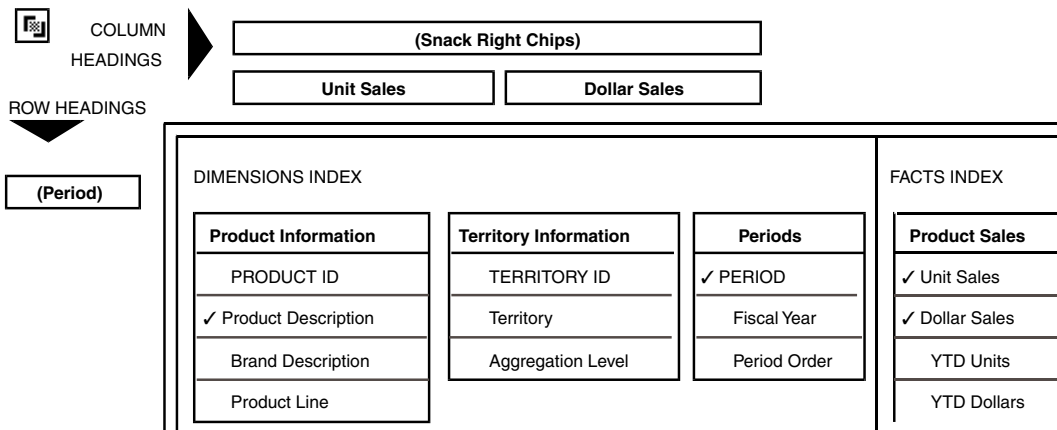
Figure 144. Setup area missing constraints on Territory Information table

The creator of this report intended to return sales information for Snack Right Chips for three months, but because this product was sold in eight territories, the Reporter tool could not return a single fact and instead displayed the number of

entries it received for that column and row coordinate, as shown in Figure 143 on page 220.

To correct constraint errors so that the report returns single fact values:

1. Close the Important Message Display window.

2. Make the necessary corrections to the heading constraints associated with the highlighted data.

   For example, to correct the report shown in Figure 143 on page 220, a heading needs to be added to the COLUMN HEADINGS area or an index constraint needs to be set that specifies one territory. In this case, Territory was added as a column heading and was then constrained to Chicago on the local level. Figure 145 on page 221 shows a corrected setup window.
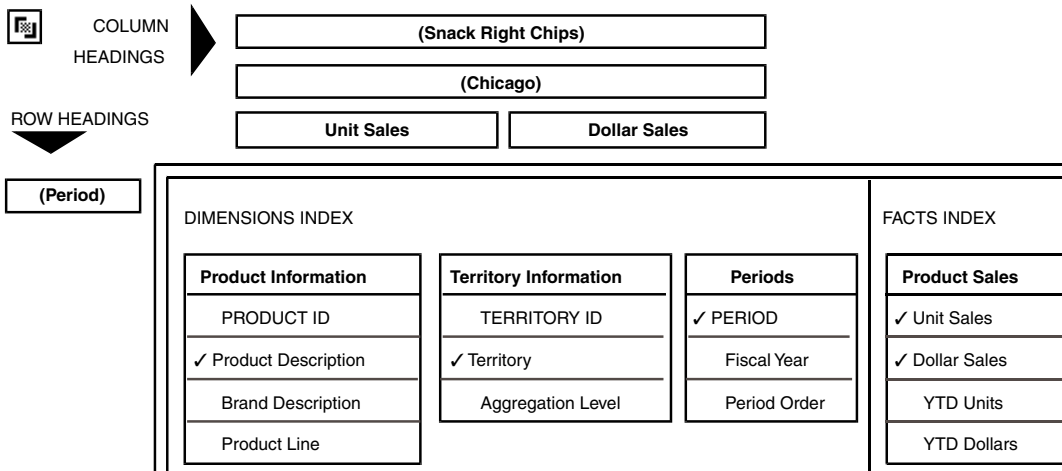
Figure 145. Corrected setup area

3. Select `Get New Data`.

   The Reporter tool retrieves new data and the report is displayed.

	Snack Right Chips Chicago	
	Dollar Sales	Unit Sales
January, 1993	48,057.00	152,969.00
April, 1993	19,173.00	60,922.00
July, 1993	332.00	996.00

Figure 146. The report with new data

See "Chapter 22. Setting Local Constraints," on page 169 for information about constraining headings.

If you are running the Reporter tool in a capsule application and using @-variables to constrain data, make sure your constraints match the values in the capsule's User Input Control window. If you add an @-variable constraint and the corresponding value field in the capsule control window is left blank, the Reporter tool retrieves all data just as if you had left the table unconstrained.

Fact Headings in Both Rows and Columns

The Reporter tool cannot return data in a report that contains fact headings as both column and row headings. The setup shown in Figure 147 on page 222 would result in an error message and would not generate a report until the fact headings are both in the same headings area.

COLUMN
HEADINGS ▶

| (Brand Description) |
| Product Description |
| (PERIOD) |
| Unit Sales |

ROW HEADINGS
▼

| Territory |

| **Dollar Sales** |
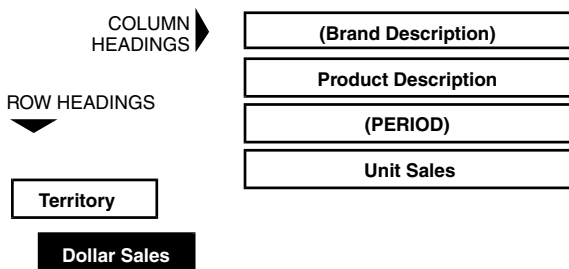
Figure 147. Facts headings in both rows and columns

To correct this report, reposition the Dollar Sales heading next to the UNIT SALES heading in the COLUMN HEADINGS area. Or, move the Unit Sales heading to the row headings area and indent it parallel to the Dollar Sales heading.

Facts and Dimensions as Lowest-Level Headings

When you have multiple level headings in a report, fact headings must be positioned at the lowest level. In addition, fact and dimension headings cannot share the lowest heading level. For example, the report shown in Figure 148 is set up incorrectly.

COLUMN
HEADINGS ▶

| (Brand Description) |
| (PERIOD) |
| **Unit Sales** | Product Description |

ROW HEADINGS
▼

| Territory |
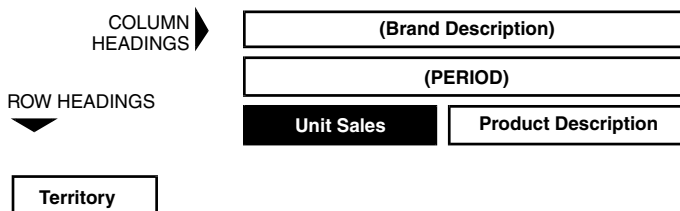
Figure 148. Incorrect setup showing both fact and dimension at lowest level

Before this setup can retrieve data, the fact heading Unit Sales must be moved to the lowest level in the COLUMN HEADINGS or ROW HEADINGS area. This can be done by positioning Unit Sales under Product Description in the column area or indenting Unit Sales under Territory in the row area.

Handling Incorrect N/A Values

The Reporter tool displays N/A when the database contains no data for a particular value. These valid N/A values add significant information to a report. However, if you include headings from the same table in both the ROW HEADINGS and COLUMN HEADINGS area, the Reporter tool displays only N/A values. These N/A values are not valid. When you see only N/A values in a report, check the arrangement of headings to ensure that column names from the same table are displayed in the same heading area.

Chapter 28.   The SQL Entry Tool

The SQL Entry tool processes Structured Query Language (SQL) commands, including SQL extensions supported by the relational database management systems (RDBMS) used by Meta5.

While working with the SQL Entry tool, you can:

- Design complex applications by entering SQL statements into a source document
- Use logic statements for flow control and conditional processing
- Use functions and @-variables in generic applications
- Supplement other tools in a capsule application by running a complex SQL program that cannot be generated from other tools, or use it in stand-alone mode

The SQL Entry Window

The SQL Entry window opens when you double-click on a configured SQL Entry icon. (See "Configuring the SQL Entry Icon" on page 227.) The display area of the window shows the SQL program and commands. You can also replace the SQL program in the display area by copying the program from the source document into it, or can copy the SQL program from the display area to other tools.
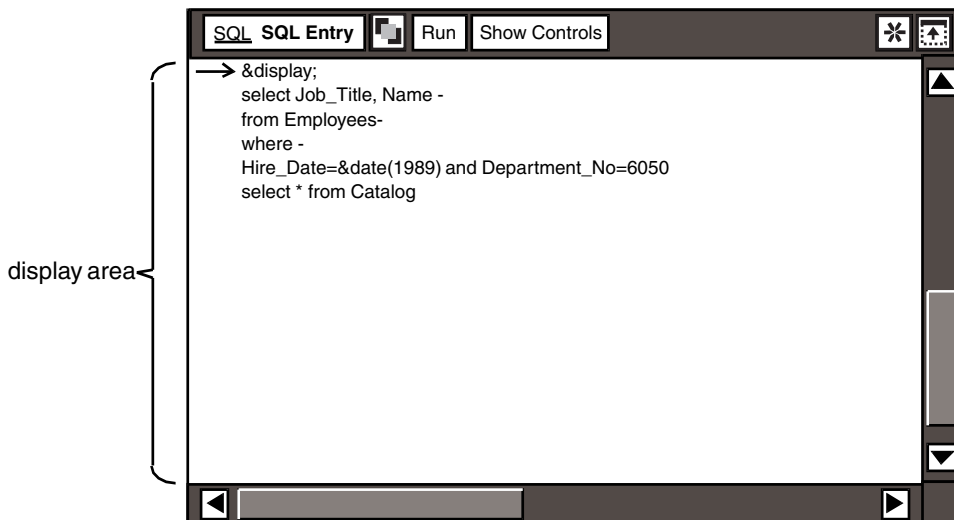
Figure 149. The SQL Entry window

The SQL Controls Window

The SQL Controls window opens when you click on the SQL Entry window header. The SQL Controls window contains fields let you specify the source document containing the SQL program and determine the behavior of the SQL Entry tool when running the SQL program.

SQL Controls	Apply	Cancel	Reset	⬆

Obtain Program Source From

Stop On Error	Proceed On Error

Generate SQL Log

Never	On Error Only	Always
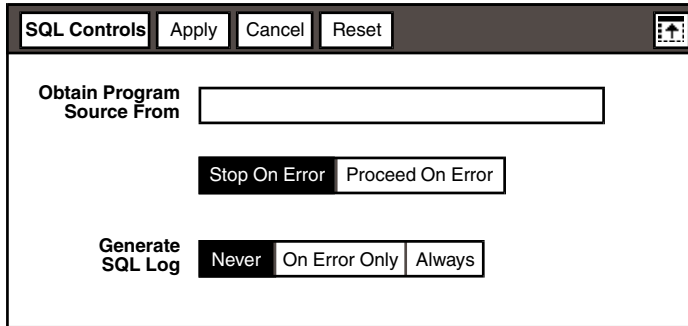
Figure 150. The SQL Entry Controls window

The Source Document

The source document is a text document containing the SQL program. The source document can be stored in a central file drawer for easy maintenance.

The SQL Entry Tool in a Capsule Application

In a capsule application, you can use @-variables to control the processing within an SQL Entry tool. A capsule application also allows you to automatically transfer the results of the SQL program to an icon, such as a Spreadsheet or Text icon.

Chapter 29.   Getting Started

Before you can use the SQL Entry icon, you must configure it to a specific database. You might also want to secure your icon after you have written a program. The program is written in a source document. This chapter describes how to:

- Configure and name the SQL Entry icon
- Secure an icon
- Create the source document

Configuring the SQL Entry Icon

The SQL Entry icons in the New Icons file drawer are not configured for any user or database. If you cannot find the SQL Entry icon, consult your system administrator for assistance.

SQL Entry icons must be configured for a specific database before you open them. To configure the icon, you must know the password and the name of the database or DB2 subsystem you want to access. If you do not have this information, consult your database administrator.

To configure the SQL Entry icon:

1. Select the SQL Entry icon.
2. Open the Icon Options window.
3. Select `Other Data` in the `Display` field.

    The `Other Data` settings are displayed, as shown in Figure 151.

Figure 151. Other Data page of the Icon Options window

4. Using the guidelines provided in Table 28 on page 228, type the required information into the text fields and select the appropriate choices in the other fields.

Table 28. Icon Options window fields

Field	Type of input	Required / Optional
Gateway	Type the name of the database gateway to which you want your data access icon to have access. If the service is on a different realm from the one you are on, immediately follow the gateway name with a colon and then the realm name. For example: `mydbs:HQ`	Required

Table 28. Icon Options window fields

Field	Type of input	Required / Optional
Database Name	Type the name of the database that contains the category needed for this data access icon. If your server stores more than one physical database, you must identify the database to which you want access. It is unnecessary to supply a database name if only one physical database exists, or if you want access to a default database. For DB2 for MVS databases, type the name of the DB2 subsystem you want to access. For DB2 for VM databases, type the name of the virtual machine running DB2 for VM. For AS/400 databases, you do not need to enter anything in this field, because the AS/400 is a single-database system. To connect to a supported remote IBM database using Distributed Relational Database Architecture (DRDA), immediately follow the local database name with a period and then the name of the server through which the connection is being made. For example: `DSN.TD1` To connect to a remote SYBASE or Red Brick database, immediately follow the SQL Server name with a vertical bar and then the name of the database you want to access. For example: `SYBSERVER2|SYBPROD`. To connect to a remote ORACLE database, specify the full database name or its alias. For the full database name, specify the standard single-character prefix used for the remote connection (such as T for TCP/IP), followed by a colon, the name of the target host followed by another colon, and finally the system ID (SID) of the target ORACLE database. For example: `T:host1:DBS` If you have questions about the database name, consult you database administrator.	Required
Category	Type the print name or the internal name of the database category needed for this data access icon. The name you enter is displayed in the window header of the category window.	Required
WTDD Owner	If the icon is configured for access to a database that supports multiple WTDDs and qualified table names, type the name of the owner of the WTDD tables. If you enter a value in this field, you do not have to drop and recreate synonyms whenever you want to access a different WTDD within the same database.	Might not apply in your installation

Table 28. Icon Options window fields

Field	Type of input	Required / Optional
SQL ID	If you are using DB2, type the table qualifier name. The ID entered in this field overrides the default table qualifier name, which is the name entered in the `User Name` field. If you have questions about the table qualifier name, consult your database administrator.	Might not apply in your installation
Database Logon	Select `Specified Here` if you want database access to be based on information you type in the `User Name` and `Password` fields. Select `From Data Access Controls` if you want access to be based on information in the desktop's Data Access Controls window. If you have questions about security, consult your database administrator.	Optional. The default value is `Specified Here`.
Secured	Select `Yes` to set the icon's `User Name` field to the user ID of the desktop on which the icon resides. This is an irreversible operation. Before you select `Yes`, see "Securing Your Icon" on page 25 for important information.	Optional. The default value is `No`.
User Name	Type a valid user ID. This might be the same as your desktop user ID, depending on how your database security is set up. When the data access icon connects to the RDBMS, this is the user ID sent to the RDBMS. If you are using the DB2 for OS/2 DRDA gateway to connect to a DRDA server, and your DB2 for OS/2 user ID is different from your DRDA server user ID, you must specify both user IDs separated by a period. For example: `DB2 for OS/2_userid.DRDAID`	Required
Password	Type the database user's password. This password might be the same as your desktop password, depending on how your database security is set up. For security, the password is never displayed. If you are using the DB2 for OS/2 DRDA gateway to connect to a DRDA server, and your DB2 for OS/2 password is different from your DRDA server password, you must specify both passwords separated by a period. For example: `DB2 for OS/2_password.DRDA_password`	Required

After you enter data into the fields, rename the SQL Entry icon so the name reflects its data source, the name of the database being used, or the name of the application or task you are performing with the icon.

To rename the SQL Entry icon:

1. In the `Display` field, select `Name and Size`.

2. Delete the old name.

3. Type a new name into the `Name` field.

4. Close the Icon Options window.

Securing the SQL Entry Icon

When you write an SQL program you want to protect, you can secure the SQL Entry icon. The secured icon can then be opened only by those users whose desktops are authorized to use the specified database.

When you secure the SQL icon in the Icon Options window, the user ID of the desktop where the icon resides becomes the user ID. When a secured icon is mailed, the user ID changes to the user ID of the recipient. The icon cannot be opened or used by the recipient unless his or her user ID has the appropriate privileges for the database. You cannot change the `User ID` field of a secured icon.

If you receive a secured icon from another user and the database does not recognize your user ID, you will not be able to open the icon.

Important:
Securing an icon is an irreversible operation. Before you secure an icon that you plan to distribute to other users, check with your database administrator to ensure that their user IDs are authorized to use the specified database.

The preferred way to secure the SQL icon is to configure it to read the user ID and password setting from the desktop's Data Access Controls window. For more information about the Data Access Controls window, see *Getting Started with the Meta5 Developer's Desktop*, or consult your system administrator.

To secure the SQL Entry icon:

1. Make a copy of the SQL Entry icon you intend to secure.

2. Select the icon you want to secure and open the Icon Options window.

3. In the `Display` field, select `Other Data`.

4. In the `Secured` field, select `Yes`.

   A caution message warns you that this is a permanent change.

5. Close the icon.

When you secure an icon it is a good idea to name the icon so you can easily recognize it as a secured icon. For example, always use the same symbol at the beginning of the icon name to indicate that the icon is secured.

For more information about securing icons, see *Administering Databases with Meta5* and the *System Administration Guide and Reference*.

Creating the Source Document

The source document is a Text document containing the SQL program that is processed in the SQL Entry tool. The SQL program is automatically read from the source document. You can change the SQL program by modifying the source document and copying the contents from the source document into the SQL Entry window.

To create the source document, copy a blank Text icon to your desktop or container in which you will run the SQL Entry tool. The source document must have a unique name.

An open source document with a sample program is shown in Figure 152 on page 232.


```
&display;
select Job_Title, Name -
from Employees
where -
Hire_Date=&date(1994) and Department_No=6050
select * from Catalog
```
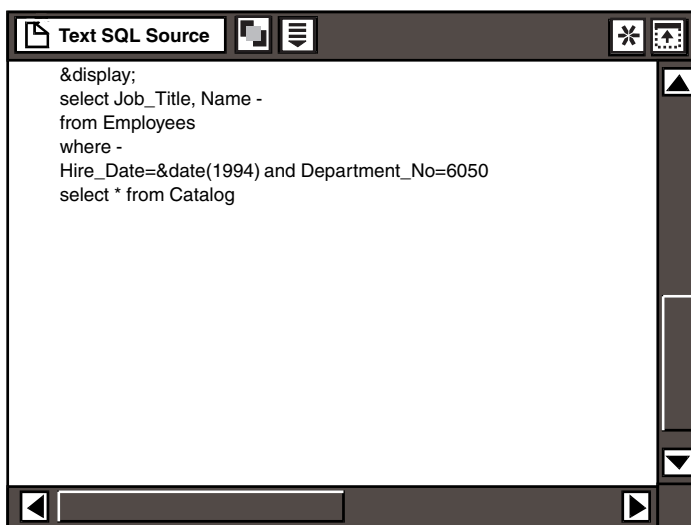
Figure 152. Sample source document

Specifying the Source of the Program

The SQL Control window contains the `Obtain Program Source From` field for specifying the name or path name of the source document. It is important to enter the exact name of the source document so the SQL Entry tool can read the SQL program. The SQL Control window and the `Obtain Program Source From` field containing the name of a source document are shown in Figure 153.

```
┌─────────────────────────────────────────────────────────────────┐
│ ┌───────────┐ ┌───────┐ ┌────────┐ ┌───────┐            ┌───┐   │
│ │SQL Control│ │ Apply │ │ Cancel │ │ Reset │            │ ⬆ │   │
│ └───────────┘ └───────┘ └────────┘ └───────┘            └───┘   │
│                                                                   │
│  Obtain Program  ┌──────────────────────────────────────────┐   │
│   Source From    │ SQL Source                               │   │
│                  └──────────────────────────────────────────┘   │
│                                                                   │
│                  ┌──────────────┬─────────────────┐             │
│                  │ Stop On Error│ Proceed On Error │             │
│                  └──────────────┴─────────────────┘             │
│                                                                   │
│       Generate   ┌───────┬──────────────┬────────┐              │
│      {RUN} Log   │ Never │ On Error Only │ Always │              │
│                  └───────┴──────────────┴────────┘              │
│                                                                   │
└─────────────────────────────────────────────────────────────────┘
```
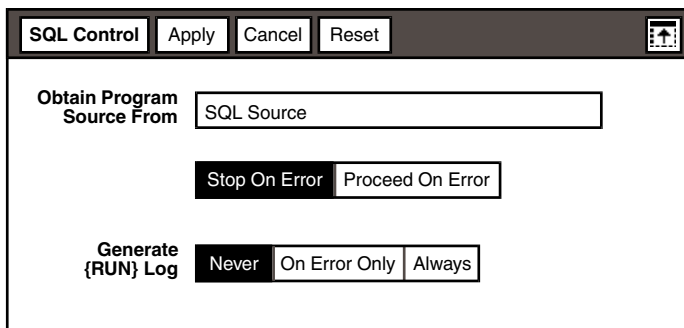
Figure 153. SQL Control window containing the source document name

To specify the name of the source document:

1. In an open SQL Entry window, click on the SQL Control window.

2. In the `Obtain Program Source From` field, type the name or path name of the source document.

   The name must match the source document name or path name exactly, including uppercase and lowercase characters and spaces.

3. Close the SQL Control window.

When you specify the source document with a path name:

- You must use a vertical bar as the delimiter.

- The path name can specify one of the file drawers in the File Drawers container, but the specified file drawer must be on the system disk.

- The path name must specify the containers that lead to the source document.

   For example, if your source document called SQL Source is in a folder named Programs in the same container as the SQL Entry tool, specify the path name as:

   `Programs|SQL Source`

   However, if the Programs folder is in the Data Entry Icons file drawer, specify the path name as:

   `Data Entry Icons|Programs|SQL Source`

The SQL Entry tool searches for the source document in the following order, using the path you specify:

1. The tool first looks for the path beginning at the same level as the tool. For example, if the tool is in a container, such as a folder or a capsule application, it looks for the path within that container. If the tool is on the desktop, it checks the desktop for a source document with the specified name or path name.

2. If the search within a container is unsuccessful, the SQL Entry tool next searches for the path at the desktop level.

3. If the desktop search is unsuccessful, the SQL Entry tool finally searches for the path to the source document beginning from System|File Drawers for the source document.

The first successful match is used as the source document. If a match is not found, the SQL Entry tool returns an error message.

Editing the SQL Program in the Source Document

The SQL program cannot be modified within the SQL Entry window, but must be edited in the source document. The changed SQL program can then be input into the SQL Entry tool by:

- Copying the edited SQL program into the SQL Entry window
- Reading the edited SQL program from the source document

When you create and test SQL programs, you can quickly update SQL statements in the SQL Entry window by copying the statements into the SQL Entry window from the source document, except when you click on the `Show Results` button. See "Creating the SQL Log" on page 252 for more information on the `Show Results` button.

To modify the SQL program:

1. Open the SQL Entry icon.

2. Open the source document and edit the SQL program as needed.

3. Click on the `Select All` button, or select as many of the SQL statements as you want to test.

4. Copy the statements into the display area of the SQL Entry window.

Attention:
> The SQL statements you copy into the display area replace any existing statements in the SQL Entry window; they are not appended to the contents of the window.

If SQL statements are not copied into the SQL Entry window, but read from the source document, edits do not take effect until you close the source document, then close and reopen the SQL Entry icon. If you leave the source document open, then close and reopen the SQL Entry icon, the original SQL statements are displayed in the SQL Entry window.

To read the modified SQL program from the source document:

1. Open the source document and edit the SQL program as needed.

2. Close the source document to save the edits to the SQL program.

3. Close the SQL Entry icon.

4. Reopen the SQL Entry icon.

Chapter 30.   Writing the SQL Program

You can use unique logic statements and functions with the SQL Entry tool that provide short cuts for writing programs. When you write the SQL program, there are certain guidelines you must follow. This chapter contains information on how to:

- Use @-variables in the SQL program
- Use logic statements in the SQL program
- Use functions in the SQL program
- Use SQL with the SQL Entry tool

This chapter also includes tables at the beginning of the sections for logic statements and function.   These tables provide syntax and a definition of each logic statement and its functions. Following each table, each logic statement and function is listed alphabetically with a detailed description and examples.

Using @-Variables

You can include @-variables in your SQL statements when the SQL Entry tool is used within a capsule application. In the source document, enter the @-variable at the appropriate point in the SQL statement. For example:

```
select column1 from table where column2 = @C
```

Using @-Keywords as @-Variables

You cannot directly use the system @-keywords, such as @Date, @User, and @Time, in SQL statements. However, when you use the SQL Entry tool in a capsule application, you can define an @-keyword in the User Input Control window of the Capsule tool as the value of one of the @-variables, such as @A. In the following example, @User is defined as @A.

```
Select * from Sales_data where salesperson = '@A'
```

This example finds and lists all sales data for the user.

For more information on defining @-variables, see the *Capsule User's Guide*.

Substituting String Values for @-Variables

When a string value is substituted for an @-variable, the @-variable must be enclosed by single quotation marks to be correctly interpreted. In this example, @A is entered as a quoted string.

```
select Name, Dept_no from Employees where (Number > 6500) and
(Hire_date <= '@A')
```

For more information on using single quotation marks in SQL statements, see the documentation for the database you are using.

Displaying @-Values

To display the actual values of the @-variables used in the SQL program, select `Show @-Values` from the `Special` menu.

The SQL Entry tool reads the values of the @-variables from the User Input Control window of the Capsule tool.

To hide the @-variables in the SQL program, select `Hide @-Values` from the `Special` menu.

Using Logic Statements

Logic statements are used in the SQL program for flow control and conditional processing. When you use logic statements with the SQL Entry tool, each logic statement must:

- Begin on a new line
- Have an ampersand (&) as the first nonblank character of the line
- End with a semicolon (;)

Table 29 lists each logic statement and provides syntax and a brief description.

The following sections about logic statements contain an explanation, a syntax illustration, remarks when needed, and examples. The logic statements are listed in alphabetical order.

Table 29. Logic statements

Logic Statement	Syntax	Description
&DISPLAY	&DISPLAY;	Specifies the SELECT statement that displays when used in stand-alone mode or that transfers data when used in a capsule application.
&ERROR	&ERROR action;	Specifies the action taken by the SQL Entry tool when it encounters errors from processing the SQL statement.
&GOTO	&GOTO label;	Transfers program control to a line tagged with the &LABEL statement.

Table 29. Logic statements

Logic Statement	Syntax	Description
&IF	&IF `condition` THEN GOTO `label`;	Conditionally transfers program control to a line tagged with the &LABEL statement.
&IMPMSG	&IMPMSG ('`string`');	Posts a message in the Important Message window.
&LABEL	&`label`:;	Specifies a word as a tagged line.
&SECURECONNECT	SECURECONNECT(['`datab ase`'], ['`service`']);	Establishes a connection to the specified database and service.
&SET	&SET `@-variable = expression`;	Sets @-variables during processing.

&DISPLAY

The &DISPLAY statement allows you to specify the SELECT statement that transfers the data from the SQL Entry tool when the tool is used in a capsule application. It also allows you to specify which SELECT statement is displayed during stand-alone use.

Syntax

```
&DISPLAY;
```

Remarks

- Because the &GOTO and &IF statements can cause nonsequential processing of SQL statements, you can use the &DISPLAY statement to identify which SELECT statement was used for the output data.

- The &DISPLAY statement must be on its own physical line and immediately precede the SELECT statement that provides the output data.

- To output data from the SQL Entry tool, the processing flow must encounter an &DISPLAY statement followed by a SELECT statement. If the &DISPLAY statement is omitted, the output is produced by the last SELECT statement in the physical order of the program.

- Only one &DISPLAY statement should be processed during a single run. If more than one &DISPLAY statement is processed in an SQL program, an error occurs.

Example

In this example, the &DISPLAY statement immediately precedes the first statement, so the result of the first SELECT statement is output.

```
&DISPLAY;
select Number, Description from Problems where Number > 100
select Number from Problems where Assigned_To = 'John'
```

&ERROR

The &ERROR statement allows you to control the action taken by the SQL Entry tool when it encounters errors resulting from processing the SQL statement. The effect the &ERROR statement has on an SQL program depends upon the options set in the SQL Controls window. See "Stopping the SQL Program" on page 255 for more information.

Syntax

```
&ERROR action;
```

action   One of the following options:

           STOP

           MESSAGE

           IGNORE

Remarks

*   The &ERROR statement changes the action taken by the SQL Entry tool for all SQL statements processed after this statement and until the next &ERROR statement is processed.

*   The action taken is dependent on the setting of the options in the SQL Controls window. The choices are `Stop On Error` and `Proceed On Error`.

    If you select the `Stop On Error` choice in the SQL Controls window, the SQL Entry tool ignores any &ERROR statements within the SQL program. Processing stops when an error occurs. An error message is posted in the message bar, Important Message window, or in the SQL Log, if one exists.

    If you select the SQL Controls window, the &ERROR statement can be used to override this setting. The possible &ERROR statements and their results are:

    STOP

        Processing stops when an error is encountered. An error message is posted in the message bar, in the Important Message window, or in the SQL Log, if one exists.

    MESSAGE

        Processing proceeds when an error is encountered. An error message is posted in the message bar, in the Important Message window, or in the SQL Log, if one exists.

IGNORE

Processing proceeds when an error is encountered. No error message is posted.

Example

Each &ERROR statement changes the action taken by the SQL Entry tool. Numerous &ERROR statements can be used in the SQL program. For example:

```
/* if update fails then stop */
&ERROR stop;
update table set sales = sales * 10
/* if no rows deleted then output a message */
&ERROR message;
delete from table where sales < 10
/* if select fails for any reason, keep on running */
&ERROR ignore;
select * from WT_CONTENTS
```

&GOTO

Use the &GOTO statement to transfer control of the program to a line you tag with the &LABEL statement. Program control is transferred to the SQL statement that is displayed immediately after the label.

Syntax

```
&GOTO label;
```

label   The label variable as assigned using the &LABEL statement

Example

```
&SET @A=0;
&loop:;
&IF @A>10 then goto endit;
&SET @A=@A+1;
insert into Problems_list (number) values (@A)
&GOTO loop;
&endit:;
```

&IF

Use the &IF statement to conditionally transfer control to a line you tag using the &LABEL statement.

Syntax

```
&IF condition THEN GOTO label;
```

condition   A conditional expression.

label   The label variable as assigned using the `&LABEL` statement.

Remarks

- If the conditional expression evaluates to true, then program control is transferred to the SQL statement immediately following the label; otherwise, program control is transferred to the SQL statement following the &IF statement.

- Conditional expressions can include @-variables, logical operators (`AND`, `NOT`, and `OR`), relational operators (=, Not =, <, <=, >, and >=), constants (integer, floating point, and strings), and mathematical operators (+, -, *, and /). The + operator can be used to concatenate character strings. Conditional expressions can also contain some of the special functions such as COLVAL or special variables such as NROWS or ERRNUM, and can use parentheses.

- The SQL Entry tool converts integers over 100 million into real numbers.

- The tagged line can be displayed before or after the &IF statement.

Example

```
select * from WT_CONTENTS
&IF errnum = -1 then goto end;
&IF nrows = 0 then goto end;
&SET @A = colval(1);
&end:;
```

&IMPMSG

The &IMPMSG statement allows you to post an important message in the message bar.

Syntax

```
&IMPMSG('string');
```

string   A constant text string or an @-variable containing the text of the specified message.

Remarks

- The string must be enclosed in single quotes.

- Text and @-variables can be used in the message.

- Before a message is posted, @-variables are evaluated.

- The identifier, `Application Message`, prefixes each message displayed by an application.

Example

In this example, the &IMPMSG statement and the result that is posted to the message bar are shown.

```
&IMPMSG('Error inserting row into database');
Application Message: Error inserting row into database
```

&LABEL

By prefixing a word of your choice with an ampersand (&), you can place a tag or identifier before a line in the source document. With the &GOTO statement you can transfer control to the line immediately following the label definition.

The &LABEL statement must:

- Be on a line by itself
- Contain a colon (:) followed by a semicolon (;), as shown in the syntax example

The SQL statement immediately following the label is referred to as a tagged line. The tagged line receives control in the SQL program when a reference is made to the &LABEL:; statement immediately preceding it. See "&GOTO" on page 239 for an illustration of the combined use of the &LABEL statement and the &GOTO statement.

Syntax

```
&label:;
```

label   A word of your choice, such as loop.

Remarks

- The comparison of labels is not case sensitive.
- You cannot assign a keyword or other reserved word as a label.

Example

This example shows a label assigned to a routine. The routine can then be referenced by other statements. When referenced in an &GOTO statement, program control is passed to the SQL statement immediately following the &LABEL:; statement.

```
&loopA:;
&set @B=@B+@G;
&if @B>@C then goto &loopD;
insert into Problems_list (number) values (@B)
&loopD:;
select * from Exceptions
```

&SECURECONNECT

The &SECURECONNECT statement allows an SQL Entry tool to be connected to different databases and services during program execution. The &SECURECONNECT statement establishes connections to the database and service specified in the logic statement.

Syntax

```
&SECURECONNECT([database],[service]);
```

database   The optional name of a database.

service   The optional name of a service.

Remarks

- The names of the specified database and service must be enclosed by single quotes.
- The user ID and password used to establish a connection to a specified database and service are read from the desktop's Icon Options window.
- You can specify the database by itself in the &SECURECONNECT statement. The SQL Entry tool connects to the database specified in the statement and the service specified in the Icon Options window. You cannot specify the service by itself.
- If a database and service are not specified in the &SECURECONNECT statement, the SQL Entry tool connects to the database and service specified in the Icon Options window.
- There is only one connection at any time during program execution. When the SQL Entry tool makes a new connection, it automatically closes the previous connection.

Example

```
&SECURECONNECT('dbs', 'HQ');
select * from WT_CONTENTS
&IF nrows = 0 then goto end;
 &SECURECONNECT('mydbs', 'HQ');
&IF nrows = 0 then goto end;
&end:;
```

&SET

The &SET statement allows you to set @-variables while the SQL Entry tool is processing.

Syntax

```
&SET @-variable=expression;
```

@-variable	The name of an @-variable.
expression	A value, logical expression, string expression, or mathematical expression whose result is assigned to the @-variable.

Remarks

- A string expression cannot be longer than 4096 characters.
- When the program is executed, the @-variable is assigned the value of the expression.
- If the value of the expression is over 100 million, the SQL Entry tool converts it into a real number.
- The value of the @-variable is changed in the User Input Control window of the capsule tool containing the SQL Entry icon, which affects all subsequent references to the @-variable, both within the SQL Entry tool and by other tools.

Examples

The following examples illustrate some of the values that can be used as the expression in the `&SET` statement.

```
&SET @G = 'Hello';
&SET @C = 2.01;
&SET @D = '@C';
&SET @J = datetype(12-25-94);
&SET @F = numtype(12.1, 13.5);
&SET @A = nrows;
&SET @R = colval(2);
&SET @H = @D + 4.0;
```

Using Functions

Functions are used within logic statements to access the state of the SQL program and within SQL statements to generate parts of the SQL statement that would be difficult to specify manually.

Table 30 lists each function and provides syntax and a brief description.

Table 30. Functions

Function	Syntax	Description
COLVAL	COLVAL(n)	Returns the value of the specified column of the first row of data of the last executed SELECT statement.
&CONSTRAINT	&CONSTRAINT(column name, data type, operator type, data value)	Specifies an item in a field value that consists of multiple data items when an unknown amount of items have been assigned to an @-variable.
&DATE	&DATE(date)	Converts date strings to the internal representation of dates in the database.
DATETYPE	DATETYPE(date)	Identifies the value of an @-variable as a date.
ERRNUM	ERRNUM	Returns a -1 if an error code was returned from the database service by the last SQL statement executed.
NROWS	NROWS	Returns an integer indicating the number of rows affected by the last SQL statement executed.
NUMTYPE	NUMTYPE(number)	Identifies the value of an @-variable as a number.

The following sections about each function contain an explanation, a syntax illustration, remarks when needed, and an example. The functions are separated into two categories and listed in alphabetical order.

Using Logic Statement Functions

Logic statement functions are used in the SQL program to access the state of the program. The logic statement functions are primarily used with the &IF and &SET logic statements.

There are two special variables that are also used in logic statements: ERRNUM and NROWS.

COLVAL

The COLVAL function accesses the results of the last executed SELECT statement. It returns the value of the specified column from the first row of data of the last executed SELECT statement.

Syntax: COLVAL(n)

n   A specified column of the first row returned by the most recent SELECT statement.

Remarks: •The COLVAL function returns an error message if any of these conditions are true:

— There is no SELECT statement

— The previous SELECT statement returns no rows

— The COLVAL argument is not a valid column number

• If the COLVAL function is used in a parenthetical expression, COLVAL must be at the end of the parenthetical expression for the logic statement to be executed correctly.

Example: `select * from WT_CONTENTS`
```
&IF errnum = -1 then goto end;
&IF nrows = 0 then goto end;
&SET @A = colval(1);
&end:;
```

DATETYPE

The DATETYPE function identifies the value of the @-variable in the @SET statement as a date. This function is useful when a date is entered as a series of numbers separated by nonalphabetic characters, such as a hyphen (–) or slash (/).

Syntax: `DATETYPE(date)`

date   The variable value of a date.

Remarks: •The DATETYPE function is required to identify a value set in an @-variable as a date. If DATETYPE is not used in an &SET statement which consists of numbers and nonalphabetic symbols, the value is treated as a number or expression and assigned a numeric type.

• The list of values in a &SET statement can contain other @-variables if the referenced @-variables also contain date values identified by the DATETYPE function.

Example: In the following example, @H in the capsule's User Input Control window would contain the number -107 if the DATETYPE function was not used in the @SET statement, because (12-25-94) would be interpreted as a mathematical equation. The second @SET statement would then return an error.

```
&SET @H = datetype(12-25-94);
&SET @J = datetype(@H);
```

ERRNUM

The ERRNUM variable returns the integer value –1 if an error was returned from the database service for the last SQL statement processed.

Syntax: `ERRNUM`

Remarks: If an error does not occur in the SQL program, or if there is no SQL statement processed by the SQL Entry tool, the value is 0.

Example: `select * from WT_CONTENTS`
```
&IF errnum = -1 then goto end;
&SET @A = colval(1);
&end:;
```

NROWS

The NROWS variable returns an integer indicating the number of rows affected by the last SQL statement executed. This function is useful for checking that a SELECT, `INSERT`, UPDATE, or DELETE statement has affected the correct number of rows.

Syntax: `NROWS`

Example: `select * from WT_CONTENTS`
```
&IF nrows = 0 then goto end;
&SET @A = colval(1);
&end:;
```

NUMTYPE

The NUMTYPE function identifies the value of the @-variable in the @SET statement as a number.

Syntax: `NUMTYPE(number)`

number   A number or list of numbers.

Remarks: •If the number argument in the @SET statement is a single value, the NUMTYPE function is not required. A single value can be an expression.

- The NUMTYPE function must be used in an &SET statement with more than one value. A list of numeric values must be constants and be separated by commas.

- When the NUMTYPE function is used, the values cannot be mathematical expressions that must be evaluated before being assigned to an @-variable.

- The list of values in a &SET statement can contain other @-variables if the referenced @-variables also contain numeric values.

Example: In the following example, @B in the capsule's User Input Control window will contain two numbers, 12.1 and 13.5.

```
&SET @B = numtype(12.1, 13.5);
```

If the NUMTYPE function were not used in the &SET statement, @B would contain the string 12.10.

Using SQL Statement Functions

SQL statement functions are used in the SQL program to generate parts of the SQL statement that would be difficult to specify manually. SQL statement functions begin with an ampersand (&).

&CONSTRAINT

The &CONSTRAINT function allows you to specify an item in a field value that consists of multiple data items when you do not know how many items have been assigned to an @-variable.

Syntax: `&CONSTRAINT(column name, data type, operator type, data values)`

column name   The table column that is to be constrained.

data type   The type of data used as the constraint. Valid types are one of the following:

CHAR (including VARCHAR)

NUMBER (including integer and real)

DATE

operator type   Either EQUAL or NOTEQUAL. If NOTEQUAL is specified, the constraint is negated by means of the NOT operator.

data values   Zero or more items used as the constraint value.

Remarks: •If the data type specified as the parameter is CHAR, the constraint value is quoted. If the constraint for CHAR consists of multiple values, quotation marks are added to each value delimited by a comma.

- If the data type specified as the parameter is DATE, the constraint value is converted to the appropriate service date.

- For single data items, the = comparison operator is used. For multiple data items, the IN operator is used.

- If the SQL statement does not have existing constraints, the WHERE clause is added. If a constraint already exists in the current SQL statement, then the AND operator is used to relate the existing constraint with the one being added by the &CONSTRAINT function.

- The &CONSTRAINT function must be the last constraint in a call for the correct keyword to be added to the SQL statement.

- The &CONSTRAINT function must follow the SELECT statement it modifies and cannot be preceded by an embedded SELECT statement.

Examples: In the following examples, statements using the `&CONSTRAINT` functions and the resulting SQL statements are shown.

If @A = NY :

```
select sales from salestable &CONSTRAINT(state, char, equal, @A)
select sales from salestable where state = 'NY'
```

If @D = A1, Smith, and Star :

```
select sales from salestable &CONSTRAINT(brand, char, equal, @D)
select sales from salestable where brand in ('A1', 'Smith', 'Star')
```

If @D = A1, Smith, and Star, and NOTEQUAL is the third parameter:

```
select sales from salestable where city = 'Atlanta'
&CONSTRAINT(brand, char, notequal, @D)
select sales from salestable where city = 'Atlanta'
and not (brand in ('A1', 'Smith', 'Star'))
```

&DATE

The &DATE function allows you to convert dates to the internal representation of dates in the database to which the SQL Entry tool is connected. The appropriate representation is necessary in an INSERT statement and in the WHERE clause of a SELECT statement.

Syntax: `&DATE(date)`

date   The variable value of a date, specified in the same format as set in your desktop, and can be any one of the following formats shown in Table 31.

Table 31. Acceptable date formats

Date type	Formats
Month	11
	nov
	November
Odd-Bimonth	DJ, 95
	DJ, 1995
Even-Bimonth	ND, 95
	ND, 1995
Quarter	1q95
	1Q1995
Year	95
	1995

Remarks: •The &DATE function has one date argument. You can use either uppercase or lowercase letters when specifying the date.

- The &DATE function cannot be used to set @-variables.

- When used in an INSERT statement, the &DATE function returns a single value representing the starting date in the range.

- When used in a WHERE clause, if the comparison operator is EQUAL or NOTEQUAL and &DATE represents a range of date values in a period, the &DATE function returns a BETWEEN operator.

When you mail the SQL Entry icon to a different desktop, the icon uses the formats from the recipient's desktop. The desktop date and number formats of the recipient must be the same as your desktop date formats or data in the icon might be incorrect.

Examples: The following example produces an SQL statement returning the names of all employees born between January 1, 1959 and December 31, 1959.

```
/*find employees born in 1959*/
select Name from Employees where (birthday=&DATE(1959))
```

The following example produces an SQL statement returning the names of all employees born after December 31, 1959.

```
/*find employees born after 1959*/
select Name from Employees where (birthday>&DATE(1959))
```

The following example produces an SQL statement returning the names of all employees not born between January 1, 1959 and December 31, 1959.

```
/*find employees not born in 1959*/
select Name from Employees where not(birthday=&DATE(1959))
```

Using SQL with the SQL Entry Tool

The following sections contain guidelines for using standard SQL statements with the SQL Entry tool.

Continuing Statements

You can use a space followed by a hyphen (-) as a continuation character to split a single SQL statement into multiple lines in the source document. Spaces are allowed after the continuation hyphen, but the last printable character in the line must be a hyphen (-). This example shows a typical continuation:

```
select Dept_no from Employee where -
(Number > 6500) and (Hire_date <= &DATE(jan01,94))
```

Although this SQL statement is displayed as two separate lines, it is processed as one SQL statement by the SQL Entry tool.

Continuation characters cannot be used with logic statements.

If you type a statement that wraps at the margin of your source document, it is still considered a single line in the SQL Entry tool. The Enter key and Shift+Enter keys are considered line separators.

Including Comments

Comments are used to clarify the SQL statement or program and are not sent to the database service.

To include a comment in your SQL program, type /* before the comment and */ at the end of the comment. For example:

```
/* These file numbers indicate departments selected for relocation
*/
```

The following rules apply to including comments in an SQL program:

- Each comment must be contained on a single line.

- A comment in the last SELECT statement of the SQL program must be displayed after the first word of the SELECT statement. If the comment is placed before the first word, then the statement is not recognized by the SQL Entry tool as the last SELECT statement in the program. It is processed, but the results are not displayed.

- A comment cannot be displayed directly after the &DISPLAY statement. If the comment is placed after the &DISPLAY statement, the SELECT statement is not recognized by the SQL Entry tool as the specified statement to display, and the SQL Entry tool returns an error.

Chapter 31. Running the SQL Program

The SQL program processes SQL statements differently depending on whether the SQL Entry tool is run in a container, on the desktop, or within a capsule application. While the program is running, it can be captured in the SQL Log, so that errors are easily detected. Data can be transferred from the SQL Entry tool to other tools after the program is finished running. This chapter contains information on how to:

- Run the SQL Entry tool in stand-alone mode
- Run the SQL Entry tool in a capsule application
- Stop the SQL program

If you create any temporary tables when the SQL program is run, you need to remove them by including the DROP command before the end of the SQL program.

Running the SQL Entry Tool in Stand-Alone Mode

The following conditions apply to running the SQL Entry tool in stand-alone mode:

- The SQL Entry tool is open in a container or on your desktop while the SQL statements are being processed.
- It is not possible to automatically send output to another tool.

To run the SQL Entry tool in stand-alone mode:

1. Open the SQL Entry icon.
2. Click on the SQL Entry window header.

An arrow points to each statement as the statement is processed.

When the program is complete, the results of the last processedSELECT statement is displayed in the SQL Entry window in the form of a spreadsheet. If you used the &DISPLAY function to display the results of a different SELECT statement, those results are displayed in the SQL Entry window.

The SQL Entry tool truncates lengthy lines in output. The length of the line that can be displayed in its entirety varies according to the font and size you have chosen for your desktop. As a rule of thumb, the window can hold about twice the width of the screen in characters without truncating data.
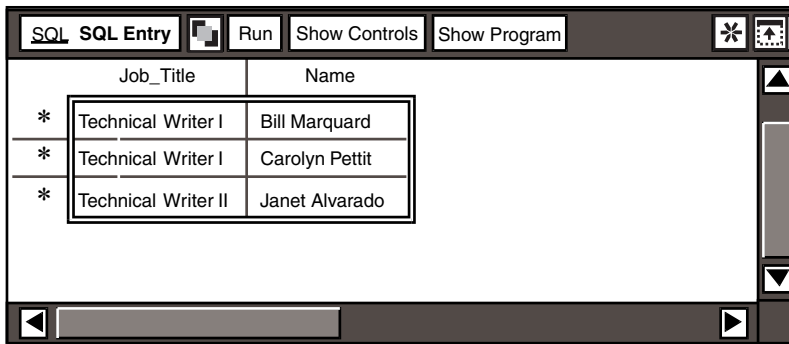
Figure 154. The Show Program button in the SQL Entry window header

The `Show Program` button is displayed in the SQL Entry window header after the results of the SQL program are returned.

To display the program again, click on the `Show Program` button. The label in the button changes to `Show Results`.

You cannot copy SQL programs into the SQL Entry window while results are being displayed.

Creating the SQL Log

When you run the SQL Entry tool in stand-alone mode, you have the option of capturing the SQL program as it runs in a specially created text document, the SQL Log. The SQL Log does not capture the results of the program, but it does capture:

- The actual processing flow of the program
- The logic statements
- The SQL statements as they are displayed after being sent to the database
- The actual time the SQL statements were sent to the database
- The number of rows (tuples) that were processed
- Any error messages

To create the SQL Log:

1. Open the SQL Entry icon.
2. Select `Capture SQL` in the `Special` menu. The SQL Log window opens on the desktop. The created Text document is assigned the name SQL Log, with the current date and time.
3. Click on the SQL Entry window header.

   The SQL Log is shown in Figure 155 on page 253.
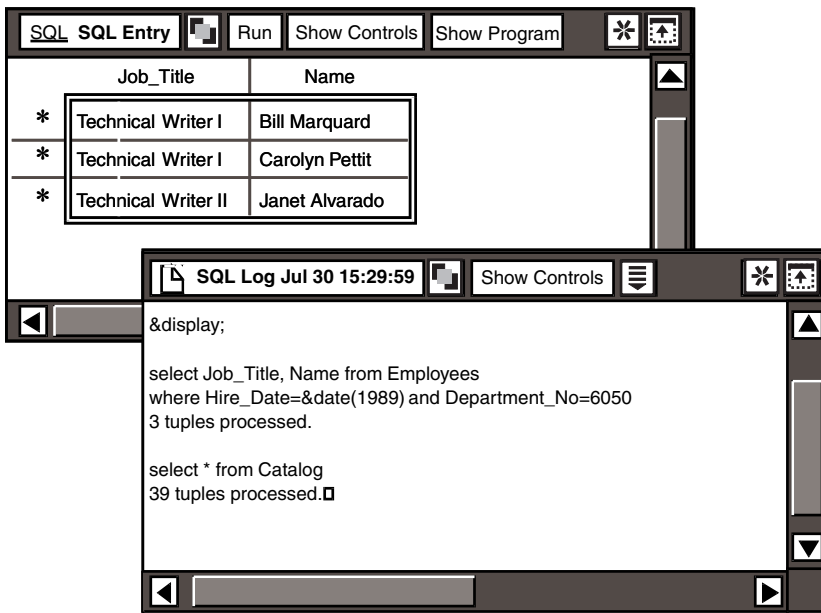
Figure 155. SQL Log window

4. Click on the title block of the SQL Log window to close it after the SQL program runs.

   If you close the SQL Log window while the program is running, the SQL Log stops capturing information.

If an error is encountered in the SQL program, an error message is sent to the SQL Log. A message is also posted to the message bar or Important Message window, indicating that an error occurred. If the SQL Log is not generated, the error messages are posted as important messages in the message bar or Important Message window.

Copying Information to Other Tools

The SQL program or its results can be transferred from the SQL Entry window by copying the information to other tools.

To transfer information from the SQL Entry window:

1. Click on the `Select All` button in the window header of the SQL Entry window, or select the specific rows or columns you want to copy.

2. Copy the information to the destination icon, such as a Spreadsheet or Text icon.

Information cannot be moved or deleted from the SQL Entry window.

Running the SQL Entry Tool in a Capsule Application

The following conditions apply to running the SQL Entry tool in a capsule application:

- The SQL Entry icon must be closed.
- The SQL Entry icon cannot have incoming arrows.
- The SQL Entry icon must have only one outgoing arrow to transfer results of a SELECT statement to another icon.
- You can use an @-variable, such as @A, and define the @-value as an @-keyword, such as @DATE, in the User Input Control window of the capsule tool.

To run the SQL Entry tool in a capsule application, click on the capsule window header.

The SQL statements are processed in three phases:

1. The SQL statements up to, but not including, the SELECT statement which transfers data to another tool, are processed.
2. Either the last SELECT statement in the SQL program or the SELECT statement prefaced by &DISPLAY is processed.
3. The outgoing arrow and everything following the SELECT statement which transfers data are processed by the capsule application.

If you run the SQL Entry tool in an open capsule window, the SQL Entry tool runs as if it is in stand-alone mode, although defined @-variables are still processed.

Creating the SQL Log in a Capsule Application

When you run the SQL Entry tool in a capsule application, you can capture the program as it runs to a specially created System Logging icon, the SQL Log. The SQL Log does not capture the results of the program, but it does capture:

- The actual processing flow of the program
- The logic statements
- The SQL statements as they look after being sent to the database
- The actual time the SQL statements were sent to the database
- The number of rows (tuples) that were processed
- Any error messages

When SQL Logs are generated, they reside inside a Folder icon named LOGS that is automatically created and placed on your desktop. The SQL Log is a closed System Logging icon, and is assigned the name of the SQL Entry icon from which it was generated, the word Log, and a date and time stamp.

Do not confuse the SQL Log with the Capsule window.

To create the SQL Log:

1. Open the SQL Entry icon.

2. Click on the `Show Controls` button in the SQL Entry window header to display the `Generate SQL Log` field in the SQL Controls window.

3. In the `Generate SQL Log` field, select one of the settings described in Table 32.

Table 32. The Generate SQL Log settings

Setting	Function
Never	Never generates the SQL Log.
On Error Only	Generates then SQL Log only if an error occurs. The SQL Log contains all of the statements processed by the program, regardless of where the error occurred in the program.
Always	Generates the SQL Log each time the program is run.

Do not generate the SQL Log if the program is very lengthy or has long iterations. When the SQL Log becomes full, another log is created to continue capturing information. Multiple SQL Logs could use all available disk space.

4. Close the SQL Controls window to retain the setting for the `Generate SQL Log` field.

5. Close the SQL Entry window.

6. Click on the Capsule window header to begin running the SQL program.

You can sort the information in the SQL Logs or sort the SQL Logs themselves within the LOGS folder. See *Getting Started with the Meta5 Developer's Desktop* for more information on sorting with the System Logging and Folder icons.

Transferring the Results of the SQL Program

The results of the SQL program are automatically transferred from the SQL Entry icon to the connected icon when the SQL program is finished running. The &DISPLAY statement specifies which information is transferred from the SQL Entry icon. Icons that can accept data from the SQL Entry icon are Text, Spreadsheet, Plot, Layout, and Transformer icons. For more information about connecting icons and the Capsule tool, see the *Capsule User's Guide*.

Stopping the SQL Program

You can stop the SQL program either automatically when an error is encountered in SQL statements, or manually.

You can set the SQL program to automatically stop when an error is generated. To set this option, select `Stop On Error` in the SQL Controls window before you run the program.

To continue running the SQL program even if an error is encountered, select `On Error` in the SQL Controls window.

The &ERROR statement can be used to override the `Proceed On Error` option. See "&ERROR" on page 238 for more information.

To stop the SQL program manually at any time, press the Stop function key.

To begin running the SQL program again, click on the SQL Entry window header.

Glossary

This glossary defines terms that are used in this book and throughout the Meta5 library. If you do not find the term you are looking for, see the index of this book.

@date.   A system-defined @-keyword that returns the date.

@-keyword.   A system-defined variable that returns current values within a capsule application or within the headers and footers of a printable icon. System-supplied @-keywords cannot be used directly in SQL statements, but they can be defined as the value of an @-variable.

@user.   A system-defined @-keyword that returns the user's user ID.

@-value.   The value assigned to an @-variable in the capsule's User Input Control window. In the SQL Entry tool, the &SET statement allows you to define the value of an @-variable as an expression which is evaluated to an actual value when the statement containing the expression is processed.

@-variable.   A control variable used to represent a value in any tool that can be run inside a capsule application. These values are frequently used as constraints and variable titles in the Query, Plot, Spreadsheet, Layout, and other Meta5 tools.

access key.   A code number that restricts access to an Meta5 icon. Only users who have been assigned this code number can use the icon.

access privileges.   A set of permissions assigned by an icon's owner to control who can view or change the icon.

aggregated fact.   The result of a user-defined calculation that combines multiple values into one fact. The individual values are not shown in the report.

aggregate function.   A calculation that combines values. Examples of aggregate calculations are Average and Sum.

aggregate value.   A set of values stored in the database as one value.

Ascending.   The choice in the Sort Level and Sort By fields of a controls window that arranges the data in order from smallest to largest (A to Z, 0 to 9).

attribute.   A column in a database table (or relation).

average.   An operator that adds all the returned values together and then divides the result by the number of returned values.

Beginning value.   The field where the user enters a value that constrains the returned data to that which is greater than or equal to the entered value.

Between.   An operator that constrains returned values to those that are greater than or equal to the Beginning Value entered and less than or equal to the Ending Value entered.

bimonth.   A two-month period.

binary calculation.   A calculation that uses + , - , * , / , Share -- % Of, or % Change to create computed frames.

*Blank Icons file drawer.   A file drawer icon that contains one of each icon that an Meta5 user is likely to need. An asterisk at the beginning of a file drawer name

indicates the file drawer is a standard system file drawer distributed on the software installation media.

browser.   Any configured, defined Browser icon.

Browser.   (1) The Meta5 tool that lets you create Browser icons to display unique values of specified columns in one or more database tables. (2) The window in which you view a completed Browser icon, and in which you constrain and manipulate data you have retrieved.

Browser Controls window.   The window into which you copy database tables and columns, and define your browser.

button.   An object, in a window or window header, that contains graphics or text and is used to open other windows, open a menu, perform an action, or set a condition.

Cancel Changes.   A window header button or a choice in a `Special` menu that closes the icon without saving the changes that you have made since you opened the icon.

capsule.   A tool for building an automated processing sequence using other icons

Capture SQL.   The choice in the `Special` menu that opens the Query Log window in which SQL statements are recorded. A time stamp recording the date and time when the window was opened is added to the icon name.

capture window.   A special Text window used to record the SQL statements sent to the database. In the Query tool, this window is called the Query Log.

category.   The highest-level division of a logical database. A category contains tables, and tables contain columns and rows. Logical joins between tables are defined at the category level.

category window.   The window that displays a specific category of database table for which a Browser icon is configured.

Character.   In the Display As field of the Column Options window, the choice that causes Browser to display selections as strings of alphanumeric characters.

choice.   Graphics or text that can be selected in a field or menu.

Choices.   The window that displays a one-column list of all acceptable values that can be used in a particular field. The user can select values from the list instead of typing them into the field. The user can open a Choices window by clicking on a button labeled Show All Choices or Show Constrained Choices.

choices window.   A window that displays a list of all unique values in a particular database column. The user can select values from the list instead of typing them into a field. Contrast with browse list.

click .   (1) To press and release a mouse button without moving the pointer. (2) To press and release the left mouse button while the pointer is on a desired object.

(3) On a left-handed mouse, the right mouse button is used instead of the left one.

column.   A vertical field in a table or spreadsheet. Columns can be identified by letters or text strings at the top of the display area.

column groups.   Associated groupings of columns that can be constrained in conjunction with one another. Column groups are created by joining tables.

column names.   Subdivisions of table data. These names are grouped after their respective table names in the user catalog.

Column Options.   The options window in which the user can change a column heading.

Column Options window.   The window in which you can set options that apply to specific column data in the Browser Controls window.

Column Order.   In the Column Options window (Browser Controls), a field where you can specify whether a column in the browser is sorted in ascending order, in descending order, or according to the order of another column.

Comparison Options.   (1) An options window for column names in which the user can specify a label, an operator, and a value, and can open a Choices window.

(2) An option window for joins in which the user can specify two labels and an operator.

computed column.   A column created to contain the results of calculations performed on one or more columns.

Computed Column Options.   The window in which the user can create computed columns.

computed frame.   A heading frame that is displayed in the setup area when the user uses the Computed Options window to create a calculation associated with one or more headings.

computed heading.   The heading that is displayed in a report to label the results of a computed frame.

conditional processing.   Processing of logic statements, such as the &IF statement.

configure.   To prepare a Browser icon (or any Meta5 data-access icon) to retrieve data from a specific database, by specifying the database gateway, database category, and other data in the Icon Options window.

constraint.   A limitation on the range or values of data retrieved from the database to reduce the amount of data that is returned. For example, the user might constrain data based on territory and period so that only data relevant to New York during March, 1992 is retrieved.

Constraint Operator button.   In the main Browser window, the button in a column heading that opens a menu from which you can select an operator to constrain column data.

container.   An icon, such as the Folder and File Drawer icons, that can hold other icons.

controls window.   A window that displays settings that you can view or modify. Usually, to open a controls window you click on a button (often named Show Controls) or select a choice from a menu.

Create Column.   The button in the Query window that opens the Computed Column Options window or the Column Options window.

Data Access Controls.   The window that displays a list of databases to which the user's desktop has access (each entry includes the service name, database name, and user ID). This window enables an authorized user to add or modify an entry and change his or her mainframe password.

database administrator (DBA).   The person who issues administrative instructions to a database service. The DBA defines the data tables used by data access tools, monitors database performance, and assigns user access.

Date.   In the Display As field of the Column Options window, the choice that causes Browser to display selected date data in date format.

date format.   The internal storage representation of dates with a particular date resolution.

date resolution.   The way in which the interval between dates is interpreted. For example, if the date resolution is Week, the interval between dates is 7 days, but if the date resolution is QuadWeek, the interval is 28 days (4 weeks). Meta5 date resolutions include Day, Week, QuadWeek, Month, EvenBiMonth, OddBiMonth, Quarter, and Year.

DB2 for MVS.   DATABASE 2, an IBM relational database management system that runs on an MVS system.

DBA.   Database administrator.

DBA catalog.   The database listing containing all categories and tables available in a database on your system.

decimal precision.   The number of digits past the decimal that are used to express the fractional part of a number. More digits result in greater precision. For example, 3.14159265 is more precise (that is, more exact) than 3.14.

default value.   A value that is assumed when no value has been specified.

define.   To prepare a configured Browser icon to retrieve and display desired data, by specifying tables and columns from a database category, by setting up relationships between tables and columns, and by applying constraints.

desktop.   The screen space occupied by Meta5.

destination icon.   An icon that receives information from other icons.

dimension.   Data (such as periods of time, products, and locations) defining the context of facts. Dimensions typically make up the column or row headings in a report.

display area.   An area of the SQL Entry window where the SQL statements are shown as they are executed, and the results of the SQL program are shown.

Ending Value.   The field where the user enters a value that constrains the returned data to that which is less than or equal to the entered value.

Envelope.   A Meta5 tool used to create electronic-mail messages and to mail messages and icons to other users.

even bimonth.   A two-month period ending in an even-numbered month; for example, January and February.

expert function.   An advanced capability that permits users to perform calculations in constraints.

fact.   Data consisting of measures such as unit price or volume. Facts typically make up the returned data in a report.

field.   (1) A specified area used for a particular class of data. (2) In a window, an identifiable area where the user can enter information, select a choice, or view information.

file.   A collection of information stored as a unit on a disk or other storage media.

file drawer.   A container, created or renamed by the system administrator, that may be shared among desktops. A file drawer typically contains folders.

folder.   An organizing container that resides on a single desktop and is used to store icons and other folders. Folders are represented on the Meta5 desktop by the Folder icon, on which a file folder is depicted.

frame.   A rectangular box that holds heading-label, pattern, text, and new-page information in the setup area.

From Data Access Controls.   The choice in the Database Logon field of an Icon Options window specifying that the user ID and password are to be determined from the settings in the desktop Data Access Controls window.

full value.   The entire value of a number as it was entered into a report or spreadsheet cell, rather than the displayed value, which might have been truncated or rounded.

function keys.   A set of workstation keyboard keys, labeled F1, F2, F3, and so on, located across the top or at the left side of the keyboard. In Meta5, function keys are used to perform tasks such as deleting an object or opening a help window.

Gateway.   In the Icon Options window, a field where you type the name of the database gateway that the desktop or tool needs to access.

gateway service.   A software process that translates protocols and access methods between two dissimilar systems, such as between a non-Meta5 database and the Meta5 Browser tool.

General Qualifier.   An expert function that permits users to constrain a query with an or, an and, or a percent, and enter @-variables.

Get New Data.   The button in the main Browser window that causes Browser to gain access to the database and retrieve data that matches the constraints set within the icon.

global constraint.   A constraint applied to a column name in the index area that limits the scope of the query for all headings associated with that column name.

heading.   The name of a column or row that is displayed at the top or left of a report and identifies the data in the corresponding column or row.

heading frame.   The rectangular box that surrounds a heading label in the setup area.

heading label.   The name of a heading as it is displayed in a heading frame in the setup window. The default value of the heading label is the column name from the index area, but the user can rename a heading in the Label field of the Heading Options window.

Help button.   The button on the right side of the message bar that opens a menu of Meta5 online help topics.

Help key.   The Meta5 function key that opens a menu of online help topics.

icon.   An electronic desktop representation of a query, report, plot, folder, or other object. Every workstation tool is represented by an icon.

icon graphic.   The small picture that is displayed in the title block of a tool window header and in the tool icon. The icon graphic usually depicts a tool's function, so you can easily identify a tool window or icon at a glance.

Icon Options.   A window in which you can reset configuration values or view configuration information about a Browser icon.

Important Message.   A window that displays a message that requires an acknowledgment from the user. An important message can be generated by a tool or service, or by the system administrator.

index.   A list of pointers in a file used to locate records in a database.

index area.   The portion of the setup window that contains database table information.

inner join.   A join between two tables in which equal or identical values from both tables are listed in the results.

input.   Data that is entered into a computer for processing. Contrast with output.

insertion point.   The symbol (usually a blinking vertical bar) that shows where mouse or keyboard input is displayed in a document or field.

integer.   A whole number, that is, a number that does not contain a decimal place, such as 5, 60, or 912.

Integer field.   In the Display As field (Column Options window), the choice that causes Browser to display selections as integers (whole numbers).

internal name.   In the Meta5 environment, the name by which a database item is stored in the Workstation Tools Data Dictionary (WTDD). Each database category, table, and column has an internal name based on naming conventions required by the database system. To make these names more useful to users, each internal name has a corresponding external name, called a print name, that the Meta5 tool user sees on the screen. For example, a table with the internal name DBA_EMP might be known to the user as the Employee table.

iteration.   The process of repeatedly running a set of instructions until some condition is satisfied. The SQL Entry tool performs iterations using the &IF and &GOTO statements.

join.   The method used to match tables of identical information in relational databases. A join between tables is usually represented by a line with an equal sign in the middle.

key.   A button on the keyboard. In Meta5 publications and online information, the name of a keyboard key is enclosed in brackets; for example, Enter refers to the Enter key.

key fields.   Certain fields within a database that are used to uniquely identify records. Key fields cannot be changed nor can blank key fields be inserted using the Query tool.

key holder.   A user to whom the system administrator has assigned an access key.

Label.   The field where the user can enter a name for a column or Query view.

Like.   A constraint operator that enables the user to match string data. The user can use the percent-sign (%) and underscore (_) wild cards with the Like operator. For example, in a search for the names of various colors, entering a Like constraint of rose% might return roseblush, rosebud, and rosewood.

list separator.   A character, such as a comma, used to break a text string into separate items.

local constraint.   A constraint applied to a heading frame in the setup area that limits the scope of the query for that heading only.

logical database.   A database representation that includes print names for tables and columns, and that groups the tables into useful categories. The logical database also contains definitions for default joins between tables. The Workstation Tools Data Dictionary (WTDD) stores the description of the logical database, the mapping of print names to internal names in the physical database, and other logical attributes, such as the type and length of data.

Long.   The choice in the Column Length field in which you identify a column as one

that can have more than the Browser tool's column-length threshold of 100 rows. If you select **Long**, Browser automatically applies its threshold limit, and if the column does have more than 100 rows, only the column heading is displayed with the message Too Many Values.

macro.   An Meta5 text document in the DBA file drawer that contains SQL statements and that can contain substitutable values that are passed when executed. You can use macros through either the host interface or the SA tool on a desktop, but not with the SQL Entry tool.

main Browser window.   The window in which you can view a completed browser, and constrain and manipulate retrieved data.

manual join.   A join between two table created from within the Query Control window. Manual joins are used to enhance Query performance.

menu.   A list of available choices that you open by pressing the left mouse button while the pointer is on certain buttons.

message bar.   The rectangular area along the bottom of the desktop, where advisory or error messages are displayed.

Message Log.   A window that stores and displays messages sent to the message bar. You can open this window to read the full text of a lengthy message, to read a previous message, or to copy messages to a text document.

Message Log button.   The button on the right side of the message bar that opens a window in which you can view desktop messages.

Minimize button.   The window header button that reduces the size of a window so that only the window header is displayed on the desktop.

minimized window.   An Meta5 window that is open but has been reduced to the size of its window header.

Month.   The choice in the Date Resolution field (Column Options window) specifying that the date be resolved to the month.

More button.   The window header button that opens a menu of other window header buttons that cannot be displayed for space reasons.

Move.   A function key used to transfer selected objects, such as icons or text, from one location to another.

N/A value.   A data value that is unavailable.

Name and Size.   The choice in the Display field of an Icon Options window that displays the page in which the user can change the name and access privileges of an icon and can view other information about the icon such as modification dates, size, and ownership.

network.   A set of workstations, servers, and other devices connected together for the interchange of information. See also local area network.

New Icons file drawer.   A file drawer that contains the *Public File Drawers file drawer and the *Blank Icons file drawer.

new-page symbol.   A symbol that indicates printing will end on the current page and restart at the top of the next page.

Not Between.   A constraint operator that enables the user to select all values that are not contained within the identified range.

Not =.   A constraint operator that enables the user to select all values that are not equal to the specified value.

Not Like.   A constraint operator that enables the user to request all values that do not match the character string entered. This operator can be used with the percent-sign (%) and underscore (_) wild cards.

Not Null.   A constraint operator that returns all values except those that are identified as null in the database.

Null.   A constraint operator that returns all values identified as null in the database.

numeric date format.   The representation of a date as the number of days before or after January 1, 1970.   For example, 0 represents January 1, 1970, 1 represents January 2, 1970, and -1 represents December 31, 1969. Dates are typically stored in a database in numeric date format.

odd bimonth.   A two-month period ending in an odd-numbered month; for example, December and January.

OK.   The button in an Important Message window that closes the window.

open.   To perform an action that causes a window or menu to be displayed on the desktop. For example, you open a tool window by double-clicking on an icon.

operator.   A symbol or word that you select or enter along with one or more values to define the amount, range, or characteristics of data. For example, +, -, >, not=, and between.

Operators.   The field of choices such as =, <, Average and Between that enable the user to constrain data relative to a specified value or to create calculations.

Options.   A function key used to open an options window or, if an options window is already open, to close it.

options window.   Any window that you can open by using the Options key or the

options function on the pop-up function pad. Options windows let you view and modify the properties of the selected object.

Order By.   In the Column Options window (Browser Controls), a field where you can specify whether a column in the browser is sorted according to the order of another column.

OS/2.   Operating System/2. A single-user, multitasking, IBM operating system that runs on computers with an Intel 80286 or later microprocessor.

outer join.   A join between two tables in which all values from the first, second, or both tables are listed in the results, whether or not table values match.

Other Data.   The choice in the Display field of the Icon Options window that displays settings for configuring an icon to a specific database.

output.   The result of computer processing.

page.   (1) In a window, an alternate view that provides a different set of options for setting controls and defining the behavior of an icon. (2) In a window, the amount of information that can be displayed at one time.

password.   A unique string of characters known to a computer system and to a user, who must specify the character string to gain access to a desktop, gateway, database, system, or service within a system.

Password field.   The field in some windows in which you type the appropriate sequence of characters to gain access to a desktop, database, service, or system.

path name.   A designation for the location of a file or icon.

PC application.   An OS/2, DOS, or Windows computer program. The terms application and program are often used interchangeably.

phantom.   A catalog, table, or column that has been deleted from or changed in the logical database, but whose name remains in the Query tool windows with an overstrike through it to alert users that the item no longer exists.

physical database.   The database as seen by the database management system. It is a set of physically stored data tables, grouped by user, that is represented to Meta5 data access tool users by the logical database.

plot.   A graphical representation of one row or column of numerical values.

Plot tool.   A tool used to create line, bar, text, and pie graphs.

pointer.   The symbol displayed on the computer screen that you move by moving the mouse or other pointing device. Usually, the pointer looks like an arrow, but it assumes other shapes depending on the operation taking place. For example, the stopwatch pointer indicates that a process is in progress.

pop-up function pad.   An image that is displayed on the desktop when you press both mouse buttons at the same time and that is used to delete, move, or copy icons, or to open or close an options window.

Precision.   A field in the Column Options window where you specify the decimal places for real numbers.

print name.   The name of a database item (such as a column or table) that is used in Meta5 windows instead of the more cryptic name by which the data item is identified in the database. Print names are identified in the Workstation Tools Data Dictionary

(WTDD) and are converted during data retrieval to internal names that can be understood by the database.

quad week.   Exactly four weeks, starting on a Sunday.

query.   A request for data from a database, based on specified conditions.

Query Catalog.   A window that provides a catalog of column and table names from which users create database queries.

Query Control.   A window where users create a depiction of a database query.

query depiction.   The database tables shown in the Query Control window after column names are copied or selected from the Query Catalog window.

Query Log.   The window that displays the SQL statements sent to the database while data is being retrieved.

Query Strategy.   An expert function that only works with the DBS-250, Query Strategy permits you to set a priority list for constraints.

Query tool.   A tool used to retrieve data from a database, based on specified conditions.

RDBMS.   Relational database management system.

realm.   In Meta5 networks, a collection of Meta5 resources that are maintained as a logical group (that is, a group that is determined not by physical boundaries, but rather by virtue of being associated with one another). A realm must contain at least a primary file service and a directory service. Other components such as workstations, Internetwork Routing Service, and Data Access Services can be added to form a functional Meta5 local area network (LAN).

real number.   A number with a decimal point, such as 2.1 or .003.

relational database.   A database that is organized and accessed according to relationships between data items. These relationships are expressed as tables related by data values, rather than by pointers or memory locations.

relational database management system (RDBMS).   The software that makes it possible to create, use, and maintain relational data in the form of tables consisting of rows and columns of data.

Reporter.   A Meta5 tool used to retrieve data from a database, analyze it, and format it into a report that can be printed.

report window.   The window where the formatted report is displayed after data is retrieved from the database.

Restore button.   The window header button that expands a minimized window to its full size. Contrast with Minimize button.

row.   (1) The horizontal component of a table. A row contains exactly one value for each column of the table. (2) A record, or single instance, in a database table.

scroll.   To move the image in a window up, down, left, or right to view information that is not otherwise visible within the boundaries of the window.

scroll bar.   A bar, at the bottom or right edge of a window, that shows that more information is available or can be added that is not currently displayed in the window. The components of a scroll bar can be used to bring different information into view.

scroll box.   The part of a scroll bar that indicates the position and proportion of information currently visible in a window relative to the total amount of information available. You can drag the scroll box to a different location in the scroll bar to bring different information into view.

scroll button.   The part of a scroll bar that contains an arrow. Clicking on a scroll button causes the window to scroll up, down, left, or right.

secure.   To restrict access to.

Secured.   The field in the Icon Options window in which you select whether or not to prevent unauthorized users from opening the icon.

select.   To identify one or more objects on the computer screen so that they can be operated on. You select icons and choices in fields by clicking on them.

Select.   The transformer that sends specified data columns from 1 input region to as many as 10 output regions.

Select All button.   (1) The button in a window header that causes everything in the window to be selected. The Select All button looks like this: **selection**.

Something on the desktop that has been selected. Selections are highlighted.

server.   The computer on which a service runs.

service.   A software process that provides facilities to other parts of Meta5, such as a file service, a mail service, a mail gateway service, and a data access service.

setup area.   The upper-left corner of the setup window where the user places frames to be used as row and column headings.

setup window.   The window in which the user creates the layout of a report. The setup window has two main areas, the setup area and the index area.

share base.   The value used as the denominator in a percentage or share equation.

Short.   The choice in the Column Length field specifying that the length of the column, that is, the number of rows it contains, is under the Browser tool's column-length threshold of 100 rows. If you select Short, Browser does not automatically apply its threshold limit, and attempts to display all retrieved values for the column. If the column actually is over the limit, your workstation can run out of memory and the query can stop; or the retrieval process can take a very long time.

Show Category.   The window header button or the choice in the `Special` menu that opens the category window displaying the database tables for which the icon is configured.

Show Constrained Choices.   A button in the options windows of dimension headings and dimension column names. This button opens a Choices window that displays a list of all acceptable constraint values based on constraints the user has already applied to the selected table.

Show Controls.   (1) A window header button, usually in the main window of an icon, that opens a controls window in which the user can specify settings that determine icon behavior, how a program is processed, or both. (2) A button in the main Browser window header that opens the Browser Controls window.

Show Data.   The button in the Query window header that causes the retrieved information from the database to be displayed.

Show Query.   The button in the Query Control window header that causes the columns selected from the user catalog to be displayed in the query depiction and in the Query window.

Size.   A function key used to open an icon or to change the size of a window. This key has additional functions in data access tools.

Sort Controls.   The window in which the user can change the sorting sequence of retrieved data.

Source.   A field in many constraint windows that enables the user to choose between entering constraint values directly in that window or using values that have already been entered in a Text icon.

source document.   A Text icon that contains the SQL program that is read into the SQL Entry tool.

Special button.   A button in some window headers and on the far-right side of the message bar.

Special menu.   A menu that is displayed when the user points to the Special button and presses mouse button 1. In tool windows, the menu choices are usually reserved for special functions or controls associated with the icon.

Specified Here.   The choice in the Database Logon field of the Icon Options window specifying that the user ID and password are to be determined in the Icon Options window rather than in the desktop Data Access Controls window.

Spreadsheet.   A Meta5 tool used to perform calculations and analyses, schedule projects, and perform iteration in embedded capsules.

SQL.   Structured Query Language.

SQL Entry.   A tool used to run Structured Query Language (SQL)programs.

SQL ID.   The field in the Icon Options window in which the user specifies the name of the creator of the database.

SQL log.   A Text or System Logging icon used to record SQL statements as they are processed. The SQL log also includes a beginning and ending time stamp, and processing statistics.

stand-alone mode.   The mode in which the user runs the SQL Entry icon interactively and open in a container.

Stop.   A function key used to stop an operation in progress, such as retrieving data from a database.

stopwatch pointer.   A graphic representation of a stopwatch that replaces the pointer to inform the user to wait until a process has been completed.

string.   A sequence of characters.

Structured Query Language.   A command language for use with relational databases. The language consists of statements to insert, update, delete, query, and protect data. Meta5 tools use SQL to communicate with database servers.

Sum.   An operator in the Formula page of the Computed Options window that enables the user to add together the values from two columns or a value from a column and a constant value.

system administrator.   In Meta5, the person who is responsible for maintaining and configuring Meta5, including its workstations, servers, and network.

table.   In a database, a single file, consisting of data organized in columns and rows.

table name.   The title or label for a database table.

Table Options window.   The window in which you set options that apply to specific table data in the Browser Controls window.

tagged line.   In an SQL program, the line immediately following the line containing the &LABEL statement. The tagged line takes control of the program when an &GOTO statement passes control to the tagged line.

Text.   A tool used to write and format text documents, format the results of data access tools, and receive data and images from other tools and PC applications.

title block.   A window header button that contains the icon graphic and the window title. The user can click on the title block to close the window.

tool.   An Meta5 workstation program, such as Browser, Spreadsheet, Text, Reporter, or Query. Every tool is represented by an icon.

tool window.   A window that opens when the user double-clicks on an icon or points to an icon and presses the Size key. A tool window is the user's view of a tool.

user ID.   A name used to gain access to a desktop, system, gateway, or database service.

User ID field.   In the desktop data access windows (Add Entry, Change Mainframe Password, and Entry Options)and in the Icon Options windows for data access tools, a field where the user types a user ID that the database can identify as valid. This may or may not be the same as the user's Meta5 user ID.

user catalog.   The page of the Query Catalog window that contains the index of table information from which column names are selected.

User Input Control.   The window in which the user can set or view @-variables, their descriptions, and their type designations.

Value.   A character field in the Comparison Options window that contains the text parameter that the operator will act upon.

Value field.   The choice in the Source field of constraint windows that the user selects to enter constraints into the Value field of that window.

view.   A copy of a query that can be named, stored, edited and redisplayed for use in comparison analysis and query computations.

wild card.   A special character, such as a percent sign (%) or an underscore (_), that can be used to represent one or more characters.

window.   A rectangle that displays a window header and display area, the contents of which vary depending on the type of window. For example, a tool window displays a view of the tool and the data associated with it.

window header.   The area at the top of a window that contains the title block, command buttons, and other buttons.

workstation.   A computer at which you can use Meta5 to perform work.

Workstation Tools Data Dictionary (WTDD).   A logical data dictionary that standardizes the Meta5 workstation view of data across many relational database management systems. The WTDD stores the print names of database items, defines how the items are to be displayed, and includes other logical attributes of data. The WTDD is implemented as a set of standard relational tables that can be managed through the DBA tool.

WTDD.   Workstation Tools Data Dictionary.

WTDD Owner.   The field in the Icon Options window in which the user specifies the name of the owner of the WTDD catalog.

Year Format.   In the Country page of the Set Preferences window, the field where the user specifies the format of a year in a date entry. The choices are yy (two digits, as in 01)or yyyy (four digits, as in 2001).

Meta5 Publications

This section lists Meta5 publications. To order copies of the books listed here, or to get more information about a book, see your Meta5, Inc. representative.

- **Meta5 Volume 1**

    Getting Started with the Meta5 Developer's Desktop

    PC Integration Tools

- **Meta5 Volume 2**

    Spreadsheet User's Guide

    Plot User's Guide

- **Meta5 Volume 3**

    Text User's Guide

    Layout User's Guide

- **Meta5 Volume 4**

    Capsule User's Guide

    BASIC Tool User's Guide

- **Meta5 Volume 5**

    Data Access Tools User's Guide

- **Meta5 Volume 6**

    Forms User's Guide

- **Meta5 Volume 7**

    Transformers Guide

- **Meta5 Volume 8**

    Error Messages and Codes

- **Meta5 Volume 9**

    Installing Meta5 LAN Components

    System Administration Guide and Reference

- **Meta5 Volume 10**

    Database Gateway Services Guide

    Administering Databases with Meta5

- **Meta5 Volume 11**

    Installing and Configuring Meta5 Open Clients

    Developing Applications with Open Data Access Service

- **Meta5 Volume 12**

Administering Host Services for MVS:DB2 and Cooperative Application Services

Planning and Installing Host-to-LAN Communications for MVS

Index

Special Characters