IBM

eserver

iSeries

Database overview

Version 5 Release 3

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Note

Before using this information and the product it supports, be sure to read the information in "Notices," on page 37.

Second Edition (August 2005)

| This edition applies to version 5, release 3, modification 0 of IBM Operating System/400 (product number 5722–SS1)
| and to all subsequent releases and modifications until otherwise indicated in new editions. This version does not
| run on all reduced instruction set computer (RISC) models nor does it run on CISC models.

Contents

Database overview

DB2 Universal Database™ for iSeries™ shares characteristics with many other implementations of DB2®. But if you have just migrated to iSeries, you may be wondering how DB2 UDB differs on other IBM® platforms, or you may need to know how IBM's Universal Database compares to other relational database platforms, and what advantages iSeries brings to database development.

These links should help you understand the various strengths of iSeries as a database platform. They can help you assess which data access methods make most sense for your organization as well as build a rough framework for developing and maintaining your database implementation on iSeries.

You can also explore other database information using the main navigation bar.

This disclaimer information pertains to code examples.

What's new for V5R3

This article summarizes the changes made to the Database Overview in V5R3.

- In V5R3, the Query for iSeries manual was not updated, but numerous functional updates were made to the product. These updates are summarized in the Queries and reports article of the Database administration topic.
- The check pending constraints function was added. Check pending constraints allows you to view and change constraints that have been placed in a check pending state by the system. See "Managing check pending constraints" on page 18 for more information.
- Partitioned tables support is now available using SQL and iSeries Navigator. See Partitioned tables in the DB2 Multisystem topic for more information.
- You can now create sequences using SQL and iSeries Navigator. See CREATE SEQUENCE in the SQL Reference topic.
- You can now create materialized query tables using SQL and iSeries Navigator. See CREATE TABLE in the SQL Reference topic.
- The SQL diagnostics area contains information to help you debug your application programs, SQL functions, SQL procedures, and triggers. See Using the SQL diagnostics area in the Embedded SQL programming topic.

How to see what's new or changed

To help you see where technical changes have been made, this information uses:

- The » image to mark where new or changed information begins.
- The « image to mark where new or changed information ends.

To find other information about what's new or changed this release, see the Memo to Users.

Print this topic

Use this to view and print a PDF of this information.

To view or download the PDF version of this document, select Database Overview (about 590 KB).

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- Right-click the PDF in your browser (right-click the link above).
- Click **Save Target As...** if you are using Internet Explorer. Click **Save Link As...** if you are using Netscape Communicator.
- Navigate to the directory in which you would like to save the PDF.
- Click **Save**.

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DB2 UDB for iSeries

This topic provides a high-level description of DB2 Universal Database for iSeries.

DB2 Universal Database for iSeries is the relational database manager that is fully integrated on your iSeries. Because it is integrated on iSeries, DB2 Universal Database for iSeries is very easy to use and manage. DB2 Universal Database for iSeries also provides a wealth of functions and features such as triggers, stored procedures, and dynamic bitmapped indexing that serve a wide variety of application types. These applications range from traditional host-based applications to client/server solutions to business intelligence applications.

As an interface to DB2 Universal Database for iSeries, the DB2 Query Manager and SQL Development Kit for iSeries adds an interactive query and report writing interface, as well as precompilers and tools to assist in writing SQL application programs in high-level programming languages. Conforming to the industry standard Structured Query Language (SQL), the SQL implementation for OS/400® allows you to define, manipulate, query, and control access to your iSeries data. It works equally well with iSeries files and SQL tables.

The DB2 Universal Database for iSeries topic tells you about how to take advantage of DB2 Universal Database for iSeries to access and manage iSeries data, through an application or a user interface. Find how-to information, underlying concepts, reference information, or examples you are looking for here.

Get started with iSeries Navigator

This tutorial describes how to create and work with schemas, tables, and views using iSeries Navigator. iSeries Navigator Database is a graphical interface that you can use to perform many of your common administrative database operations. Most of the iSeries Navigator operations are based on Structured Query Language (SQL), but you do not need to fully understand SQL to perform them.

In this topic, the examples use iSeries Navigator to perform common database tasks. The objects created are the same objects that are created in the examples using Interactive SQL in the SQL Reference topic.

See the following for details:
- Start iSeries Navigator
- Creating a schema with iSeries Navigator (SAMPLELIB)
- Editing the list of schemas displayed in iSeries Navigator
- Creating and using a table with iSeries Navigator
- Defining columns on a table with iSeries Navigator
- Copying column definitions with iSeries Navigator
- Inserting information into a table with iSeries Navigator
- Viewing the contents of a table with iSeries Navigator

- Changing information in a table with iSeries Navigator
- Deleting information from a table with iSeries Navigator
- Copying and moving a table with iSeries Navigator
- Creating and using a view with iSeries Navigator
- Creating a WHERE clause
- Deleting database objects with iSeries Navigator

For more information about setting up iSeries Navigator, see Getting to know iSeries Navigator.

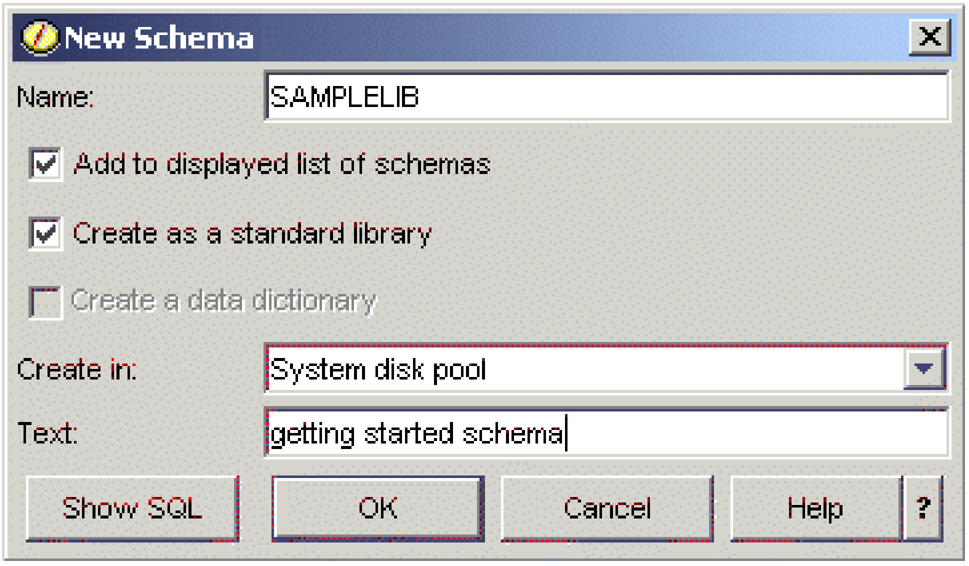
For information about other database tasks that you can perform using iSeries Navigator, see iSeries Navigator tasks.

Start iSeries Navigator

1. Double-click the **iSeries Navigator** icon.
2. Expand the system you want to use.

Creating a schema with iSeries Navigator (SAMPLELIB)

1. In the iSeries Navigator window, expand the system that you want to use.
2. Expand **Databases** and the database that you want to work with.
3. Right-click **Schemas**, and select **New Schema**.
4. On the New Schema window, type SAMPLELIB in the name field.
5. To add to the list of schemas to be displayed, select **Add to displayed list of schemas**.
6. Select **Create as a standard library**.
7. Specify a disk pool to contain the schema. Choose one so that the schema is created on the system disk pool.
8. Specify a description (optional).
9. Click **OK**.


New Schema

Name: SAMPLELIB

☑ Add to displayed list of schemas

☑ Create as a standard library

☐ Create a data dictionary

Create in: System disk pool

Text: getting started schema

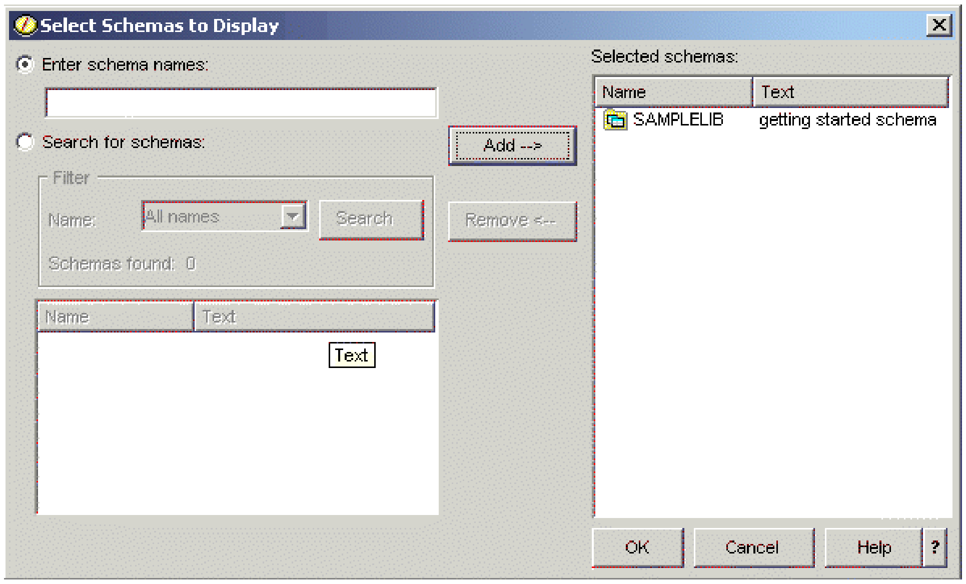
Note: See Working with multiple databases for more information about creating schemas in user disk pools.

Editing the list of schemas displayed in iSeries Navigator

Once you have successfully created a schema, you can create tables, views, indexes, stored procedures, user-defined function, and user-defined types in it.

To edit the list of schemas displayed when you click **Schemas**:

1. Right-click **Schemas**, and select **Select Schemas to Display**.
2. On the Select Schemas to Display window, you can edit the list by selecting **Enter schema names** and specifying a schema, or by selecting **Search for schemas** and performing a search. Select the schema you want to display, then click **Add**.
3. You can remove a schema from the list of schemas to display by selecting that schema from the list of schemas to display and clicking **Remove**.



Name	Text
SAMPLELIB	getting started schema

4. For now, leave SAMPLELIB as the schema displayed.

Creating a table and defining a column with iSeries Navigator

A table is a basic database object that is used to store information. Once you have created a table, you can define the columns, create indexes, and add triggers and constraints by using the Table Properties window.

When you are creating a table, you need to understand the concepts of null value and default value. A null value indicates the absence of a column value for a row. It is not the same as a value of zero or all blanks. It means ″unknown.″ It is not equal to any value, not even to other null values. If a column does not allow the null value, a value must be assigned to the column. This value is either a default value or a user supplied value.

If no value is specified for a column when a row is added to a table, the row is assigned a default value. If the column is not assigned a specific default value, the column uses the system default value.

This example shows you how to create a table to maintain information about the current inventory of a business. It will have information about the items kept in the inventory, their cost, quantity currently on hand, the last order date, and the number last ordered. The item number will be a required value. It cannot be null. The item name, quantity on hand, and order quantity will have user-supplied default values. The last order date and quantity will allow the null value.

To create a table, do the following:

1. In the iSeries Navigator window, expand the system that you want to use.
2. Expand **Databases** and the database that you want to work with.
3. Expand **Schemas**.
4. Right-click **SAMPLELIB** and select **New**.
5. Select **Table** → **Table**.
6. On the New Table window, specify INVENTORY_LIST as the table name.
7. Select **SAMPLELIB** in the **Schema** field.
8. Select **System-generated** in the **System table name** field.
9. Specify a description in the **Text** field (optional).

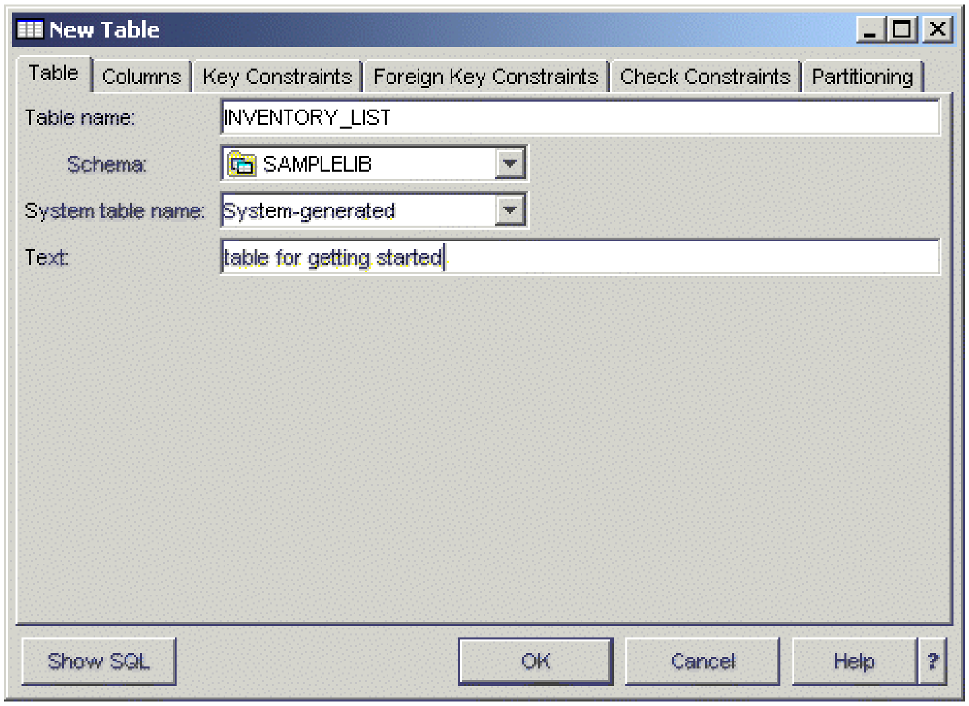
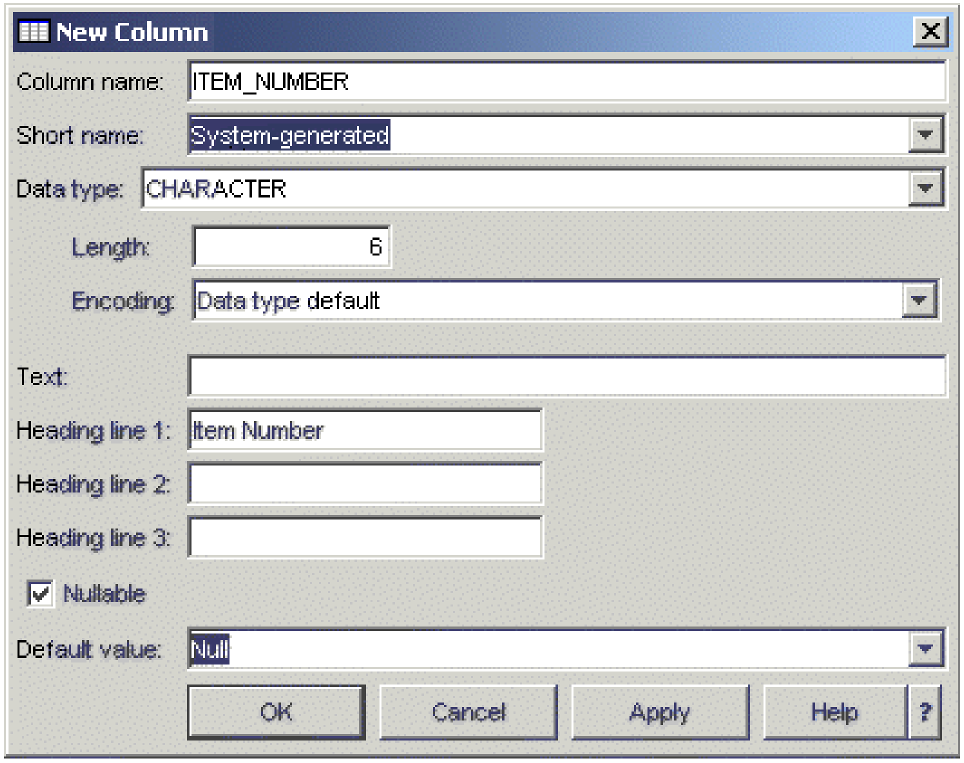


Table name: INVENTORY_LIST
Schema: SAMPLELIB
System table name: System-generated
Text: table for getting started

10. Next, define a column for the new table. Click the **Columns** tab.
11. Click the **Add** button.
12. Enter ITEM_NUMBER in the **Column name** field.
13. You can specify a short name in the **Short column name** field. If you do not specify a short name, the system automatically generates a name. If the column name is 10 characters or less, then the short name is the same as the column name. You can perform queries by using either column name. Just leave this space as the default, **System-generated**, for now.
14. Select **CHARACTER** as the Data type.
15. Specify a length of 6 for this column. For data types where the size is predetermined, the size is filled in and you cannot change the value.
16. Leave the **Encoding** option as the default, **Data type default**.
17. You can specify a description for the column in the **Text** field. This step is optional.
18. Enter a column heading in the **Heading** fields. The heading is the label that will appear at the top of the column for displaying or printing. You are limited to 60 characters, 20 per line.
19. Deselect the **Nullable** option. This ensures that a value must be placed in this column in order for the row insert to be successful.
20. In the **Default value** field, enter **0**.
21. Click **OK** to create the table.



Column name:	ITEM_NUMBER
Short name:	System-generated
Data type:	CHARACTER
Length:	6
Encoding:	Data type default
Text:	
Heading line 1:	Item Number
Heading line 2:	
Heading line 3:	
Nullable	✓
Default value:	Null

The new table INVENTORY_LIST appears.

Defining additional columns on a table with iSeries Navigator

You can define columns on a new or existing table. To add columns to the table you just created, navigate to the table INVENTORY_LIST by expanding **Database** → **Schemas** → **SAMPLELIB** → **Tables**. In the detail pane, right-click the table INVENTORY_LIST and select **Definition**.

1. To define a column on the Table Definition window, select the **Columns** tab.
2. Click **Add**.
3. Add the following columns to Table INVENTORY_LIST:

Column name	Type	Length	Precision	Scale	Nullable	Default Value
ITEM_NAME	VARCHAR	20			No	UNKNOWN
UNIT_COST	DECIMAL		8	2	No	0
QUANTITY_ON_HAND	SMALLINT				Yes	NULL
LAST_ORDER_DATE	DATE				Yes	NULL
ORDER_QUANTITY	SMALLINT				Yes	20

When you finish defining these columns, click **OK** to create the table.

Creating the supplier table (SUPPLIERS) with iSeries Navigator

Later in our examples, you will need a second table. This table will contain information about suppliers of our inventory items, which items they supply, and the cost of the item from that supplier. Create a table called SUPPLIERS in SAMPLELIB. This table will have three columns: SUPPLIER_NUMBER, ITEM_NUMBER, and SUPPLIER_COST. Notice that this table has a common column with table INVENTORY_LIST: ITEM_NUMBER. Rather than create a new ITEM_NUMBER column, you can copy the column definition used for ITEM_NUMBER in INVENTORY_LIST table.

Copying column definitions with iSeries Navigator

To copy column definitions, do the following:

1. On the SUPPLIER Table Properties or the New Table window, click **Browse**.
2. On the Browse Tables window, expand **SAMPLELIB**.
3. Click **INVENTORY_LIST**. The columns in that table are listed, along with their data type, size, and description.
4. Select **ITEM_NUMBER**.
5. Click **Add** to copy this column definition to table SUPPLIERS.
6. Close the Browse Columns window.

Add the last two columns for table SUPPLIERS with the following values:

Column name	Type	Length	Precision	Scale	Nullable	Default Value
SUPPLIER_NUMBER	CHAR	4			No	0
SUPPLIER_COST	DECIMAL		8	2	Yes	NULL

Inserting information into a table with iSeries Navigator

To insert, edit or delete data in a table, you must have authority to that table. To add data to the table INVENTORY_LIST:

1. In the iSeries Navigator window, expand the system that you want to use.
2. Expand **Databases** and the database that you want to work with.
3. Expand **Schemas**.
4. Select **SAMPLELIB**.
5. Double-click **Tables**.
6. Right-click INVENTORY_LIST and select **Edit Contents**.
7. From the Rows menu, select **Insert**. A new row appears.

Enter the information from the table below under the appropriate headings.

Note: The values you enter must satisfy all constraints and satisfy the type of each column. If there is a unique constraint or index over the table, the values you enter must define a unique key value. If you do not enter a value in a column, the default value will be entered, if allowed. For this exercise, insert only those values shown in the table below so that the default values are used.

ITEM_NUMBER	ITEM_NAME	UNIT_COST	QUANTITY_ON_HAND
153047	Pencils, red	10.00	25
229740	Lined tablets	1.50	120
544931		5.00	
303476	Paper clips	2.00	100
559343	Envelopes, legal	3.00	500
291124	Envelopes, standard		
775298	Chairs, secretary	225.00	6
073956	Pens, black	20.00	25

From the **File** menu, select **Save**.

Add the following rows to the SAMPLELIB.SUPPLIERS table.

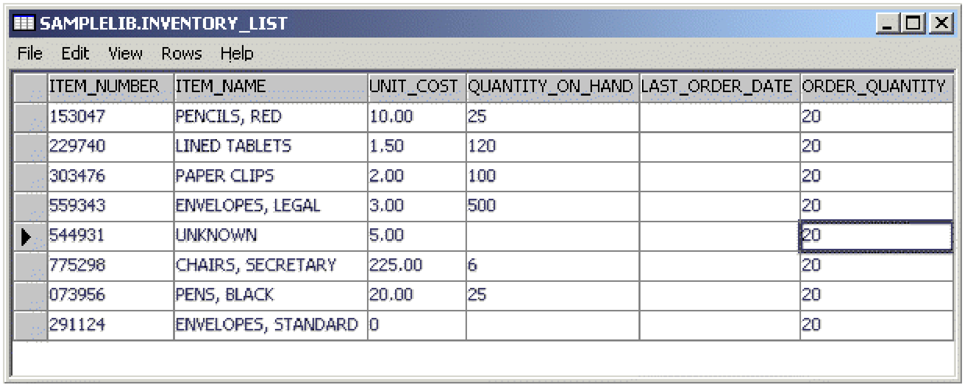
ITEM_NUMBER	SUPPLIER_NUMBER	SUPPLIER_COST
153047	1234	10.00
229740	1234	1.00
303476	1234	3.00
153047	9988	8.00
559343	9988	3.00
153047	2424	9.00
303476	2424	2.50
775298	5546	225.00
303476	3366	1.50
073956	3366	17.00

From the **File** menu, select **Save**. The sample schema now contains two tables with several rows of data in each.

Viewing the contents of a table with iSeries Navigator

You can display the contents of your tables and views. You can only view the contents; to make changes to a table, you must edit the table. To view the contents of INVENTORY_LIST:

1. In the iSeries Navigator window, expand the system that you want to use.
2. Expand **Databases** and the database that you want to work with.
3. Expand **Schemas**.
4. Select **Tables**.
5. Click SAMPLELIB.
6. Right-click INVENTORY_LIST and select **View Contents**.



ITEM_NUMBER	ITEM_NAME	UNIT_COST	QUANTITY_ON_HAND	LAST_ORDER_DATE	ORDER_QUANTITY
153047	PENCILS, RED	10.00	25		20
229740	LINED TABLETS	1.50	120		20
303476	PAPER CLIPS	2.00	100		20
559343	ENVELOPES, LEGAL	3.00	500		20
544931	UNKNOWN	5.00			20
775298	CHAIRS, SECRETARY	225.00	6		20
073956	PENS, BLACK	20.00	25		20
291124	ENVELOPES, STANDARD	0			20

Changing information in a table with iSeries Navigator

You can use iSeries Navigator to change the data values in the columns of a table. Suppose you want to update a column using iSeries Navigator to indicate that you received an order for more paper clips today. Keep in mind that the value you enter must be valid for that column.

1. Navigate to table INVENTORY_LIST. Right-click the table and select **Edit Contents**.
2. Enter the current date in the LAST_ORDER_DATE column for the row Paper clips. Be sure to use the correct date format for your system.
3. Change the ORDER_QUANTITY to 50.

4. Save the changes, then view the table contents by using **View Contents**.

The paper clip row reflects the changes you made.

Deleting information from a table with iSeries Navigator

You can delete data from a table by using iSeries Navigator. You can delete information from a single column in a row or delete the row entirely. Keep in mind that if a column requires a value, you will not be able to delete it without deleting the entire row.

1. Open table INVENTORY_LIST by double-clicking on it.
2. Delete the column value for ORDER_QUANTITY for the **Envelopes, standard** row. Because this is a column that allows Null values, you can delete the value.
3. Delete the column value for UNIT_COST for the **Lined tablets** row. Because this column does not allow Null values, the deletion is not allowed.

Deleting a row without removing column values individually:

You can also delete an entire row without removing all of the column values one at a time.

1. Open table INVENTORY_LIST by double-clicking it.
2. Click the cell to the left of the UNKNOWN row. This highlights the entire row.
3. Select **Delete** from the **Rows** menu or press the Delete key on your keyboard. The UNKNOWN row is deleted.
4. Delete all of the rows from table INVENTORY_LIST that do not have a value in the QUANTITY_ON_HAND column.
5. Save the changes and view the contents by using **View Contents**.

You should have a table that contains the following data:

ITEM_ NUMBER	ITEM_ NAME	UNIT_ COST	QUANTITY_ ON_ HAND	LAST_ ORDER_ DATE	ORDER_ QUANTITY
153047	Pencils, red	10.00	25		20
229740	Lined tablets	1.50	120		20
303476	Paper clips	2.00	100	2003-09-22	50
559343	Envelopes, legal	3.00	500		20
775298	Chairs, secretary	225.00	6		20
073956	Pens, black	20.00	25		20

Copying and moving a table with iSeries Navigator

iSeries Navigator allows you to copy or move tables from one schema or system to another. Copying a table creates more than one instance of the table; moving transfers the table to its new location while removing the instance from its former location.

Copying a table with iSeries Navigator:

Create a new schema called LIBRARY1 and add it to the list of schemas displayed. Once you have created this new schema, copy INVENTORY_LIST over to LIBRARY1. To copy a table:

1. In the iSeries Navigator window, expand the system that you want to use.
2. Expand **Databases** and the database that you want to work with.
3. Expand **Schemas**.
4. Double-click **Tables**.

5. Click SAMPLELIB.
6. Right-click INVENTORY_LIST and select **Copy**.
7. Right-click LIBRARY1 and select **Paste**.

Moving a table with iSeries Navigator:

Now that you have copied table INVENTORY_LIST to LIBRARY1, move table SUPPLIERS to LIBRARY1. To move a table:

1. In the iSeries Navigator window, expand the system that you want to use.
2. Expand **Databases** and the database that you want to work with.
3. Expand **Schemas**.
4. Double-click **Tables**.
5. Click SAMPLELIB.
6. Right-click SUPPLIERS and select **Cut**.
7. Right-click LIBRARY1 and select **Paste**.

Note: You can move a table by dragging and dropping the table on the new schema. Moving a table to a new location does not always remove it from the source system. For example, if you have read authority but not delete authority to the source table, you can move the table to the target system. However, you cannot delete the table from the source system, causing two instances of the table to exist.

Creating and using a view with iSeries Navigator

You may find that no single table contains all the information you need. You may also want to give users access to only part of the data in a table. Views provide a way to divide the table so that you deal with only the data you need. A view reduces complexity and, at the same time, restricts access.

In order to create a view, you must have the correct authority to the tables or physical files on which the view is based. See the CREATE VIEW statement in the SQL Reference topic for a list of authorities needed.

If you do not specify column names in the view definition, the column names will be the same as those for the table on which the view is based.

You can make changes to a table through a view even if the view has a different number of columns or rows than the table. For INSERT, columns in the table that are not in the view must have a default value.

You can use the view as though it were a table, even though the view is totally dependent on one or more tables for data. The view has no data of its own and therefore requires no storage for the data. Because a view is derived from a table that exists in storage, when you update the view data, you are really updating data in the table. Therefore, views are automatically kept up-to-date as the tables they depend on are updated.

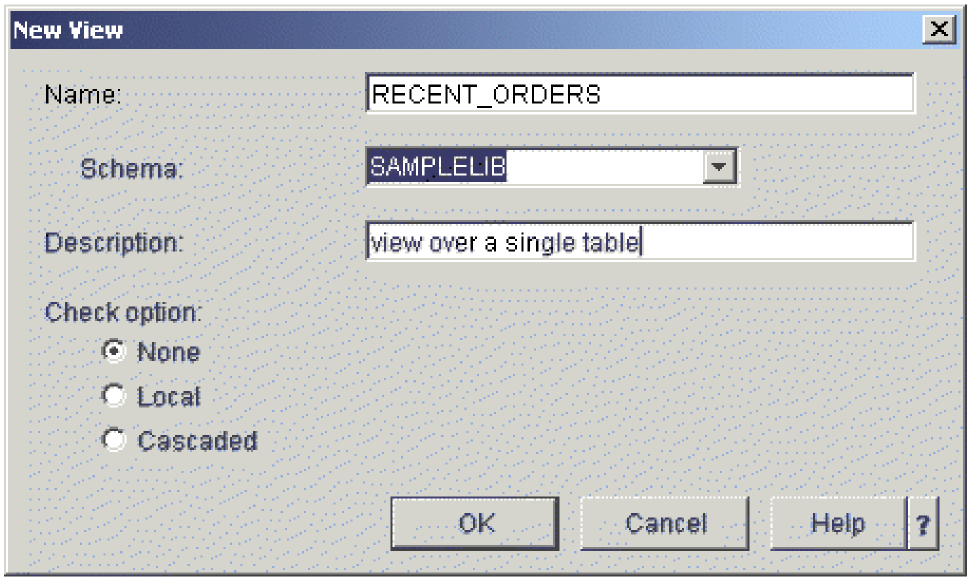
Creating a view over a single table with iSeries Navigator

The following example shows how to create a view on a single table. The view is built on the INVENTORY_LIST table. The table has six columns, but the view uses only three of the columns: ITEM_NUMBER, LAST_ORDER_DATE, and QUANTITY_ON_HAND.

To create a view over a single table:

1. In the iSeries Navigator window, expand the system that you want to use.
2. Expand **Databases** and the database that you want to work with.

3. Expand **Schemas**.
4. Right-click SAMPLELIB and select **New**, then **View**.
5. On the New View window, type RECENT_ORDERS in the **Name** field.
6. Specify SAMPLELIB in the **Schema** field.
7. Optionally, you can specify a description.
8. Select a check option. A check option on a view specifies that the values inserted or updated into a row must conform to the conditions of the view. For this view, select **None**.
9. Click **OK**. The New View definition window appears.



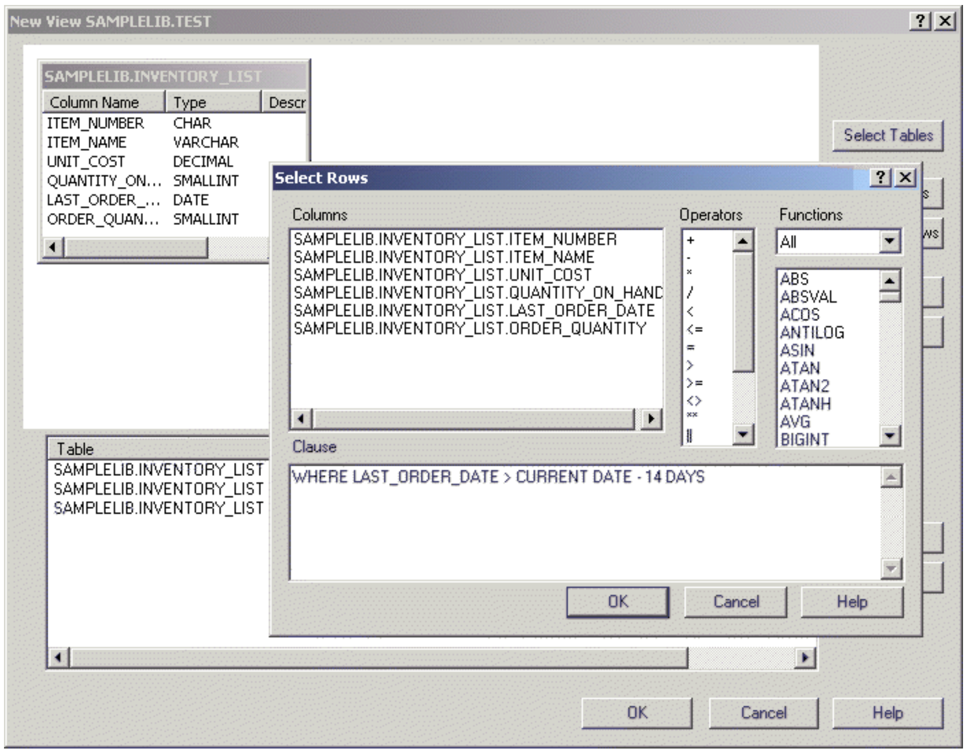
Name: RECENT_ORDERS
Schema: SAMPLELIB
Description: view over a single table
Check option: [✓ None] Local Cascaded

10. On the New View window, click **Select tables**.
11. On the Browse for Tables window, expand SAMPLELIB, then select INVENTORY_LIST.
12. Click **Add**.
13. Click **OK**. INVENTORY_LIST should now be in the work area on the New View window.
14. To choose the columns that you want in the new view, click them in the selected tables and drag-and-drop them in the selection grid on the bottom half of the window. Select ITEM_NUMBER, LAST_ORDER_DATE, and QUANTITY_ON_HAND.
15. The order that the columns appear in the selection grid is the order that they will appear in the view. To change the order, select a column and drag it to its new position. Put the columns in the following order: ITEM_NUMBER, LAST_ORDER_DATE, QUANTITY_ON_HAND.

Creating a WHERE clause

The view is now essentially finished, but for this example, you only want to view those items that have been ordered in the last 14 days. To specify this information, you need to create a WHERE clause:

1. Click **Select Rows**.
2. On the Select Rows window, enter the following: `WHERE LAST_ORDER_DATE > CURRENT DATE - 14 DAYS`. You can select the elements that make up this WHERE clause by selecting them from the options shown, or you can enter them in the **Clause** field.
3. Click **OK**.
4. To view the SQL used to generate this view, click **Show SQL**.
5. Click **OK** to create the view.



SAMPLELIB.INVENTORY_LIST

Column Name	Type	Descr
ITEM_NUMBER	CHAR	
ITEM_NAME	VARCHAR	
UNIT_COST	DECIMAL	
QUANTITY_ON...	SMALLINT	
LAST_ORDER_...	DATE	
ORDER_QUAN...	SMALLINT	

Columns:

```
SAMPLELIB.INVENTORY_LIST.ITEM_NUMBER
SAMPLELIB.INVENTORY_LIST.ITEM_NAME
SAMPLELIB.INVENTORY_LIST.UNIT_COST
SAMPLELIB.INVENTORY_LIST.QUANTITY_ON_HAND
SAMPLELIB.INVENTORY_LIST.LAST_ORDER_DATE
SAMPLELIB.INVENTORY_LIST.ORDER_QUANTITY
```

Operators: + - * / < <= = > >= <> ** ||

Functions: ABS ABSVAL ACOS ANTILOG ASIN ATAN ATAN2 ATANH AVG BIGINT

Table:

```
SAMPLELIB.INVENTORY_LIST
SAMPLELIB.INVENTORY_LIST
SAMPLELIB.INVENTORY_LIST
```

Clause:

```
WHERE LAST_ORDER_DATE > CURRENT DATE - 14 DAYS
```

6. To display the contents of RECENT_ORDERS, right-click RECENT_ORDERS and select **View Contents**.

You should see the following information displayed:

ITEM_NUMBER	LAST_ORDER_DATE	QUANTITY_ON_HAND
303476	2003-09-22	100

In the example above, the columns in the view have the same name as the columns in the table because you did not specify new names. The schema that the view is created into does not need to be the same schema as the table it is built over. You can use any schema.

Creating a view combining data from more than one table with iSeries Navigator

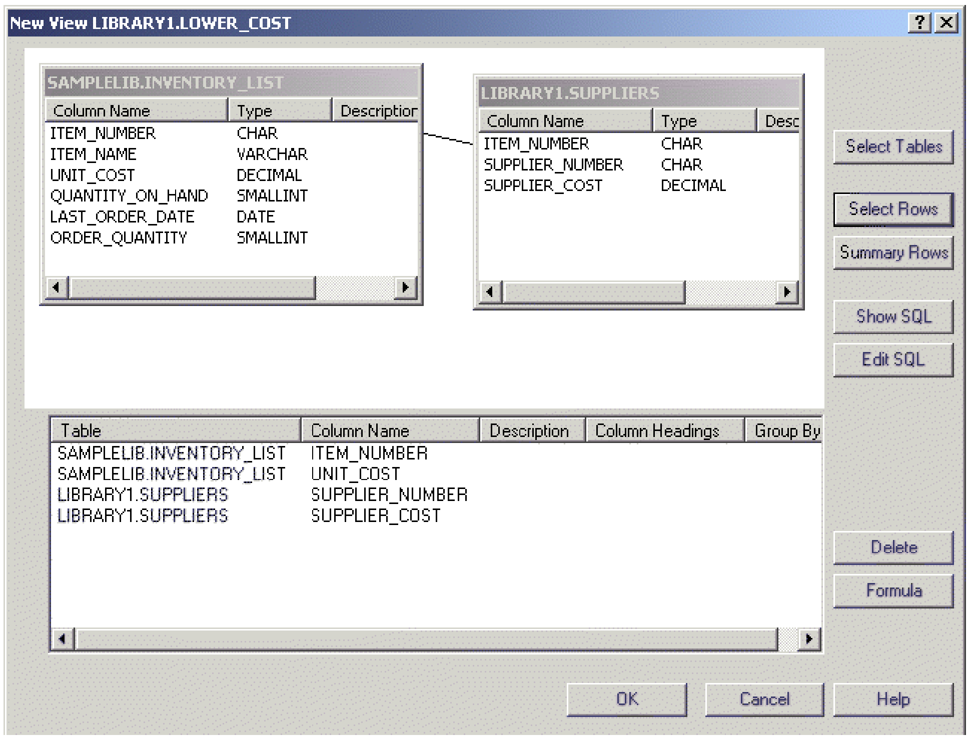
You can create a view combining information from more than one table by selecting more than one table in the work area of the New View window. You can create a simple view from more than one table by selecting the columns that you want to include from different tables and clicking **OK**. However, this example shows how to create a view that joins information from two different tables and returns only those rows that you want to see, much like using a WHERE clause.

In this example, you create a view that contains only those item numbers for suppliers that can supply an item at lower cost than the current unit cost. This will require selecting ITEM_NUMBER and UNIT_COST from the INVENTORY_LIST table and joining them with SUPPLIER_NUMBER and SUPPLIER_COST from the SUPPLIERS table. A WHERE clause is used to limit the number of rows returned.

To create a view called LOWER_COST:

1. Navigate to schema LIBRARY1. Right-click **Views** and select **New**.
2. Select INVENTORY_LIST from SAMPLELIB and SUPPLIERS from LIBRARY1.
3. Click **OK**. Both tables should appear in the working area of the window.
4. Select ITEM_NUMBER and UNIT_COST from INVENTORY_LIST.

5. Select SUPPLIER_NUMBER and SUPPLIER_COST from SUPPLIERS.
6. To define the join, select ITEM_NUMBER from INVENTORY_LIST and drag it to ITEM_NUMBER in SUPPLIERS. A line is drawn from one column to the other and the Join window opens.
7. On the Join window, select **Return rows with a matching condition (Inner Join)**.
8. Click **OK**.
9. Click **Select Rows** to create a WHERE clause for the view. Double-click LIBRARY1.SUPPLIERS.SUPPLIER_COST, then double-click the < operator and finally double-click SAMPLELIB.INVENTORY_LIST.UNIT_COST . As you click the items, they appear in the window. You can also type this in directly.
10. Click **OK** to create the view, LOWER_COST.



SAMPLELIB.INVENTORY_LIST

Column Name	Type	Description
ITEM_NUMBER	CHAR	
ITEM_NAME	VARCHAR	
UNIT_COST	DECIMAL	
QUANTITY_ON_HAND	SMALLINT	
LAST_ORDER_DATE	DATE	
ORDER_QUANTITY	SMALLINT	

LIBRARY1.SUPPLIERS

Column Name	Type	Desc
ITEM_NUMBER	CHAR	
SUPPLIER_NUMBER	CHAR	
SUPPLIER_COST	DECIMAL	

Table	Column Name	Description	Column Headings	Group By
SAMPLELIB.INVENTORY_LIST	ITEM_NUMBER			
SAMPLELIB.INVENTORY_LIST	UNIT_COST			
LIBRARY1.SUPPLIERS	SUPPLIER_NUMBER			
LIBRARY1.SUPPLIERS	SUPPLIER_COST			

Note: You can view the SQL used to create this view by selecting **Show SQL**. You can also edit the SQL by selecting **Edit SQL**. Edit SQL launches Run SQL Scripts, where you can edit your SQL statement. Be aware, however, that if you change the SQL, you will need to run the statement from Run SQL Scripts rather than returning to the New View window. If you return to the New View window, your changes are not saved.

To display the contents of this new view, right-click LOWER_COST and select **View Contents**. The rows that you seen through this view are only those rows that have a supplier cost that is less than the unit cost.

ITEM_NUMBER	UNIT_COST	SUPPLIER_NUMBER	SUPPLIER_COST
153047	10.00	9988	8.00
153047	10.00	2424	9.00
229740	1.50	1234	1.00
303476	2.00	3366	1.50
073956	20.00	3366	17.00

Deleting database objects with iSeries Navigator

Once you have created these objects on your system, you may want to drop them to save on system resource. You will need Delete authority in order to perform these tasks.

Note: To retain the information in these tables, create a third schema and copy the tables and views to it.

1. First, drop INVENTORY_LIST table from LIBRARY1:
   a. In the iSeries Navigator window, expand the system that you want to use.
   b. Expand **Databases** and the database that you want to work with.
   c. Expand **Schemas** and select LIBRARY1.
   d. Select **Tables**.
   e. Right-click INVENTORY_LIST and select **Delete** or press the Delete key.
   f. On the Object deletion confirmation window, select **Delete**. INVENTORY_LIST table is dropped.
2. Next, delete SUPPLIERS from LIBRARY1, and delete LIBRARY1:
   a. Right-click SUPPLIERS and select **Delete** or press the Delete key.
   b. On the Object deletion confirmation window, select **Yes**.
   c. A new window opens, indicating that the view, LOWER_COST, is dependent on SUPPLIERS. The view should also be deleted. Click **Delete**.
   d. SUPPLIERS and LOWER_COST are deleted. Now that LIBRARY1 is empty, delete it by right-clicking on it and selecting **Delete**.
   e. On the Object deletion confirmation window, select **Yes**. LIBRARY1 is deleted.
3. Finally, delete SAMPLELIB:
   a. Navigate to SAMPLELIB in the **Schemas** menu.
   b. Right-click SAMPLELIB and select **Delete**.
   c. On the Object deletion confirmation window, select **Delete**.
   d. A new window opens, indicating that the table INVENTORY_LIST and view RECENT_ORDERS are dependent on INVENTORY_LIST. These should also be deleted. Click **Yes**.

SAMPLELIB, INVENTORY_LIST, and RECENT_ORDERS are deleted.

For more information about using iSeries Navigator, see iSeries Navigator tasks.

iSeries Navigator database tasks

This topic describes the database tasks you can perform using the iSeries Navigator interface.

In addition to the tasks described in the Get started with iSeries Navigator topic, there are many other ways to use iSeries Navigator with you DB2 UDB for iSeries database. See the following links for information about how to use iSeries Navigator with your database:

Tasks in the Database programming topic:

Other tasks that are included in the Database Programming topic include:

- Adding triggers
- Authorizing a user or group to files
- Copying a file (table)
- Creating a schema
- Defining public authority for a file
- Displaying attributes for a file (table)

- Displaying locked rows
- Moving a file (table)
- Reorganizing a file (table)
- Setting a default public authority for new files
- Working with journals:
  - Creating a journal
  - Creating a journal receiver
  - Adding a remote journal
  - Removing a remote journal
  - Activating a remote journal
  - Deactivating a remote journal
  - Displaying journal information
  - Swapping journal receivers
  - Starting and stopping a journal

Tasks in the Database performance and query optimization topic

Tasks in the Database Performance and Query Optimization topic include:
- Examine debug messages in the job log
- Gather information about embedded SQL statements using PRTSQLINF
- Monitoring your queries using Start Database Monitor (STRDBMON)
- Monitoring your database with the memory-resident database monitor
- Viewing implementation of your queries using Visual Explain
- Change the attributes of your queries with the Change Query Attributes (CHGQRYA) command
- Collecting statistics with the Statistics Manager

Mapping your database using Database Navigator maps

Database Navigator enables you to visually depict the relationships of database objects on your system. This depiction is called a map. In essence, the Database Navigator Map is a snapshot of your database and the relationships that exist between all of the objects in the map.

Using Database Navigator, you can explore the complex relationships of your database objects using a graphical representation that presents the tables in your database, the relationships between tables, and indexes and constraints that are attached to tables. The primary workspace for Database Navigator is a window that is divided into several main areas. The map is displayed in the right pane. You can perform a variety of tasks by right-clicking on an object. The Locator pane is found on the left side of the window. You can use this pane to locate specific objects to include in the map or to specify a type of object to include in the map.

1. You can use Database Navigator Maps by expanding the system name, **Databases**, and the database that you want to use.
2. To display a list of existing maps in the right pane, click **Database Navigator Maps** to display a list of existing maps in the right pane.
3. To create a new map, right-click **Database Navigator Maps** and select **New** → **Map**.

Tips for using Database Navigator:
- To change the size of either side of the window, drag the bar (splitter) that separates the two sides.
- Be sure to right-click the objects in both the left and right sides of the window. The right-click menus give you quick access to common functions.

- To quickly open a schema and display the objects in it, double-click the schema.
- To access the various Database Navigator commands use either the Menu bar or the Toolbar.

You can find out more information about Database Navigator in the Online help.

Querying your database using Run SQL Scripts

The Run SQL Scripts window in iSeries Navigator allows you to create, edit, run, and troubleshoot scripts of SQL statements. When you have finished working with the scripts, they can be saved to your PC. You can launch Run SQL Scripts by expanding the system name, Databases, and right-clicking on the database that you want to connect to.

You can use the Examples list to build your scripts, manually create your statement, retrieve the SQL for an existing object using the generate SQL function, or build a script using SQL Assist. See "Building SQL statements with SQL Assist" on page 17 for details.

You can check the syntax of your SQL by clicking **Check Syntax**. Additional ways of debugging your programs and scripts include debug messages in the job log and launching the iSeries System debugger. See "Viewing the Job Lob" and "Launching the iSeries System Debugger" on page 17 for details. When syntax checking is complete, you can save the script by selecting **Save** from the **File** menu.

To run an SQL script, select one of the following options from the **Run** menu:
- **All** - Runs your SQL script from the beginning to the end. If an error occurs and the **Stop on Error** option is turned on, the program stops and the statement where the error occurred remains selected.
- **From Selected** - Starts your SQL script from the first statement that is selected or from the current cursor position and continues to the end of the script.
- **Selected** - Runs the statements that are selected.

The results are added to the end of the **Messages** tab. If the **Smart Statement Selection** option on the **Options** menu is not checked, the text that is selected is run as a single SQL statement.

See the following topics for more information:
- "Stopping Run SQL Scripts"
- "Viewing the Job Lob"
- "Generating SQL for objects" on page 17
- "Building SQL statements with SQL Assist" on page 17
- "Launching the iSeries System Debugger" on page 17

Stopping Run SQL Scripts

To stop or cancel an SQL scripts run, select one of the following options from the **Run** menu:
- **Stop After Current** - Stops running the SQL script after the currently running statement ends.
- **Cancel Request** - Requests that the system cancel the current SQL statement. However, as not all SQL statements can be canceled, the SQL statement may continue to completion even after this option is used. SQL statements that have already completed host processing before Cancel Request is pressed will also continue to completion. For example, Select statements that have already completed query processing but have not yet returned the results to the client typically cannot be canceled.

You can find out more information about Run SQL Scripts in the Online help.

Viewing the Job Lob

The **Job Log** displays messages related to your job.

- To see query optimizer and other database debugging messages, select **Include Debug Messages in Job Log** from the **Options** menu and run the statements again. If the Job Log dialog is open when you do this, refresh the view to see new messages.
- To view the Job Log, select **Job Log** from the **View** menu.

The Job Log is not cleared when **Clear Run History** is used, so you can use the Job Log to see messages that are no longer in the **Output** pane.

You can find out more information about the job log in the Online help.

Generating SQL for objects

Generate SQL allows you to reconstruct the SQL used to create existing database objects. This process is often referred to as reverse engineering. You can generate SQL for most database objects. Additionally, if you generate SQL for a table that has constraints or triggers associated with it, the SQL will be generated for those as well. You can generate the SQL for one object or many at a time. You also have the option of sending the generated SQL to Run SQL Scripts window for running or editing or you can write the generated SQL directly to a database or PC file.

- To generate SQL for an object, right-click the object and select **Generate SQL**.
- You can also launch generate SQL from Run SQL Scripts by selecting **Insert Generated SQL** from the **Edit** menu.

You can find out more information about Generate SQL in the Online help.

Building SQL statements with SQL Assist

You can build your SQL statements interactively with SQL Assist. SQL Assist helps you to build select, insert, update, and delete statements.

- To launch SQL Assist, select **SQL Assist** from the **Edit** menu in Run SQL Scripts. From the SQL Assist interface, you can choose tables to work with and build selection criteria. The statement is built in the bottom portion of the interface.
- Click **OK** to return the statement you built to Run SQL Scripts.
- You can edit, run, and save your statement.

You can find out more information about SQL Assist in the Online help.

Launching the iSeries System Debugger

The iSeries System Debugger provides a new graphical user debugging environment on the iSeries server. You can use iSeries System Debugger to debug and test programs that run on your iSeries server, including those that run in the OS/400 PASE environment.

To launch the System Debugger from Run SQL Scripts, select **Debugger** from the **Run** menu.

For more details about the iSeries System Debugger, see the iSeries System Debugger topic or the Online help.

Creating and managing objects using iSeries Navigator

You can create and manage many objects in iSeries Navigator.

Among the objects that you can create and manage are:

- Schemas
- Tables- including materialized query tables and partitioned tables.
- Aliases

- Sequences
- SQL Packages
- User-defined functions (UDFs)
- User-defined distinct types (UDTs)
- Procedures
- Indexes
- Triggers
- Constraints
- Views
- Journals
- Journal Receivers

Most objects are created from the **Schema** container object. To navigate to the schema container:

- Expand the system name, **Databases**, and the database that you want to use. Expand **Schemas**, right-click the schema that you want to work with, and select **New**
- Select the type of object that you want to create.
- Alternately, you can expand the schema that you want to work with and right-click the container type that you want to create. Schemas are created from the **Schemas** container. SQL packages are created at the system level. Right-click the system name and select **New** → **SQL package**.

You can find more information about creating objects in the Online help.

Managing check pending constraints

You can view and change constraints that have been placed in a check pending state by the system. Check pending refers to a state in which a mismatch exists between either a parent and foreign key in the case of a referential constraint or between the column value and the check constraint definition in the case of a check constraint.

1. To view constraints that have been placed in a check pending state, expand the system name and **Databases**. Right-click the database that you want to use and select **Manage check pending constraints**.
2. From this interface, you can view the definition of the constraint and the rows that are in violation of the constraint rules. Select the constraint that you want to work with and then select **Edit Check Pending Constraint** from the **File** menu.
3. You can either alter or delete the rows that are in violation.

For more details about check pending constraints, see the Check pending status in referential constraints in the Database programming topic and the Online help.

Get started with SQL

This article describes how to create and work with schemas, tables, and views using SQL statements in Interactive SQL.

The syntax for each of the SQL statements used in this chapter is described in detail and descriptions of how to use SQL statements and clauses in more complex situations are provided in the SQL Reference topic.

In this article, the examples use the interactive SQL interface to show the use of SQL statements. Each SQL interface provides methods for using SQL statements to define tables, views, and other objects, methods for updating the objects, and methods for reading data from the objects.

See the following topics for details:
- Creating a schema
- Creating and using a table
- Using the LABEL ON statement
- Inserting information into a table
- Getting information from a single table
- Getting information from more than one table
- Changing information in a table
- Deleting information from a table
- Creating and using a view

First, start interactive SQL:
1. Type `STRSQL NAMING(*SQL)`.
2. Press **Enter**.

When the Enter SQL Statements display appears, you are ready to start typing SQL Statements. For more information about interactive SQL and the STRSQL command, see SQL Programming.

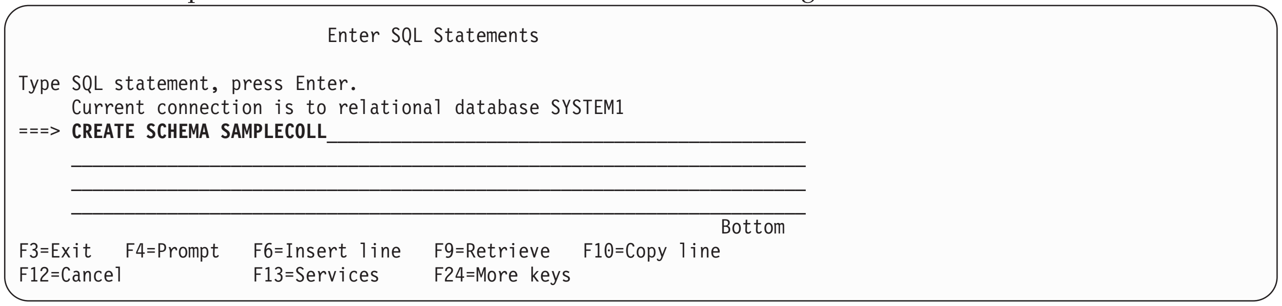
If you are reusing an existing interactive SQL session, make sure that you set the naming mode to **SQL naming**. You can specify this on the F13 (Services) panel, option 1 (Change session attributes).

Creating a schema

A schema is the basic object in which tables, views, indexes, and packages are placed. For more information about creating a schema, see SQL CREATE SCHEMA statement in the SQL Reference topic.

Note: The term *collection* can be used synonymously with schema.

To create a sample schema named SAMPLECOLL, do the following:



```
                              Enter SQL Statements

Type SQL statement, press Enter.
     Current connection is to relational database SYSTEM1
===> CREATE SCHEMA SAMPLECOLL_____________________________________________
     _____________________________________________________________________
     _____________________________________________________________________
     _____________________________________________________________________
                                                                    Bottom
F3=Exit   F4=Prompt   F6=Insert line   F9=Retrieve   F10=Copy line
F12=Cancel            F13=Services     F24=More keys
```

1. Enter the following SQL statement on the Enter SQL Statements display:
2. Press **Enter**.

Note: Running this statement causes several objects to be created and takes several seconds.

After you have successfully created a schema, you can create tables, views, and indexes in it. Tables, views, and indexes can also be created in libraries instead of schemas.

Creating and using a table

You can create a table by using the SQL CREATE TABLE statement. The CREATE TABLE statement allows you to create a table, define the physical attributes of the columns in the table, and define constraints to restrict the values that are allowed in the table.

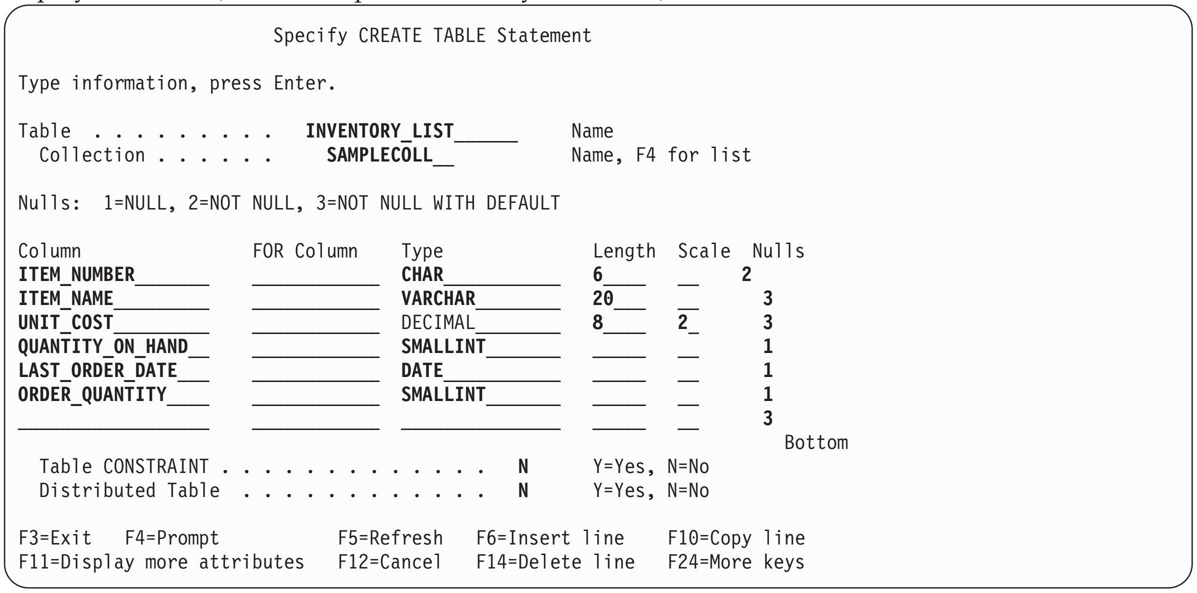
When creating a table, you need to understand the concepts of null value and default value. A null value indicates the absence of a column value for a row. It is not the same as a value of zero or all blanks. It means ⌂unknown.″ It is not equal to any value, not even to other null values. If a column does not allow the null value, a value must be assigned to the column, either a default value or a user supplied value.

A default value is assigned to a column when a row is added to a table and no value is specified for that column. If a specific default value is not defined for a column, the system default value will be used. For more information about the default values used by INSERT, see the SQL Reference.

You are going to create a table to maintain information about the current inventory of a business. It will have information about the items kept in the inventory, their cost, quantity currently on hand, the last order date, and the number last ordered. The item number will be a required value. It cannot be null. The item name, quantity on hand, and order quantity will have user supplied default values. The last order date and quantity ordered will allow the null value.

You will also create a second table. This table will contain information about suppliers of your inventory items, which items they supply, and the cost of the item from that supplier.

1. First, follow these steps to create the first table named INVENTORY_LIST:
   a. On the Enter SQL Statements display, type `CREATE TABLE` and press F4 (Prompt). The following display is shown (with the input areas not yet filled in):



```
                         Specify CREATE TABLE Statement

Type information, press Enter.

Table  . . . . . . . . .   INVENTORY_LIST______     Name
  Collection . . . . . .     SAMPLECOLL__           Name, F4 for list

Nulls:  1=NULL, 2=NOT NULL, 3=NOT NULL WITH DEFAULT

Column              FOR Column    Type              Length  Scale  Nulls
ITEM_NUMBER_______  ____________  CHAR___________   6____   __     2
ITEM_NAME_________  ____________  VARCHAR________   20___   __     3
UNIT_COST_________  ____________  DECIMAL________   8____   2_     3
QUANTITY_ON_HAND__  ____________  SMALLINT_______   _____   __     1
LAST_ORDER_DATE___  ____________  DATE___________   _____   __     1
ORDER_QUANTITY____  ____________  SMALLINT_______   _____   __     1
__________________  ____________  _______________   _____   __     3
                                                                     Bottom
  Table CONSTRAINT . . . . . . . . . . . . .  N      Y=Yes, N=No
  Distributed Table  . . . . . . . . . . . .  N      Y=Yes, N=No

F3=Exit   F4=Prompt           F5=Refresh   F6=Insert line    F10=Copy line
F11=Display more attributes   F12=Cancel   F14=Delete line   F24=More keys
```

   b. Type the table name INVENTORY_LIST and schema name SAMPLECOLL at the **Table** and **Collection** prompts, as shown.
   c. Each column you want to define for the table is represented by an entry in the list on the lower part of the display. For each column, type the name of the column, the data type of the column, its length and scale, and the null attribute.
   d. Press F11 to see more attributes that can be specified for the columns. This is where a default value may be specified.

```
                         Specify CREATE TABLE Statement

Type information, press Enter.

Table  . . . . . . . . .   INVENTORY_LIST______      Name
  Collection . . . . . .     SAMPLECOLL__            Name, F4 for list

Data:  1=BIT, 2=SBCS, 3=MIXED, 4=CCSID

Column                Data  Allocate  CCSID  CONSTRAINT  Default
ITEM NUMBER_______     _     _____    _____      N       __________________
ITEM NAME_________     _     _____    _____      N       '***UNKNOWN***'___
UNIT_COST_________     _     _____    _____      N       __________________
QUANTITY_ON_HAND__     _     _____    _____      N       NULL______________
LAST_ORDER_DATE___     _     _____    _____      N       __________________
ORDER_QUANTITY____     _     _____    _____      N       20________________
__________________     _     _____    _____      _       __________________
                                                                        Bottom
  Table CONSTRAINT . . . . . . . . . . . . . .   N      Y=Yes, N=No
  Distributed Table  . . . . . . . . . . . . .   N      Y=Yes, N=No

F3=Exit   F4=Prompt           F5=Refresh   F6=Insert line    F10=Copy line
F11=Display more attributes   F12=Cancel   F14=Delete line   F24=More keys
```

Note: Another way of entering column definitions is to press F4 (Prompt) with your cursor on one of the column entries in the list. A display that shows all of the attributes for defining a single column appears.

e. When all the values have been entered, press Enter to create the table. The Enter SQL Statements display will be shown again with a message indicating that the table has been created.

Note: You can type this CREATE TABLE statement on the Enter SQL Statements display as follows:

```
CREATE TABLE SAMPLECOLL.INVENTORY_LIST
(ITEM_NUMBER CHAR(6) NOT NULL,
 ITEM_NAME VARCHAR(20) NOT NULL WITH DEFAULT '***UNKNOWN***',
 UNIT_COST DECIMAL(8,2) NOT NULL WITH DEFAULT,
 QUANTITY_ON_HAND SMALLINT DEFAULT NULL,
 LAST_ORDER_DATE DATE,
 ORDER_QUANTITY SMALLINT DEFAULT 20)
```

2. Next, create a second table named SUPPLIERS. There are two methods you can use:
   a. Type the following command directly on the Enter SQL Statements display.
   b. Press F4 (Prompt) to use the interactive SQL displays to create the definition.

```
CREATE TABLE SAMPLECOLL.SUPPLIERS
     (SUPPLIER_NUMBER CHAR(4)NOT NULL,
     ITEM_NUMBER CHAR(6) NOT NULL,
     SUPPLIER_COST DECIMAL(8,2))
```

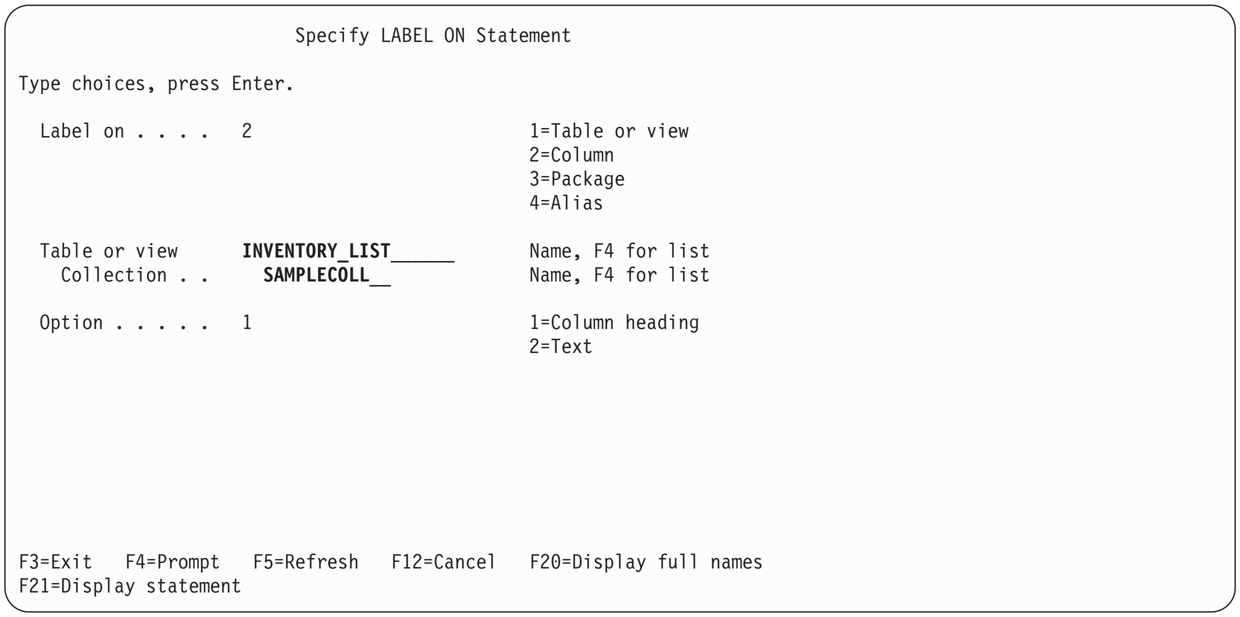
This disclaimer information pertains to code examples.

Using the LABEL ON statement

Normally, the column name is used as the column heading when showing the output of a SELECT statement in interactive SQL. By using the LABEL ON statement, you can create a more descriptive label for the column name. Because you are going to be running your examples in interactive SQL, you will use the LABEL ON statement to change the column headings. Even though the column names are descriptive, it will be easier to read if the column headings show each part of the name on a single line. It will also allow you to see more columns of data on a single display.

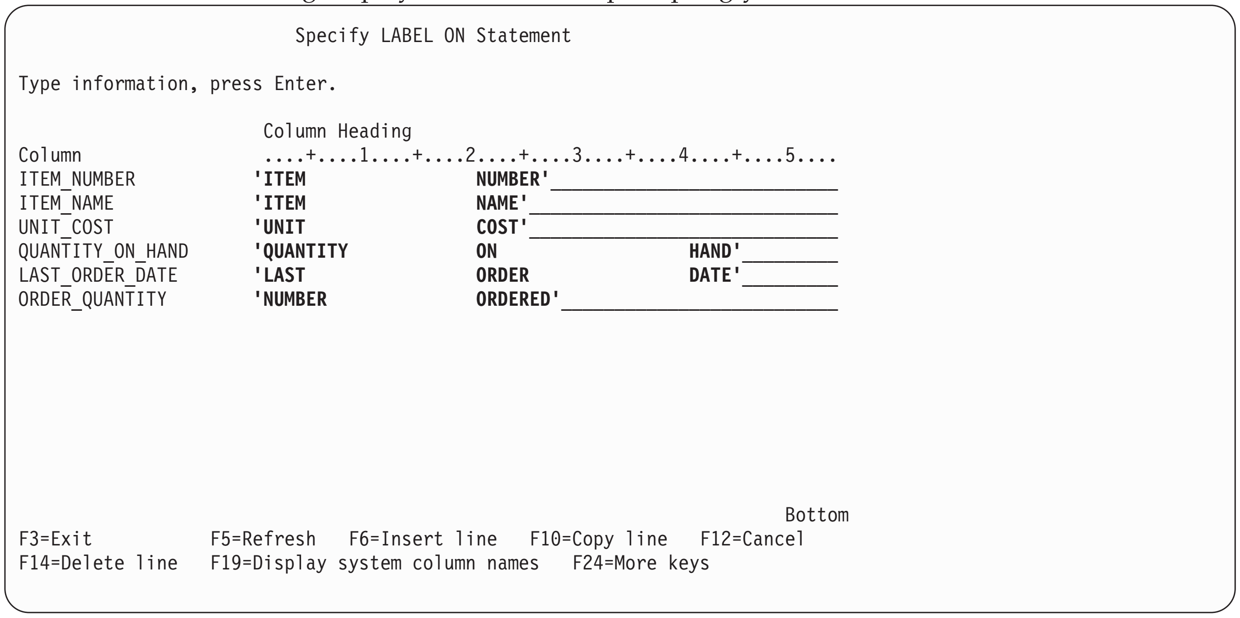
To change the labels for our columns, do the following:

1. Enter `LABEL ON COLUMN` on the Enter SQL Statements display.
2. Press F4 (Prompt). The following display will appear:



```
                           Specify LABEL ON Statement

Type choices, press Enter.

  Label on . . . .   2                           1=Table or view
                                                 2=Column
                                                 3=Package
                                                 4=Alias

  Table or view      INVENTORY_LIST______        Name, F4 for list
    Collection . .     SAMPLECOLL__              Name, F4 for list

  Option . . . . .   1                           1=Column heading
                                                 2=Text










F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F20=Display full names
F21=Display statement
```

3. Type in the name of the table and schema containing the columns for which you want to add labels.
4. Press Enter. The following display will be shown, prompting you for each of the columns in the table.



```
                           Specify LABEL ON Statement

Type information, press Enter.

                       Column Heading
Column                 ....+....1....+....2....+....3....+....4....+....5....
ITEM_NUMBER           'ITEM                NUMBER'___________________________
ITEM_NAME             'ITEM                NAME'_____________________________
UNIT_COST             'UNIT                COST'_____________________________
QUANTITY_ON_HAND      'QUANTITY            ON                  HAND'_________
LAST_ORDER_DATE       'LAST                ORDER               DATE'_________
ORDER_QUANTITY        'NUMBER              ORDERED'__________________________









                                                                        Bottom
F3=Exit           F5=Refresh   F6=Insert line   F10=Copy line   F12=Cancel
F14=Delete line   F19=Display system column names   F24=More keys
```

5. Type the column headings for each of the columns. Column headings are defined in 20 character sections. Each section will be displayed on a different line when showing the output of a SELECT statement. The ruler across the top of the column heading entry area can be used to easily space the headings correctly.
6. Press Enter.

The following message indicates that the LABEL ON statement was successful:

```
LABEL ON for INVEN00001 in SAMPLECOLL completed.
```

The table name in the message is the system table name for this table, not the name that was actually specified in the statement. DB2 UDB for iSeries maintains two names for tables with names longer than ten characters. For more information about system table names, see the CREATE TABLE statement in the SQL Reference topic.

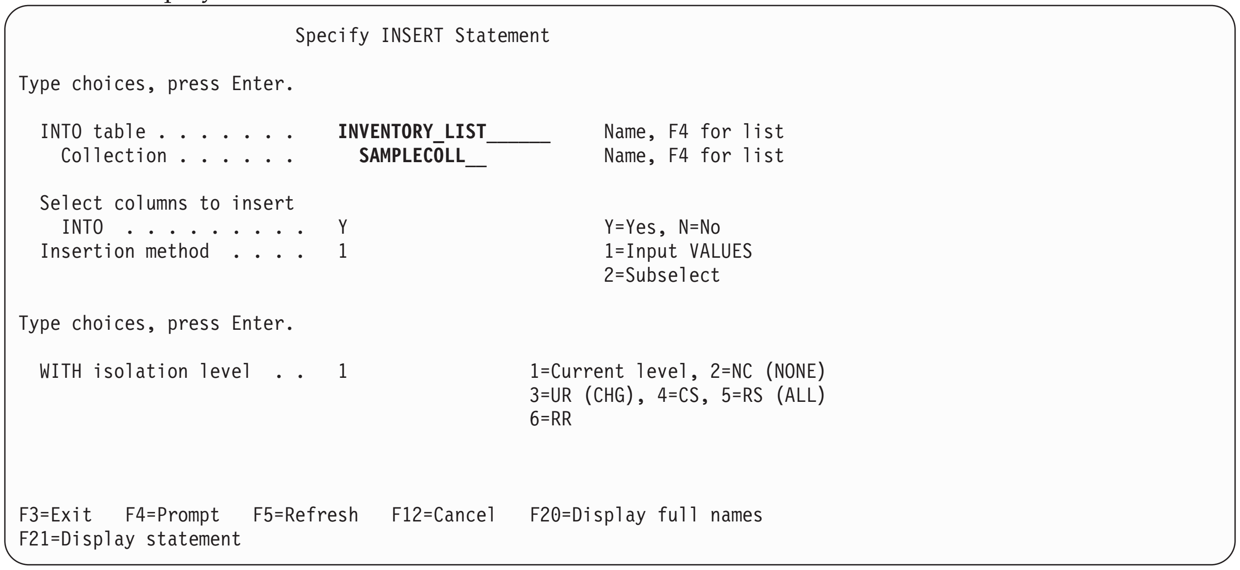
Note: The `LABEL ON` statement can also be keyed in directly on the Enter SQL statements display as follows:

```
LABEL ON SAMPLECOLL.INVENTORY_LIST
(ITEM_NUMBER       IS 'ITEM       NUMBER ',
ITEM_NAME          IS 'ITEM       NAME ',
UNIT_COST          IS 'UNIT       COST ',
QUANTITY_ON_HAND   IS 'QUANTITY     ON       HAND ',
LAST_ORDER_DATE    IS 'LAST       ORDER      DATE ',
ORDER_QUANTITY     IS 'NUMBER      ORDERED ')
```

Inserting information into a table

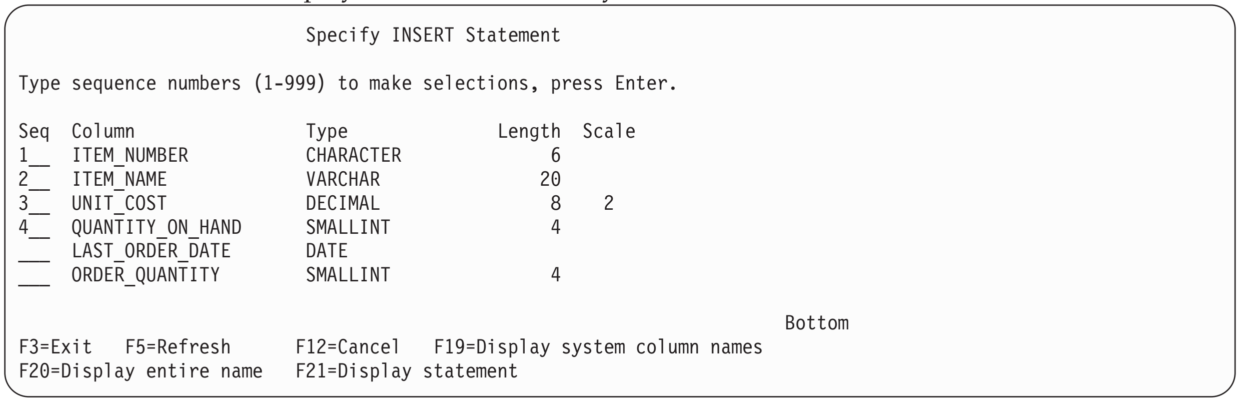
After you create a table, you can insert, or add, information (data) into it by using the SQL INSERT statement.

1. On the Enter SQL Statements display, type `INSERT` and press F4 (Prompt). The Specify INSERT Statement display will be shown.



```
                          Specify INSERT Statement

Type choices, press Enter.

  INTO table . . . . . . .    INVENTORY_LIST______     Name, F4 for list
    Collection . . . . . .      SAMPLECOLL__           Name, F4 for list

  Select columns to insert
    INTO  . . . . . . . . .   Y                        Y=Yes, N=No
  Insertion method  . . . .   1                        1=Input VALUES
                                                       2=Subselect

Type choices, press Enter.

  WITH isolation level  . .   1                 1=Current level, 2=NC (NONE)
                                                3=UR (CHG), 4=CS, 5=RS (ALL)
                                                6=RR



F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F20=Display full names
F21=Display statement
```

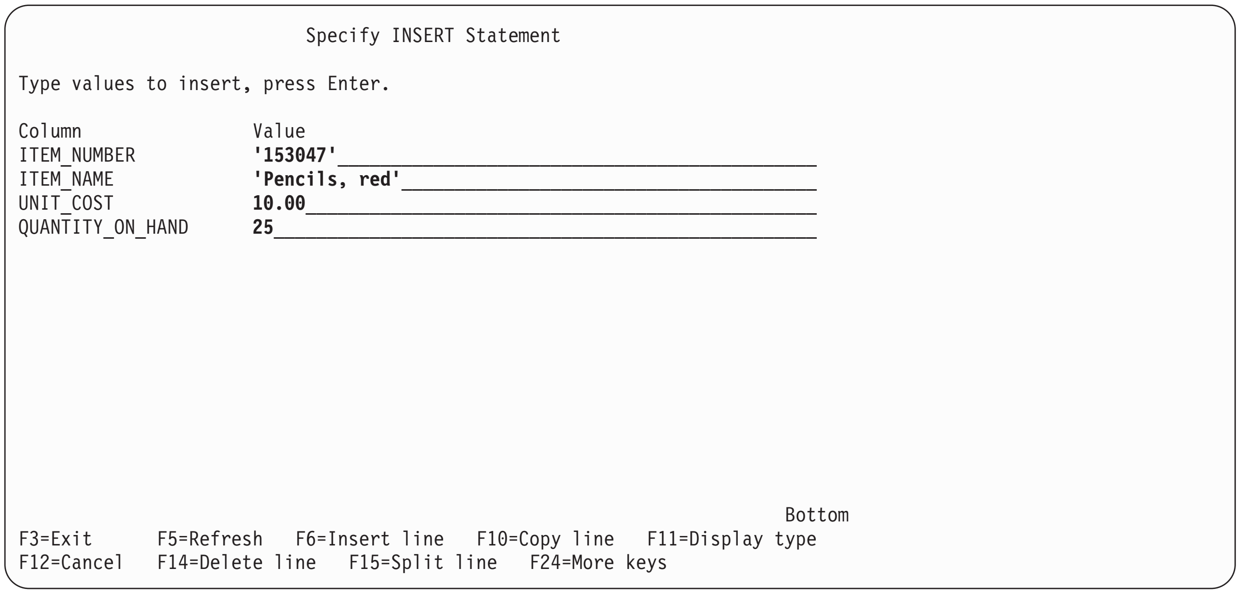
2. Type the table name and schema name in the input fields as shown.
3. Change the **Select columns to insert INTO** prompt to **Yes**.
4. Press Enter to see the display where the columns you want to insert values into can be selected.



```
                           Specify INSERT Statement

Type sequence numbers (1-999) to make selections, press Enter.

Seq  Column               Type             Length  Scale
1__  ITEM_NUMBER          CHARACTER             6
2__  ITEM_NAME            VARCHAR              20
3__  UNIT_COST            DECIMAL               8    2
4__  QUANTITY_ON_HAND     SMALLINT              4
___  LAST_ORDER_DATE      DATE
___  ORDER_QUANTITY       SMALLINT              4

                                                                   Bottom
F3=Exit   F5=Refresh      F12=Cancel   F19=Display system column names
F20=Display entire name   F21=Display statement
```

In this example, insert into four of the columns. Allow the other columns have their default value inserted. The sequence numbers on this display indicate the order that the columns and values will be listed in the INSERT statement.

5. Press Enter to show the display where values for the selected columns can be typed.


```
                            Specify INSERT Statement

 Type values to insert, press Enter.

 Column                 Value
 ITEM_NUMBER            '153047'________________________________________
 ITEM_NAME              'Pencils, red'__________________________________
 UNIT_COST              10.00___________________________________________
 QUANTITY_ON_HAND       25______________________________________________




















                                                                        Bottom
 F3=Exit      F5=Refresh   F6=Insert line   F10=Copy line   F11=Display type
 F12=Cancel   F14=Delete line   F15=Split line   F24=More keys
```

Note: To see the data type and length for each of the columns in the insert list, press F11 (Display type). This will show a different view of the insert values display, providing information about the column definition.

6. Type the values to be inserted for all of the columns and press Enter. A row containing these values will be added to the table. The values for the columns that were not specified will have a default value inserted. For LAST_ORDER_DATE it will be the null value because no default was provided and the column allows the null value. For ORDER_QUANTITY it will be 20, the value specified as the default value on the CREATE TABLE statement.
7. You can type the INSERT statement on the Enter SQL Statements display as:

```
INSERT INTO SAMPLECOLL.INVENTORY_LIST
        (ITEM_NUMBER,
         ITEM_NAME,
         UNIT_COST,
         QUANTITY_ON_HAND)
   VALUES ('153047 ',
       'Pencils,red ',
        10.00,
        25)
```

   This disclaimer information pertains to code examples.
8. To add the next row to the table, press F9 (Retrieve) on the Enter SQL Statements display. This will copy the previous INSERT statement to the typing area. You can either type over the values from the previous INSERT statement or press F4 (Prompt) to use the Interactive SQL displays to enter data.
9. Continue using the INSERT statement to add the following rows to the table.

Values not shown in the chart below should not be inserted so that the default will be used. In the INSERT statement column list, specify only the column names for which you want to insert a value. For example, to insert the third row, specify only ITEM_NUMBER and UNIT_COST for the column names and only the two values for these columns in the VALUES list.

ITEM_NUMBER	**ITEM_NAME**	**UNIT_COST**	**QUANTITY_ON_HAND**
153047	Pencils, red	10.00	25
229740	Lined tablets	1.50	120
544931		5.00	
303476	Paper clips	2.00	100

ITEM_NUMBER	ITEM_NAME	UNIT_COST	QUANTITY_ON_HAND
559343	Envelopes, legal	3.00	500
291124	Envelopes, standard		
775298	Chairs, secretary	225.00	6
073956	Pens, black	20.00	25

Add the following rows to the SAMPLECOLL.SUPPLIERS table.

SUPPLIER_NUMBER	ITEM_NUMBER	SUPPLIER_COST
1234	153047	10.00
1234	229740	1.00
1234	303476	3.00
9988	153047	8.00
9988	559343	3.00
2424	153047	9.00
2424	303476	2.50
5546	775298	225.00
3366	303476	1.50
3366	073956	17.00

The sample schema now contains two tables with several rows of data in each.

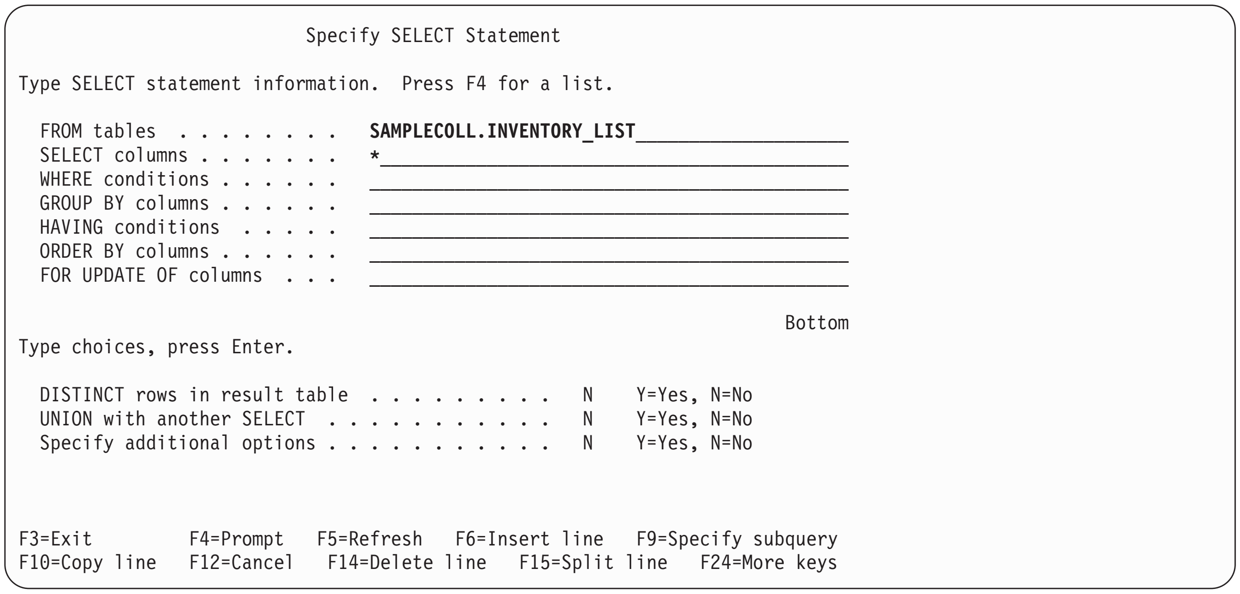
Getting information from a single table

Now that you have inserted all the information into our tables, you must look at it again. In SQL, this is done with the SELECT statement. The SELECT statement is the most complex of all SQL statements. This statement is composed of three main clauses:

1. The SELECT clause, which specifies those columns containing the data.
2. The FROM clause, which specifies the table or tables containing the columns with the data.
3. The WHERE clause, which supplies conditions that determine which rows of data are retrieved.

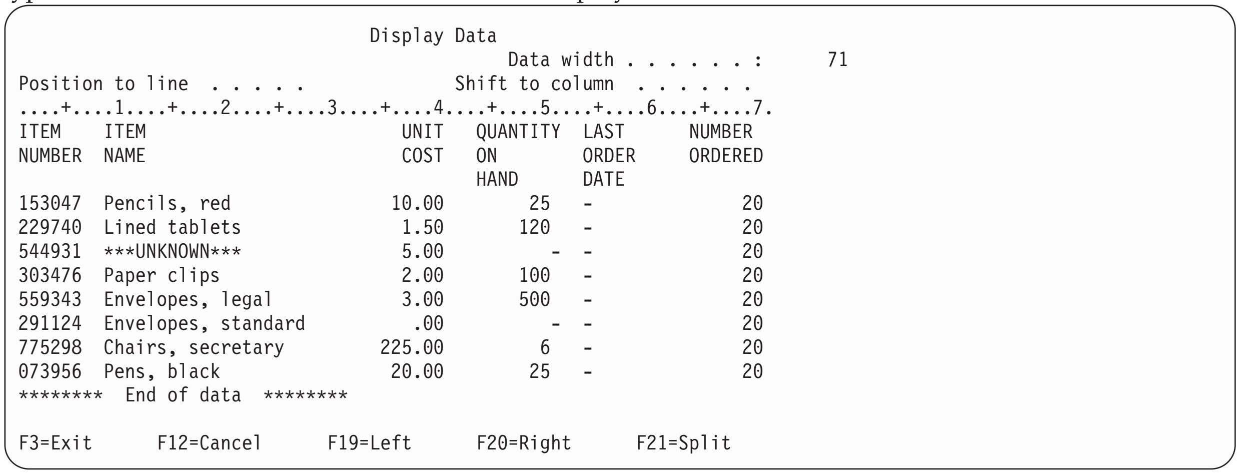
In addition to the three main clauses, there are several other clauses described in SQL Programming topic and in the SQL Reference topic that can affect the final form of returned data.

1. To see the values you inserted into the INVENTORY_LIST table, type SELECT and press F4 (prompt). The following display will be shown:



```
                         Specify SELECT Statement

Type SELECT statement information.  Press F4 for a list.

  FROM tables  . . . . . . . .   SAMPLECOLL.INVENTORY_LIST___________________
  SELECT columns . . . . . . .   *___________________________________________
  WHERE conditions . . . . . .   ____________________________________________
  GROUP BY columns . . . . . .   ____________________________________________
  HAVING conditions  . . . . .   ____________________________________________
  ORDER BY columns . . . . . .   ____________________________________________
  FOR UPDATE OF columns  . . .   ____________________________________________

                                                                       Bottom
Type choices, press Enter.

  DISTINCT rows in result table  . . . . . . . . .   N    Y=Yes, N=No
  UNION with another SELECT  . . . . . . . . . . .   N    Y=Yes, N=No
  Specify additional options . . . . . . . . . . .   N    Y=Yes, N=No



F3=Exit         F4=Prompt   F5=Refresh   F6=Insert line   F9=Specify subquery
F10=Copy line   F12=Cancel   F14=Delete line   F15=Split line   F24=More keys
```

2. Type the table name in the **FROM tables** field on the display. To select all columns from the table, type * for the **SELECT columns** field on the display.



```
                               Display Data
                                            Data width . . . . . . :      71
Position to line  . . . . .             Shift to column  . . . . . .
....+....1....+....2....+....3....+....4....+....5....+....6....+....7.
ITEM    ITEM                         UNIT   QUANTITY  LAST      NUMBER
NUMBER  NAME                         COST   ON        ORDER     ORDERED
                                            HAND      DATE
153047  Pencils, red                10.00       25    -              20
229740  Lined tablets                1.50      120    -              20
544931  ***UNKNOWN***                5.00         -   -              20
303476  Paper clips                  2.00      100    -              20
559343  Envelopes, legal             3.00      500    -              20
291124  Envelopes, standard           .00         -   -              20
775298  Chairs, secretary          225.00        6    -              20
073956  Pens, black                 20.00       25    -              20
********  End of data  ********

F3=Exit      F12=Cancel      F19=Left      F20=Right      F21=Split
```

3. Press Enter and the statement will run to select all of the data for all of the columns in the table. The following output will be shown:

   The column headings that were defined using the LABEL ON statement are shown. The ITEM_NAME for the third entry has the default value that was specified in the CREATE TABLE statement. The QUANTITY_ON_HAND column has a null value for the rows where no value was inserted. The LAST_ORDER_DATE column contains all null values because that column is not in any of the INSERT statements and the column was not defined to have a default value. Similarly, the ORDER_QUANTITY column contains the default value for all rows.

   This statement can be entered on the Enter SQL Statements display as:

```
SELECT *
  FROM SAMPLECOLL.INVENTORY_LIST
```

4. To limit the number of columns returned by the SELECT statement, the columns you want to see must be specified. To restrict the number of output rows returned, the WHERE clause is used. To see only the items that cost more than 10 dollars, and only have the values for the columns ITEM_NUMBER, UNIT_COST, and ITEM_NAME returned, type `SELECT` and press F4 (Prompt). The Specify SELECT Statement display will be shown.

```
                            Specify SELECT Statement

 Type SELECT statement information.  Press F4 for a list.

   FROM tables  . . . . . . . .   SAMPLECOLL.INVENTORY_LIST____________________
   SELECT columns . . . . . . .   ITEM_NUMBER, UNIT_COST, ITEM_NAME____________
   WHERE conditions . . . . . .   UNIT_COST > 10.00____________________________
   GROUP BY columns . . . . . .   _____________________________________________
   HAVING conditions  . . . . .   _____________________________________________
   ORDER BY columns . . . . . .   _____________________________________________
   FOR UPDATE OF columns  . . .   _____________________________________________

                                                                          Bottom
 Type choices, press Enter.

   DISTINCT rows in result table  . . . . . . . . .   N    Y=Yes, N=No
   UNION with another SELECT  . . . . . . . . . . .   N    Y=Yes, N=No
   Specify additional options . . . . . . . . . . .   N    Y=Yes, N=No



 F3=Exit         F4=Prompt   F5=Refresh   F6=Insert line   F9=Specify subquery
 F10=Copy line   F12=Cancel   F14=Delete line   F15=Split line   F24=More keys
```

Although only one line is initially shown for each prompt on the Specify SELECT Statement display, F6 (Insert line) can be used to add more lines to any of the input areas in the top part of the display. This can be used if more columns were to be entered in the SELECT columns list, or a longer, more complex WHERE condition were needed.

5. Fill in the display as shown above.
6. Press Enter to run the SELECT statement The following output will appear:

```
                                  Display Data
                                              Data width . . . . . . :      41
 Position to line  . . . . .              Shift to column  . . . . . .
 ....+....1....+....2....+....3....+....4.
 ITEM          UNIT   ITEM
 NUMBER        COST   NAME
 775298      225.00   Chairs, secretary
 073956       20.00   Pens, black
 ********  End of data  ********

 F3=Exit      F12=Cancel      F19=Left      F20=Right      F21=Split
```

The only rows returned are those whose data values compare with the condition specified in the WHERE clause. Furthermore, the only data values returned are from the columns you explicitly specified in the SELECT clause. Data values of columns other than those explicitly identified are not returned.

This statement can be entered on the Enter SQL Statements display as:

```
SELECT ITEM_NUMBER,UNIT_COST,ITEM_NAME
 FROM SAMPLECOLL.INVENTORY_LIST
 WHERE UNIT_COST > 10.00
```

This disclaimer information pertains to code examples.

Getting information from more than one table

SQL allows you to get information from columns contained in more than one table. This operation is called a join operation. (For a more detailed description of the join operation, see on page 0). In SQL, a join operation is specified by placing the names of those tables you want to join together into the same FROM clause of a SELECT statement.

Suppose you want to see a list of all the suppliers and the item numbers and item names for their supplied items. The item name is not in the SUPPLIERS table. It is in the INVENTORY_LIST table. Using the common column, ITEM_NUMBER, you can see all three of the columns as if they were from a single table.

Whenever the same column name exists in two or more tables being joined, the column name must be qualified by the table name to specify which column is really being referenced. In this SELECT statement, the column name ITEM_NUMBER is defined in both tables so the column name needs to be qualified by the table name. If the columns had different names, there is no confusion, so qualification is not needed.

1. To perform this join, the following SELECT statement can be used. Enter it by typing it directly on the Enter SQL Statements display or by prompting. If using prompting, both table names need to be typed on the FROM tables input line.

   ```
   SELECT SUPPLIER_NUMBER, SAMPLECOLL.INVENTORY_LIST.ITEM_NUMBER, ITEM_NAME
         FROM SAMPLECOLL.SUPPLIERS, SAMPLECOLL.INVENTORY_LIST
         WHERE SAMPLECOLL.SUPPLIERS.ITEM_NUMBER
                         = SAMPLECOLL.INVENTORY_LIST.ITEM_NUMBER
   ```

2. Another way to enter the same statement is to use a correlation name. A correlation name provides another name for a table name to use in a statement. A correlation name must be used when the table names are the same. It can be specified following each table name in the FROM list. The previous statement can be rewritten as:

   ```
   SELECT SUPPLIER_NUMBER, Y.ITEM_NUMBER, ITEM_NAME
         FROM SAMPLECOLL.SUPPLIERS X, SAMPLECOLL.INVENTORY_LIST Y
         WHERE X.ITEM_NUMBER = Y.ITEM_NUMBER
   ```

   This disclaimer information pertains to code examples.

In this example, SAMPLECOLL.SUPPLIERS is given a correlation name of X and SAMPLECOLL.INVENTORY_LIST is given a correlation name of Y. The names X and Y are then used to qualify the ITEM_NUMBER column name.

For more information about columns and correlation names, see Correlation names in the SQL Reference topic.

Running this example returns the following output:

```
                                 Display Data
                                             Data width . . . . . . :      45
Position to line  . . . . .            Shift to column  . . . . . .
....+....1....+....2....+....3....+....4....+
SUPPLIER_NUMBER  ITEM    ITEM
                 NUMBER  NAME
     1234        153047  Pencils, red
     1234        229740  Lined tablets
     1234        303476  Paper clips
     9988        153047  Pencils, red
     9988        559343  Envelopes, legal
     2424        153047  Pencils, red
     2424        303476  Paper clips
     5546        775298  Chairs, secretary
     3366        303476  Paper clips
     3366        073956  Pens, black
********  End of data  ********

F3=Exit      F12=Cancel      F19=Left      F20=Right      F21=Split
```

Note: Because no ORDER BY clause was specified for the query, the order of the rows returned by your query may be different.

The data values in the result table represent a composite of the data values contained in the two tables INVENTORY_LIST and SUPPLIERS. This result table contains the supplier number from the SUPPLIER table and the item number and item name from the INVENTORY_LIST table. Any item numbers that do not appear in the SUPPLIER table are not shown in this result table. The results are not guaranteed to be in any order unless the ORDER BY clause is specified for the SELECT statement. Because you did not change any column headings for the SUPPLIER table, the SUPPLIER_NUMBER column name is used as the column heading.

The following is an example of using ORDER BY to guarantee the order of the rows. The statement will first order the result table by the SUPPLIER_NUMBER column. Rows with the same value for SUPPLIER_NUMBER will be ordered by their ITEM_NUMBER.

```
SELECT SUPPLIER_NUMBER,Y.ITEM_NUMBER,ITEM_NAME
 FROM SAMPLECOLL.SUPPLIERS X,SAMPLECOLL.INVENTORY_LIST Y
 WHERE X.ITEM_NUMBER = Y.ITEM_NUMBER
 ORDER BY SUPPLIER_NUMBER,Y.ITEM_NUMBER
```

This disclaimer information pertains to code examples.

Running the previous statement produces the following output.

```
                                 Display Data
                                             Data width . . . . . . :      45
Position to line  . . . . .             Shift to column  . . . . . .
....+....1....+....2....+....3....+....4....+
SUPPLIER_NUMBER  ITEM    ITEM
                 NUMBER  NAME
     1234        153047  Pencils, red
     1234        229740  Lined tablets
     1234        303476  Paper clips
     2424        153047  Pencils, red
     2424        303476  Paper clips
     3366        073956  Pens, black
     3366        303476  Paper clips
     5546        775298  Chairs, secretary
     9988        153047  Pencils, red
     9988        559343  Envelopes, legal
********  End of data  ********

F3=Exit      F12=Cancel      F19=Left      F20=Right      F21=Split
```

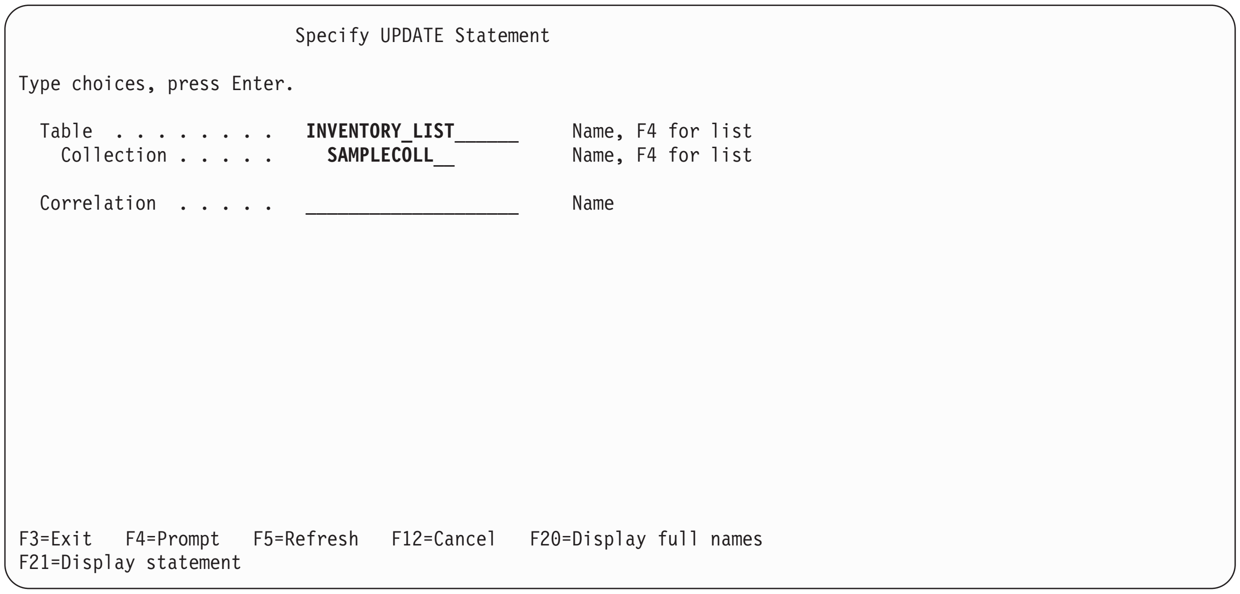
Changing information in a table

You can use the SQL UPDATE statement to change the data values in some or all of the columns of a table.

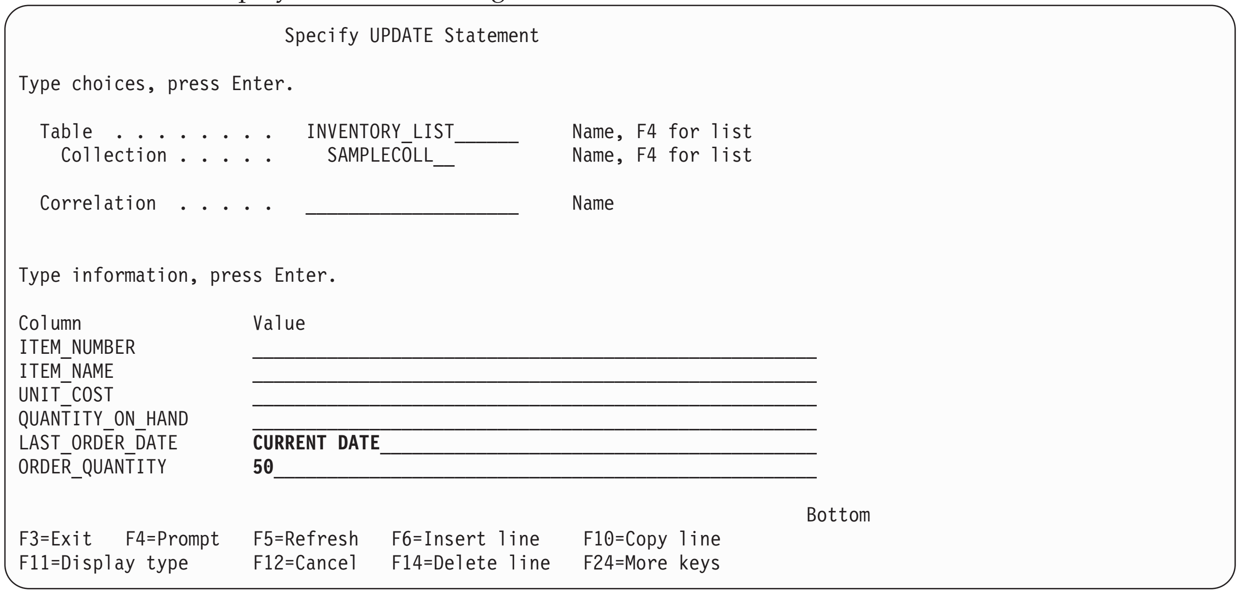
If you want to limit the number of rows being changed during a single statement execution, use the WHERE clause with the UPDATE statement. If you do not specify the WHERE clause, all of the rows in the specified table are changed. However, if you use the WHERE clause, the system changes only the rows satisfying the conditions that you specify. For more information, see SQL Programming topic.

Suppose you want to use interactive SQL and are placing an order for more paper clips today.

1. To update the LAST_ORDER_DATE and ORDER_QUANTITY for item number 303476, type `UPDATE` and press F4 (Prompt). The Specify UPDATE Statement display will be shown.


```
                           Specify UPDATE Statement

Type choices, press Enter.

  Table  . . . . . . . .   INVENTORY_LIST______     Name, F4 for list
    Collection . . . . .     SAMPLECOLL__           Name, F4 for list

  Correlation  . . . . .   ____________________     Name














F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F20=Display full names
F21=Display statement
```

2. Enter the table name and schema name, as shown.
3. Press Enter. The display will be shown again with the list of columns in the table.


```
                          Specify UPDATE Statement

Type choices, press Enter.

  Table  . . . . . . . .   INVENTORY_LIST______     Name, F4 for list
    Collection . . . . .     SAMPLECOLL__           Name, F4 for list

  Correlation  . . . . .   ____________________     Name


Type information, press Enter.

Column                Value
ITEM_NUMBER           _____________________________________________________
ITEM_NAME             _____________________________________________________
UNIT_COST             _____________________________________________________
QUANTITY_ON_HAND      _____________________________________________________
LAST_ORDER_DATE       CURRENT DATE_________________________________________
ORDER_QUANTITY        50___________________________________________________

                                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F6=Insert line    F10=Copy line
F11=Display type      F12=Cancel   F14=Delete line   F24=More keys
```

4. Specify `CURRENT DATE` in the **LAST_ORDER_DATE** field to change the value to today's date.
5. Enter the updated values as shown.
6. Press Enter to see the display on which the WHERE condition can be specified. If a WHERE condition is not specified, all the rows in the table will be updated using the values from the previous display.

```
                            Specify UPDATE Statement

Type WHERE conditions, press Enter.  Press F4 for a list.
  ITEM_NUMBER = '303476'________________________________________________
  ______________________________________________________________________




                                                                        Bottom
Type choices, press Enter.

  WITH isolation level . . .   1                1=Current level, 2=NC (NONE)
                                                3=UR (CHG), 4=CS, 5=RS (ALL)
                                                6=RR








F3=Exit         F4=Prompt   F5=Refresh   F6=Insert line   F9=Specify subquery
F10=Copy line   F12=Cancel   F14=Delete line   F15=Split line   F24=More keys
```

7. Enter `ITEM_NUMBER ='303476'` in the WHERE condition field.
8. Press Enter to perform the update on the table. A message will indicate that the function is complete.

Running a SELECT statement to get all the rows from the table (SELECT * FROM SAMPLECOLL.INVENTORY_LIST), returns the following result:

```
                                  Display Data
                                              Data width . . . . . . :      71
Position to line  . . . . .              Shift to column  . . . . . .
....+....1....+....2....+....3....+....4....+....5....+....6....+....7.
ITEM    ITEM                         UNIT   QUANTITY  LAST      NUMBER
NUMBER  NAME                         COST   ON        ORDER     ORDERED
                                            HAND      DATE
153047  Pencils, red                10.00        25   -              20
229740  Lined tablets                1.50       120   -              20
544931  ***UNKNOWN***                5.00         -   -              20
303476  Paper clips                  2.00       100   05/30/94       50
559343  Envelopes, legal             3.00       500   -              20
291124  Envelopes, standard           .00         -   -              20
775298  Chairs, secretary          225.00         6   -              20
073956  Pens, black                 20.00        25   -              20
********  End of data  ********
                                                                  Bottom
F3=Exit      F12=Cancel      F19=Left      F20=Right      F21=Split
```

Only the entry for *Paper clips* was changed. The LAST_ORDER_DATE was changed to be the current date. This date is always the date the update is run. The NUMBER_ORDERED shows its updated value.

This statement can be typed on the Enter SQL Statements display as:

```
UPDATE SAMPLECOLL.INVENTORY_LIST
 SET LAST_ORDER_DATE = CURRENT DATE,
    ORDER_QUANTITY = 50
 WHERE ITEM_NUMBER = '303476'
```

This disclaimer information pertains to code examples.

Deleting information from a table

You can delete data from a table by using the SQL DELETE statement. You can delete entire rows from a table when they no longer contain needed information or you can use the WHERE clause with the DELETE statement to identify rows to be deleted during a single statement execution. For more information, see DELETEin the SQL Reference topic.

Suppose you want to remove all the rows in your table that have the null value for the QUANTITY_ON_HAND column.

1. Enter the following statement on the Enter SQL Statements display:

   ```
   DELETE
    FROM SAMPLECOLL.INVENTORY_LIST
    WHERE QUANTITY_ON_HAND IS NULL
   ```

   To check a column for the null value, the IS NULL comparison is used.

   This disclaimer information pertains to code examples.
2. After the delete is completed, run another SELECT statement. This results in the following table:

   ```
                                  Display Data
                                               Data width . . . . . . :      71
   Position to line  . . . . .             Shift to column  . . . . . .
   ....+....1....+....2....+....3....+....4....+....5....+....6....+....7.
   ITEM    ITEM                        UNIT   QUANTITY  LAST      NUMBER
   NUMBER  NAME                        COST   ON        ORDER     ORDERED
                                              HAND      DATE
   153047  Pencils, red               10.00        25   -              20
   229740  Lined tablets               1.50       120   -              20
   303476  Paper clips                 2.00       100   05/30/94       50
   559343  Envelopes, legal            3.00       500   -              20
   775298  Chairs, secretary         225.00         6   -              20
   073956  Pens, black                20.00        25   -              20
   ********  End of data  ********
                                                                        Bottom
   F3=Exit      F12=Cancel      F19=Left      F20=Right      F21=Split
   ```

The rows with a null value for QUANTITY_ON_HAND were deleted.

Creating and using a view

You may find that no single table contains all the information you need. You may also want to give users access to only part of the data in a table. Views provide a way to subset the table so that you deal with only the data you need. A view reduces complexity and, at the same time, restricts access.

You can create a view using the SQL CREATE VIEW statement. Using the CREATE VIEW statement, defining a view on a table is like creating a new table containing just the columns and rows you want. When your application uses a view, it cannot access rows or columns of the table that are not included in the view. However, rows that do not match the selection criteria may still be inserted through a view if the SQL WITH CHECK OPTION is not used. See WITH CHECK OPTION on a View in the SQL Programming topic for more information about using WITH CHECK OPTION.

In order to create a view you must have the proper authority to the tables or physical files on which the view is based. See the CREATE VIEW statement in the SQL Reference topic for a list of authorities needed.

If you do not specify column names in the view definition, the column names will be the same as those for the table on which the view is based.

You can make changes to a table through a view even if the view has a different number of columns or rows than the table. For INSERT, columns in the table that are not in the view must have a default value.

You can use the view as though it were a table, even though the view is totally dependent on one or more tables for data. The view has no data of its own and therefore requires no storage for the data. Because a view is derived from a table that exists in storage, when you update the view data, you are really updating data in the table. Therefore, views are automatically kept up-to-date as the tables they depend on are updated.

Creating a view on a single table

The following example shows how to create a view on a single table. The view is built on the INVENTORY_LIST table. The table has six columns, but the view uses only three of the columns: ITEM_NUMBER, LAST_ORDER_DATE, and QUANTITY_ON_HAND. The order of the columns in the SELECT clause is the order in which they will appear in the view. The view will contain only the rows for items that were ordered in the last two weeks. The CREATE VIEW statement looks like this:

1. Use the following command to create the view:

   ```
   CREATE VIEW SAMPLECOLL.RECENT_ORDERS AS
     SELECT ITEM_NUMBER, LAST_ORDER_DATE, QUANTITY_ON_HAND
       FROM SAMPLECOLL.INVENTORY_LIST
       WHERE LAST_ORDER_DATE > CURRENT DATE - 14 DAYS
   ```

   In the example above, the columns in the view have the same name as the columns in the table because no column list follows the view name. The schema that the view is created into does not need to be the same schema as the table it is built over. Any schema or library can be used.

   This disclaimer information pertains to code examples.

2. Run this statement:

   ```
   SELECT *FROM SAMPLECOLL.RECENT_ORDERS
   ```

The result looks like this:

```
                                  Display Data
                                                Data width . . . . . . :      26
 Position to line  . . . . .              Shift to column  . . . . . .
 ....+....1....+....2....+.
 ITEM    LAST      QUANTITY
 NUMBER  ORDER     ON
         DATE      HAND
 303476  05/30/94      100
 ********  End of data  ********
                                                                        Bottom
 F3=Exit      F12=Cancel      F19=Left      F20=Right      F21=Split
```

The only row selected by the view is the row that you updated to have the current date. All other dates in our table still have the null value so they are not returned.

Creating a view combining data from more than one table

You can create a view that combines data from two or more tables by naming more than one table in the FROM clause. In the following example, the INVENTORY_LIST table contains a column of item numbers called ITEM_NUMBER, and a column with the cost of the item, UNIT_COST. These are joined with the ITEM_NUMBER column and the SUPPLIER_COST column of the SUPPLIERS table. A WHERE clause is used to limit the number of rows returned. The view will only contain those item numbers for suppliers that can supply an item at lower cost than the current unit cost.

1. Use the following command to create the view:

```
CREATE VIEW SAMPLECOLL.LOWER_COST AS
 SELECT SUPPLIER_NUMBER, A.ITEM_NUMBER,UNIT_COST, SUPPLIER_COST
  FROM SAMPLECOLL.INVENTORY_LIST A, SAMPLECOLL.SUPPLIERS B
  WHERE A.ITEM_NUMBER = B.ITEM_NUMBER
  AND UNIT_COST > SUPPLIER_COST
```

This disclaimer information pertains to code examples.

2. Run this statement:

```
SELECT *FROM SAMPLECOLL.LOWER_COST
```

The results looks like this:

```
                              Display Data
                                         Data width . . . . . . :      51
Position to line  . . . . .            Shift to column  . . . . . .
....+....1....+....2....+....3....+....4....+....5.
SUPPLIER_NUMBER  ITEM         UNIT   SUPPLIER_COST
                 NUMBER       COST
     1234        229740       1.50          1.00
     9988        153047      10.00          8.00
     2424        153047      10.00          9.00
     3366        303476       2.00          1.50
     3366        073956      20.00         17.00
********  End of data  ********
                                                                    Bottom
F3=Exit      F12=Cancel      F19=Left      F20=Right      F21=Split
```

Note: Because no ORDER BY clause was specified for the query, the order of the rows returned by your query may be different.

The rows that can be seen through this view are only those rows that have a supplier cost that is less than the unit cost.

For more information about using Interactive SQL, see Using Interactive SQL in the SQL Programming topic.

SQL versus traditional file access terminology

DB2 Universal Database for iSeries supports more than one access methodology. You need to understand the differences between them and under what circumstances one method presents advantages for your organization or specific project.

DB2 Universal Database for iSeries provides two access methods for manipulating database tables and data:

- Structured Query Language (SQL) represents iSeries strategic direction for database development and access.
- System file access methods (often referred to as ″system″ or traditional file access methods, or sometimes legacy file access methods) are familiar to any pre-V3R7 customers, and in fact many customers' databases reflect a significant development investment in system level file access methods.

As an interface to DB2 Universal Database for iSeries, the DB2 Query Manager and SQL Development Kit for iSeries adds an interactive query and report writing interface, as well as precompilers and tools to assist in writing SQL application programs in high-level programming languages. Conforming to the industry standard Structured Query Language (SQL), the SQL implementation for OS/400 allows you to define, manipulate, query, and control access to your iSeries data. It works equally well with OS/400 files and SQL tables.

SQL versus traditional file access terminology

SQL Term	Traditional File Access Term
Collection. Consists of a library, a journal, a journal receiver, an SQL catalog, and an optional data dictionary. A collection groups related objects and allows you to find the objects by name.	**Library.** Groups related objects and allows you to find the objects by name.
Table. A set of columns and rows.	**Physical file.** A set of records.
Row. The horizontal part of a table containing a serial set of columns.	**Record.** A set of fields.
Column. The vertical part of a table of on data type.	**Field.** One of more bytes of related information of one data type.
View. A subset of columns and rows of one or more tables.	**Logical file.** A subset of fields and/or records of up to 32 physical files.
Index. A collection of data in the columns of a table, logically arranged in ascending or descending order.	A type of logical file.
Package. An object that contains control structures for SQL statements to be used by an application server.	**SQL Package.** Has the same meaning as the SQL term.
Catalog. A set of tables and views that contain information about tables, packages, views, indexes, and constraints.	No similar object. However, the Display File Description (DSPFD) and Display File Field Description (DSPFFD) commands provide some of the same information that querying an SQL catalog provides.

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Programming Interface Information

This Database overview documents intended Programming Interfaces that allow the customer to write programs to obtain the services of DB2 UDB for iSeries.

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