IBM InfoSphere Optim for z/OS
Version 11 Release 3

Access Introduction

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Note
Before using this information and the product it supports, read the information in "Notices" on page 55.

Version 11 Release 3

This edition applies to version 11, release 3 of IBM InfoSphere® Optim™ for z/OS® and to all subsequent releases and modifications until otherwise indicated in new editions.

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Contents

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About this publication

This document provides an overview of Access and demonstrates key product features. You can use this document as a tutorial. The scenarios discussed are based on the sample database distributed with Optim.

For detailed information, refer to the *Access User Manual*.

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Chapter 1. Overview

IBM Optim for z/OS manages enterprise data throughout every stage of the information lifecycle. Optim enables you to assess, classify, subset, archive, store, and access enterprise application data.

Optim uses the relationships defined in the IBM DB2 Catalog, where available, and supplements these relationships with those defined in the Optim Directory. Optim runs as a TSO/ISPF application and incorporates familiar ISPF commands. Optim handles any number of tables and any number of relationships, regardless of the complexity. The Optim components include Access, Archive, Move, and Compare.

Access is the relational edit and browse component of Optim. This interactive utility is useful for programmers, database administrators, production control staff, DB2 support technicians, and any DB2 users that need to manipulate DB2 data.

One of the main reasons that companies invest in relational technology is to gain more flexible access to their corporate information. In a DB2 database, information is normalized into simple elements and stored in multiple tables. Application programs access these related tables to "re-assemble" the information. However, there are many times during the development, testing, and maintenance of applications when faster, more flexible access to the data is needed.

Access provides this needed access to related data in multiple DB2 tables and simplifies many daily maintenance tasks, such as

- Creating test data to verify all the logic paths in an application.
- Ensuring that the data in one or more tables is as expected. This includes inspecting specific rows or columns that may be causing problems.
- Correcting data problems.
- Previewing the data accessed by SQL statements embedded in programs. In this manner, the SQL statements can be verified.

Since Access runs as a TSO/ISPF application, intelligent screen handling allows simultaneous display of multiple tables, pop-up windows, cursor-sensitive on-line help, and tutorials.

The contents of this manual demonstrates how to display and edit related data using Access. Menu-driven prompt screens or panels are used to specify which data to obtain.

Dynamic Access

To highlight the dynamic capabilities of Access, the first part of the demonstration begins by selecting one table, then shows you how to access related data in multiple tables simultaneously. This part of the demonstration explains how to edit the related data, scroll the multiple table display, and dynamically specify sort and selection criteria.

Predefined Set of Data

The second part of the demonstration focuses on predefining and saving for future use the specifications needed to access a set of data. The specifications are stored in an Access Definition that can be used to edit or browse the specific set of data without redefining the specifications. The Access Definition created in this part of the demonstration expands on the specifications defined dynamically in the first part.

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Other Optim Components

In addition to Access, the components of Optim are:

Archive
Archive is a relational archiving facility that allows you to identify and archive sets of relationally intact data before removing selected data from your database. Archived data is indexed and stored. You can browse, search, or restore selected subsets of archived data. See the *Archive User Manual* for detailed information.

Compare
Compare is a relational comparison facility that compares two sets of relationally intact data. The data to be compared may reside in DB2 or have been extracted prior to the comparison. See the *Compare User Manual* for detailed information.

Move Move is a relational copy facility that extracts and copies relationally intact sets of data to assist in the creation and maintenance of test data. See the *Move User Manual* for detailed information.

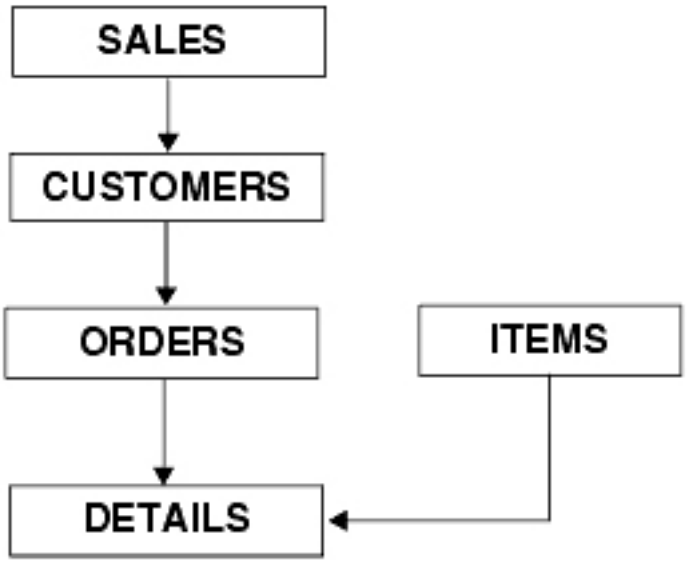
Sample Database

Optim is distributed with a sample database for demonstration purposes. This database includes the following tables (names are prefixed with the Creator ID FOPDEMO).

Note: The table names in the sample scenario are shown without the OPTIM_ prefix. To use the scenarios, prefix the table names with OPTIM_

- **OPTIM_CUSTOMERS**
  - OPTIM_ORDERS
- **OPTIM_DETAILS**
  - OPTIM_SALES
- **OPTIM_FEMALE_RATES**
  - OPTIM_SHIP_INSTR
- **OPTIM_ITEMS**
  - OPTIM_SHIP_TO
- **OPTIM_MALE_RATES**
  - OPTIM_STATE_LOOKUP

The demonstrations and examples in this manual use the following related tables from the sample database. The arrows indicate the parent-to-child relationships.



The data and the relationships in the sample database may have been modified during other Optim product training functions. Also, the table names are shown in the diagram without the OPTIM_ prefix.

Chapter 2. Accessing Data Dynamically

To access and edit data from multiple related DB2 tables dynamically, first provide the name of a single table or view. Access displays the data from that table. From that table, you can access related data from other tables or views.

The displayed data from multiple tables is always related. Scrolling one table also scrolls subordinate tables so that only related rows are displayed at all times. Additionally, you can edit all accessed data from multiple tables on a single screen at one time. These dynamic features let you focus on the data, rather than methods needed to get to the data.

Main Menu

When you log on to Access, the **Main Menu** is displayed. The following figure shows the **Main Menu,** as it appears when Optim is installed.

```
---------------------------- IBM's InfoSphere Optim ---------------------------
OPTION  ===>

0  OPTIONS         - Site and User Options      SQLID  ===> FOPDEMO
1  BROWSE TABLE    - Browse a DB2 Table         SUBSYS ===> TDB2
2  EDIT TABLE      - Edit a DB2 Table           LOCATION ===>
3  BROWSE USING AD - Browse DB2 Tables Using Access Definition
4  EDIT USING AD   - Edit DB2 Tables Using Access Definition
5  ADS             - Create or Modify Access Definitions
6  DEFINITIONS     - Maintain InfoSphere Optim Definitions (Keys, Maps, ...)
7  MIGRATION       - Data Migration - Extract, Insert, Update, ...
8  COMPARE         - Compare Two Sets of Data
9  ARCHIVE         - Archive and Restore Data

T  TUTORIAL        - Information About IBM's InfoSphere Optim
C  CHANGES         - Changes from Prior Release(s)
X  EXIT            - Terminate Product Use
P  LICENSING       - Product Licensing Modification
```

Figure 1. Main Menu

The panel prompts for an SQLID and a DB2 subsystem or SUBSYS. These values are site-specific. The DB2 subsystem must be supplied the first time you log on to Access. These values are profiled. (If remote access is available, a LOCATION prompt for the remote location is displayed.)

Panel Options

The **Main Menu** options are:

0 OPTIONS

Specify product options, including user, editor and display, job card and print, Compare, Archive, and Legacy options.

1 BROWSE TABLE
Use Access to browse data from a DB2 table.

2 EDIT TABLE
Use Access to edit data from a DB2 table.

3 BROWSE USING AD
Use Access to browse DB2 data defined by an Access Definition.

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4 EDIT USING AD
Use Access to edit DB2 data defined by an Access Definition.

5 ADS
Create and maintain Access Definitions.

6 DEFINITIONS
Create or modify primary keys and relationships defined to the Optim Directory or display primary keys and relationships defined in the DB2 Catalog. You can also use this option to create or modify Access Definitions, Archive Collections, and migrate Optim object definitions for use by other subsystems.

7 MIGRATION
Perform the Move processes for extracting, inserting, updating, loading, creating, converting, and browsing DB2 or Legacy data, or the Compare processes for extracting and comparing data.

8 COMPARE
Use Compare to compare two sets of related data and browse the results.

9 ARCHIVE
Perform the Archive processes for archiving data, browsing and searching the archives, and selectively restoring archived data.

T TUTORIAL
Display the tutorial.

C CHANGES
Display a list of enhancements for the current release.

X EXIT
Terminate the product session.

P LICENSING
Display a list of the Optim components and their status (In Evaluation, Permanently Licensed, Disabled).

This manual focuses on Option 2 EDIT TABLE, and Option 5 ADS.

Additional Information

For more information about the other options available for Access, see the *Access User Manual*. For information about the Compare, Move, or Archive menu options, refer to the appropriate user manual. Many of the **Main Menu** options are available for all or most Optim components; see the *Common Elements Manual* for information about these common options.

Displaying Data

Access provides a variety of display features that allow you to browse or edit complex data with speed and flexibility.

You can view data in different formats, include and exclude rows as needed, sort rows on many levels, and display related rows from several tables simultaneously.

Specifying a Table Name

In this demonstration of Access, the edit session begins with one table. You will dynamically include additional tables.

Select Option 2 EDIT TABLE from the **Main Menu** to display the Choose a Table/View to Edit panel.

```
------------------------- Choose a DB2 Table/View to Edit ----------------------
COMMAND ===>
                                            SQLID  ===> FOPDEMO
DB2 Table:                                  SUBSYS ===> TDB2
  Creator ID  ===> FOPDEMO                >     LOCATION ===>
  Table Name  ===> CUSTOMERS                                >

  Database   ===>
  Tablespace ===>

Begin Edit Session with        ===> D   (D-Data from Table,
                                         C-Column Attributes/Sort Criteria,
                                         S-Selection Criteria,
                                         Q-SQL WHERE Clause)

Prompt to Create AD on Exit    ===> YES (Y-Yes, N-No)
Use '_' for DB2 LIKE character ===> NO  (Y-Yes, N-No)
```

Figure 2. Choose a Table/View

The Choose a DB2 Table/View to Edit panel prompts for the name of the table or view to be accessed. You must provide this name in two parts, **Creator ID** and **Table Name**.

Table List

To obtain a list of tables in the designated SUBSYS and LOCATION, use DB2 LIKE syntax or leave one or both **DB2 Table** prompts blank. For example, to obtain a list of all tables with the Creator ID FOPDEMO, supply this value for **Creator ID** and leave **Table Name** blank.

The table specified in this example is named FOPDEMO.CUSTOMERS. (Hereafter, references to tables use **Table Name** without the **Creator ID**.)

Data or Prompt

The **Begin Edit Session with** prompt allows you to begin the session with a display of data from the table or with a prompt for column attributes, selection criteria, or an SQL WHERE clause. Since a discussion of selection criteria follows this section, specify D and press Enter to begin the session with a display of the data from the CUSTOMERS table.

Data Displayed

Information about the CUSTOMERS table, including the table name and the number of retrieved rows, is displayed on the table information line. Column headings for each column in the display are provided. The data is presented by rows, with columns aligned beneath the headings. The TOP marker indicates the first line of data.

```
--------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ==================== 1 OF 488 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ==================== --------------- -----
*** ********************************** TOP ***********************************
___     22232  Movie Mania          572 Front St         Twig             MN
___     00051  Rick's Flicks        823 Chestnut St      Lookout          CA
___     00049  Pick-a-Flick         120 Central Avenu    Blue Jay         CA
___     00094  Popcorn Videos       Aramingo Place       Scotty's Castle  CA
___     00041  Prime Time Video     64 Newberg Avenue    Bonny Doon       CA
___     10051  Take Home Movies     Box 357              Coyote           CA
___     01150  Rick's Flicks        823 Chestnut St      Forked River     NJ
___     00203  Movies-R-Us          1772 Bridge St       Brigantine       NJ
___     00191  Popcorn              15 Crystal Park      Green Pond       NJ
___     00260  Five Star Videos     123 Howe Lane        Hope             NJ
___     00189  Showtime             322 Rt 28            Little Ferry     NJ
___     00160  Reely Great Videos   590 Frontage Rd      Pelletttown      NJ
___     00156  Prime Tyme           982 Upper State St   Hackensack       NJ
___     00141  Showcase II          57 Rock Hollow       Brick            NJ
___     00140  Showcase             1150 Indian Terrace  Four Mile        NJ
```

Figure 3. Data Displayed

MAX ROWS Command

You can use the MAX ROWS command to increase the maximum number of retrieved rows to the limit established for your site. For example, if your Maximum Fetch Limit is 200 rows, and the COUNT command shows that there are 300 rows for the edit session, you can use the MAX ROWS command to display the 300 rows. Specify MAX ROWS 300 to refetch all rows. This command affects the current session only. To increase the maximum number of fetch rows for all sessions, use the **Maximum Fetch Rows** option on the Editor and Display Options panel, as described in the *Common Elements Manual*section for Editor and Display Options.

Display Column Attributes

Use the ATTRIBUTES ON command to display column attributes during an edit or browse session. Column attributes include the data type and length, and the null eligibility of each column. Attributes are displayed beneath the column name, as in the following figure.

```
--------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ==================== 1 OF 488 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      -CH(5)- -------CH(20)------- ======VCH(50)======= ----VCH(15)---- -CH(2)-
*** ********************************** TOP ***********************************
___     22232  Movie Mania          572 Front St         Twig              MN
___     00051  Rick's Flicks        823 Chestnut St      Lookout           CA
```

Figure 4. Column Attributes Displayed

The format of the attribute display is *type*(*n*):N, where *type* is the data type and *n* is the width of the column. The :N attribute is displayed when the column is null eligible.

Use the ATTRIBUTES OFF command to remove column attributes from the display.

Sidelabels Format

Thus far, figures in this demonstration have used the standard display format, or *columnar* format. However, when editing tables that contain many or wide columns, you may prefer *sidelabels* format.

In sidelabels format, the panel displays one table row at a time. Each row of the panel displays the heading and data for a column. Although the display is focused on a single row, more columns can be accommodated on the screen, as shown in the following figure.

```
-------------------------------- Optim: Edit ----------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

== Table: FOPDEMO.CUSTOMERS(T1) ==============================ROW    1 OF 488 =
== LineCmd ==> ___          Row Status:               COLUMN 1 OF 9

CUST_ID      : 22232
CUSTNAME     : Movie Mania
ADDRESS      : 572 Front St
CITY         : Twig
STATE        : MN
ZIP          : 01501
YTD_SALES    :   568.30
SALESMAN_ID  : NC003
PHONE_NUMBER : 6128888000
```

Figure 5. Sidelabels Format

Use the SIDELABELS primary or SID line command to toggle the display between columnar and sidelabels format. The remainder of this demonstration uses columnar format.

Selecting a Set of Rows

By default, all rows in the table are accessed. However, you can use selection criteria to limit the set of data retrieved. Type the SELECTION CRITERIA command (or SEL) and press Enter.

```
-------------------------------- Optim: Edit ----------------------------------
COMMAND ===> SEL                                             SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ===================== 1 OF 488 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ==================== --------------- -----
*** ********************************** TOP ***********************************
___    22232  Movie Mania          572 Front St         Twig             MN
___    00051  Rick's Flicks        823 Chestnut St      Lookout          CA
```

Figure 6. Requesting Selection Criteria Prompt

The Specify Selection Criteria panel is displayed, providing the prompts to specify selection criteria. You can also display this panel by specifying S on the Choose a DB2 Table/View to Edit panel to begin an edit session with selection criteria.

```
-- Specify Selection Criteria for Table: FOPDEMO.CUSTOMERS---------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Table Name: FOPDEMO.CUSTOMERS                            Col 1 of 9     <<MORE
Combine All Column Criteria by ==> A   (A-AND, O-OR)

Cmd     Column Name                       Selection Criteria
---  ----------------  ------------------------------------------------------
***  ******************************** TOP ***********************************
___  CUST_ID
___  CUSTNAME
___  ADDRESS
___  CITY
___  STATE              ='MA'
___  ZIP
___  YTD_SALES
___  SALESMAN_ID
___  PHONE_NUMBER
***  ******************************** BOTTOM ********************************
```

Figure 7. Selecting Customers in Massachusetts

To enter selection criteria, supply an appropriate operator with a corresponding value or a list of values. For example, to display the customers in Massachusetts, specify = 'MA' as the selection criteria for the STATE column. If you specify criteria for more than one column, you can combine all criteria using AND or OR. You can use the SELECTION CRITERIA command to redisplay the panel and change the criteria at any time during the edit or browse session.

Display Selected Data

After typing the selection criteria, use END to display the data. The displayed data reflects the selection criteria. In the following figure, only customers in Massachusetts are displayed.

```
------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ====================== 1 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- ------------------- ==================== -------------- -----
*** ********************************* TOP ***********************************
___     07203  Movies-R-Us          1772 Bridge St       Bourne           MA
___     07201  Movie Buff           400 Merrimac Ave     Concord          MA
___     07198  Video-tron           100 West Street      Brookline        MA
___     07191  Popcorn              15 Crystal Park      Lenox            MA
___     07189  Showtime             322 Rt 28            Hyannis          MA
___     07160  Reely Great Videos   590 Frontage Rd      Amherst          MA
___     07156  Prime Tyme           982 Upper State St   Marion           MA
___     07141  Showcase II          57 Rock Hollow       Salem            MA
___     07140  Showcase             1150 Indiana Terr    Beverly          MA
___     07126  Movie Rentals        101 Munson St        Greenfield       MA
___     07123  Video Way            112 South Moreland A Groton           MA
___     07118  Movie Store          752 State Rd         Menemsha         MA
___     07103  Video Edge           400 Pittsfield Rd    Lenox            MA
___     07101  Movie Mania          571 Front St         Auburn           MA
___     07053  Replay Video         9032 Dickerson St    Amherst          MA
```

Figure 8. Customers from Massachusetts Selected

Sorting the Selected Rows

The order in which the rows are retrieved is unpredictable unless you use SORT criteria to organize the data. In the following figure, the CUSTOMERS rows for customers in Massachusetts are displayed in random order.

```
-------------------------------- Optim: Edit ---------------------------------
COMMAND ===> SOR                                          SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ====================== 1 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ================== --------------- -----
*** ********************************** TOP ***********************************
___     07203  Movies-R-Us          1772 Bridge St       Bourne          MA
___     07201  Movie Buff           400 Merrimac Ave     Concord         MA
___     07198  Video-tron           100 West Street      Brookline       MA
___     07191  Popcorn              15 Crystal Park      Lenox           MA
___     07189  Showtime             322 Rt 28            Hyannis         MA
___     07160  Reely Great Videos   590 Frontage Rd      Amherst         MA
___     07156  Prime Tyme           982 Upper State St   Marion          MA
___     07141  Showcase II          57 Rock Hollow       Salem           MA
___     07140  Showcase             1150 Indiana Terr    Beverly         MA
___     07126  Movie Rentals        101 Munson St        Greenfield      MA
___     07123  Video Way            112 South Moreland A Groton          MA
___     07118  Movie Store          752 State Rd         Menemsha        MA
___     07103  Video Edge           400 Pittsfield Rd    Lenox           MA
___     07101  Movie Mania          571 Front St         Auburn          MA
___     07053  Replay Video         9032 Dickerson St    Amherst         MA
```

Figure 9. Requesting Sort Criteria Prompt

Use the SORT CRITERIA command (or SOR) to request the **Specify Sort Criteria** pop-up window, needed to define sort specifications.

```
-------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                              SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ====================== 1 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------                                                      --- -----
*** ******** +----Specify Sort Criteria for FOPDEMO.CUSTOMERS-----+ **********
___     07203 |                                                    |      MA
___     07201 | Sort Level is a Consecutive Value Between 1 and 64 |      MA
___     07198 | Sort Direction is A - Ascending or D - Descending   |      MA
___     07191 |                                                    |      MA
___     07189 |                                  --Sort Criteria-- |      MA
___     07160 |            Column Name            Level  Asc/Desc  |      MA
___     07156 |   ----------------------------  -----  --------   |      MA
___     07141 |   ******************** TOP ********************    |      MA
___     07140 |   CUST_ID                          1_       A      |      MA
___     07126 |   CUSTNAME                         __       _      |      MA
___     07123 |   ADDRESS                          __       _      |      MA
___     07118 |   CITY                             __       _      |      MA
___     07103 |   STATE                            __       _      |      MA
___     07101 |   ZIP                              __       _      |      MA
___     07242 +----------------------------------------------------+      MA
```

Figure 10. Specify Sort Criteria

Sort Example

The **Specify Sort Criteria** pop-up window lists all columns in the table, shows any current sort criteria, and prompts for additional sort criteria. In the preceding example, the rows from the CUSTOMERS table are sorted by customer ID, the value in the CUST_ID column. The level is specified as 1 (first) and the order as A (ascending). After you specify a sort criteria, use END to return to the data display and see the results. In the following example, only rows for customers from Massachusetts are displayed and sorted in ascending order by customer ID.

```
-------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ====================== 1 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ==================== --------------- -----
*** ********************************** TOP ***********************************
___     07053  Replay Video         9032 Dickerson St    Amherst          MA
___     07101  Movie Mania          571 Front St         Auburn           MA
___     07103  Video Edge           400 Pittsfield Rd    Lenox            MA
___     07118  Movie Store          752 State Rd         Menemsha         MA
___     07123  Video Way            112 South Moreland A Groton           MA
___     07126  Movie Rentals        101 Munson St        Greenfield       MA
___     07140  Showcase             1150 Indiana Terr    Beverly          MA
___     07141  Showcase II          57 Rock Hollow       Salem            MA
___     07156  Prime Tyme           982 Upper State St   Marion           MA
___     07160  Reely Great Videos   590 Frontage Rd      Amherst          MA
___     07189  Showtime             322 Rt 28            Hyannis          MA
___     07191  Popcorn              15 Crystal Park      Lenox            MA
___     07198  Video-tron           100 West Street      Brookline        MA
___     07201  Movie Buff           400 Merrimac Ave     Concord          MA
___     07203  Movies-R-Us          1772 Bridge St       Bourne           MA
```

Figure 11. Rows are Sorted

You can use the SORT command at any time during an edit or browse session to change the displayed sort criteria.

Joining Related Data

You can display, scroll, and edit data from the CUSTOMERS table. More importantly, you can simultaneously access related data from other tables. Additional tables may be accessed using the Join facility. The currently displayed table is joined to a related table and the rows from the related table are also displayed. The JOIN primary command or the Join line command is used to join tables.

Access requires a relationship in order to join one table to another. The relationship may be defined in the DB2 Catalog or in the Optim Directory. If a relationship does not exist, you are prompted to create one. The new relationship is stored in the Optim Directory and is available to all Optim components. For more information on creating relationships, see the *Common Elements Manual*.

Name of Table Known

When you know the name of the table you want to access, specify the table name with the JOIN command.

For example, to display the data in the ORDERS table related to a specific row in the CUSTOMERS table, type JOIN ORDERS at the command prompt, position the cursor on the desired row in the CUSTOMERS table, and press Enter.

The cursor is placed on the row for CUST_ID 07123 in the following panel.

```
-------------------------------- Optim: Edit ----------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ====================== 1 OF 20 ===       MORE>>
      CUST_ID       CUSTNAME            ADDRESS              CITY              STATE
      ------- -------------------- ================== ---------------       -----
*** ********************************** TOP ***************************************
___    07053   Replay Video         9032 Dickerson St       Amherst           MA
___    07101   Movie Mania          571 Front St            Auburn            MA
___    07103   Video Edge           400 Pittsfield Rd       Lenox             MA
___    07118   Movie Store          752 State Rd            Menemsha          MA
__|    07123   Video Way            112 South Moreland A    Groton            MA
___    07126   Movie Rentals        101 Munson St           Greenfield        MA
___    07140   Showcase             1150 Indiana Terr       Beverly           MA
___    07141   Showcase II          57 Rock Hollow          Salem             MA
___    07156   Prime Tyme           982 Upper State St      Marion            MA
___    07160   Reely Great Videos   590 Frontage Rd         Amherst           MA
___    07189   Showtime             322 Rt 28               Hyannis           MA
___    07191   Popcorn              15 Crystal Park         Lenox             MA
___    07198   Video-tron           100 West Street         Brookline         MA
___    07201   Movie Buff           400 Merrimac Ave        Concord           MA
___    07203   Movies-R-Us          1772 Bridge St          Bourne            MA
```

Figure 12. Join Request

For this demonstration, assume that a DB2 relationship between the CUSTOMERS and ORDERS tables exists. The tables are related by values in the column CUST_ID, which is the primary key for the CUSTOMERS table and the foreign key for the ORDERS table. Access displays the row from the CUSTOMERS table with related rows from the ORDERS table.

```
-------------------------------- Optim: Edit ----------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ====================== 5 OF 20 === MORE>>
      CUST_ID       CUSTNAME            ADDRESS              CITY       STATE
      ------- -------------------- ================== --------------- -----
___    07123  Video Way            112 South Moreland A Groton            MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 3 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************** TOP ***************************************
___      99002   07123  04/14/1999  11.30.11       52.00          RP0013
___      93702   07123  03/31/1999  14.25.41       15.25          RP0013
___      93854   07123  02/15/1999  11.23.38       12.95          RP0013
*** ******************************** BOTTOM ***************************************
```

Figure 13. Related Orders

Name of Table Not Known

To save time or if you do not know the name of the table, you can request a selection list from which to choose.

Although you can use the JOIN primary command, for this example, use the Join line command. To view a list of tables, type J in **Cmd** for the desired ORDERS row and press Enter.

J Line Command

```
-------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ====================== 5 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS              CITY       STATE
      ------- -------------------- ==================== --------------- -----
___    07123  Video Way            112 South Moreland A Groton            MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 3 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************* TOP ***********************************
 __     99002   07123  04/14/1999  11.30.11       52.00          RP0013
J__     93702   07123  03/31/1999  14.25.41       15.25          RP0013
___     93854   07123  02/15/1999  11.23.38       12.95          RP0013
*** ******************************** BOTTOM ***********************************
```

Figure 14. Join Line Command

Access prompts you to specify whether the list should contain all related tables, all tables, or all views.

```
-------------------------------- Optim: Edit ---------------------------------
COMMAND ===> JOIN ORDERS                                     SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ====================== 5 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS              CITY       STATE
      -----                                                            --- -----
___    0712 +-------------JOIN Selection List Prompt--------------+      MA
            |                                                      |
Cmd F == Ta |     Specify Criteria to Generate Selection List      |  === MORE>>
      ORDER |                                                      | ALESMAN
      ----- |         1 - All Related Tables                       | -------
*** ******* |         2 - All Tables                               | ***********
 __     990 |         3 - All Views                                | 013
J       937 |                                                      | 013
___     938 |                    Option ===> 1                     | 013
*** ******* |                                                      | ***********
            |                              (CreatorID.)TableName   |
            | List of Names LIKE ===> FOPDEMO.%                    |
            +------------------------------------------------------+
```

Figure 15. JOIN Table Prompt

For this example, all tables with the Creator ID FOPDEMO that are related to ORDERS are included on the list. Note that DB2 LIKE syntax is used at the **List of Names LIKE** prompt.

If more than one table is related to the ORDERS table, Access displays a selection list of related tables. However, in this example, DETAILS is the only related table, so a selection list is not displayed. Instead, the DETAILS table is automatically joined and the related rows from the DETAILS table are displayed, as shown in the following figure.

```
-------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ====================== 5 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ================== --------------- -----
___    07123  Video Way            112 South Moreland A Groton            MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 2 OF 3 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************** TOP ************************************
___     93702   07123  03/31/1999  14.25.41       15.25          RP0013

Cmd F == Table: FOPDEMO.DETAILS(T3) ========================= 1 OF 2 ==========
      ORDER_ID ITEM_ID ITEM_QUANTITY DETAIL_UNIT_PRICE
      -------- ------- ------------- -----------------
*** ********************************** TOP ************************************
___     93702   SF010          5            22.00
___     93702   SF012          4            19.00
*** ******************************** BOTTOM ***********************************
```

Figure 16. Details Table Displayed

Display Levels

The sequence in which tables are joined determines the “display level.”

In this example, the CUSTOMERS table is the start table, so the CUSTOMERS table is displayed first. The ORDERS table was joined to the CUSTOMERS table, so the ORDERS table is displayed after the CUSTOMERS table. The DETAILS table was joined to the ORDERS table, so the DETAILS table is displayed after the ORDERS table. It is often helpful to refer to a given table based on its display level.

Short Names

Short names that reflect the table level are assigned by Access. The short names are displayed in parentheses after the table names. In the previous figure, the CUSTOMERS table is T1, the ORDERS table is T2, and the DETAILS table is T3.

Many primary commands for editing and scrolling have operands to specify the table that is the subject of the function. These short names can be used in place of the table name as a command operand.

Number of Joined Tables

The maximum number of tables that can be joined is 64. However, the number of levels that can be displayed is limited by the physical size of the terminal screen. When one or more rows from a newly joined table cannot be displayed, the first table on the screen is scrolled off the display to provide space for the newly joined table.

Multi-Way Joining

Most tables are related to more than one table. Frequently it is useful to browse and edit related data simultaneously.

With Access, you can join multiple tables to any one table. This is referred to as multi-way joining.

For example, CUSTOMERS is related to both ORDERS and SALES and can be joined to both at the same time. CUSTOMERS and ORDERS are joined as part of the current set of related data. You can use either the JOIN primary command or the Join line command to join additional tables to CUSTOMERS. When you know the name of the table to join, use the primary command. For example, to join SALES to CUSTOMERS, use JOIN SALES FROM CUSTOMERS. The SALES table is joined to the CUSTOMERS

table and is displayed.

```
------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ====================== 5 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ==================== --------------- -----
___    07123  Video Way            112 South Moreland A Groton            MA

Cmd F == Table: FOPDEMO.SALES(T2) ================= STACKED = 1 OF 1 === MORE>>
      SALESMAN_ID    SALESMAN_NAME         AGE     SEX   TERRITORY
      ----------- -------------------- ----------- --- --------------
*** ********************************* TOP ***********************************
___     RP0013    Richard Parente               30  M  Massachusetts
*** ******************************** BOTTOM *********************************
```

Figure 17. SALES Joined

When two or more tables are joined to a single table, they are “stacked” in the order in which they were joined. The most recently joined table is stacked on the second most recently joined, and so forth. In this example, two tables are stacked at level 2, ORDERS and SALES. SALES was joined most recently, so SALES is stacked before ORDERS.

Only the uppermost table in a stack is displayed. The STACKED indicator after the table name on the table information line indicates that one or more additional tables are joined at the same level.

Other tables in the stack are "hidden." Tables that are joined to other tables in the stack are also "hidden." That is, when SALES is displayed, ORDERS and DETAILS are hidden. However, ORDERS and DETAILS remain joined and are active.

Indented Table Display

Use the INDENT command to display the Indented Table Display panel, which provides a list of active tables, formatted to show relationships.

```
--------------------------- Indented Table Display ----------------------------
Command ===>                                                 Scroll ===> PAGE

Default Creator ID: FOPDEMO                                          1 OF 4

Cmd Lvl                      Table Name                  Stkd Relation  Type
--- --- ------------------------------------------------ ---- -------->> ----
*** ********************************* TOP ************************************
___ 1*  CUSTOMERS                                          START TABLE
___ 2*   P:SALES                                          RSC       DB2
___ 2    C:ORDERS                                       Yes RCO       DB2
___ 3     C:DETAILS                                        ROD       DB2
*** ******************************** BOTTOM ***********************************

Line Commands: (S)elect - Switch to Specified Table
```

Figure 18. Indented Table Display

The tables are displayed as follows:

- The highest-level table is at the beginning of the list and is identified as the Start Table. In this session, CUSTOMERS is the Start Table.
- Each joined table is indented one position more than the table to which it is joined. SALES and ORDERS are both joined to CUSTOMERS.
- Each joined table is identified with a prefix indicating the table is either the parent or the child of the related table. “P” identifies SALES as the parent of CUSTOMERS, and “C” identifies ORDERS as the child of CUSTOMERS and DETAILS as the child of ORDERS.

- The value in **Lvl** identifies the display levels. The level for CUSTOMERS, the Start Table, is 1. The level for SALES and ORDERS, both joined to CUSTOMERS, is 2. The level for DETAILS, joined to ORDERS, is 3.
- All tables in a stack (e.g., SALES and ORDERS) are on the same level. Within each stack, the displayed tables are listed first with an asterisk following the **Lvl** value. The SALES table is the displayed table in the level 2 stack.
- Any stacked tables that are not displayed are identified by the word "Yes" in **Stkd** after the table name. In the example, for instance, the ORDERS table in the level 2 stack is not displayed, so "Yes" is displayed in **Stkd**.

Use END to return to the editor.

Switching Displayed Tables

Since only one table in a stack is displayed at a time, you may need to change the display from one table to another in a stack. You display another table in the stack from:

- The editor using the SWITCH primary command.
- The **Indented Table Display** using the S line command.

In the editor, use the SWITCH primary command.

```
------------------------------- Optim: Edit ----------------------------------
COMMAND ===> SWITCH T2                                    SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ====================== 5 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ==================== --------------- -----
___    07123  Video Way            112 South Moreland A Groton            MA

Cmd F == Table: FOPDEMO.SALES(T2) ================= STACKED = 1 OF 1 === MORE>>
      SALESMAN_ID    SALESMAN_NAME         AGE     SEX   TERRITORY
      ----------- -------------------- ----------- --- --------------
*** ********************************* TOP ***********************************
___     RP0013    Richard Parente               30  M  Massachusetts
*** ******************************** BOTTOM *********************************
```

Figure 19. SWITCH Command

By default, the command attempts to switch tables at the lowest display level. If you want to switch the stack on a different display level, you must specify the level. You can indicate the display level by placing the cursor in the appropriate window or by using the display level indicator. For example, SWITCH T2 indicates that the second display level is the target.

If the stack contains only one other table, the display switches to that table. If the stack contains more than one other table, you can use operands to indicate a specific table. You can:

- Specify the table name.
- Specify "NEXT" to switch to the next table in the stack.
- Omit a table name to display a selection list of tables in the stack, and then select the desired table using the S line command.

For example, specify SWITCH T2 NEXT to switch to the next table in the stack on the second display level.

Indented Table Display

From the Indented Table Display panel, you can change the displayed table by typing an S in **Cmd** next to the table you want to display. When you press Enter, the selected table and any joined lower-level

tables are displayed in the editor.

```
--------------------------- Indented Table Display ---------------------------
Command ===>                                                 Scroll ===> PAGE

Default Creator ID: FOPDEMO                                          1 OF 4

Cmd Lvl                     Table Name                 Stkd Relation  Type
--- --- ------------------------------------------------ ---- ------->> ----
*** ********************************* TOP ***********************************
___ 1*  CUSTOMERS                                          START TABLE
 __ 2*   P:SALES                                          RSC      DB2
S__ 2    C:ORDERS                                     Yes RCO      DB2
___ 3     C:DETAILS                                      ROD      DB2
*** ******************************** BOTTOM *********************************

Line Commands: (S)elect - Switch to Specified Table
```

Figure 20. Switch from the Indented Table Display

In this session, specify S for the ORDERS table. This hides the SALES table and switches the editor display to the ORDERS table and the related DETAILS.

Unjoining

Use the UNJOIN primary command or UNJ line command to remove joined tables from the display. These commands sever the link between the specified table and the next higher-level table.

When you enter the UNJOIN command, you can either position the cursor on the desired table, regardless of level, or you can specify the table name or identifier as an operand (e.g., UNJOIN SALES or UNJOIN T2). The UNJOIN command removes the specified table and all related lower-level tables. If you do not specify a table, the lowest-level table is unjoined.

You can also use the UNJ line command on a row in the table you want to unjoin. Entering the UNJ command removes the specified table and any related lower-level tables from the display.

If the unjoined table is not stacked, the remaining joined tables are repositioned and the display of the lowest-level table expands to include any additional rows.

For example, when you enter the UNJ line command for the SALES table, the SALES table is removed from the display and the ORDERS table is displayed. (Since the DETAILS table is joined to the ORDERS table it is also displayed.) The STACKED designation is removed because ORDERS is now the only table joined to CUSTOMERS.

The following figure shows the result of unjoining SALES.

```
-------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ====================== 5 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ================== --------------- -----
___    07123  Video Way            112 South Moreland A Groton            MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 3 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************** TOP ************************************
___     99002   07123  04/14/1999  11.30.11       52.00          RP0013

Cmd F == Table: FOPDEMO.DETAILS(T3) ========================== 1 OF 2 ==========
      ORDER_ID ITEM_ID ITEM_QUANTITY DETAIL_UNIT_PRICE
      -------- ------- ------------- -----------------
*** ********************************** TOP ************************************
___     99002   DR041          6            20.00
___     99002   XX026         10            79.00
*** ******************************** BOTTOM ***********************************
```

Figure 21. Unjoin Results

You can use operands with the UNJOIN command to unjoin all tables in a stack. UNJOIN ALL removes all tables in a stack at the lowest level. If there is no stack at the lowest level, the table at the lowest level is unjoined. When there are multiple stacks, you can specify the target stack using the cursor position or the level indicator (e.g., UNJOIN T2 ALL).

Managing the Display

There are several scrolling facilities to help you to manage the displayed data. Standard ISPF commands and function keys are available for scrolling, along with some extensions that are useful when data is displayed from multiple tables.

Scrolling Through Rows

When the screen cannot accommodate all of the rows in a table, you can scroll through the rows by using the UP and DOWN commands. The UP and DOWN commands are usually assigned to the function keys PF7/19 and PF8/20.

Related Data Scrolled

When any displayed table is scrolled, all the subordinate tables are scrolled to display the related data. For example, when scrolling the CUSTOMERS table to display the next row, the ORDERS table is scrolled to display the orders related to the new CUSTOMERS row.

Specifying a Table

There are several ways to scroll a specific table:

- Position the cursor in the window and press the PF key assigned to the scroll function desired.
- Specify the command without an operand, position the cursor on the window to be scrolled, and press Enter.
- Specify the table name with the command as in DOWN CUSTOMERS.
- Specify the short name with the command as in DOWN T1.

If you do not identify a specific table, the lowest level table is scrolled.

Scroll Example

In the following example, the DOWN command is used to scroll. The short name T1 is specified to scroll the CUSTOMERS table.

```
------------------------------- Optim: Edit ---------------------------------
COMMAND ===> DOWN T1                                        SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ====================== 5 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ==================== --------------- -----
___    07123  Video Way            112 South Moreland A Groton            MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 2 OF 3 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************** TOP ***********************************
___     93702   07123  03/31/1999  14.25.41       15.25          RP0013
___     93854   07123  02/15/1999  11.23.38       12.95          RP0013
*** ******************************** BOTTOM ***********************************
```

Figure 22. Scrolling Requested

The following figure shows the result of the scroll. The scrolled display includes the next customer and the related orders for that customer.

```
------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ====================== 6 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ==================== --------------- -----
___    07126  Movie Rentals        101 Munson St        Greenfield        MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 1 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************** TOP ***********************************
___      1302   07126  10/18/1999  11.15.23       15.72          RP0013
*** ******************************** BOTTOM ***********************************
```

Figure 23. Scrolling Coordinated

When several tables are displayed, any of them can be scrolled. When you scroll a table, all subordinate tables are scrolled so that only related data is displayed.

Scrolling Through Columns

When the screen cannot accommodate all of the columns in a table, you can scroll through the columns by using the LEFT and RIGHT primary commands. The LEFT and RIGHT primary commands are usually assigned to PF10/21 and PF11/22.

Assume RIGHT STATE has been entered to scroll the STATE column in the CUSTOMERS table to the first position on the screen. The result is shown in the following figure.

```
-------------------------------- Optim: Edit ----------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ====================== 6 OF 20 === <<MORE
      STATE  ZIP  YTD_SALES SALESMAN_ID PHONE_NUMBER
      ----- ----- --------- ----------- ------------
___    MA   01441    783.00   RP0013     5176789002

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 1 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************** TOP ***********************************
___       1302   07126  10/18/1999  11.15.23       15.72           RP0013
*** ******************************** BOTTOM **********************************
```

Figure 24. CUSTOMERS is Scrolled Right

In the previous figure, it is difficult to determine which CUSTOMERS row is shown because the CUSTNAME column is no longer displayed.

Locking Columns

The LOCK command can be used to retain a column on the display, regardless of scrolling. For example, you can lock the CUSTNAME column to retain the customer's name on the screen while scrolling the other data. The command is specified as:

LOCK CUSTNAME

Since only the CUSTOMERS table has a column named CUSTNAME you do not need to supply the table name (CUSTOMERS.CUSTNAME).

However, to lock the column CUST_ID in the CUSTOMERS table, you must specify the table name, as in CUSTOMERS.CUST_ID, because more than one table has a CUST_ID column. If the table name is not specified the column in the lowest level table is locked.

You can lock multiple columns. For example, the CITY column can also be locked (LOCK CITY). The following figure shows the result of locking the columns CUSTNAME and CITY. Notice that the names of the locked columns are separated from their data by a series of plus signs (+++++).

```
-------------------------------- Optim: Edit ----------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ====================== 6 OF 20 = <<MORE>>
            CUSTNAME            CITY       STATE  ZIP  YTD_SALES SALESMAN_ID
      +++++++++++++++++++ +++++++++++++++ ----- ----- --------- -----------
___   Movie Rentals        Greenfield       MA   01441    783.00   RP0013

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 1 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************** TOP ***********************************
___       1302   07126  10/18/1999  11.15.23       15.72           RP0013
*** ******************************** BOTTOM **********************************
```

Figure 25. CUSTNAME and CITY are Locked

The CUSTNAME column is the first locked column, so the CUSTNAME column is displayed first. The CITY column is the second locked column, so the CITY column is displayed after the CUSTNAME column. The other columns are displayed after the locked columns.

Locked Column Indicator

A locked column is identified by a series of plus signs (+) under the column heading. A column that exceeds the maximum column display width is indicated by equal signs, =, under the column heading. If the truncated column is also locked, a series of dots under the column heading distinguish it from locked columns that are not truncated.

Unlocking Columns

Use the UNLOCK command with no operands to unlock all locked columns. Use the UNLOCK command with a column name operand to unlock a single column. For example, to unlock an individual column, specify:

UNLOCK CITY

Alternatively, you can omit the column name from the command and position the cursor on the column to be unlocked.

Locating Specific Data

You can locate the first row containing a specific value using the FIND command.

The command can be specified to search any of the displayed tables. For example, to search the CUSTOMERS table for a CUST_ID of 07160, enter:

FIND 07160 IN CUSTOMERS.CUST_ID

The fully qualified column name is required for the IN operand, since a column named CUST_ID is also defined for the ORDERS table. If the table name is not specified, Access searches the column in the lowest level table by default.

If the located row is not currently displayed, the display is scrolled to include the row. In the following figure, the display is scrolled to CUST_ID 07160.

```
-------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ===================== 10 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ==================== --------------- -----
___    07160  Reely Great Videos   590 Frontage Rd      Amherst           MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 3 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************** TOP ***********************************
___       1522   07160  04/12/1999  09.27.51       12.00          RP0013
___       1491   07160  03/29/1999  16.24.41        9.25          RP0013
___       1305   07160  03/15/1999  10.23.38       12.95          RP0013
*** ******************************** BOTTOM *********************************
```

Figure 26. Display Scrolled to CUST_ID 07160

Excluding Specific Rows

When many rows are displayed, it can be useful to exclude some rows from the display to obtain a more manageable set. These rows are retained in the table, but are not displayed.

Use the EXCLUDE primary command or the Exclude line command (X) to exclude rows.

The excluded rows are replaced with a message indicating the location and number of excluded rows.

The line count is updated to reflect the excluded rows. Each “excluded lines” message counts as one line.

The EXCLUDE command can be used to exclude rows based on specific search criteria. For example, to exclude all rows from the CUSTOMERS table for customers in the city of Amherst, enter:

EXCLUDE ALL Amherst IN CITY

The ALL operand specifies that all rows containing the specified value are to be excluded. Otherwise, only the first occurrence is excluded. As with FIND, the IN operand can be used to limit the search to a specific column.

The excluded rows can be redisplayed with the SHOW primary command or the Show (S), First (F), or Last (L) line commands.

The FIND ALL command is useful when issued after an EXCLUDE ALL command, to display all occurrences of a specified character string.

Including Only Specific Rows

The ONLY command is used to display only rows that satisfy the specified search criteria. It provides, in one command, the results obtained from executing the EXCLUDE command followed by the FIND command.

For example, to display only those rows from the CUSTOMERS table for customers in the city of Amherst, enter:

ONLY Amherst IN CITY

To obtain the same display using EXCLUDE and FIND, first enter EXCLUDE ALL and then enter FIND ALL Amherst IN CITY.

The ONLY command can be re-executed to display a different set of rows based on new search criteria without redisplaying rows excluded by the previously executed ONLY command.

Rows excluded with the ONLY command can be redisplayed with the SHOW primary command or the Show (S), First (F), or Last (L) line commands.

Focusing on a Single Table

When displaying multiple tables, only one row in all higher level tables is displayed and as many rows as fit on the screen are displayed for the table at the lowest level.

To display more rows from any table on the screen or to display a table that has been removed from the screen, use the ZOOM command. All joins are maintained.

For example, ZOOM CUSTOMERS or ZOOM T1 will display the CUSTOMERS table, beginning with the currently displayed row.

```
-------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ============ ZOOMED = 10 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ==================== --------------- -----
___    07160  Reely Great Videos   590 Frontage Rd      Amherst          MA
___    07189  Showtime             322 Rt 28            Hyannis          MA
___    07191  Popcorn              15 Crystal Park      Lenox            MA
___    07198  Video-tron           100 West Street      Brookline        MA
___    07201  Movie Buff           400 Merrimac Ave     Concord          MA
___    07203  Movies-R-Us          1772 Bridge St       Bourne           MA
___    07235  Jack's               Grafton Plaza        Grafton          MA
___    07242  Video Rental         523 Maple St         Boston           MA
___    07367  Movie Rentals        7853 Green St        Amherst          MA
___    07950  Sir Video Inc        11 Midstate Dr       Auburn           MA
___    07960  Top Hat Video        972 Vine St          Boston           MA
*** ******************************** BOTTOM ***********************************
```

Figure 27. Result of Zooming Display

ZOOMED Indicator

The ZOOMED indicator is displayed after the table name on the table information line.

You can scroll and edit data during the ZOOM display, but you cannot join to another table.

Zoom Toggle

Use the ZOOM primary command or the Zoom line command, Z, to return to the multiple table display. For the primary command, if the cursor is positioned on a specific row, the multiple table display places that row at the first row of the window, and scrolls any subordinate tables accordingly. For the line command, the Z designates the row to be displayed.

For example, type the Zoom line command for the row to be displayed when the multiple table display is restored, and press Enter.

```
-------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ============ ZOOMED = 10 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ==================== --------------- -----
Z__    07160  Reely Great Videos   590 Frontage Rd      Amherst          MA
___    07189  Showtime             322 Rt 28            Hyannis          MA
___    07191  Popcorn              15 Crystal Park      Lenox            MA
___    07198  Video-tron           100 West Street      Brookline        MA
___    07201  Movie Buff           400 Merrimac Ave     Concord          MA
___    07203  Movies-R-Us          1772 Bridge St       Bourne           MA
___    07235  Jack's               Grafton Plaza        Grafton          MA
___    07242  Video Rental         523 Maple St         Boston           MA
___    07367  Movie Rentals        7853 Green St        Amherst          MA
___    07950  Sir Video Inc        11 Midstate Dr       Auburn           MA
___    07960  Top Hat Video        972 Vine St          Boston           MA
*** ******************************** BOTTOM ***********************************
```

Figure 28. Terminating a Zoomed Display

The rows from the multiple tables are redisplayed, and Reely Great Videos is displayed with its related orders.

```
-------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ==================== 10 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ================== --------------- -----
___    07160  Reely Great Videos   590 Frontage Rd      Amherst           MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 3 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************** TOP ***********************************
___       1522   07160  04/12/1999  09.27.51       12.00          RP0013
___       1491   07160  03/29/1999  16.24.41        9.25          RP0013
___       1305   07160  03/15/1999  10.23.38       12.95          RP0013
*** ********************************* BOTTOM **********************************
```

Figure 29. Returned to Multiple Table Display

Printing a Report

You can produce a report of the displayed data at any time during an edit or browse session using the REPORT primary command.

For example, to generate a report about the orders from the customer Reely Great Videos, type REPORT on the command line and press Enter.

```
-------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ==================== 10 OF 20 === MORE>>

+---------------------------Specify Report Options---------------------------+
|                                                                            |
| All rows are printed for the named table.  If 'All' is selected, one       |
| row is printed for each table above and all rows for each table below.     |
| Leave 'Table Name' blank for a selection list.  Use HELP for more          |
| information.  Press ENTER to continue, END or CANCEL to exit report.       |
|                                                                            |
| Table Name, Tn, or LAST       ===> FOPDEMO.ORDERS           >>             |
| Process All Tables or One     ===> A         A-All, N-Named Table Only     |
| Report Title                  ===> Orders from Reely Great Videos          |
| Output Type                   ===> S         D-Dataset, S-Sysout, J-Job    |
|   If Dataset/Job: DSN         ===>                                         |
|   If Sysout/Job:  Class       ===> *         A - Z, 0 - 9, *               |
|                   Destination ===>                                         |
|                   Hold        ===> Y         Y-Yes, N-No                   |
|   If Job:         Review JCL  ===>           Y-Yes, N-No                   |
| Display Report Parameters     ===> N         Y-Yes, N-No                   |
+----------------------------------------------------------------------------+
```

Figure 30. Report Options

The Specify Report Options panel is displayed. Specify FOPDEMO.ORDERS as the table and specify A for **Process All Tables or One**. The resulting report will include all active rows from the ORDERS table, and current rows from any higher level tables. (In this example, CUSTOMERS is the only higher level table.) If any tables are joined to the ORDERS table, all related rows from those tables are also included in the report. In this example, there are no tables that are joined to the ORDERS table.

On the Specify Report Options panel, specify the title “Orders from Reely Great Videos” and indicate the destination for the report at the **Output Type** prompt. Provide the dataset name or SYSOUT parameters, as appropriate.

Specify Y for the **Display Report Parameters** prompt, if you want to modify the report parameters such as spacing, headings, page breaks, and so forth. Otherwise, the defaults are used.

When your entries are completed, press Enter and Access generates the report. If the destination is a dataset, you can use ISPF facilities to view the report.

Editing the Data

Any of the displayed data can be edited. The editing is controlled by the specifications in DB2. All referential integrity rules are respected.

For example, you cannot enter character data in a column defined as an integer or duplicate data in columns that are defined as unique. But within the range of these logical restrictions, you can edit the data displayed in any table.

Status Flags

Access identifies the result of your editing by placing a Status flag under the **F** heading for the row. The possible flags are:

U The row was updated.

I The row was inserted.

D The row was deleted.

E The row contains an error.

Updating Rows

There are three techniques for updating existing data:

- Overtype the data.
- Use the line commands UC and LC to make the alphabetic characters on a line uppercase or lowercase.
- Use the CHANGE command to replace one value with another.

Overtyping

You can type over data in any column not defined as read-only. The entire width of the column must be displayed. Column data can be defined as read-only in DB2 specifications or through a column description option on the **ACCESS Describe Columns for AD** panel, described in Section 3.3.1 Column Attributes.

Use the **Columnar Max Display Width** option on the **Editor and Display Options panel** to define the maximum display width for columnar format. A separate option, called **Sidelabel Max Display Width**, determines the maximum display width for sidelabels format. See the *Common Elements Manual* for further information on the two Max Display Width options.

As an example, assume that the maximum display width for each column is 20 characters. You can type over data in any columns that contain 20 or fewer characters because all data in these columns is displayed.

In the following figure, the city in the CUSTOMERS row has been changed from Amherst to Boston.

```
-------------------------------- Optim: Edit ----------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ===================== 10 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ================== --------------- -----
___ U  07160  Reely Great Videos   590 Frontage Rd      Boston            MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 3 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************** TOP ************************************
___       1522   07160  04/12/1999  09.27.51       12.00          RP0013
___       1491   07160  03/29/1999  16.24.41        9.25          RP0013
___       1305   07160  03/15/1999  10.23.38       12.95          RP0013
*** ********************************* BOTTOM ***********************************
```

Figure 31. Data is Overtyped

The U Status flag is displayed after the **Cmd** field at the beginning of the row.

Wide Columns

A column of more than 20 characters (the maximum display width) is indicated by a series of equal signs under the column heading. The data in such a column cannot be modified directly because the width of the column exceeds the display width. All the data must be displayed to be edited.

EXPAND Command

To display the entire contents of the column, type the EXPAND primary command, position the cursor on the column, and press Enter. (You can assign EXPAND to a program function key.)

For example, the CUSTOMERS table ADDRESS column shown in the previous figure cannot be overtyped directly. The column must be expanded, as in the following figure.

```
-------------------------------- Optim: Edit ----------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ===================== 10 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ================== --------------- -----
___ U  07160  Reely Great Videos   590 Frontage Rd      Boston            MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 3 === MORE>>

 +-Cmd-F-------------------(ADDRESS) Width: 50---------------------- 10 OF 20 -+
 |                                                                              |
 |       ----+----1----+----2----+----3----+----4----+----5                     |
 | ___ U 590 Frontage Rd                                                        |
 |                                                                              |
 +Col: 1-------------------------------------------------------------Col: 50-+
```

Figure 32. Expanded Column

The column name and the actual width are displayed in the header of the expanded window. The row count indicator is also displayed.

When the column width exceeds the screen width, scroll the data horizontally by using the LEFT and RIGHT commands. The starting and ending column positions currently displayed are indicated in the footer of the expanded window.

Edit Expanded Data

The data displayed in the expanded window can be edited. In this example, the address is overtyped with “112 South Moreland Avenue”.

While editing the expanded data, you cannot edit data in any of the other columns. However, you can scroll UP or DOWN to edit the expanded column in other rows.

Use END to terminate the expanded data display. If you have edited the data in the expanded column, a U is displayed under the **F** heading.

Additional Commands

You can use the CAPS primary command to change all the character data in a column to uppercase if the column is modified.

You can use the HEX primary command to toggle the display between character data only and character data with its hexadecimal representation. This is useful when you need to edit non-displayable characters.

Adding Rows

You can add rows to the table using the following line commands.

I Insert one or more new rows.

C Copy one or more existing rows to a new location.

R Repeat one or more rows one or more times.

RP Repeat one or more rows one or more times and leave those rows in insert-pending status.

Any rows added by these functions are indicated by an I under the **F** heading.

Insert Command

Assume that an order must be added for the customer Reely Great Videos. To add a new row, type the I line command in **Cmd** for any displayed row, and then press Enter to insert a new data entry line after the selected row. The new row will include an I at the beginning of the row to indicate the line was newly inserted. In the following example, the I was entered on the last row (ORDER_ID 1305), so a new row was added after that row. Notice that the appropriate value for the foreign key column entry was automatically inserted, which in this instance was CUST_ID 07160.

```
-------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ==================== 10 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ------------------- --------------- -----
___ U  07160  Reely Great Videos   590 Frontage Rd      Boston            MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 4 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************** TOP ************************************
___       1522   07160  04/12/1999  09.27.51       12.00          RP0013
___       1491   07160  03/29/1999  16.24.41        9.25          RP0013
___       1305   07160  03/15/1999  10.23.38       12.95          RP0013
___
... I           07160
*** ******************************** BOTTOM ***********************************
```

Figure 33. Adding a Row to the ORDERS Table

Default Values Inserted

Type the order information and press Enter. Based on user options for default column values, Access will either insert default values for any columns you leave blank or prompt you for the columns requiring input, as defined to DB2. The default values are based on the data type of the column and DB2-defined values, if provided. The possible values are: spaces, zeros, current date, current time, and NULL. For example, if a value is not entered for ORDER_DATE, a date column, the current date is automatically inserted.

The I status flag is displayed for the inserted row.

```
-------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ==================== 10 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ------------------- --------------- -----
___ U  07160  Reely Great Videos   590 Frontage Rd      Boston            MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 4 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************** TOP ************************************
___       1522   07160  04/12/1999  09.27.51       12.00          RP0013
___       1491   07160  03/29/1999  16.24.41        9.25          RP0013
___       1305   07160  03/15/1999  10.23.38       12.95          RP0013
___ I     1603   07160  07/10/1999  11.04.30        8.75          RP0013
*** ******************************** BOTTOM ***********************************
```

Figure 34. Row Inserted in the ORDERS Table

Copy and Repeat Commands

The Copy line commands (C and CC), the Repeat line commands (R and RR), and the Repeat Pending line commands (RP and RRP), can also be used to insert rows.

Partitioned Indexes

The Repeat and Repeat Pending line commands both duplicate rows to be inserted into the table. However, use the Repeat Pending line commands to repeat rows with partitioned indexes. This allows you to edit the repeated rows before Access attempts to insert them into the database.

To minimize data entry when creating a new order, use the Repeat line command on a row in the ORDERS window. The ORDERS row is repeated once after itself, but an error condition results. This is

indicated by an E under the **F** heading as shown in the following figure.

```
-------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ===================== 10 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ==================== --------------- -----
___ U  07160  Reely Great Videos   590 Frontage Rd      Boston            MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 5 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************* TOP ***********************************
___       1522   07160  04/12/1999  09.27.51       12.00          RP0013
___       1491   07160  03/29/1999  16.24.41        9.25          RP0013
___       1305   07160  03/15/1999  10.23.38       12.95          RP0013
___ E     1305   07160  03/15/1999  10.23.38       12.95          RP0013
___ I     1603   07160  07/10/1999  11.04.30        8.75          RP0013
*** ******************************** BOTTOM *********************************
```

Figure 35. Error Condition

Handling Editing Errors

The entire row is duplicated, including the data in the primary key column of that row. In this example, the ORDER_ID column is the primary key. Since this data is defined as unique, an error results when the row is repeated. To correct the error, overtype the data in the primary key column with a unique value.

Alternatively, remove the row in error by using the Access Undo Facility.

Undoing Errors

The Undo Facility includes the primary command, UNDO ERRORS, to remove all changes that caused an error and the line command, UE, to remove changes that caused an error in a specific row.

Type the UE line command in **Cmd** for the line in error to remove the repeated row. (For more information about undoing changes, refer to “Interacting with the Database” on page 32.)

Table Constraint Errors

An error condition can also occur if any of the inserted or edited data does not conform to the table constraints. These errors are handled like any other error. You can overtype or Undo the changes.

To avoid table constraint errors, you can use the LIST CONSTRAINTS command to display the table constraints for any displayed table while editing.

For example, assume constraints have been defined for the ORDERS table. To indicate a request for the ORDERS table, you can position the cursor on that table or supply the name with the command, as in:

LIST CONSTRAINTS ORDERS

If there is only one constraint, the text is displayed. If there are multiple constraints, a selection list is displayed. In this example, two constraints are defined. The following list is displayed:

```
-------------------------------- Optim: Edit ----------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ===================== 10 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ================== --------------- -----
___ U  07160  Reely Great Videos   590 Frontage Rd      Boston            MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 5 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** **************** +------ Select Constraint for Table ------+ **************
___       1522   0716 | Cmd        ConstraintName        1 OF 2 | RP0013
___       1491   0716 | --- --------------------------          | RP0013
___       1305   0716 | ************* TOP *************         | RP0013
___ I     1603   0716 | ___ ORDER_ID_CON                       | RP0013
*** **************** | ___ FREIGHT_CHARGES_CON                | **************
                      | ************ BOTTOM ************       |
                      +----------------------------------------+
```

Figure 36. Selection List of Table Constraints

You can display the text associated with any constraint by typing an S in **Cmd** for that constraint, as in the following example in which the user selected the ORDER_ID constraint. Notice that the table constraint states that the ORDER_ID value must be numeric within a specific range.

```
-------------------------------- Optim: Edit ----------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ===================== 10 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ================== --------------- -----
___ U  07160  Reely Great Videos   590 Frontage Rd      Boston            MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 5 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************* TOP ***********************************
  +------------------Text for Constraint: ORDER_ID_CON-----------------------+
  |                                                                          |
  | ------------------------------------------------------------------------ |
  | ********************************* TOP ********************************** |
  | ORDER_ID BETWEEN '00000' AND '9999'                                      |
  | ******************************** BOTTOM ******************************** |
  +--------------------------------------------------------------------------+
```

Figure 37. Displayed Table Constraint Text

Use END or CANCEL to return to the selection list. Use END or CANCEL again to return to the edit session.

Deleting Rows

Use the Delete line commands, D or DD, to delete rows.

D is used to delete a single row, while DD is used to delete two or more consecutive rows by typing DD in **Cmd** for both the first and last row in the range you want to delete. Type D in **Cmd** for the row to be deleted.

```
------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ==================== 10 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ------------------- --------------- -----
___ U  07160  Reely Great Videos   590 Frontage Rd      Boston            MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 4 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************* TOP ***********************************
___       1522   07160  04/12/1999  09.27.51       12.00          RP0013
___       1491   07160  03/29/1999  16.24.41        9.25          RP0013
___       1305   07160  03/15/1999  10.23.38       12.95          RP0013
D__ I     1603   07160  07/10/1999  11.04.30        8.75          RP0013
*** ******************************** BOTTOM *********************************
```

Figure 38. Deleting an ORDERS Row

The following figure shows the updated display with a D under the **F** heading for the deleted row.

```
------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ==================== 10 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ------------------- --------------- -----
___ U  07160  Reely Great Videos   590 Frontage Rd      Boston            MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 4 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************* TOP ***********************************
___       1522   07160  04/12/1999  09.27.51       12.00          RP0013
___       1491   07160  03/29/1999  16.24.41        9.25          RP0013
___       1305   07160  03/15/1999  10.23.38       12.95          RP0013
___ D     1603   07160  07/10/1999  11.04.30        8.75          RP0013
*** ******************************** BOTTOM *********************************
```

Figure 39. Deleted Row Shown

HIDE DELETES Command

Use the HIDE DELETES command to remove the deleted row from the display. Also, an editor option is available to designate whether deleted rows should be displayed throughout the edit session.

Cascading Deletes

If referential integrity rules between the CUSTOMERS and ORDERS table specify cascading deletes, deleting a CUSTOMERS row will cause all related ORDERS rows to be deleted. Access will adjust the display of both tables to reflect the cascading delete.

Interacting with the Database

This section discusses the Access facilities provided to commit outstanding changes and remove unwanted changes from the database.

Committing Data

In Access, rows that you modify are updated in the DB2 database when you press Enter or a PF key.

Each time a row is updated, DB2 locks the page containing the modified row. These locks are released by the execution of the DB2 COMMIT statement. The ACCESS COMMIT command explicitly directs Access to issue a DB2 COMMIT.

The AUTOCOMMIT command is available to minimize the length of time that DB2 retains the locks. By default, AUTOCOMMIT ON is in effect, and Access automatically issues a DB2 COMMIT with each screen interaction.

Restoring Data

Access allows you to restore data using either the DB2 ROLLBACK command or its own unique UNDO facility.

Use the DB2 ROLLBACK command to remove uncommitted changes and return the database to the last commit point. However, when AUTOCOMMIT ON is in effect, only the changes on the current screen are removed.

Access's unique Undo facility can be directed to restore the data in a single row, a block of rows, or all rows. The Undo facility supersedes any DB2 COMMIT/ROLLBACK activity.

To provide the Undo facility, Access keeps track of:

- The original set of rows fetched from DB2 for each table. This is the “fetch set.”
- The last changes made to each row.

All changes can be removed by restoring the original fetched row for all rows or a single row. The last set of changes to a fetch set, regardless of the number of screen interactions (or commit points), can be removed from all rows or a single row.

Example

Using the following figure as the initial set of data, assume that CUSTOMERS.CITY and CUSTOMERS.ADDRESS have been changed and that ORDERS.ORDER_DATE for the last displayed order has been changed. These changes are marked by U under the **F** heading.

```
-------------------------------- Optim: Edit ----------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ===================== 10 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ==================== --------------- -----
___ U  07160  Reely Great Videos   112 South Moreland A Boston            MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 4 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************** TOP ***********************************
___       1522   07160  04/12/1999  09.27.51       12.00          RP0013
___       1491   07160  03/29/1999  16.24.41        9.25          RP0013
___       1305   07160  03/15/1999  10.23.38       12.95          RP0013
*** ********************************* BOTTOM **********************************
```

Figure 40. A Set of Changes

An additional change is made to the CUSTOMERS row in the CUSTNAME column and a change is made to the FREIGHT_CHARGES column of the second row in the ORDERS table and the ORDER_DATE in the third row of that table. Enter is pressed and the U status flag is displayed for all three modified rows.

```
-------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                SCROLL ===> PAGE

Cmd F == Table: FOPDEMO.CUSTOMERS(T1) ==================== 10 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- -------------------- ------------------- --------------- -----
___ U  07160  Reely Good Movies    112 South Moreland A Boston            MA

Cmd F == Table: FOPDEMO.ORDERS(T2) ========================== 1 OF 4 === MORE>>
      ORDER_ID CUST_ID ORDER_DATE ORDER_TIME FREIGHT_CHARGES ORDER_SALESMAN
      -------- ------- ---------- ---------- --------------- --------------
*** ********************************** TOP ***********************************
___       1522   07160  04/12/1999  09.27.51       12.00          RP0013
___ U     1491   07160  03/29/1999  16.24.41       13.00          RP0013
___ U     1305   07160  03/26/1999  10.23.38       12.95          RP0013
*** ******************************** BOTTOM *********************************
```

Figure 41. Another Set of Changes

Undo Line Command

You can use the Undo line command, U, in **Cmd** to remove the last change made to any one of the rows. For example, you can remove the last change to the CUSTOMERS row (the new CUSTNAME value) and retain any previous changes (the new CITY and ADDRESS values). Changes made to any other rows are also retained.

The U line command will undo all changes made to a given row since you last pressed Enter. Thus, if you change three entries on a row and you press Enter *after each change*, the U line command will only undo the last entry you changed. However, if you only press Enter once (i.e., after all three entries are changed), then all three entries will be undone by the U line command.

You can restore the original data fetched from DB2 for any one of the rows, regardless of how many changes you have made and how many times you have pressed Enter, using the UA (Undo All) line command. Type UA in **Cmd** to remove all changes to the CUSTOMERS row. All changes to the other rows are retained.

UNDO Primary Command

The UNDO primary command removes all changes to rows made in the last screen interaction.

The UNDO ALL primary command restores all the rows to the values they had when originally fetched from DB2.

Impact of Fetching New Data

The Undo Facility is based on the current set of data fetched from DB2, or the fetch set. Undo cannot remove any changes made to a fetch set that is no longer active.

For example, after making changes, the CUSTOMERS table is scrolled. Access obtains a new set of rows from the ORDERS table related to the newly displayed CUSTOMERS row. The original set of CUSTOMERS rows remains, it has simply been scrolled. Therefore, the changes to the CUSTOMERS row for Reely Great Movies can be removed, but the changes to the related ORDERS rows cannot. The old fetch set has been replaced with the new fetch set of ORDERS rows related to the currently displayed CUSTOMERS row.

Terminating the Session

Use END to terminate the edit session and redisplay the Choose a DB2 Table/View to Edit panel.

All specifications you made to select and display the DB2 data are called an Access Definition. This includes:

- The names of all of the tables that were accessed. (In "Joining Related Data" on page 12, the CUSTOMERS, ORDERS, and DETAILS tables were accessed.)
- Any selection or sort criteria. (In "Selecting a Set of Rows" on page 9, selection criteria and, in "Sorting the Selected Rows" on page 10, sort criteria were specified for the CUSTOMERS table.)

Confirmation Prompt

If you specified YES for the **Prompt to Create AD on Exit** on the Choose a DB2 Table/View to Edit panel (as shown in Figure 2 on page 7), the following prompt is displayed to save the Access Definition.

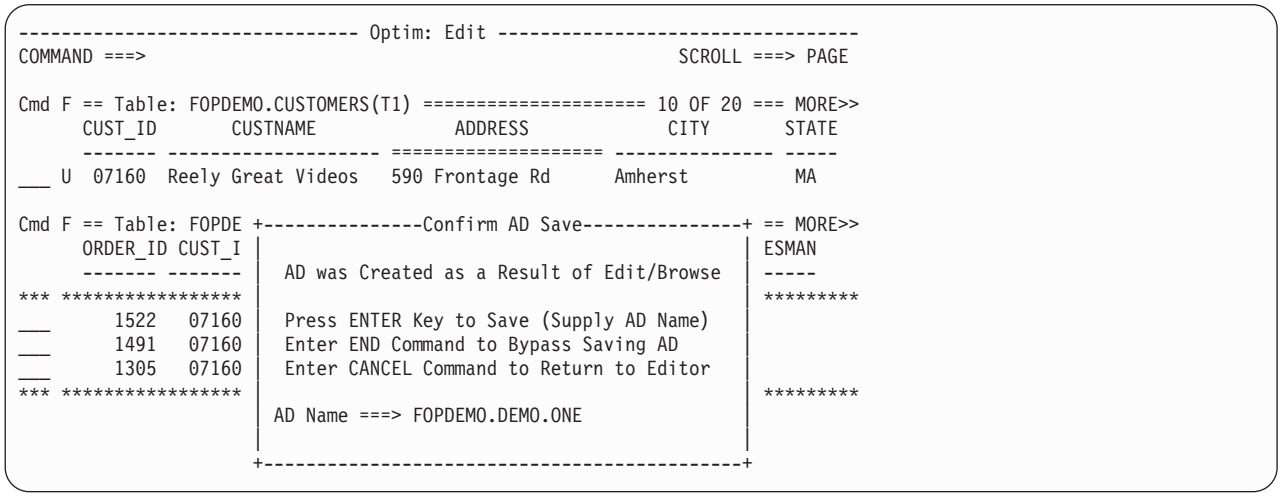

Figure 42. Confirmation Prompt to Save Access Definition

For this demonstration, the name specified is:

FOPDEMO.DEMO.ONE

Access Definition Name

The Access Definition name is composed of three parts:

GROUP

USER

NAME

GROUP and USER are useful to categorize Access Definitions. Thus, several users can have Access Definitions with the same NAME but a different GROUP and USER.

Using an Existing Access Definition

To edit or browse data using an existing Access Definition, select Option 3 or Option 4 on the **Main Menu**.

All the specifications saved in the Access Definition named FOPDEMO.DEMO.ONE can be used again without respecifying them. In fact, during a session invoked using an Access Definition, ACCESS checks the list of tables included in the Access Definition for a related table when you request a join. If only one

related table is included, Access automatically joins to that table with no further prompting. That means, using FOPDEMO.DEMO.ONE in an edit session, you can join using the J line command from CUSTOMERS to ORDERS without any prompting.

If you modify the Access Definition while you are editing, by joining to new tables or modifying sort or selection criteria, the **Confirm AD Save** prompt is displayed when you terminate the session.

Dynamic or Predefined Access Definition

This section discussed how to specify a single table and then dynamically join to other tables. It also included a description of how to specify selection and sort criteria during an edit session. This dynamic capability is extremely powerful, but there may be times when you want to predefine an Access Definition either for your own use to handle repetitive queries or for other users to limit their access to data. Section 3. Specifying an Access Definition discusses how to predefine an Access Definition.

Chapter 3. Specifying an Access Definition

This section demonstrates how to specify the tables and the sort and selection criteria prior to using the Access Definition.

In addition, you can select specific columns for display and specify access privileges for the data that are more restrictive than those defined in the DB2 Catalog. You can predefine several parameters to control the behavior of a browse or edit session. To aid in specifying the parameters, you can invoke a browse or edit session while defining the Access Definition.

Modify Existing Access Definition

In Chapter 2, "Accessing Data Dynamically," on page 5, a new Access Definition was created dynamically. In this section, a new Access Definition is created by modifying an existing one and saving the modified version under a new name. You use the same panels and commands to create or modify Access Definitions.

Edit and Browse Data

As long as one table is specified, you can invoke an edit or browse session from any of the panels used to create and modify the current Access Definition.

The EDIT or BROWSE command invokes an edit or browse session for the data as defined in the current Access Definition. Any dynamic changes that you make to the Access Definition during this edit or browse session (for example, joining to other tables) are automatically included in the Access Definition. Use END to terminate the edit or browse session. The panel that was active when you invoked the edit or browse session is redisplayed.

Selecting an Access Definition

Select Option 5 ADS on the **Main Menu** to create or modify Access Definitions. The **Choose an Access Definition** panel is displayed.

```
------------------------- Choose an Access Definition -----------------------
Command ===>
                                           SQLID  ===> FOP
Access Definition:                         SUBSYS ===> TDB2
  Group ===>                               LOCATION ===>
  User  ===>
  Name  ===>

Use '_' For DB2 LIKE character ===> NO   (Y-Yes, N-No)


To limit selection list to Access Definitions with certain start tables, enter
the start table name below.  A wild card is allowed at the end of each part.

  Start Table Creator ID ===>                                  >
  Start Table Name       ===>                                  >
```

Figure 43. Choose an Access Definition

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Selection List

Group, User and **Name** prompt for the full name of an Access Definition. If you leave one or more prompts blank or specify DB2 LIKE syntax, a selection list is displayed. The list contains the names of all Access Definitions that satisfy the entries.

Note: You can further limit an Access Definitions selection list by specifying a fully qualified Start Table name or specify DB2 LIKE syntax to obtain a selection list of Access Definitions that reference the specified Start Table.

For example, assume Access Definitions, in addition to the one in Chapter 2, "Accessing Data Dynamically," on page 5, have been created. This Access Definition was saved under the Group name FOPDEMO and the User name DEMO. You can display all Access Definitions in the **Group** FOPDEMO by leaving the **User** and **Name** prompts blank. The selection list of Access Definitions is displayed as shown in the following figure.

```
------------------------- Select Access Definitions --------------------------
Command ===>                                                 Scroll ===> PAGE

    Line Cmds: S-Select, D-Delete, C-Copy, R-Rename, AT-Attr, I-Info 1 OF 4

    ----- Access Definition ------ ------ Last Modified -------
Cmd  Group     User       Name        By           Date
--- -------- -------- ------------ -------- -------------------
    ****************************** TOP ***********************************
___ FOPDEMO  DEMO     ABC          GUIDE    1999-04-15 13.00.00
___ FOPDEMO  DEMO     ONE          GUIDE    1999-08-12 12.00.00
___ FOPDEMO  FOPDEMO  SAMPLE       OPTIM    1999-06-01 15.00.00
___ FOPDEMO  SYSIBM   CATALOG      Optim    1999-06-01 15.00.00
    ****************************** BOTTOM ********************************
```

Figure 44. Select an Access Definition

The names are presented in alphabetical order sorted by **Group**, **User**, and **Name**. Additional information, including a description, may also be presented, depending upon the Selection List Format designated on the User Options panel.

Regardless of the Selection List Format, you can display or edit an Access Definition description by using the Attribute line command, AT. Access displays the Object Attributes panel, where you can type in the **Description** and, if available, **Security Status**, as in the following figure.

```
------------------------- Select Access Definitions --------------------------
Command ===>                                                 Scroll ===> PAGE

    Line Cmds: S-Select, D-Delete, C-Copy, R-Rename, AT-Attr, I-Info 1 OF 4

     +------------------------Object Attributes-----------------------+
Cmd  |                                                               |
---  | Object Name:  FOPDEMO.DEMO.ABC                                |
     |                                                               | ***
AT_  | Modify the attributes below as needed.                        |
___  |                                                               |
___  | Description     ===> ACCESS INTRO DEFINITION                  |
     |                                                               | ***
     | Security Status ===> PUBLIC     (PUBLIC, PRIVATE, READONLY)   |
     |                                                               |
     | Use END command to accept any changes and return.             |
     | Use CANCEL command to ignore any changes and return.          |
     |                                                               |
     +---------------------------------------------------------------+
```

Figure 45. Object Attributes

Use END to return to the selection list.

Use the Select line command, S, on the selection list to select the Access Definition to be modified. For this example, FOPDEMO.DEMO.ABC, which is the first Access Definition on the list shown in Figure 44 on page 38, is selected.

Selecting Tables

When an Access Definition has been specified, the Select Tables/Views for AD panel is displayed.

```
-- Select Tables/Views for AD: FOPDEMO.DEMO.ABC -------------------------------
Command ===>                                                 Scroll ===> PAGE

 Primary : COL,SEL,SQL,REL,POINT,GROUP,GET TABLES RELATED,INDENT,ARC,LIST SUBS
    Line : COL,SEL,SQL,ALL,GR(A),GP(A),GC(A),DR(A),PR(A),DP(A),PP(A),
           DC(A),PC(A),EXP,ARC,ACT,STA
                                                 Table 1 of 1       MORE>>
Default Creator ID ===> FOPDEMO                                        >>
Start Table        ===> CUSTOMERS                                      >>
Start Table Options   : None
                                       ---- Access Rights ----
Cmd   Status    (CreatorID.)Table/View Name (S)el/(U)pd/(I)ns/(D)el  Type
--- ----------- ------------------------>> ---------------------- -------
*** ******************************** TOP ********************************
___              CUSTOMERS                    D             TABLE
*** ***************************** BOTTOM *******************************
```

Figure 46. Select Tables/Views for AD

Note: The REL, POINT, and GROUP commands, and the **MORE** indicator are displayed on this panel only if Move or Compare is installed. The ARC and ACT commands are displayed only if Archive is installed. The **Start Table Options** prompt is relevant only for Archive, Compare, and Move.

If an existing Access Definition is selected, the set of tables defined for that Access Definition is displayed. If the Access Definition is being created, space is provided to enter the name of a table to be included.

In this example, the CUSTOMERS table is the only table currently defined in the selected Access Definition, FOPDEMO.DEMO.ABC. (At least one table name must be specified to create an Access Definition.)

Default Creator ID

The **Default Creator ID** is used to qualify a table name when the Creator ID is not specified in **Table/View Name**. For this demonstration, the default Creator ID is FOPDEMO.

Start Table

The **Start Table** specifies which table is displayed initially when the Access Definition is used. Any table defined in the Access Definition may be selected as the Start Table. In this example, CUSTOMERS is the Start Table.

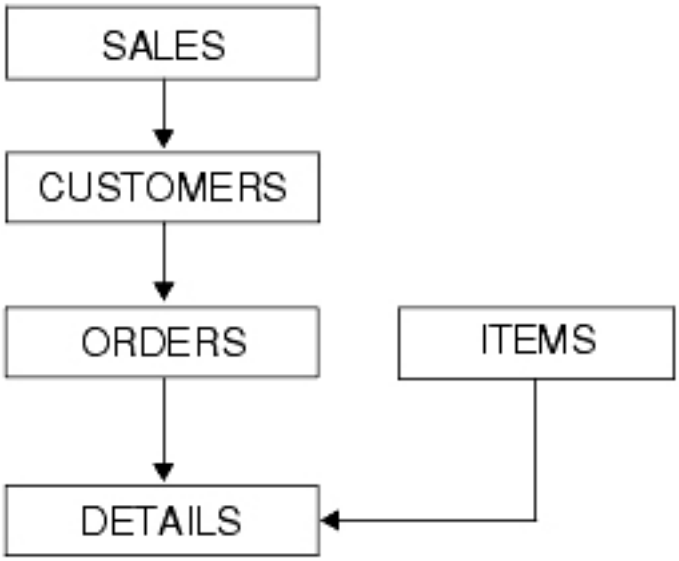
Table names may be:

- Included automatically using the GET TABLES RELATED command.
- Selected from a selection list obtained with the LIST command.
- Entered by typing them in the space provided by the I line command.

Including Related Tables Automatically

The GET TABLES RELATED command is used to add the names of tables related to a specific table in the Access Definition.

By default, only tables directly related to the specified table are added to the Access Definition. To demonstrate, consider the following diagram of related tables.



To include the tables directly related to the CUSTOMERS table (in this case, SALES and ORDERS), enter:

GET TABLES RELATED TO CUSTOMERS

To include only the children of the CUSTOMERS table (in this case, ORDERS), add the CHILD operand:

GET TABLES RELATED TO CUSTOMERS CHILD

To include all tables both directly and indirectly related to the CUSTOMERS table (in this case, SALES, ORDERS, DETAIL, and ITEMS), add the ALL operand:

GET TABLES RELATED TO CUSTOMERS ALL

Line Commands

You can also use the Get Tables Related line commands to include tables related to a specific table (for example, GC for GET TABLES RELATED CHILD).

GRA Line Command

In the following figure, the GRA line command (for GET TABLES RELATED ALL) is entered in **Cmd** next to the CUSTOMERS table.

```
-- Select Tables/Views for AD: FOPDEMO.DEMO.ABC -------------------------------
Command ===>                                                 Scroll ===> PAGE

 Primary : COL,SEL,SQL,REL,POINT,GROUP,GET TABLES RELATED,INDENT,ARC,LIST SUBS
    Line : COL,SEL,SQL,ALL,GR(A),GP(A),GC(A),DR(A),PR(A),DP(A),PP(A),
           DC(A),PC(A),EXP,ARC,ACT,STA
                                                    Table 1 of 1       MORE>>
Default Creator ID ===> FOPDEMO                                         >>
Start Table        ===> CUSTOMERS                                       >>
Start Table Options   : None
                                        ---- Access Rights ----
Cmd   Status    (CreatorID.)Table/View Name (S)el/(U)pd/(I)ns/(D)el  Type
--- ----------- -------------------------->> ----------------------- -------
*** ******************************** TOP ********************************
GRA             CUSTOMERS                     D             TABLE
*** ***************************** BOTTOM *******************************
```

Figure 47. Using the GRA Line Command

The following figure shows the results of the GRA line command.

```
-- Select Tables/Views for AD: FOPDEMO.DEMO.ABC -------------------------------
Command ===>                                                 Scroll ===> PAGE

 Primary : COL,SEL,SQL,REL,POINT,GROUP,GET TABLES RELATED,INDENT,ARC,LIST SUBS
    Line : COL,SEL,SQL,ALL,GR(A),GP(A),GC(A),DR(A),PR(A),DP(A),PP(A),
           DC(A),PC(A),EXP,ARC,ACT,STA
                                                    Table 1 of 5       MORE>>
Default Creator ID ===> FOPDEMO                                         >>
Start Table        ===> CUSTOMERS                                       >>
Start Table Options   : None
                                        ---- Access Rights ----
Cmd   Status    (CreatorID.)Table/View Name (S)el/(U)pd/(I)ns/(D)el  Type
--- ----------- -------------------------->> ----------------------- -------
*** ******************************** TOP ********************************
___             CUSTOMERS                     D             TABLE
___             ORDERS                        D             TABLE
___             DETAILS                       D             TABLE
___             SALES                         D             TABLE
___             ITEMS                         D             TABLE
*** ***************************** BOTTOM *******************************
```

Figure 48. Result of GRA Line Command

In the preceding example, four tables were added to the Access Definition as a result of the GRA line command: the ORDERS, DETAILS, SALES, and ITEMS tables.

Editing Table Names

You can edit this list by deleting or overtyping any of the listed table names. Line commands are available to copy, move, insert, delete, and repeat table names. When inserting and editing table names, you must ensure that each name is unique.

Selecting Tables From a List

You can request a list of tables from which you can select the tables for the Access Definition.

For example, to display a list of all available tables having the default Creator ID, enter:

LIST TABLES

The selection list does not include tables that are already defined in the Access Definition. Assume only the CUSTOMERS table is specified in the Access Definition. The selection list is displayed as shown in the following figure.

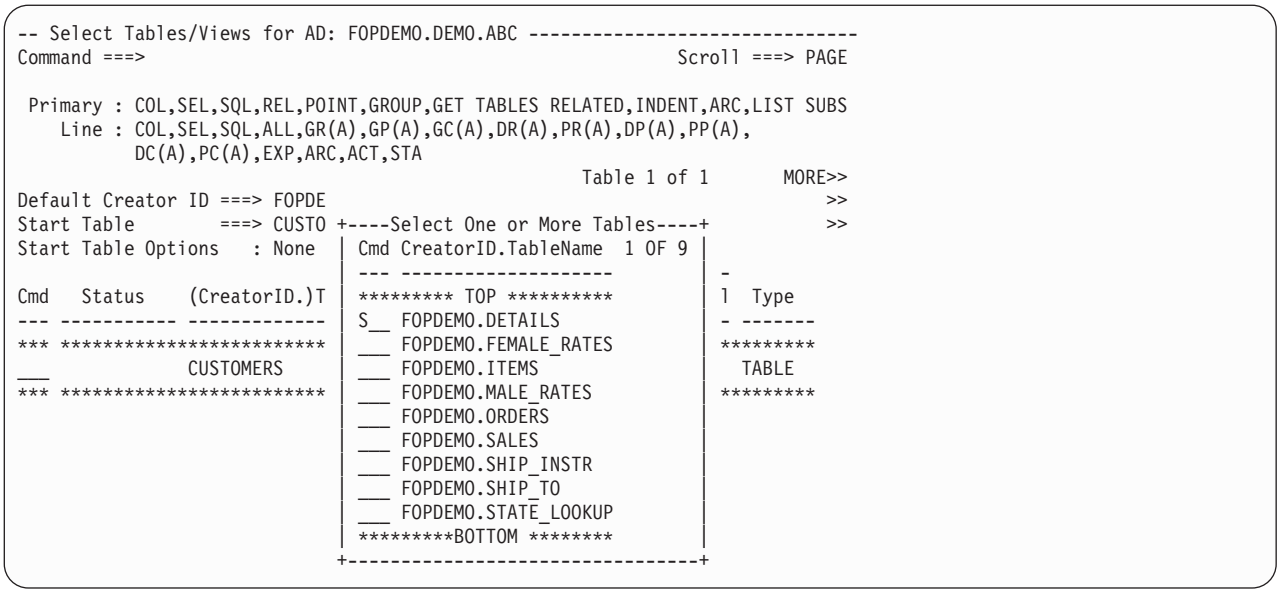


Figure 49. Table Selection List

The LIST TABLES command lists all tables with the specified default Creator ID. In this example, seven tables are included on the table list that are not related to the CUSTOMERS table. Only SALES and ORDERS are related to CUSTOMERS.

The list can be scrolled. Any number of tables can be selected by typing S in **Cmd**. In this example, the first table, the DETAILS table, is selected.

Use END or ENTER to terminate the selection list processing and include the selected table in the Access Definition.

When a table is selected from the list, the Creator ID is included with the name only if it differs from the Default Creator ID defined in the Access Definition. In this example, the table selected from the list does not include the Creator ID because it is the same as the Default Creator ID in the Access Definition.

DETAILS Table Inserted

The selected table, DETAILS, is added to the list as shown in the following figure.

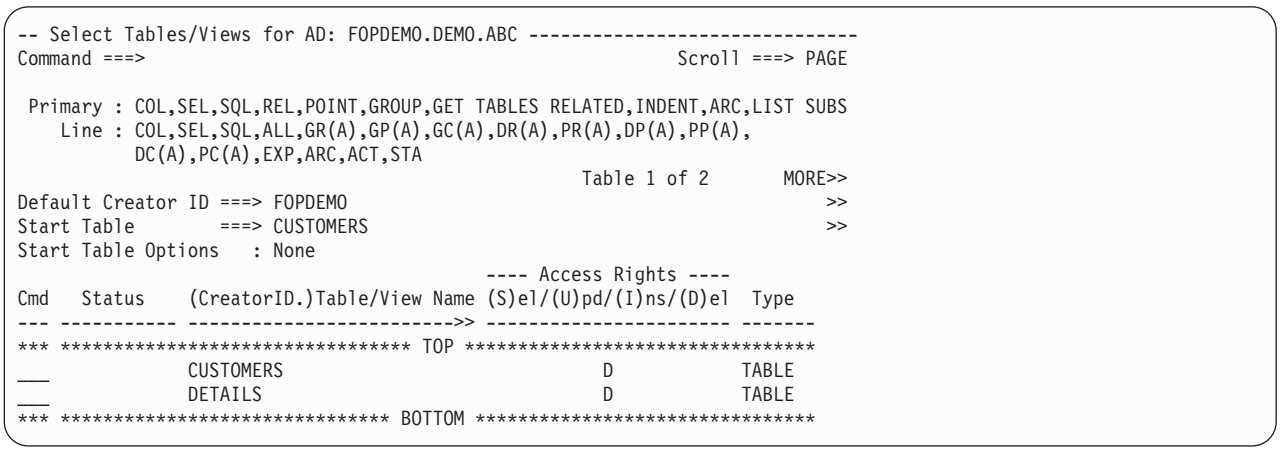


Figure 50. Selected Table Included

Limit the List

The list of tables obtained using the LIST TABLES command contains all the tables with the **Default Creator ID**, and may be extensive. You can limit the list to a range of names using DB2 LIKE syntax. For example, to display a list of tables that begin with A, and have the Creator ID of OPTIM, enter:

LIST TABLES OPTIM.A%

The names of any tables selected from this list include the Creator ID (OPTIM) since it is different from the Default Creator ID (FOPDEMO).

List Related Tables

You can also limit the list to related tables. Use the LIST TABLES RELATED command. For example, to list only those tables that are related to the DETAILS table, enter the command:

LIST TABLES RELATED TO DETAILS

LR Line Command

The LR line command also can be used to display a list of only those tables related to a specific table.

Tables Selected

In the following figure, the LR line command has been entered for the DETAILS table, and the list of related tables is displayed. Use the Select line command to select the desired tables. Both tables are selected in this example.

```
-- Select Tables/Views for AD: FOPDEMO.DEMO.ABC -------------------------------
Command ===>                                                 Scroll ===> PAGE

 Primary : COL,SEL,SQL,REL,POINT,GROUP,GET TABLES RELATED,INDENT,ARC,LIST SUBS
    Line : COL,SEL,SQL,ALL,GR(A),GP(A),GC(A),DR(A),PR(A),DP(A),PP(A),
           DC(A),PC(A),EXP,ARC,ACT,STA
                                                 Table 1 of 2       MORE>>
Default Creator                                                         >>
Start Table     +---------Select One or More Related Tables----------+      >>
Start Table Opt | Cmd    CreatorID.TableName      From  Type  1 OF 2 |
                | ---  ---------------------------------------      |
Cmd   Status    | ****************** TOP ******************          | pe
--- ----------- | S__ FOPDEMO.ITEMS               DB2  PARENT         | ----
*** *********** | S__ FOPDEMO.ORDERS              DB2  PARENT         | ****
___             | ***************** BOTTOM ******************        | LE
LR              +-----------------------------------------------------+ LE
*** ***********                                                       ****
```

Figure 51. Related Tables Selection List

Use END or ENTER to redisplay the Select Tables/Views for AD panel. The selected tables are included in the Access Definition.

ITEMS and ORDERS Inserted

In the following figure, the ITEMS and ORDERS tables are listed in the Access Definition. The table count includes the inserted tables.

```
-- Select Tables/Views for AD: FOPDEMO.DEMO.ABC ------------------------------
Command ===>                                                Scroll ===> PAGE

 Primary : COL,SEL,SQL,REL,POINT,GROUP,GET TABLES RELATED,INDENT,ARC,LIST SUBS
    Line : COL,SEL,SQL,ALL,GR(A),GP(A),GC(A),DR(A),PR(A),DP(A),PP(A),
           DC(A),PC(A),EXP,ARC,ACT,STA
                                                    Table 1 of 4       MORE>>
Default Creator ID ===> FOPDEMO                                          >>
Start Table        ===> CUSTOMERS                                        >>
Start Table Options   : None
                                        ---- Access Rights ----
Cmd   Status    (CreatorID.)Table/View Name (S)el/(U)pd/(I)ns/(D)el  Type
--- ----------- -------------------------->> ----------------------- -------
*** ******************************** TOP ********************************
___             CUSTOMERS                       D            TABLE
___             DETAILS                         D            TABLE
___             ITEMS                           D            TABLE
___             ORDERS                          D            TABLE
*** ***************************** BOTTOM ********************************
```

Figure 52. Four Tables Specified

Display Sequence

The sequence in which the tables are listed on the Select Tables/Views for AD panel has no effect on the sequence in which the tables are displayed. The sequence in which they are displayed is determined during the edit or browse session.

Showing Relationships

The INDENT primary command provides an indented display of the tables and their relationships as specified in the Access Definition. The display indicates how the tables can be joined during an edit session. This may be helpful in determining which tables to include in the Access Definition. Multiple references to a table are indicated. A sample indented table list is shown in the following figure.

```
--------------------------- Indented Table Display ---------------------------
Command ===>                                                Scroll ===> PAGE
                                                            ROW 0    OF 4
******************************** Top of Data *********************************

     Default Creator ID: FOPDEMO

                            Table Name                          Relation Type
    ------------------------------------------------------------ -------- ----
   1 CUSTOMERS                                                   STRT TBL
   2  C:ORDERS                                                   RCO      DB2
   3   C:DETAILS                                                 ROD      DB2
   4    P:ITEMS                                                  RID      DB2

****************************** Bottom of Data ********************************
```

Figure 53. Indented Table Display

With the exception of the Start Table, each table in the display is prefixed with a “C” (for child) or “P” (for parent) to indicate the relationship defined between the table and the table under which it is displayed. Use END to redisplay the Select Tables/Views for AD panel.

Specifying Table Access Rights

Access Rights specify the user privilege for editing data in the table when the Access Definition is used.

This value takes precedence over the value in the DB2 Catalog only when it is more restrictive; otherwise, the user's authorization as defined in the DB2 Catalog is used.

```
-- Select Tables/Views for AD: FOPDEMO.DEMO.ABC -------------------------------
Command ===>                                                 Scroll ===> PAGE

 Primary : COL,SEL,SQL,REL,POINT,GROUP,GET TABLES RELATED,INDENT,ARC,LIST SUBS
    Line : COL,SEL,SQL,ALL,GR(A),GP(A),GC(A),DR(A),PR(A),DP(A),PP(A),
           DC(A),PC(A),EXP,ARC,ACT,STA
                                                    Table 1 of 4       MORE>>
Default Creator ID ===> FOPDEMO                                          >>
Start Table        ===> CUSTOMERS                                        >>
Start Table Options   : None
                                        ---- Access Rights ----
Cmd   Status    (CreatorID.)Table/View Name (S)el/(U)pd/(I)ns/(D)el  Type
--- ----------- -------------------------->> ---------------------- -------
*** ******************************** TOP ***********************************
___             CUSTOMERS                     D            TABLE
___             DETAILS                       D            TABLE
___             ITEMS                         D            TABLE
___             ORDERS                        D            TABLE
*** ************************ BOTTOM ************************************
```

Figure 54. Access Privileges

In the preceding Access Definition, “D” is specified as the Access Right for all of the tables, which means the user can display, update, insert, and delete the data in those tables.

Status and Type Information

Status and the **Type** values are provided for information and cannot be modified.

Status

The **Status** value reflects column information that has been specified. In Figure 54, the **Status** is blank because column information has not been specified.

Type

The **Type** value indicates whether a table or a view is listed. In “Specifying Table Access Rights” on page 44, the list contains only tables, no views.

Specifying Columns and Selection Criteria

By default, all columns and rows in the table are retrieved when the Access Definition is used to browse and edit data.

However, you may want to select specific columns to be displayed or provide selection criteria to screen the rows that are retrieved. These specifications are made on the **Describe Columns for AD** and the Specify Selection Criteria for AD panels.

To display the Describe Columns for AD panel, use the COLUMNS (or the short form COL) primary command or the COL line command. For example, you can request the panel to specify column handling for the CUSTOMERS table using the primary command:

COLUMNS CUSTOMERS

To display the Specify Selection Criteria for AD panel, use the SELECTION (or the short form SEL) primary command or the SEL line command. For example, you can request the panel to specify selection criteria for the ORDERS table using the primary command:

SEL ORDERS

Example

In the following figure, the COL line command is entered for the CUSTOMERS table to display the Describe Columns for AD panel.

```
-- Select Tables/Views for AD: FOPDEMO.DEMO.ABC -------------------------------
Command ===>                                                 Scroll ===> PAGE

 Primary : COL,SEL,SQL,REL,POINT,GROUP,GET TABLES RELATED,INDENT,ARC,LIST SUBS
    Line : COL,SEL,SQL,ALL,GR(A),GP(A),GC(A),DR(A),PR(A),DP(A),PP(A),
           DC(A),PC(A),EXP,ARC,ACT,STA
                                                 Table 1 of 4       MORE>>
Default Creator ID ===> FOPDEMO                                         >>
Start Table        ===> CUSTOMERS                                       >>
Start Table Options   : None
                                        ---- Access Rights ----
Cmd   Status    (CreatorID.)Table/View Name (S)el/(U)pd/(I)ns/(D)el  Type
--- ---------- -------------------------->> ---------------------- --------
*** ******************************** TOP ********************************
COL             CUSTOMERS                    D             TABLE
___             DETAILS                      D             TABLE
___             ITEMS                        D             TABLE
___             ORDERS                       D             TABLE
*** ***************************** BOTTOM *******************************
```

Figure 55. Selecting a Table for Column Handling

Column Attributes

The Describe Columns for AD panel is shown in the following figure.

```
-- Describe Columns for AD: FOPDEMO.DEMO.ABC ----------------------------------
Command ===>                                                 Scroll ===> PAGE

Table Name: FOPDEMO.CUSTOMERS                              Col 1 of 9     MORE>>

                         Disp  ACC  -Sort--  -Heading-
Cmd     Column Name      Y/N   S/U  Lvl A/D  N/L L/R/C   Data Type    Null Crit
---  ------------------  ----  ---  --- ---  --- ----- -------------- ---- ----
***  ******************************** TOP ************************************
___  CUST_ID              Y     U   __   _    N    C   CHAR(5)        NO   NO
___  CUSTNAME             Y     U   3_   A    N    C   CHAR(20)       NO   NO
___  ADDRESS              Y     U   __   _    N    C   VARCHR(50)     NO   NO
___  CITY                 Y     U   __   _    N    C   VARCHR(15)     NO   NO
___  STATE                Y     U   1_   A    N    C   CHAR(2)        NO   NO
___  ZIP                  Y     U   2_   A    N    C   CHAR(5)        YES  NO
___  YTD_SALES            Y     S   __   _    N    C   DECIMAL(7,2)   NO   NO
___  SALESMAN_ID          N     U   __   _    N    C   CHAR(6)        YES  NO
___  PHONE_NUMBER         N     U   __   _    N    C   CHAR(10)       YES  NO
***  ***************************** BOTTOM ***********************************
```

Figure 56. Describe Columns for AD

Table Name

The name of the table is displayed. The relative position of the first column in the display and the total number of columns in the table are noted after the table name. This information is useful when you need to scroll a long list of columns.

Reorder Columns

The names of the columns are presented as a scrollable list. The order in which the columns are listed is the same order used to position the columns when the data is displayed. You can use the Move line command, M or MM, to rearrange the list. You may want to position the most frequently modified columns together to minimize tabbing and horizontal scrolling.

Select Columns for Display

You can select the columns to be included in the display by specifying Y or N for **Disp**. Specify Y to include the column or N to omit it. Alternatively, you can use the DISPLAY primary command to set the **Disp** value for all columns. By default, all columns are included in the display. In Figure 56 on page 46, the last two columns are omitted from the display.

Specify Access Privileges

You can control whether the data in a displayed column can be edited. Specify U in **ACC** for each column that can be edited. Specify S for each column that is displayed, but cannot be edited. The DB2 Catalog is consulted when the Access Definition is used. The more restrictive privilege, whether from the DB2 Catalog or defined on this panel, always takes precedence. In Figure 56 on page 46, for example, YTD_SALES is marked with an S, so that column is display only; it cannot be edited.

Sort Criteria

The rows fetched from DB2 are not automatically sorted. Use the **Sort** entries to specify up to 64 sort columns, with 1 assigned to the highest sort level. Specify whether the sort is Ascending or Descending.

In Figure 56 on page 46, the sort is specified so that the data in the CUSTOMERS table is sorted by three columns, STATE, ZIP, and CUSTNAME, in that order. Each sort is defined as ascending.

Heading

Heading is used to specify whether the column heading for the data is the column name or a DB2-defined label and how that heading is positioned relative to the data for columnar display. In Figure 56 on page 46, the column name is used for all columns and the columnar display heading is centered.

Informational Entries

Data Type, **Null**, and **Criteria** are provided for information only. **Data Type** indicates the data type as defined in the DB2 Catalog and cannot be modified. **Null** indicates whether the column is null eligible. The **Criteria** value indicates whether selection criteria have been specified on the Specify Selection Criteria for AD panel.

Selection Criteria

From the Describe Columns for AD panel, use the SEL command to display the Specify Selection Criteria for AD panel.

```
-- Specify Selection Criteria for AD: FOPDEMO.DEMO.ABC ------------------------
Command ===>                                                 Scroll ===> PAGE

Table Name: FOPDEMO.CUSTOMERS                          Col 1 of 9     <<MORE
Combine All Column Criteria by ==> A   (A-AND, O-OR)

Cmd     Column Name                      Selection Criteria
---  ------------------  ------------------------------------------------------
***  ******************************** TOP ************************************
___  CUST_ID
___  CUSTNAME
___  ADDRESS
___  CITY
___  STATE               = 'MA'
___  ZIP
___  YTD_SALES
___  SALESMAN_ID
___  PHONE_NUMBER
*** ******************************** BOTTOM ***********************************
```

Figure 57. Specify Selection Criteria for AD

The names of the columns are listed in the same order as on the Describe Columns for AD panel. You can scroll the list of columns and use the Move line command to rearrange the names of the columns, but the main purpose of this panel is to specify selection criteria.

Selection Criteria Examples

In Figure 57 on page 47, only the STATE column has criteria. You can specify criteria for any column regardless of whether it is included in the display when the Access Definition is used to browse and edit data. Any valid SQL predicate is allowed.

If selection criteria are specified for more than one column in the table, the criteria can be combined with a logical AND so that all criteria must be satisfied, or combined with a logical OR so that any criteria must be satisfied to select a particular row.

Assume that you want to display a list of the most active customers in Massachusetts. In addition to selecting only the customers in Massachusetts, you want to further limit the selection to those customers with YTD_SALES exceeding $1,000. The criteria must be ANDed to select only those CUSTOMERS rows that satisfy both criteria. If the criteria are ORed, all the CUSTOMERS rows that satisfy either criteria are selected.

SQL Command

At times you may want to specify more complex selection criteria. The SQL command displays a panel for you to enter an SQL WHERE clause.

Return to Select Tables/Views Panel

When all column specifications for the table are completed, use END to redisplay the Select Tables/Views for AD panel. **Status** on this panel contains one or more of the following:

COL If you have made any changes to the default column specifications.

SEL If you have specified selection criteria.

SQL If you have specified an SQL WHERE clause.

In the following figure, both column specifications (COL) and selection criteria (SEL) have been specified for the CUSTOMERS table, as indicated under **Status** by the COL/SEL entry.

```
-- Select Tables/Views for AD: FOPDEMO.DEMO.ABC -------------------------------
Command ===>                                                 Scroll ===> PAGE

 Primary : COL,SEL,SQL,REL,POINT,GROUP,GET TABLES RELATED,INDENT,ARC,LIST SUBS
    Line : COL,SEL,SQL,ALL,GR(A),GP(A),GC(A),DR(A),PR(A),DP(A),PP(A),
           DC(A),PC(A),EXP,ARC,ACT, STA
                                                 Table 1 of 4       MORE>>
Default Creator ID ===> FOPDEMO                                         >>
Start Table        ===> CUSTOMERS                                       >>
Start Table Options   : None
                                      ---- Access Rights ----
Cmd   Status    (CreatorID.)Table/View Name (S)el/(U)pd/(I)ns/(D)el  Type
--- ---------- ------------------------>> ---------------------- -------
*** ******************************** TOP ********************************
___ COL/SEL     CUSTOMERS                    D            TABLE
___             DETAILS                      D            TABLE
___             ITEMS                        D            TABLE
___             ORDERS                       D            TABLE
*** ***************************** BOTTOM ******************************
```

Figure 58. Column Specifications and Selection Criteria Indicated

ALL Command

You can remove the selection criteria specifications for the tables in an Access Definition using the ALL primary command or the ALL line command on the Select Tables/Views for AD panel. For example, to remove the criteria specified for the CUSTOMERS table you can specify the primary command as:

ALL CUSTOMERS

or specify the ALL line command in **Cmd** before the table name.

Saving an Access Definition

After you have completed specifying the Access Definition information on the Select Tables/Views for AD panel, use END. If you are modifying an existing Access Definition, it is automatically updated. If you are creating a new Access Definition, it is saved.

SAVE Command

You can use the SAVE command to store a modified Access Definition under another name and retain the original version. For example, an existing Access Definition was modified in this section. Assume the original version included one table, CUSTOMERS. Various changes were made to that Access Definition to include additional tables, column specifications, and sort and selection criteria. Use the SAVE command to save the modified version under a different name:

SAVE PSTDEMO.DEMO.XYZ

Press ENTER to save the new Access Definition.

END Again

When you use END on the Select Tables/Views for AD panel, the Choose an Access Definition panel or the Select Access Definitions panel is redisplayed. Use END again to return to the **Main Menu**.

From the Main Menu

From the **Main Menu** you can select Option 3 or 4 to browse or edit using an existing Access Definition. Once an Access Definition is selected, the browse or edit session begins.

If you modify the Access Definition while browsing or editing, you may be prompted to specify whether the modifications to the definition should be stored, and under what name.

Recursive Use of Access Definitions

During a browse or edit session using an Access Definition, you can use the BROWSE or EDIT commands to invoke a session for another Access Definition. The activity involving the current Access Definition is suspended until the session using the new Access Definition is terminated.

Chapter 4. Processing Embedded SQL

Access provides the ability to process SQL statements embedded in a source program while that program is displayed in the ISPF editor. Access edit macros and their functions are:

FOPD2EXE
Executes the targeted SQL statement as input. The subsequent action is based on the SQL statement. FOPD2EXE provides a convenient method for ensuring that the correct data is accessed by SQL SELECT statements.

FOPD2EXP
Executes the DB2 EXPLAIN command using the targeted SQL statement as input. The DB2 EXPLAIN command evaluates the performance of an SQL statement. The resulting information is formatted for easy reading and inserted as note lines after the targeted SQL statement.

Since the ISPF edit session remains active, you can edit the SQL statement, if necessary, while reviewing the EXPLAIN information and then re-execute FOPD2EXP. FOPD2EXP helps you evaluate the performance of each SQL statement. You can fine-tune your statements before they impact your system.

FOPFAD2P
Executes the DB2 PREPARE command using the targeted SQL statement as input. The DB2 PREPARE command checks the SQL statement for syntax errors and returns the result of that check.

The ISPF edit session remains active and an appropriate message is displayed in the message area on the ISPF edit session screen. You can ensure that there are no syntax errors in your SQL statements before you compile and bind the program.

Using ACCESS Edit Macros

To invoke the Access edit macros from the ISPF editor, do the following:

- Identify the target SQL statement using the O line command or by positioning the cursor on the line.
- Specify the desired Access edit macro on the Command line.

The statements that directly affect the data (INSERT, UPDATE, DELETE, CREATE, DROP, ALTER, GRANT, and REVOKE) are executed. Access displays a message showing the return code, the number of affected rows, and the SQL statement. You can COMMIT or ROLLBACK the changes resulting from the SQL statement.

SQL SELECT Example

When the SQL statement is a SELECT request, an Access edit session is automatically invoked for the selected data. In the following figure, an ISPF edit session is active. The O line command is typed on line 000002 and the command FOPD2EXE is entered. The targeted SQL statement is a SELECT request.

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```
EDIT ------- DEMO.SAMPLE.SQL(TESTSQL) - 01:33 ------------- COLUMNS 001 072
Command ===> FOPD2EXE                                      Scroll ===> CSR

****** *************************** TOP OF DATA ***************************
000001             EXEC SQL
000002               SELECT X.CUST_ID, X.CUSTNAME, X.ADDRESS, X.CITY,
000003                   X.STATE
000004               FROM FOPDEMO.CUSTOMERS X
000005                 WHERE X.STATE = 'MA'
000006                 ORDER BY X.CUST_ID
000007             END-EXEC
```

Figure 59. Targeting an SQL Statement for Processing

Executing this SQL statement invokes an Access edit session. All edit session facilities except the SEL, COL, SHOW SQL, SQL, and SORT commands are available. When you terminate using Access, you are returned to the ISPF session.

Host Variables

FOPD2EXE supports host variables. If host variables are specified in the SQL statement, Access prompts for the values. Assume the SQL statement in the previous figure is modified so that a host variable is specified for the STATE column in the WHERE clause. The following prompt is displayed:

```
--------------------------- Optim's ACCESS for DB2 ----------------------------
Command ===>

The extracted SQL contains host variables. Specify values in the SQL statement
below and press ENTER, or use the END command to return to the ISPF/PDF editor.

 SELECT X.CUST_ID, X.CUSTNAME, X.ADDRESS, X.CITY, X.STATE
   FROM FOPDEMO.CUSTOMERS X
   WHERE X.STATE = :T1 MA_______________
   ORDER BY X.CUST_ID
```

Figure 60. Specifying Host Variable Values

An Access edit session is invoked using the value “MA” specified for the host variable to select the set of rows.

```
-------------------------------- Optim: Edit ---------------------------------
COMMAND ===>                                                 SCROLL ===> PAGE

Cmd F == View: $$View$$.TESTSQL_1(V1) ====================== 1 OF 20 === MORE>>
      CUST_ID       CUSTNAME             ADDRESS             CITY       STATE
      ------- ------------------- ==================== --------------- -----
*** ********************************* TOP ***********************************
___     07053  Replay Video         9032 Dickerson St    Amherst          MA
___     07101  Movie Mania          571 Front St         Auburn           MA
___     07103  Video Edge           400 Pittsfield Rd    Lenox            MA
___     07118  Movie Store          752 State Rd         Menemsha         MA
___     07123  Video Way            112 South Moreland A Groton           MA
___     07126  Movie Rentals        101 Munson St        Greenfield       MA
___     07140  Showcase             1150 Indiana Terr    Beverly          MA
___     07141  Showcase II          57 Rock Hollow       Salem            MA
___     07156  Prime Tyme           982 Upper State St   Marion           MA
___     07160  Reely Great Videos   590 Frontage Rd      Amherst          MA
___     07189  Showtime             322 Rt 28            Hyannis          MA
___     07191  Popcorn              15 Crystal Park      Lenox            MA
___     07198  Video-tron           100 West Street      Brookline        MA
___     07201  Movie Buff           400 Merrimac Ave     Concord          MA
___     07203  Movies-R-Us          1772 Bridge St       Bourne           MA
```

Figure 61. Edit Session is Invoked

Host variables enable iterative prompting. When the Access edit session is terminated, you are prompted to specify other values for the host variables or terminate FOPD2EXE processing and return to the ISPF editor.

```
--------------------------- Optim's ACCESS for DB2 ----------------------------
Command ===>

ACCESS for DB2 edit session complete. Modify the values below and press ENTER
to execute the statement again, or enter END to return to the ISPF/PDF editor.

SELECT X.CUST_ID, X.CUSTNAME, X.ADDRESS, X.CITY, X.STATE
   FROM FOPDEMO.CUSTOMERS X
   WHERE X.STATE = :T1 NJ_____________
   ORDER BY X.CUST_ID
```

Figure 62. Iterative Prompting for Host Variable Values

Invoking ISPF/PDF Editor

You can invoke the ISPF/PDF editor from within Access using the PDF command.

This is useful when you have started an Access session and need to execute SQL embedded in a program. Use the PDF command to invoke the ISPF/PDF editor and then use FOPD2EXE to execute the embedded SQL. When you exit the ISPF/PDF edit session, you return to the Access session.

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Index

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F

G

H

I

J

L

M

O

P

R

S

T

U

Z

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