# **DBMaker**

JDBA Tool User's Guide



CASEMaker Inc./Corporate Headquarters 1680 Civic Center Drive Santa Clara, CA 95050, U.S.A. www.casemaker.com www.casemaker.com/support

©Copyright 1995-2006 by CASEMaker Inc. Document No. 645049-231291/DBM43-M01202006-JDBA Publication Date: 2006-01-20

All rights reserved. No part of this manual may be reproduced, stored in a retrieval system, or transmitted in any form, without the prior written permission of the manufacturer.

For a description of updated functions that do not appear in this manual, read the file named README.TXT after installing the CASEMaker DBMaker software.

#### Trademarks

CASEMaker, the CASEMaker logo, and DBMaker are registered trademarks of CASEMaker Inc. Microsoft, MS-DOS, Windows, and Windows NT are registered trademarks of Microsoft Corp. UNIX is a registered trademark of The Open Group. ANSI is a registered trademark of American National Standards Institute, Inc.

Other product names mentioned herein may be trademarks of their respective holders and are mentioned only form information purposes. SQL is an industry language and is not the property of any company or group of companies, or of any organization or group of organizations.

#### Notices

The software described in this manual is covered by the license agreement supplied with the software.

Contact your dealer for warranty details. Your dealer makes no representations or warranties with respect to the merchantability or fitness of this computer product for any particular purpose. Your dealer is not responsible for any damage caused to this computer product by external forces including sudden shock, excess heat, cold, or humidity, nor for any loss or damage caused by incorrect voltage or incompatible hardware and/or software.

Information in this manual has been carefully checked for reliability; however, no responsibility is assumed for inaccuracies. This manual is subject to change without notice.

# Contents

1	Intr	oduction	1-1
	1.1	Additional Resources	1-2
	1.2	Technical Support	1-3
	1.3	Document Conventions	
2	Get	ting to know JDBA Tool	2-1
	2.1	Summary of Features	2-2
	2.2		2-4
		The Database in Tree View	
	2.3	Connecting to a Database	2-6
	2.4	Disconnecting from a Database	
3	Wo	rking with Schema	3-1
	3.1	Browsing Schema	3-2
	3.2	Creating a Schema	3-3
	3.3	Dropping a Schema	3-7
4	Wo	rking with Tablespaces	4-1
	4.1	Browsing Tablespaces	

4.2	Creating a Tablespace	4-4
4.3	Altering a Tablespace	4-9
	Adding Files to a Tablespace	
	Shrinking and Compressing a Tablespace	
	Modifying a File in a Tablespace	
	Changing Tablespace Mode	
	Change the Read Only Mode	
	Updating Statistics in a Tablespace	
4.4	Dropping a Datafile From a Tablespace	4-17
4.5	Dropping a Tablespace	4-18
Wo	rking with Tables	5-1
5.1	Creating a Table	5-2
	Starting the Create Table Wizard	
	Setting Table, Tablespace, and Schema Options	
	Setting Column Options	
	Setting Column and Table Constraints	
	Adding a UNIQUE Constraint	
	Adding a Foreign Key While Creating a Table	
	Setting Advanced Table Options	
	Completing Table Creation	
5.2	Modifying Table Schema	5-20
	Changing the Column Order	
	Changing Column Names	
	Changing Column Type	
	Changing Precision and Scale	
	Changing Column Null / Not Null	
	Changing the Primary Key	
	Changing the Column Default Value	
	Adding Column Constraints	
	Adding a Column	
	Deleting a Column	
5.3	Setting Table Properties	5-27

5

	5.4	Granting/Revoking Table Privileges	5-29
	5.5	Checking Dependencies and Statistics	5-32
		Checking Dependencies	
		Checking and Updating Table Statistics	
	5.6	Editing Data in a Table	5-34
	5.7	Renaming a Table	5-36
	5.8	Dropping a Table	5-38
	5.9	Constraint Syntax	5-39
6	Woi	rking with Views	6-1
	6.1	Creating a View	6-2
	6.2	Checking View Properties	6-7
	6.3	Granting View Privileges	6-8
	6.4	Browsing Views	6-9
	6.5	Dropping a View	6-11
7	Woi	rking with Indexes	7-1
7	<b>Wo</b> ı 7.1	r <b>king with Indexes</b> Creating an Index	
7		-	7-3
7	7.1	Creating an Index	7-3 7-8
7	7.1 7.2	Creating an Index Dropping an Index	7-3 7-8 7-9
7	7.1 7.2 7.3	Creating an Index Dropping an Index Rebuilding an Index	7-3 7-8 7-9 7-10
8	7.1 7.2 7.3 7.4 7.5	Creating an Index Dropping an Index Rebuilding an Index Renaming an Index	7-3 7-8 7-9 7-10 7-11
-	7.1 7.2 7.3 7.4 7.5	Creating an Index Dropping an Index Rebuilding an Index Renaming an Index Updating Index Statistics	7-3 7-8 7-9 7-10 7-11 <b>8-1</b>
-	7.1 7.2 7.3 7.4 7.5 <b>Wo</b> l	Creating an Index Dropping an Index Rebuilding an Index Renaming an Index Updating Index Statistics rking with Signature Text Indexes	7-3 7-8 7-9 7-10 7-11 <b>8-1</b> 8-2
-	7.1 7.2 7.3 7.4 7.5 <b>Wor</b> 8.1	Creating an Index Dropping an Index Rebuilding an Index Renaming an Index Updating Index Statistics <b>rking with Signature Text Indexes</b> Creating a Signature Text Index.	7-3 7-8 7-9 7-10 7-11 <b>8-1</b> 8-2 8-7
-	7.1 7.2 7.3 7.4 7.5 <b>Wor</b> 8.1 8.2	Creating an Index Dropping an Index Rebuilding an Index Renaming an Index Updating Index Statistics rking with Signature Text Indexes Creating a Signature Text Index	7-3 7-8 7-9 7-10 7-11 <b>8-1</b> 8-2 8-7 8-8
-	7.1 7.2 7.3 7.4 7.5 <b>Wol</b> 8.1 8.2 8.3 8.4	Creating an Index Dropping an Index Rebuilding an Index Renaming an Index Updating Index Statistics rking with Signature Text Indexes Creating a Signature Text Index Dropping a Signature Text Index Rebuilding a Signature Text Index	

	9.2	Dropping an IVF Text Index	9-8
	9.3	Rebuilding an IVF Text Index	9-9
	9.4	Checking IVF Text Index Statistics	9-10
10	Usir	ng Foreign Keys	
	10.1	Creating a Foreign Key	
		Adding a Foreign Key	
		Setting Foreign Key Options	
	10.2	Dropping a Foreign key	10-9
11	Usir	ng Triggers	11-1
	11.1	Creating a Trigger	11-2
		Assigning a Trigger Name and Table	
		Specifying Trigger Action Settings	
		Indicating the Referencing Clause	
		Entering the WHEN condition clause	
		Entering SQL statements for the trigger action	
	11.2		
	11.3	Modifying a Trigger	11-12
12	Wor	king with Stored Commands	12-1
	12.1	Creating a Stored Command	12-2
	12.2	Executing a Stored Command	12-4
	12.3	Dropping a Stored Command	12-6
	12.4	Granting Stored Command Privileges	12-8
13	Wor	king with Stored Procedures	13-1
	13.1	Creating a Stored Procedure	13-2
	13.2	Executing a Stored Procedure	13-9
	13.3	Dropping a Stored Procedure	13-10
	13.4	Granting Privileges on Stored Procedures	13-11
	13.5	Add jarfile for Java Stored Procedure	13-13

	13.6	Drop jarfile	13-17
14	Wor	king with Database Links	14-1
	14.1	Creating a Database Link	14-2
	14.2	Dropping a Database Link	14-4
15	Wor	king with Replication Schedule	15-1
	15.1	Creating a Replication Schedule	15-2
	15.2	Dropping a Replication Schedule	15-7
	15.3	Modifying a Replication Schedule	15-8
16	Man	aging Table Replication	16-1
	16.1	- ,	
		Adding Synchronous Table Replication Adding Subscribers to a Synchronous Replication	
	16.2		
	10.2	Adding Asynchronous Table Replication	
		Adding Subscribers to an Asynchronous Replication	
	16.3	Dropping a Subscriber	16-29
	16.4	Dropping a Replication	16-30
17	Wor	king with Domains	17-1
	17.1	Creating a Domain	17-2
	17.2	Dropping a Domain	17-5
18	Wor	king with Synonyms	18-1
	18.1	Creating a Synonym	18-2
	18.2	Dropping a Synonym	18-4
19	Que	ry by example (QBE)	19-1
20	Man	aging Users	20-1
	20.1	Creating a New User Account	20-2
	20.2	Changing Security Level	20-6

		Setting Authority Level	
		Granting and Removing Object Privileges	
	20.3	Changing a User's Password	20-11
	20.4	Browsing Assigned Schema	20-12
	20.5	Deleting a User Account	20-13
21	Man	aging Groups	21-1
	21.1	Creating a New Group	21-2
	21.2	Adding and Removing Group Members	
		Managing Group Object Privileges	
22	Con	troling Access	
		Broswing Access Control List	
		Creating Access Controling List	
		Dropping Access Controling List	
23	Data	a Transfer	
	23.1	Importing Data from Text	23-3
	23.2	Importing Data from XML	23-12
	23.3	Importing Data from ODBC	23-16
		Importing ODBC Data from Tables	
		Importing ODBC Data Using SQL SELECT State	
		Importing ODBC Data Through an XML Batch Fi	
	23.4	Exporting Data to Text	
	23.5	Exporting Data to XML	23-42
24	Mon	itoring a Database	24-1
	24.1	Database Monitor Tool	24-2
	24.2	Export to File Options	24-10
	24.3	Database Monitor (Tree)	24-13
		Monitoring Database Sessions	
		Killing Connections	
		Monitoring Database Locks	

		Monitoring Database Status Monitoring Pending Transactions	
25	Sett	ing JDBA Options	25-1
	25.1	Altering Run Time Settings	
		Changing Backup Settings	
		Changing File Object Settings	
		Changing System Control Settings	
		Changing Connection Settings	
	25.2	Setting Preferences	
		Setting General Options	
		Setting Table Options	
Glos	ssary		Glossary-1
Inde	ЭХ		Index-1

# Introduction

Welcome to the JDBA Tool User's Guide. JDBA Tool is a cross-platform userfriendly graphical user interface (GUI) that helps users to easily manage database objects in DBMaker, a powerful and flexible SQL Database Management System. JDBA Tool hides the complexity of the DBMS and query language and provides an easy to understand and convenient interface. You can perform database functions without having to learn SQL. JDBA Tool also provides statistical data and information on who is using your database with its monitoring functions.

This manual gives systematic instructions on how to use the JDBA Tool to manage database objects in DBMaker. The features of the program are explained with a brief description of their function followed by procedures that guide you through proper use of the feature. The procedural steps are periodically reinforced by figures of the JDBA Tool screen.

This book is intended for users who will design and administer DBMaker databases using JDBA Tool. It is intended to teach those who are unfamiliar with using DBMaker, but have some understanding of how a relational database works. It is assumed that the user does have some knowledge of the platform on which they are working from. Information in this manual may also be helpful as a reference for experienced users.

To perform JDBA Tool tasks, refer to specific sections in the chapters. You should read any descriptions included before the procedures and follow each of the steps in the procedures. It is also recommended that you read other sections within the same chapter, as this will increase your understanding of JDBA Tool.

# 1.1 Additional Resources

DBMaker provides a complete set of DBMS manuals in addition to this one. For more detailed information on a particular subject, consult one of the books listed below:

- For an introduction to DBMaker's capabilities and functions, refer to the *DBMaker Tutorial*.
- For more information on designing, administering, and maintaining a DBMaker database, refer to the *Database Administrator's Guide*.
- For more information on database server management, refer to the *JServer Manager User's Guide*.
- For more information on configuring DBMaker, refer to the *JConfiguration Tool Reference*.
- For more information on the native ODBC API, refer to the *ODBC Programmer's Guide*.
- For more information on the dmSQL interface tool, refer to the *dmSQL User's Guide*.
- For more information on the SQL language used in dmSQL, refer to the *SQL Command and Function Reference*.
- For more information on the ESQL/C programming, refer to the *ESQL/C User's Guide*.
- For more information on error and warning messages, refer to the *Error and Message Reference*.
- For more information on the DBMaker COBOL Interface, refer to the *DCI User's Guide*.

## 1.2 Technical Support

CASEMaker provides thirty days of complimentary email and phone support during the evaluation period. When software is registered an additional thirty days of support will be included. Thus, extending the total support period for software to sixty days. However, CASEMaker will continue to provide email support for any bugs reported after the complimentary support or registered support has expired (free of charges).

Additional support is available beyond the sixty days for most products and may be purchased for twenty percent of the retail price of the product. Please contact <u>sales@casemaker.com</u> for more details and prices.

CASEMaker support contact information for your area (by snail mail, phone, or email) can be located at: <u>www.casemaker.com/support</u>. It is recommended that the current database of FAQ's be searched before contacting CASEMaker support staff.

Please have the following information available when phoning support for a troubleshooting enquiry or include the information with a snail mail or email enquiry:

- Product name and version number
- Registration number
- Registered customer name and address
- Supplier/distributor where product was purchased
- Platform and computer system configuration
- Specific action(s) performed before error(s) occurred
- Error message and number, if any
- Any additional information deemed pertinent

# 1.3 Document Conventions

This book uses a standard set of typographical conventions for clarity and ease of use. The NOTE, Procedure, Example, and CommandLine conventions also have a second setting used with indentation.

CONVENTION	DESCRIPTION
Italics	Italics indicate placeholders for information that must be supplied, such as user and table names. The word in italics should not be typed, but is replaced by the actual name. Italics also introduce new words, and are occasionally used for emphasis in text.
Boldface	Boldface indicates filenames, database names, table names, column names, user names, and other database schema objects. It is also used to emphasize menu commands in procedural steps.
KEYWORDS	All keywords used by the SQL language appear in uppercase when used in normal paragraph text.
SMALL CAPS	Small capital letters indicate keys on the keyboard. A plus sign (+) between two key names indicates to hold down the first key while pressing the second. A comma (,) between two key names indicates to release the first key before pressing the second key.
NOTE	Contains important information.
Procedure	Indicates that procedural steps or sequential items will follow. Many tasks are described using this format to provide a logical sequence of steps for the user to follow
<ul><li>Example</li></ul>	Examples are given to clarify descriptions, and commonly include text, as it will appear on the screen. Other forms of this convention include Prototype and Syntax.
CommandLine	Indicates text, as it should appear on a text-delimited screen. This format is commonly used to show input and output for dmSQL commands or the content in the dmconfig.ini file

Table 1-1Document Conventions

# **Getting to know JDBA Tool**

2

This chapter introduces the layout of the JDBA Tool workspace, and contains general information about many of its components. You will also learn how to connect and disconnect from a database.

JDBA Tool as well as all the other *DBMaker* Java tools (JServer Manager, Java Configuration Tool) operates in the Java Run Time Environment. To start these programs the jdk1.3 (Java Development Kit 1.3) or the JRE (Java Run Time Environment) for Java should be installed on the system. JRE 1.3.1 is automatically installed on the system if DBMaker release 4.3 is installed from disk.

# 2.1 Summary of Features

JDBA Tool has a wide variety of features that will enable you to effectively manage your database.

- You can easily create table schema in a database and add columns to it. You can also define constraints for data in a table.
- After creating the table schema and adding columns, you can insert records to a table. Moreover, you can define a constraint to ensure that each inserted record falls within a specified range.
- You can define a column using a domain. The column inherits the properties of the domain (data type, default value, and value constraint) without requiring you to explicitly specify them.
- After a table is created successfully, it is easy to create an index, primary key, or foreign key in a table. A foreign key lets you establish a relationship between different tables in a database.
- DBMaker allows you to query easily by creating a view from various tables or specifying a synonym for a specific table. Views and synonyms let you refer to and manipulate data from tables quickly and easily.
- After creating all database objects, you can easily drop a table, view, synonym, or domain. (To drop some objects, you should take into account the mutual relationships between objects. For example, you should drop a foreign key before dropping the referred primary key.)
- Any authorized user can create database links to access database objects on remote databases
- You can transfer table data between local and remote table objects through the Table Replication command.
- To manage frequently used SQL commands, you can create stored commands which can be reused whenever needed.

- To perform frequently repeated tasks easily, stored procedures are used. Thus, eliminating the need for repeated SQL compilation and optimization.
- For handling complex transactions in the database, you can create triggers that will automatically execute when the user inserts, deletes, or updates data in the database.
- A stored procedure can be called by a trigger action
- Text indices can be created for columns with CHAR, VARCHAR, LONGVARCHAR and FILE data types.
- As the system administrator, you can add users or groups to a database. After adding users and groups to a database, you can assign privileges to a user or a group. The benefit of a group is that you can assign the same privileges to multiple users. You only need to assign these privileges to a group once.
- Monitor the current system environment such as which database users are currently connected to the database, locks placed on data objects, and all current runtime settings.
- You can set default values for creating tables and choose to display BLOB data using SQL statements.

### 2.2 About the JDBA Tool Workspace

Figure 2-1 shows the information required for logging on to the JDBA Tool. It is recommended that all the database settings be made before logging on to the database. The database settings are changed using the configuration tool. The **Setup** button launches the JConfiguration Tool. Enter the **Database Name**, **User Name** and **Password** and click **Setup** to check or modify the advanced settings of the database.

JDBATool Login		×
Database Name :	DBSAMPLE4 💌	<u> 0</u> K
User Name: Password:	SYSADM	<u>業 C</u> ancel 満 <u>Setup</u> 愛日elp
<b>?)</b> (c) 15	95-2005 CASEMaker Inc. All Rights Re	eserved.

Figure 2-1 The JDBA Tool Login window

For details regarding settings, please refer to the *JConfiguration Tool Reference*. After you log onto a database the elements of the GUI will appear on the screen. These elements are summarized in Figure 2-2 and described in the following subsections

Menu Bar	Toolbar	Main Console	
Incompany and in the later	100 Mar.		
. 533.	Tool Day		
S CARRENT CECHARCES	General information		
Comparison     C	Della franza en tra esta alterna esta della del	1234 2009 201 12 2019 2.0 2.0 0.0 Marine 2014 0.0 Ma	

Figure 2-2 The elements of the JDBA Tool Graphical User Interface

#### Menu Bar

The menu bar displays the JDBA Tool's pull-down menus. Each menu item is used for performing different functions and is discussed in detail in the following chapters of this book.

#### The Database in Tree View

The database tree displays all the objects in the database. The root of the tree is the name of the database, the rest of the objects follow down the tree. The name of each object is also displayed. With the help of the database monitor in the tree, the user can monitor the database and keep track of users and their transactions.

### 2.3 Connecting to a Database

To manipulate data in a database, you must connect to the database first. JDBA Tool allows you to connect to a single database at a time. In order to connect to a multi-user database with JDBA Tool, a database server program must already be running. The database can be started with JServer Manager or DBMaker Server. After the database is started, proceed with the following steps to connect to the database.

- **T**o connect to a database:
  - 1. Select a database from the **Database Name** menu in the **JDBA Tool Login** window.

JDBATool Login		×
Database Name :	DBSAMPLE4 -	<mark>€</mark> ¶ <u>o</u> k
User Name :	SYSADM	🗱 <u>C</u> ancel
		💑 <u>S</u> etup
Password :		🦞 <u>H</u> elp
<b>ද</b> ි) (c) 19	95-2005 CASEMaker Inc. All Rights Re	eserved.

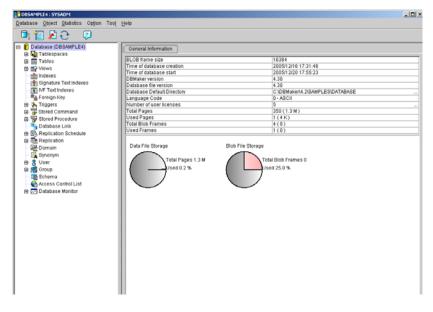
2. Enter your user ID in the User Name field.

**NOTE** If a default user ID has already been set, then the default user ID is automatically displayed in the User Name field.

- 3. If you have been assigned a password, enter it in the **Password** field
- 4. Click Setup to open the Connect Database Advanced Setting window.
- 5. Set options in the following categories:
  - Connection
  - DmServer
  - Data Manipulation
  - SQL Attributes

**NOTE** *Refer to the JConfiguration Tool Reference for more information about advanced settings.* 

- 6. Click **OK**. The **General Information** window displays the following information:
  - The DBMaker version (4.3).
  - The file version.
  - The date and time of database creation
  - The date and time at which the database was started.
  - The BLOB frame size.
  - The database default directory
  - The language code
  - The number of users who have permission to access the database.
  - The total number of data pages reserved by the database.
  - The number of data pages reserved by the database that are used.
  - The total number of BLOB frames reserved by the database
  - The number of used BLOB frames.



#### **NOTE** *A graphical representation of the Data and BLOB File storage is also displayed.*

7. If you wish to connect to another database that has been started by your server program, click the Database pull-down menu and select Connect Database. Repeat steps 1 to 4. Connecting to a new database will automatically disconnect the database that you were connected to earlier.

# 2.4 Disconnecting from a Database

Once you have finished using the database, you can disconnect from the database.

- **NOTE** Since JDBA Tool works in an AUTOCOMMIT mode, all database transactions are automatically written to the disk before disconnecting from the database.
- **T**o disconnect from a database:
  - 8. Select Disconnect Database from the database menu. The JDBA console will appear empty.

# Working with Schema

3

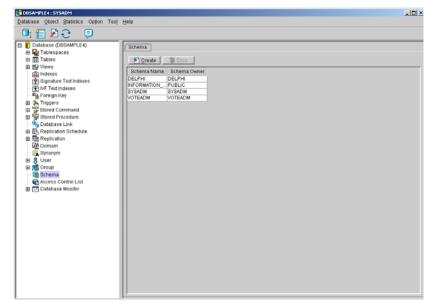
A schema is essentially a namespace. A schema contains schema objects, also known as named objects. Tables, views, indexes, synonyms, domains, commands and procedures are all examples of schema objects. Synonyms and domains must have unique names in the database, but other schema object names may duplicate those of other objects existing in other schemas. Schema objects are accessed by qualifying their names. Qualifying a schema object means tagging the object with the schema's name as a prefix.

You can quickly and easily, enter or remove, a schema into the current database using the JTool interface. The schema name must be distinct from the name of any existing schema in the current database.

### 3.1 Browsing Schema

You can quickly browse all schema contained in a database by selecting the Schema icon from the data structure tree. The schema's name and owner are displayed in the panel to the right of the data structure tree.

- **T**o browse a schema:
  - 1. Click the **Schema** icon from the tree. A list of all schemas in the database is displayed.



2. Browse the schema listed on the right panel by using the upward and downward arrows.

# 3.2 Creating a Schema

Creating a schema using JDBATool is a very intuitive process. You are guided through the process by a user-friendly user interface. After the schema is created, you can create objects within the schema. The schema owner has full control for any privileges granted on the schema that they have created or been assigned to them by the DBA.

It is important to note that every schema must have a unique name in the database.

- **T**o create a schema:
  - 1. Click the **Schema** icon from the tree. A list of all schemas in the database is displayed in the panel to the right.

D0SAMPLE4 : SYSADM		
Database Object Statistics Option Tool	Help	
🔍 🛅 🖉 근 🖉		
Contabase (IBS/MPLEs)     Contabase (IB	Schems Sc	

2. Click the **Create** button in the **Schema** window. The **Create Schema Wizard Introduction** window appears.



3. Click the Next button in the Create Schema Wizard Introduction window. The Create Schema Wizard Name Schema/Authorize the Schema window appears.

Create Schema Wizard Name the Schema	Authorize the Schema Owner	×
Name the Schema and		
Authorize the Schema		
Owner.		
When naming the schema, the schema name should unique in the database system catalog. You can also transfer		
ownership of the schema to a user.	Schema Name :	
	Authorization user name :	
	▼	
	♀ Previous Next	

- 4. In the **Schema name** field enter a name for the schema. Schema names may not contain spaces and every schema name must be unique.
- 5. Select the schema owner from the **Authorization user name** drop down list. If no name is selected from the list, the creator of the schema becomes the schema owner.
- 6. Click the Next button. The Create Schema Wizard Final Review window appears. From this window the user can edit the SQL code in the Create Schema SQL Script field.

Create Schema Wizard Final review	×					
	Create Schema SQL Script :					
	CREATE SCHEMA NewShema AUTHORIZATION SYSADM					
Final reivew.						
The SQL script will be executed when you press the Finish button.						
<u> </u>	Previous Finish 🗘 🗱 Cancel 🥊 Help					

7. Click the **Finish** button when you are satisfied with the schema being created. A conformation message will appear stating that the creation of the schema was successful. The created schema will appear in the **Schema** window to the right.

Inforn	ation				×
1	Schema Cr	eation	Successful!		
			<u> () o</u> k	]	

# 3.3 Dropping a Schema

When a schema is no longer required in the database you can remove the schema.

- ➔ To drop a schema:
  - 1. Click the **Schema** icon from the tree. A list of all schemas in the database is displayed in the panel to the right.

Schema	
<u>C</u> reate	谢 Drop
Schema Name	Schema Owner
DELPHI	DELPHI
INFORMATION	PUBLIC
SYSADM	SYSADM
VOTEADM	VOTEADM

2. Choose the schema you want to drop. Click the **Drop** button in the **Schema** window. The **Drop Schema** confirmation dialog box appears.

Drop So	:hema			x
	Do you want i	to drop the so	hema A1 ?	
1	Default	$\bigcirc$ Restrict	🔿 Cascade	
		Mord		
		<u>ф</u> ок	🛛 🇱 <u>C</u> ancel	

- 3. DBMaker provides three options to drop the Schame. The **Default** option is same as dropping shema without option specified, this behavior will not check if any dependent object exits when dropping shema, and the dependent objects would become invalid then; the **Restrict** option will check the security and whether there is table, domain or procedure depends on it, this option only allows to drop the shema that no other objects depend on it; the **Cascade** option drop the schema and all the other dependent objects.
- 4. Click **OK**. The schema will be removed from the database or there will be appear a dialog box to tell you that the schema cannot be dropped.

# **Working with Tablespaces**

4

A DBMaker database is composed of one or more logical divisions known as *tablespaces*. With tablespaces, the database can be divided into manageable areas. In the logical view, a tablespace contains one or more tables and indexes. In the physical view, a tablespace is the physical storage (directory path) that consists of one or more files. By the proper use of tablespaces, data is better organized both at the physical and logical level, and storage space is used more efficiently.

### 4.1 Browsing Tablespaces

All DBMaker databases have at least two tablespaces. The first is called the system tablespace (SYSTABLESPACE), and the second is the default user tablespace (DEFTABLESPACE). Whenever you create a database, DBMaker generates a system tablespace to record the *system catalog tables*. The system catalog tables store information about the entire database. The default tablespace (DEFTABLESPACE) is used to store user tables if users do not define their own tablespace. You can view information about all the tablespaces in a database by selecting the Tablespace item from the tree.

- **•** To browse a tablespace:
  - 1. Click the **Tablespace** object in the tree. A list of all tablespaces is displayed.

B Distance (CBSAMPLE4) B D Tableparter DEFTABLESPACE	Tatessee								
									Signalise Telescolor     Signalise Telescolor     Signalise Telescolor     Tracing Telescolor     Tracing Telescolor     Signalise Manifer

- 2. Browse the tablespaces listed on the right panel by using the upward and downward arrows. You can see all the tablespace information listed under the following fields.
  - **Name** tablespace name
  - **Type** tablespace type which can be regular tablespace or autoextend tablespace.
  - **Read Only Mode** determines whether the tablespace is a Read Only tablespace or a Read/Write one. The read-only tablespace is a tablespace that does not allow any updates or creations of new objects in the tablespace.
  - # of files number of files in the tablespace, including data files and BLOB files
  - Total Pages number of total pages in data files
  - Free Pages number of free pages in data files
  - Total Frames number of total frames in BLOB files
  - Free Frames number of free frames in BLOB files
  - Creation Time tablespace creation time

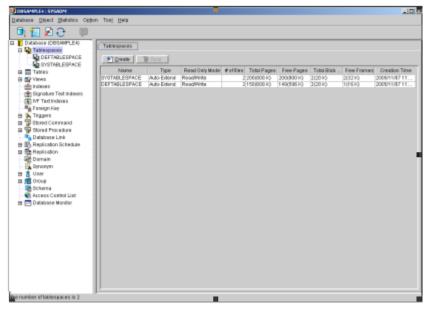
### 4.2 Creating a Tablespace

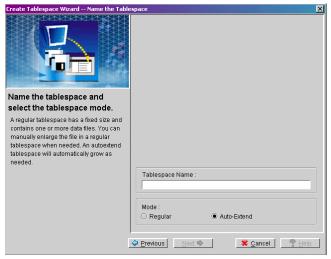
Smaller tables that contain data of a similar nature can be grouped in a single tablespace, but very large tables should be placed in their own tablespaces. A regular tablespace has a fixed size and contains one or more data files. If the physical file of a regular tablespace is too small to hold all the data you wish to store in it, you must enlarge it manually. An autoextend tablespace is a tablespace that will automatically grow as needed.

Consider the following when creating a tablespace:

- The logical name must be a unique name.
- There are two types of files available: DATA or BLOB.
- In the case of a data file in a tablespace, the size is represented as the number of pages. In the case of a BLOB file, the size is represented as the number of frames.
- A BLOB file cannot be the only file in a single tablespace. There should be at least one data file in a tablespace. Tablespace creation will fail if no data file is included.
- **T**o create a tablespace:
  - 1. Click the **Tablespaces** object in the tree. The **Tablespaces** page is displayed

2. Click the **Create** button in the **Tablespaces** window. The **Create Tablespace Wizard** window is opened.

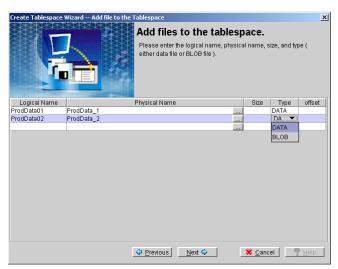




3. Click the **Next** button. The **Name the Tablespace** window is displayed.

- 4. Enter the name of the tablespace in the **Tablespace Name** field.
- 5. Select a tablespace type:
  - To select a regular tablespace, select the **Regular** option button.
  - To select an Auto-Extend tablespace, select the **Auto-Extend** option button.

6. Click the **Next** button. The **Add file to the Tablespace** window is displayed.

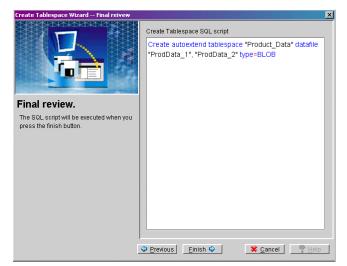


- 7. Enter the logical name of the tablespace in the **Logical Name** column.
- 8. Enter the physical name of the tablespace in the **Physical Name** column.

**NOTE** *You can also select the physical name of the tablespace from a list by clicking the Browse button.* 

- 9. Enter the size of the tablespace in the Size column.
- 10. Select the tablespace type from the **Type** column.
- 11. Set the file offset for raw devices in the **Offset** column.
  - **NOTE** *This option is active only for databases running in a Unix environment.*

12. Click the **Next** button to proceed. The wizard will display the SQL command for creating a new tablespace. This command can be edited.



- **13**. To edit the command, enter or delete command syntax in the command line area.
- 14. Click the **Finish** button. The **Information** window of the **Create Tablespace Wizard** is displayed.



### 4.3 Altering a Tablespace

After creating a tablespace, the user may want to alter the tablespace in the following ways:

- Add data or BLOB files to a tablespace.
- Compress a tablespace.
- Add pages to files in a tablespace.
- Change the tablespace from autoextend to regular or vice versa.
- Change the tablespace from read only to read/writeor vice versa.

#### Adding Files to a Tablespace

Once you have created a tablespace, you can add data or BLOB files to a tablespace. Consider the following when adding files to a tablespace:

- The logical name must be a unique name.
- There are two types of files available: DATA or BLOB.
- In the case of a data file in a tablespace, the size is represented as the number of pages. In the case of a BLOB file, the size is represented as the number of frames.
- **To add files to a tablespace:** 
  - 1. Select the tablespace to which you want to add one or more files. The properties for the tablespace will be displayed in the main console.
  - 2. Click the **Modify** button. An empty row is displayed in the tablespace list.

Properties	]							
Check T	ablespace	∎,ª	Alter <u>F</u> ile	1	<u>D</u> rop File		Alter TS	
Modify	🛛 💫 Confirm 🛛 🖄 Cancel							
Tablespace M	ode: <ul> <li>Auto-Extend</li> <li>F</li> </ul>	Regular						
Read Only Mod	de: 🛛 🔿 Read Only 🔘 F	lead∕Wr	ite					
Logical Na	Physical name	Туре	Total	Total Bytes	Free	Free Bytes	Creation Time	Offset
PRODATA1	D:\DBMaker\4.3\SAMPLES\DATA	DATA	20	80 K	19	76 K	2005/11/15 16:54	
PRODATA2	D:\DBMaker\4.3\SAMPLES\DATA	BLOB	20	308 K	19	304 K	2005/11/15 16:54	
		DATA	0	0	0	0		

- 3. To change the **Tablespace mode** from Auto-Extend to Regular, select the **Regular** option button above the list.
- 4. To change the **Tablespace Mode** from Regular to Autoextend, select the **Auto-Extend** option button above the list.
- 5. To change the **Read Only Mode** from Read Only to Read/Write, select the **Read/Write** option button above the list.
- 6. To change the **Read Only Mode** from Read/Write to Read Only, select the **Read Only** option button above the list.
- 7. Enter the logical name of the tablespace in the **Logical Name** column.

Properties								
Chec <u>k</u> T	ablespace	E,	Alter <u>F</u> ile	1	<u>D</u> rop File		Alter TS	
Modify	🛛 💫 Confirm 🛛 🔭 Cancel							
Tablespace M	ode: 💿 Auto-Extend 🔿 F	Regular						
Tablespace M Read Only Mo		Read/Wri	ite					
		-		Total Bytes	Free	Free Bytes	Creation Time	Offset
Read Only Mo	de: ORead Only OF Physical name	Read/Wri		Total Bytes 80 K			Creation Time 2005/11/15 16:54	Offset
Read Only Mo Logical Na PRODATA1	de: ORead Only OF Physical name D1DBMaker(4.31SAMPLES)DATA	- Read/Wri Type	Total		19	76 K		Offset

8. Enter the physical name of the tablespace in the **Physical Name** column.

Properties	1							
Chec <u>k</u> T	ablespace Update Sta	itistics	E à A	lter <u>F</u> ile	1	<u>O</u> rop File	Alter TS	
Modify	🛛 😺 Co <u>n</u> firm 🔹 🖄 Cano	el						
Tablespace M	ode: 💿 Auto-Extend	a o f	Regular					
Read Only Mo	de: O Read Only	) F	ReadAVrite	9				
Logical Na	Physical name	Туре	Total	Total Bytes	Free	Free Bytes	Creation Time	Offset
	D3DBMaker14.3\SAMPLE	DATA	20	80 K	19	76 K	2005/11/15 16:54	
PRODATA1								
PRODATA1 PRODATA2	D:\DBMaker\4.3\SAMPLE	BLOB	20	308 K	19	304 K	2005/11/15 16:54	
				308 K 0	19 0	304 K 0	2005/11/15 16:54	

9. Enter the size of the tablespace in the **Total Pages** column.

Properties	]								
Chec <u>k</u> T	ablespace 🛛 🛄 Update Sta	tistics	∎ <sub>i</sub> t A	lter <u>F</u> ile	1	<u>D</u> rop File	Alter TS		
Modify	🛛 😺 Co <u>n</u> firm 🔹 🖄 Cano	el							
Tablespace M	ode:   Auto-Extend	a o f	Regular						
Read Only Mod	le: O Read Only	) F	Read/Writ	е					
Logical Na	Physical name	Туре	Total	Total Bytes	Free	Free Bytes	Creation Time	Offset	
PRODATA1	D:\DBMaker\4.3\SAMPLE	DATA	20	80 K	19	76 K	2005/11/15 16:54		
PRODATA2	D:\DBMaker\4.3\SAMPLE	BLOB	20	308 K	19	304 K	2005/11/15 16:54		
useDate	useData_1	DATA	30	0	0	0			
		DATA	0	0	0	0			

10. Select the tablespace type from the **Type** column

Properties	1								
Check T	ablespace 🚺 🛄 Update S	tatistics	E à A	lter <u>F</u> ile	1	<u>D</u> rop File	Alter TS		
Modify	🛛 😺 Co <u>n</u> firm 🔹 🗞 Car	ncel							
Tablespace M	ode:   Auto-Exter	nd 🔿 F	Regular						
Read Only Mod	de: 🔿 Read Onl	/ ® F	Read/Write	9					
Logical Na	Physical name	Туре	Total	Total Bytes	Free	Free Bytes	Creation Time	Offset	
PRODATA1	D:\DBMaker\4.3\SAMPLE -	. DATA	20	80 K	19	76 K	2005/11/15 16:54		
PRODATA2	D:\DBMaker\4.3\SAMPLE	. BLOB	20	308 K	19	304 K	2005/11/15 16:54		
useDate	useData_1		30	0	0	0			
		DATA	0	0	0	0			
		BLOB							

11. Press on the **Confirm** button. You can see the new file added to the rest of the files in the tablespace.

### Shrinking and Compressing a Tablespace

In order to optimize storage space, the user may choose to compress the tablespace by moving the data pages and BLOB frames to the beginning of the file or shrink the tablespace by changing the number of free pages remaining in each of the files in the tablespace.

The number of tailing free pages you want the tablespace to contain should be less than the number of free pages that are being replaced. By replacing the number of tailing free pages in a tablespace the total number of free pages in each of the files in the tablespace is altered.

- **T**o shrink or compress a tablespace:
  - 1. Select the tablespace that you want to compress or shrink. The **Properties** page is displayed.

Properties	1							
📑 Chec <u>k</u> T	ablespace 🛛 🛄 Update St	atistics	∎ <b>è</b> A	lter <u>F</u> ile	1	<u>O</u> rop File	Alter TS	
Modify	🛛 🔂 Confirm 🛛 🎦 Can	icel						
Tablespace Mo	ode: <ul> <li>Auto-Exter</li> </ul>		Regular					
Read Only Mod	de: O Read Only							
Logical Na	Physical name	Type	Total	Total Bytes	Free	Free Bytes	Creation Time	Offset
	Physical name D:\DBMaker\4.3\SAMPLE		Total 20		Free 19		Creation Time 2005/11/15 16:54	Offset
PRODATA1	· ·			80 K 308 K		76 K		Offset

2. Click the **Alter TS** button on top of the window. The **Alter Tablespace** dialog box is displayed.

Alter Tablespace
Tablespace : PRODUT_DATA
Total Pages : 50 free pages : 48
Total Blob Frames : 20 free frame : 19
Compress Tablespace move data pages to the beginning of files.
O Shrink Tablespace replace tailing free pages with free pages
Compress & Shrink Tablespace
move data pages to the beginning of files.
replace tailing free pages with free pages
Check tablespace before action
🦓 Co <u>n</u> firm

- **3**. To compress the tablespace, select the **Compress Tablespace** option button.
- 4. To reduce the tailing or remaining free pages in tablespace files, select the **Shrink Tablespace** option button.
- 5. If you want to reduce the tailing or remaining free pages in the files of the tablespace, enter the number of tailing free pages you want the files in the tablespace to contain.
- 6. To compress and shrink the tablespace:
  - a) Select the Compress and Shrink Tablespace option button.
  - **b**) Enter the number of tailing free pages you want the tablespace to contain in the text field.
- 7. In order to check the consistency of the database before changes are made to the tablespace, click the **Check tablespace before action** checkbox

- 8. Click the **Confirm** button. The **Alter Tablespace** confirmation dialog box is displayed.
- 9. Click OK.

#### Modifying a File in a Tablespace

After adding files to a tablespace, it may be necessary to change one particular file in the tablespace or alter the tablespace itself

- **To modify a single file in a tablespace:** 
  - 1. Select the tablespace from the tree or the **Tablespaces** page that contains the file you want to modify. The properties of the tablespace will be displayed in the main window.

Properties									
📑 Chec <u>k</u> Tab	lespace 🛛 🕌 Update Statistics	E,	Alter <u>F</u> ile	8	<u>D</u> rop File	6	Alter TS		
📝 <u>M</u> odify	🕞 Co <u>n</u> firm 🛛 🚵 <u>C</u> ancel								
Tablespace Mod	e: 💿 Auto-Extend 🔾 R	egular							
Read Only Mode:	🔿 Read Only 💿 R		te						
Logical Name	Physical name	Туре	Total	Total Bytes	Free	Free Bytes	Creation Time	Offset	
PRODATA1	D:\DBMaker\4.3\SAMPLES\DA1	DATA	20	80 K	19	76 K	2005/11/15 16:54		
PRODATA2	D:\DBMaker\4.3\SAMPLES\DA1	BLOB	20	308 K	19	304 K	2005/11/15 16:54		
USEDATE	D:\DBMaker\4.3\SAMPLES\DA1	DATA	30	120 K	29	116 K	2005/11/15 17:04		

2. Click the Alter File button. The Alter File dialog box is displayed.

Alter File	×
Tablespace : PRODUT_DATA Logical Name : USEDATE Total size : 30	
Add pages     pages	
O Shrink File replace tailing free pages with free page	s
🖌 Check datafile before action	
Confirm Scancel Pelp	

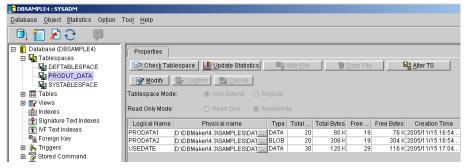
- **NOTE** *The Alter File button is disabled until a file is highlighted in the Tablespace. The highlighted file will be altered.*
- 3. Enter the number of pages you want to add to the file.

- 4. If you want to shrink the file by reducing the tailing free pages, select the **Shrink File** option button and enter the number of tailing free pages you want the file to contain.
- 5. Click the **Check datafile before action** check box if you want to check the consistency of the data file before altering the file.
- 6. Click the **Confirm** button. A message saying the file has been altered is displayed.
- 7. Click **OK**. The message clears.

### **Changing Tablespace Mode**

Changing the mode of a tablespace from autoextend to regular or from regular to autoextend is supported in DBMaker. Regular tablespaces generally provide better performance but require close management to prevent them from filling too quickly. Autoextend tablespaces are easier to manage but may become fragmented over time.

- **T**o change the tablespace mode:
  - 1. Select the tablespace to which you want change the mode. The properties for the tablespace will be displayed in the main console.



2. Click Modify.

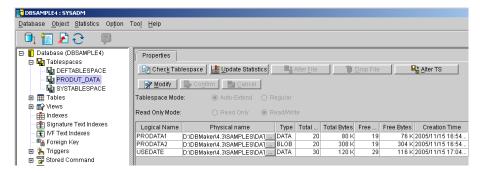
Properties								
Check Tab	lespace	۱. <sup>1</sup>	Alter <u>F</u> ile	1	Drop File		Alter TS	
Modify	💫 Co <u>n</u> firm 🛛 🔭 Cancel							
Tablespace Mod	e:       Auto-Extend       R	egular						
rablespace wou	e. 🕘 Auto-Externa 🔾 R	eguiar						
		egular ead/Wri	te					
		-	te Total	Total Bytes	Free	Free Bytes	Creation Time	Offset
Read Only Mode: Logical Name	🔿 Read Only 💿 R	ead∕Wri		Total Bytes 80 K	Free 19		Creation Time 2005/11/15 16:54	Offset
Read Only Mode: Logical Name PRODATA1	<ul> <li>Read Only          <ul> <li>Read Only</li> <li>R</li> </ul> </li> <li>Physical name</li> </ul>	- ead//Vri Type	Total	80 K		76 K		Offset
Read Only Mode:	Read Only     Read Only     Physical name D1DBMaker(4.3\SAMPLES\DA1	ead/Wri Type DATA	Total 20	80 K	19	76 K 304 K	2005/11/15 16:54	Offset

- 3. Select the tablespace mode: Auto-Extend or Regular.
- 4. Click Confirm.

#### Change the Read Only Mode

Change the Read Only Mode from Read Only to Read/Write or from Read/Write to Read Only is supported in DBMaker. The Read Only tablespace does not allow any updates or creations of new objects in the tablespace. The **SYSTABLESPACE** cannot be set to **Read Only** mode.

- **T**o change the Read Only mode:
- 1. Select the tablespace to which you want change. The properties for the tablespace will be displayed in the main console.



2. Click Modify.

Properties								
Check Tab	lespace	E,	Alter <u>F</u> ile	1	<u>D</u> rop File	5	Alter TS	
Modify	😺 Co <u>n</u> firm 🛛 🔭 Cancel							
Tablespace Mod	e:       Auto-Extend	Regular						
Read Only Mode:	<ul> <li>Read Only</li> </ul>	Read/Wri	te					
Read Only Mode: Logical Name	<ul> <li>Read Only</li> <li>Physical name</li> </ul>		te Total	Total Bytes	Free	Free Bytes	Creation Time	Offset
Logical Name		Type			Free 19		Creation Time 2005/11/15 16:54	Offset
Logical Name PRODATA1	Physical name	Type DATA	Total	80 K		76 K		Offset
	Physical name D:\DBMaker\4.3\SAMPLES\DA1_	Type DATA BLOB	Total 20	80 K 308 K	19	76 K 304 K	2005/11/15 16:54	Offset

- 3. Select the Read Only Mode: Read Only or Read/Write
- 4. Click Confirm.

### **Updating Statistics in a Tablespace**

As part of a strategy to optimize the performance of a tablespace, you can update the statistics of a tablespace. The Sample Ratio value denotes the percentage of data in the object that will be used to calculate and update the statistics of the object. If nothing is entered, the default ratio is 100. The sample ratio and the amount of data in the database determine how long it takes to update statistics.

- **T**o update statistics in a tablespace:
  - 1. Select the tablespace you want to update the statistics of from the tree or the tablespaces page. The **Properties** page is displayed.
  - 2. Click the **Update Statistics** button. The **Sample Ratio** dialog box is displayed.

Sample Ratio			×
Sample Ratio(	1~100):		
<u>୍ଶ୍ୱୀ o</u> k	🗱 <u>C</u> ancel	P <u>H</u> elp	

- **3**. Enter a sample ratio in the range of 1 to 100.
- 4. Click **OK**. The statistics of the tablespace are updated.

### 4.4 Dropping a Datafile From a Tablespace

You can drop a datafile file from a tablespace when it is no longer required. To drop a datafile from a tablespace the datafile must be empty and the datafile cannot be the only one left in the tablespace. The datafiles in the system and default tablespaces cannot be dropped.

- **T**o drop a datafile from a tablespace:
  - 1. Select the tablespace you want to modify from the tree or the tablespaces page. The **Properties** page is displayed.
  - 2. Select the datafile that you want to remove from the tablespace.

**NOTE** *You cannot remove a datafile from a tablespace if it is the only datafile remaining in the tablespace.* 

Properties								
📑 Chec <u>k</u> T	ablespace 🛛 🔡 Update Statistics	E	Alter <u>F</u> ile		Drop File	<u> </u>	Alter TS	
📝 Modify	Confirm Cancel							
Tablespace M	ode: <ul> <li>Auto-Extend</li> </ul>	Regular						
Read Only Mo	de: 🔿 Read Only 🔘							
Logical Na	Physical name	Type	Total	Total Bytes	Free	Free Bytes	Creation Time	Offset
		DATA	20	80 K	19	76 k	2005/11/15 16:54	
PRODATA1	D:\DBMaker\4.3\SAMPLES\DATA	DAIA	20	00 1	13			
PRODATA1 PRODATA2	D1DBMakerl4.3\SAMPLES\DATA D1DBMakerl4.3\SAMPLES\DATA		20	308 K			2005/11/15 16:54	

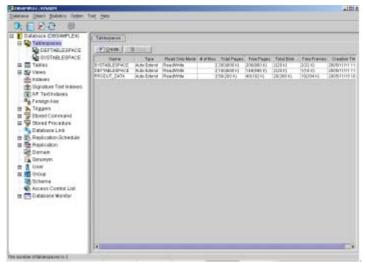
3. Click the **Drop File** button.

**NOTE** *You cannot drop the system or default tablespace datafiles.* 

### 4.5 Dropping a Tablespace

You can drop a tablespace that is no longer required in the database.

- **T**o drop a tablespace:
  - 1. Click the **Tablespace** object in the tree. A list of all tablespaces is displayed.



- 2. Select the tablespace you want to delete from the tree.
- 3. Click the **Drop** button at the top of the **Tablespace** page. Alternatively, right click the tree node of the tablespace and select **Drop Tablespace** from the popup menu. A window will open to confirm that you want to drop the selected table.

vie COSAPPLEA Terresoren	Terroren								
	Pigem   Withe								
ERPARIESPACE	Tee Tel Start All David	New Write	4 attes - Dae F 2 - Dae F 2 - Dae F 3 - Dae F	0 108/38040 0 188/38840	Take Bark	303140	Country for account of the account o		

4. The Drop Tablespace confirmation dialog box appears.



5. Click **OK** and the tablespace is dropped.

# Working with Tables

*Tables* are the logical unit of storage used by DBMaker to store data. A table consists of several columns and rows. A column can also be called a field or attribute, and a row can be called a record or tuple.

In DBMaker, each table is identified by a unique owner name and table name

This chapter describes:

5

- Creating a table
- Modifying table schema
- Setting table properties
- Granting privileges
- Updating table statistics
- Editing Data in a table
- Renaming a table
- Dropping a table
- Table and Column Constraint Syntax
- **NOTE** You can choose to view the system tables by selecting preferences from the **Option** menu in the menu bar. Select the **Show System Tables** option button from the **Table** page in the **Preferences** window. Refer to Chapter 21for more information.

### 5.1 Creating a Table

Tables provide the essential framework for designing a database. When creating a table, you can import schema from other tables belonging to the same database

When creating a table, you will select options from the Create Table wizard. The wizard lets you do the following:

- Set table, tablespace, and schema options
- Set column options
- Set column and table constraints
- Create a unique constraint
- Create foreign keys
- Set advanced table options

### Starting the Create Table Wizard

The create table wizard provides an intuitive interface for creating tables. All options for a table are available. Options that are important to set at the time of table creation are presented to ensure that the table is created in the way intended.

- **•** To start the Create Table Wizard:
  - 1. Select the **Table** object from the tree. The **Table** page will appear.

atabase <u>O</u> bject <u>S</u> tatistics	Option Tool <u>H</u>	lelp					
🕒 🔚 🖉 🕘	2						
Tables     Tables     DELPHI.CH	Tables						
	* Create	Drop					
🕀 🏛 SYSADM.AL		Clob.	11				
🖽 🎛 SYSADM.CA	Owner	Name	Tablespace	# of row		# of index	# of c
🖽 🎛 SYSADM.D/	DELPHI	CHINESE	DEFTABLESPACE	319	18	0	
🖽 🎛 SYSADM.D/	DELPHI	FORTUNES	DEFTABLESPACE	3543	187	0	000
🖽 🎛 SYSADM.D/	SYSADM	ALLTYPE	DEFTABLESPACE	1	1	0	8
🖽 🎹 SYSADM.D/	SYSADM	CARD	DEFTABLESPACE	8	1	1	8
🖽 🎹 SYSADM.D/	SYSADM	DATATYPE_BIN	DEFTABLESPACE	0	0	0	
🖽 🎹 SYSADM.DA	SYSADM	DATATYPE_BLOB	DEFTABLESPACE	2	1	0	
🖽 🎛 SYSADM.DI	SYSADM	DATATYPE_CHAR	DEFTABLESPACE	0	0	0	
🕀 🏛 SYSADM.EN	SYSADM	DATATYPE_DATE	DEFTABLESPACE	0	0	0	0000
🖽 🎛 SYSADM.HI	SYSADM	DATATYPE_FILE	DEFTABLESPACE	0	0	0	0000
🖽 🎛 SYSADM.IN	SYSADM	DATATYPE_NUM	DEFTABLESPACE	0	0	1	0000
🖽 🎛 SYSADM.PA	SYSADM	DISTRIBUTION	DEFTABLESPACE	0	0	0	0000
🕀 🎛 SYSADM.Rt	SYSADM	EMP	DEFTABLESPACE	0	0	1	8
🕀 🎹 SYSADM.Rt	SYSADM	HISTORY	DEFTABLESPACE	0	0	0	8
🕀 🎹 SYSADM.Rt	SYSADM	INFO	DEFTABLESPACE	0	0	0	8
🖽 🎹 SYSADM.T1	SYSADM	PATIENT	DEFTABLESPACE	0	0	0	
E T SYSADM.T2	SYSADM	RDOCOLUMNBLOB	DEFTABLESPACE	0	0	0	8
E T SYSADM.TS	SYSADM	RD0_TEST1	DEFTABLESPACE	0	0	0	
E T SYSADM.TE	SYSADM	REFER_INFO	DEFTABLESPACE	6	1	1	0000
E T SYSADM.TF	SYSADM	T1	DEFTABLESPACE	0	0	0	0000
E I SYSADM.TF	SYSADM	T2	DEFTABLESPACE	0	0	1	
E I SYSADM.US	SYSADM	T3	DEFTABLESPACE	0	0	1	
E T SYSADM.US	SYSADM	TESTSAMPLE	DEFTABLESPACE	0	0	0	
🕀 🎹 VOTEADM.I	SYSADM	TRIGGERTABLE1	DEFTABLESPACE	0	0	0	
E T VOTEADM.1	SYSADM	TRIGGERTABLE2	DEFTABLESPACE	0	0	0	
E TVOTEADM. V	0.0000	LIOCODATA	DEETADI CODACE	100000000	0	٨	
				10000000			•

2. Click **Create**. This will open the **Welcome to Create Table Wizard** window.



3. Click Next. The Name the Table window will open.

### Setting Table, Tablespace, and Schema Options

Once you have started the **Create Table Wizard**, you can set table, tablespace, and schema options. Table schema may be imported from another table. If you import table schema, all columns (name, length, data type) will initially have the same structure as the table the columns were imported from. The table schema may be modified after has been imported.

- **T**o set table, tablespace, and schema options:
  - 1. Follow the steps in the Create Table wizard until the **Name the Table** window will open.

Create Table Wizard Name the Table	×
Name the table and select	
the tablespace.	Schema Name :
The combination of the owner name and	SYSADM 👻
the table name must be unique. The table will be associated with DEFTABLESPACE by default if it's not explicitly associated	Table Name :
with any other. If you want to import from	Tablespace :
another table, please provide the table names.	DEFTABLESPACE
nomes.	🗌 Use Import Schema
	Import Schema
	Table Name :
	<b></b>
Previou	us Next 🗣 📔 🗱 Cancel 🖉 Help
V Previou	

- 2. Select the **Schema Name** from the drop down list. Your user login name is shown by default.
- 3. Enter a table name in the **Table Name** field.

**NOTE** *The table names should be unique for a single owner.* 

4. Select a tablespace from the **Tablespace** menu.

**NOTE** *By default, tables are placed in the default user tablespace (shown in the Tablespace menu as DEFTABLESPACE).* 

- 5. To import schema from another table:
  - a) Click the **Import Schema** check box if you want the schema of the new table to be the same as the schema of another table in the database.
  - b) Select the table to import from in the Table Name menu.
- 6. Click Next. The Add columns to the table window will open.

### **Setting Column Options**

You can set a variety of column options to meet your data requirements. The settings follow:

- Name: Lets you specify a column name.
- Type: Lets you specify the following data types: BINARY, CHAR, NCHAR, DATE, DECIMAL, DOUBLE, FILE, FLOAT, INTEGER, LONG VARBINARY, LONG VARCHAR, OID, SERIAL, SMALLINT, TIME, TIMESTAMP, VARCHAR, NVARCHAR, DOMAIN, BLOB, CLOB, and NCLOB. For complete descriptions of the data types, refer to the SQL Command and Function Reference.
- Precision: Lets you specify the length of the columns. This is necessary for the following data types that have variable length: VARCHAR, NVARCHAR, CHAR, NCHAR, DECIMAL, SERIAL, and BINARY.
- Scale: Lets you specify the scale of the data type. This is required if you specify the DECIMAL data type.
- Nullable: Lets you restrict or permit null values on your columns. By specifying NOT NULL, null values cannot be added to the column. By default, the column is set as null. NOT NULL is usually specified for primary key columns.
- Primary Key: Lets you specify a column as a primary key in a table.
- Default Value: Lets you specify a default value for the column data.
- **T**o set column options:
  - 1. Follow the steps in the Create Table wizard until the **Name the Table** window will open.

Create Table Wizard	Add columns to the Tal	ole				X
Primary Key(s) :		precision and s	lease en scale and of the col	ter a columr a starting n umns select	i name, data type, umber if data type æd (checked) as j	is SERIAL.
Name	Туре	Precision	Scale	Nullable	Default value	Primary Key
LoginID	char	20				
RequestTime	timestamp					
Request	long varchar					
Attachment	file			-		
ResponseTime	timestamp			-		
Response	long varchar			<ul> <li>Image: A set of the set of the</li></ul>		
RequestID	serial 🗸 🔻	1		$\checkmark$		
	long varbinary	10		$\checkmark$		
	long varchar					
	-					
	oid					
<ul> <li>Issessessessessessessessessesses</li> </ul>	serial	2 2 00000000000000000000000000000000000				800000000000000000000000000000000000000
• Deserve en accoccoccoccoccoccoccoccoccoccoccoccocco	smallint	20 20 20			***************************************	
	time					Remove
	timestamp	_				~ (
	varchar	🔹 Next 🗘		_ast 🕅	💥 Cancel 📗	🔮 Help

2. Enter column information under the respective headings.

3. Click the **Next** button. The **Column constraints** window will open. If you do not need to add constraints, a foreign key, or set advanced options for the table you may click **Last**; the **Final Review** window will open.

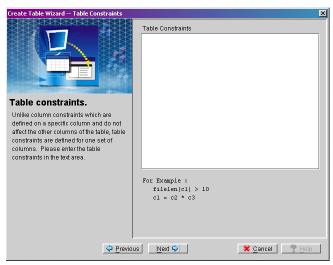
### **Setting Column and Table Constraints**

You can further customize your data requirements by setting column and table constraints. Column and table constraints must follow SQL syntax. See the section on Constraint Syntax at the end of this chapter for more information. Table constraints cannot be altered after the table has been created.

- **T**o set column and table constraints:
  - 1. Follow the steps in the Create Table wizard until the **Column Constraints** window will open.

Create Table Wizard Column Cor	nstraints
	Add column constraints to the required column. For Example : value > 100 filelen(value) < 5
Column Name	Column Constraint
LoginID	
RequestTime	
Request	
Attachment	
ResponseTime	
Response	
RequestID	
J	Previous     Next      Equation     Section:      Sec

2. Enter column constraints in the corresponding row under the **Column Constraint** heading.



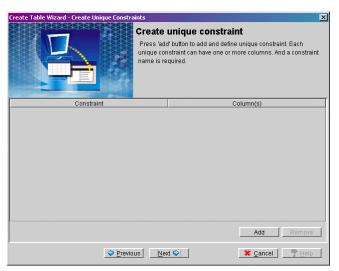
3. Click the Next button. The Table Constraint window will open.

- 4. Enter table constraints in the **Table Constraints** field.
- 5. Click the Next button. The Create Unique Constraint window will open.

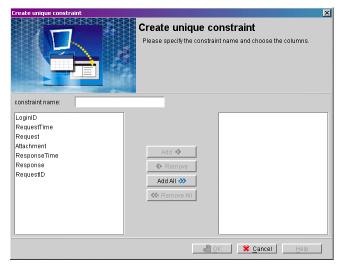
### Adding a UNIQUE Constraint

A UNIQUE constraint can be applied to one or more columns of a table at the time it is created. A column that has a UNIQUE constraint cannot have any two tuples with like values, but may contain null values. The UNIQUE constraint must be applied when a column is first created.

- To add a unique constraint
  - 1. Follow the steps in the Create Table wizard until the **Create Unique Constraint** window will open.

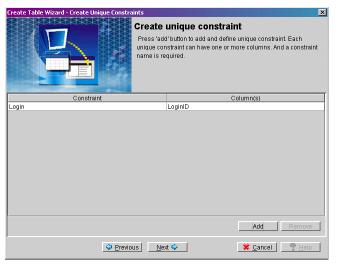


2. Click Add to select columns to apply the UNIQUE constraint to. The Create Unique Constraint window will open.



3. Enter a constraint name into the **constraint name** field.

- 4. Select columns to apply the UNIQUE constraint to by double clicking on the column names on the left. Alternatively, use the buttons in the middle to add or remove columns. Selected columns will appear on the right.
- 5. Click **OK**, the **Create unique constraint** window will reopen.



6. Click Next. The **Create Foreign Key to identify Column(s)** window will open.

### Adding a Foreign Key While Creating a Table

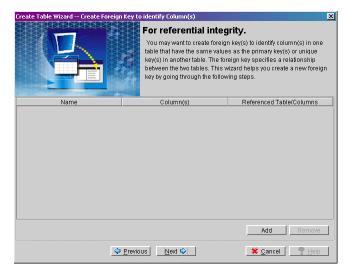
You can choose a foreign key as well as select foreign key options. Foreign key columns in the referencing table must map exactly to the primary key columns or unique index columns of the referenced table. The number of columns used in the foreign key and the schema of those columns must be the same in both the referencing and referenced tables.

A foreign key ensures referential integrity between two tables. How it performs this depends on the action chosen for the foreign key. When a record in the referenced column(s) is deleted or updated, the foreign key performs the action on the referencing column(s). The possible actions follow:

- Set Null: Records in the foreign key column are set to Null if the user updates / deletes the corresponding records in the primary key or unique index column.
- Cascade: The corresponding records in the referenced table are also updated or deleted.
- Set Default: The foreign key record is set to a default value if the user updates / delete s corresponding records in the primary key or unique index column.
- No Action: There is no action on the foreign key column if the user updates / deletes corresponding records in the primary key or unique index column.

The delete action of a foreign key may be different from the update action.

- **T**o add a foreign key during table creation:
  - 1. Follow the steps in the Create Table wizard until the **Create Foreign Key to identify Column(s)** window will open.





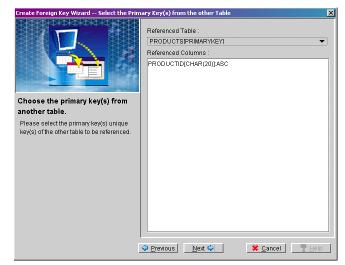
2. Click Add. The Create Foreign Key – Introduction window will open.

3. Click Next. The Name the Foreign Key window will open.

Create Foreign Key Wizard Name the Fore	ign Key	×					
	Foreign Key Name :						
	Column Order :						
	Column	Foreign Key					
and the second s	LoginID						
Manua dha ƙanalan haraan daalaad	RequestTime						
Name the foreign key and select	Request						
the column(s) as foreign key.	Attachment						
Please enter the foreign key name and	ResponseTime						
click the checkbox beside the column	Response						
names.	RequestID						
	Previous     Next	<u> H</u> elp					

- 4. Enter the foreign key name in the Foreign Key Name text field.
- 5. Click checkboxes beside the column names to indicate which columns to include in the foreign key.

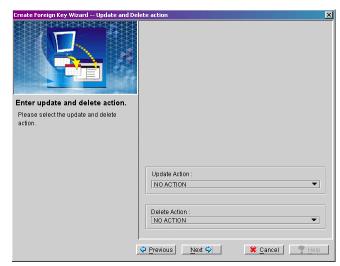
6. Click Next. The Choose the primary key(s) from another table window of the Create Foreign Key Wizard is displayed.



7. Select the name of the referenced table from the **Referenced Table** menu.

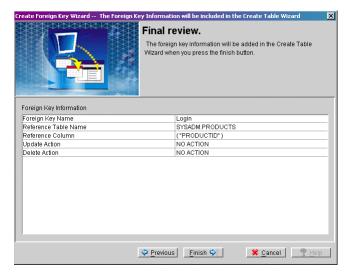
**NOTE** *Only tables containing primary keys or unique indexes that match the schema of the foreign key are shown* 

8. All the selected table columns that are primary keys or unique indexes will be displayed.

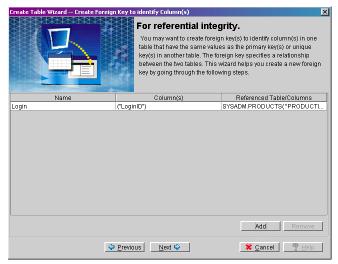


9. Click Next. The Update action and Delete action window will open.

- 10. Choose a foreign key setting from the **Update Action** menu.
- 11. Choose a foreign key setting from the **Delete Action** menu.
- 12. Click Next. The Final Review window for foreign key creation will open.



13. Click **Finish**. The **Create Foreign Key to identify Column(s)** window reappears.



- 14. To delete a foreign key:
  - a) Select the foreign key you want to remove.
  - **b**) Click the **Remove** button.
- 15. Click Next. The Advanced Information window will open.

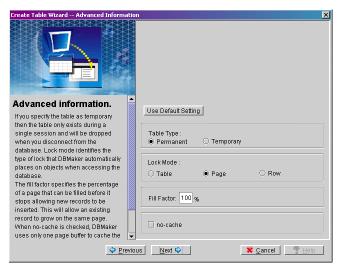
### **Setting Advanced Table Options**

For the table you are creating, you can choose various table options that affect the performance of tables in handling data. The options follow:

• Temporary / permanent tables: Temporary tables support fast data operations and can be used only by the creator. Temporary tables only exist during a single session, and DBMaker will automatically drop the temporary table when you disconnect from the database. Permanent tables on the other hand exist in the database until the user with the privilege to access and delete the table drops it. The default table type is **Permanent**.

- Lock mode: The lock mode of a table identifies the type of lock that DBMaker places on objects when accessing them. DBMaker supports three levels of lock mode: TABLE, PAGE, and ROW. The default lock mode is the **PAGE** lock mode. If the lock mode is set to a higher level (such as TABLE), the level of concurrency on database accesses will be lower, but the required lock resources (shared memory) will be smaller. If the lock mode is set to a lower level (such as ROW), the level of concurrency on database access will be higher, but the required lock resources (shared memory) will be larger.
- Fill Factor: The fill factor specifies the percentage of a page that can be filled before it stops allowing new records to be filled. Lowering the fill factor value facilitates the growth of existing records in the page.
- No-cache: The no-cache feature is useful when accessing large tables by table scan. Table scans on large tables can cause frequent disk I/O activity. This happens during a table scan on a table with a larger number of data pages than the number of page buffers, which causes all page buffers to be exhausted. If the no-cache option is specified when creating a table, DBMaker only uses one page buffer to cache the data retrieved from a table during a table scan. This prevents the page buffers from being exhausted by only one large table scan.

- **T**o set advanced table options:
  - 1. Follow the steps in the Create Table wizard until the **Advanced Information** window will open.



- 2. If you want the table being created to be a temporary table, select the **Temporary** option button.
- **3**. If you wish to change the lock mode, choose a different lock mode from the default setting (page).
  - To choose the Table Lock Mode, select the **Table** option button.
  - To choose the Row Lock Mode, select the **Row** option button.
- 4. To change the Fill Factor from the default 100%, enter a percentage in the **Fill Factor** field.
- 5. Select the **no-cache** check box if you want to use only one page buffer to cache the data retrieved from the table.
- 6. Click Next. The Final review window will appear.

#### **Completing Table Creation**

Once you have selected table options from the wizards, you are ready to complete the process of creating a table. The SQL statement that has been generated by the wizard will appear and may be edited by hand. Be aware of SQL99 grammar rules before editing any SQL. A full explanation of the CREATE TABLE statement and syntax may be found in the *SQL Command and Function Reference*.

- **•** To complete table creation:
  - 1. Follow the steps in the Create Table wizard until the **Final Review** window will open.



- 2. The SQL statement may be modified by hand at this point. Simply use the mouse to place the cursor and insert new text.
- 3. Review the final SQL script and click the **Finish** button. A confirmation message will appear.

Information	×
Table creation successful !	
<u>k</u>	

4. Click **OK**. The newly created table will appear in the tree under the **table** node.

## 5.2 Modifying Table Schema

Once a table is created, you can modify its structure by adding or deleting columns, changing the column order, or modifying schema objects. Some restrictions exist to modifying schema. The following schema objects may be altered:

- Column Order
- Name
- Type
- Null / Not Null
- Primary Key(s)
- Default Value
- Column Constraints
- Adding columns
- Deleting columns.
- **T**o modify a table's schema:
  - 1. Click the **Table** node in the tree.

- Schema Properties Permissions Dependencies Statistics Edit Data 📝 Modify 🛛 🔍 Confirm 🛛 🚈 Cancel 🏻 🏧 Rename Primary Key(s): 🗱 D<u>el ▲ U</u>p 💌 <u>D</u>own Precision Scale Nullable Primary ... Default ... Name Туре Constraint LOGINID char 20 REQUESTTIME timestamp REQUEST long varchar ATTACHMENT file RESPONSETIME timestamp RESPONSE long varchai REQUESTID serial
- 2. From the table page, double-click the table you want to modify. The **Schema** page is displayed.

- **NOTE** *You can also display the* **Schema** *page by opening the table node in the tree and clicking on a table in the tree.*
- 3. Click **Modify**. The **Del**, **Up**, **Down**, **Confirm** and **Cancel** buttons are activated.

#### **Changing the Column Order**

The order of columns in the table determines the table's schema. Changing the column order may be necessary to facilitate the use of foreign keys or table replication.

- **T**o change column order:
  - 1. Select the column you want to move.
  - 2. Click the **Up** or **Down** buttons to move the column to the desired position.
  - 3. Click Confirm.

#### **Changing Column Names**

Column names may be changed as long as the new name confirms to naming conventions. Database configuration determines whether column names are casesensitive.

- **T**o change a column name:
  - 1. Select the column you want to change the name of.
  - 2. Select the field under the **Name** heading.
  - **3**. Type a new name into the field.
  - 4. Click Confirm.

#### **Changing Column Type**

Not all data types can be converted, for example, CHAR type data cannot be converted to INTEGER type data, DOUBLE type data cannot be converted into FLOAT type data. However, FLOAT type data can be converted into DOUBLE type data. Data conversion follows standard C programming rules.

- **T**o change a column's data type:
  - 1. Select the column you want to change the data type of.
  - 2. Click the field under the **Type** heading, a drop down menu of available data types will appear.
  - 3. Select the new data type from the drop down menu.
  - 4. Click Confirm.

#### **Changing Precision and Scale**

The precision (length) of CHAR, DECIMAL and SERIAL type columns may be altered. Be aware that decreasing the scale of a column will result in concatenation at the end of the string. The scale of DECIMAL type data may also be altered.

- **T**o change a column's precision or scale:
  - 1. Select the column to change the data type.

- 2. Click the field under the **Precision** heading and enter a new value into the field.
- 3. Click the field under the **Scale** heading and enter a new value into the field.
- 4. Click Confirm.

#### **Changing Column Null / Not Null**

This setting determines whether a column may accept null values. A column can only be changed to Not Null if the table is empty or the GIVE keyword is used to input values into the empty records.

- **T**o make a column nullable/not nullable:
  - 1. Select the column you want to change.
  - 2. Click the field under the **Nullable** heading. A check mark indicates that null values are allowed for the column.
  - 3. Click Confirm.

#### **Changing the Primary Key**

Columns may only be selected as primary keys if the data contained in the column is unique.

- **•** To alter the primary keys:
  - 1. Select the column you want to modify
  - 2. Select the field under the **Primary Key** heading. A key will appear in the field to indicate that it is a primary key. The column name will likewise appear at the end of the list in the **Primary Key(s)** text field at the top of the **Schema** page.
  - 3. Clicking on the field when a key is displayed in the field removes it as a primary key, and likewise removes it from the list.
  - 4. To change the order of the primary keys, remove all primary keys and then add them in the desired order. The order of the primary keys is indicated in the **Primary Key(s)** text field at the top of the **Schema** page.
  - 5. Click **Confirm**.

#### **Changing the Column Default Value**

Default values are used to insert a value into the column in the case where the user has not input a value for that column in a record. Default values must be valid for the column data type.

- **T**o change or add a default value for the column:
  - 1. Select the column you want to change the default value of.
  - 2. Enter a default value for the column that is valid for its data type in the field under the **Default Value** heading.
  - 3. Click Confirm.

#### **Adding Column Constraints**

Column constraints must follow SQL syntax. See the section "*Constraint Syntax*" at the end of this chapter for more information

- **T**o change or add column constraints:
  - 1. Select the column you want to modify the constraint of.
  - 2. Enter a new constraint for the column in the field under the **Constraint** heading.
  - 3. Click Confirm.

#### Adding a Column

Tables without data may have columns added to them. Tables containing data or referencing foreign keys may or may not be able to have columns added to them. Foreign keys will be broken if the schema of the referenced table is changed. Refer to section 4.5 "*Checking Dependencies*" for directions on how to check for referencing tables.

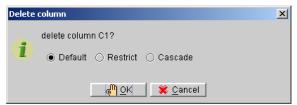
- **T**o add a column:
  - 1. Enter a column name into the blank field under the **Name** heading at the bottom of the list.

- 2. Select a data type from the drop down menu in the blank field under the **Type** heading.
- 3. Enter a precision and/or scale if the data type requires it.
- 4. Clicking on the blank field under the **Nullable** heading toggles if the column can have null values or not. A check mark indicates that null values are permitted.
- 5. Clicking on the blank field under the **Primary key** heading toggles if the column is a primary key or not. A key icon indicates that the column is a primary key.
- 6. Enter a default value into the blank field under the **Default Value** heading at the bottom of the list if one is desired.
- 7. Enter column constraints into the blank field under the **Constraints** heading at the bottom of the list.
- 8. Click Confirm.

#### **Deleting a Column**

Columns may be deleted from a table if they are no longer useful.

- **T**o delete a column:
  - 1. Select the column you want to delete.
  - 2. Click Delete.
  - 3. Click **Confirm**. The Delete column confirmation dialog box appears.



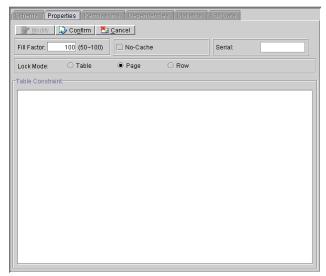
4. DBMaker provides three options for delete column; the **Default** option is same as dropping column without option specified, this behavior will not check if any dependent object exits when dropping column, and the dependent objects would become invalid then; the **Restrict** option will also check the index, text index and view besides the **Default** option checked and the option only drop the column without the above objects depend on it; the **Cascade** option will drop the column and the dependent objects too. Choose an option you prefer.

5. Click **OK**.

### 5.3 Setting Table Properties

You can modify the settings you added when you created a table, and view the table constraints. The following properties may be altered:

- Lock Mode: The lock mode of a table identifies the type of lock that DBMaker places on objects when accessing the database. DBMaker supports three levels of lock mode: TABLE, PAGE, and ROW. The default lock mode is the **PAGE** lock mode. If the lock mode is set to a higher level (such as TABLE), the level of concurrency on database accesses will be lower, but the required lock resources (shared memory) will also be smaller. If the lock mode is set to a lower level (such as ROW), the level of concurrency on database accesses will be higher, but the required lock resources (shared memory) will be higher, but the required lock resources (shared memory) will be larger.
- Fill Factor: The **Fill Factor** specifies the percentage of a page that can be filled before it stops allowing new records to be filled. The lower the **Fill Factor** value, the greater it facilitates the existing records in the page to grow.
- Cache / No-cache: The no-cache feature is useful when accessing large tables by table scan. Table scans on large tables can cause frequent disk I/O activity and can consume all available shared memory. This happens during a table scan on a table with a larger number of data pages than the number of page buffers, which causes all page buffers to be exhausted. Once the no-cache option is specified when creating a table, DBMaker only uses one page buffer to cache the data retrieved from a table during a table scan. This prevents the page buffers from being exhausted by one large table scan.
- Serial: Resets the serial number for a serial type column in the table
- **•** To set table properties:
  - 1. Double-click the **Table** node in the tree.
  - 2. Double-click the table you want to modify. The **Schema** page is displayed.



3. Select the **Properties** tab. The **Properties** page is displayed.

- 4. If you wish to change the lock mode, choose a different lock mode from the default setting.
  - To choose table lock mode, select the **Table** option button.
  - To choose row lock mode, select the **Row** option button.
- 5. To change the fill factor, enter a percentage in the **Fill Factor** field.
- 6. Select the **no-cache** check box if you want only one page buffer to cache the data retrieved from the table.
- 7. To reset the serial number for a serial type column in the table, enter the starting number of the column in the **Serial** box.
- 8. Click **Confirm**. The properties of the table are modified.

## 5.4 Granting/Revoking Table Privileges

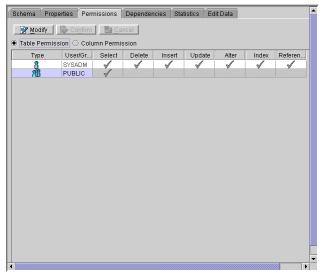
To allow other users or groups to access tables in the database, you can grant privileges to them. You can also revoke privileges to deny groups and/or users access to tables. Privileges can be granted to specific functions (Insert, Update, Delete, Index, Reference) or to specific columns of the table.

Users with resource or DBA privilege cannot have their privileges revoked on objects they own. Only by changing the user's authority can these privileges be revoked.

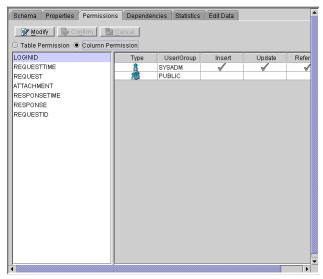
The following list summarizes table privileges:

- **Select**: Users have permission to select any records from the table.
- **Delete**: Users have permission to delete any records from the table.
- **Insert**: Users have permission to insert new records into the table or column.
- **Update**: Users have permission to update any records in the table or column.
- Alter: Users have permission to alter the schema of the table.
- **Index**: Users have permission to create an index on the table.
- **Reference**: Users have permission to create referential constraints on the table or column.
- **T**o grant/revoke privileges on tables:
  - 1. Select the table in which you want to add the privileges of which are to be granted to the other users/groups. The **Schema** page is displayed.

2. Click the **Permissions** tab at the top of the window. The **Permissions** page is displayed.



- 3. Click Modify. The Confirm and Cancel buttons are now active
- 4. Select one of the permissions in the cells for the user/group.
- 5. To revoke a privilege, click any of the checked columns.



6. To grant or revoke permission on columns, click the **Column Permissio**n option button. The window appears as below.

- 7. Select any of the following permissions in the cells for your user/group:
  - Insert: users have permission to insert new records into the column.
  - Update: users have permission to update any records in the column.
  - **Reference**: users have permission to create referential constraints on the column.
- 8. To revoke a privilege, click any of the checked columns.
- 9. Click **Confirm** to execute all changes.

## 5.5 Checking Dependencies and Statistics

Before handling data in a table or modifying a table's schema, it is recommended that you check dependencies and refer to table statistics.

#### **Checking Dependencies**

You can check table names, owners, as well as foreign and primary keys in a table.

- **T**o check dependencies:
  - 1. Select the table that you want to check the dependencies of. The **Schema** page will appear.
  - Click the Dependencies tab at the top of the window. The names of tables that foreign keys identify as referencing the selected table will appear in the Be dependent on column. The names of tables that are referenced by the selected table will appear in the Depends on column.

Sch	nema	Properties	Permissions	Dependenci	es (	Statistics Edit Data	
			Table	SYSADM.USE	RD	ATA	
		and and any			_		
F		endent on				Depends on	
	SYSAD	M.USERSTAT	rus			SYSADM.DISTRIBUTION	
	Eoreic	ın Keys				Foreign Keys	
		ign Keys : ID	JSERSTATUS			Foreign Keys : C1 Table : SYSADM.USERDATA	
		mns : LOGIN				Columns : COUNTRY1	
			: SYSADM.USE	RDATA		Referenced Table : SYSADM.DISTR	IBUTION
	Refe	renced Colun	nns : LOGINID			Referenced Columns : STATEORC	OUNTRY
4							

**3**. Selecting a table from the **Be dependent on** list displays foreign key information on the bottom.

- 4. Selecting a table from the **Depends on** list displays foreign key information on the bottom.
- 5. Double clicking on the table name on either list to changes the selected table in the **Table** field at the top of the page.

#### **Checking and Updating Table Statistics**

You can check statistics both for tables and columns. You can also alter the sample ratio and use the Update Statistics function.

- **T**o check and update table statistics:
  - 1. Select the table that you want to check the statistics of. The **Schema** page will appear.
  - 2. Select the **Statistics** tab at the top of the window. The statistics will be displayed as shown below.

Schema Propertie	es Permissions Dep	endencies	Statistics	Edit Data			
💾 Update Statistics	Sample Ratio 100 % [	1-100%]					
Statistics Data for Tal	ble						
Number of Columns			7				
Number of Indexes			1				
Number of Pages			-1				
Number of Rows			-1				
Number of Indirect R			-1				
Number of Blob Fran	nes		-1				
Average Length			118				
Number of Triggers			0				
Number of Text Index			0				
Number of Publicatio			0				
Update Statistics Tin			2001/11/12 10:54:52				
Total index size / tabl	e size		-1/-1 (1.0)				
Statistics Data for Co	lumns						
Column	# of Distinct Values	Average	Length	Low Value	High Value		
LOGINID	N/A		20				
REQUESTTIME	N/A		11				
REQUEST	N/A		24				
ATTACHMENT	N/A		24				
RESPONSETIME	N/A		11				
RESPONSE	RESPONSE N/A			24			
REQUESTID N/A			4				
1							

- **3.** If you want to change the percentage of the data used to calculate updated statistics, select the **Sample Ratio** box and enter a sample ratio percentage.
- 4. Click **Update Statistics**. The updated statistics will appear.

## 5.6 Editing Data in a Table

Once records are added to a table, you can update the existing records in the table. You must have object privilege for a table to edit it; refer to *Granting/Revoking Table Privileges* or *Granting and Removing Object Privileges* for information on how to manage user privileges on tables and columns.

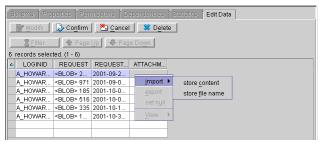
- **T**o edit data in a table:
  - 1. Double-click the **Table** node in the tree.
  - 2. Double-click the table you want to modify. The **Schema** page is displayed.
  - 3. Click the **Edit Data** tab on top of the window. The **Edit Data** page is displayed.

9	chema Pro	perties Peri	missions D	ependencies	Statistics	Edit Data		
	Modify Delete							
	<u>8 F</u> ilter	💧 🏠 Page	<u>Up</u> 🗣 Pag	ie Do <u>w</u> n				
6	records selec	ted. (1 - 6)						
	LOGINID	REQUEST	REQUEST	ATTACHM				
	A_HOWAR	<blob> 2</blob>	2001-09-2	<8L08> 7				
	A_HOWAR	<blob> 971</blob>	2001-09-0	<blob> 1</blob>				
	A_HOWAR	<blob> 185</blob>	2001-10-0	<blob> 2</blob>				
	A_HOWAR	<blob> 516</blob>	2001-10-0	<blob> 2</blob>				
	A_HOWAR	<blob> 335</blob>	2001-10-1	<blob> 2</blob>				
	A_HOWAR	<blob> 1</blob>	2001-10-3	<blob> 2</blob>				

4. To filter the data, click **Filter**. The **Data Filter** window will open where you can specify a WHERE condition.

D	ata Filter	×
	Enter WHERE clause to filter data:	
	OK Cancel Help	

- 5. Enter a condition by which the data is to be filtered and Click **OK**. The main window for the table is displayed.
  - **NOTE** WHERE conditions must follow proper SQL syntax. See the section on Constraint Syntax at the end of this chapter for more information.
- 6. To update data,
  - a) Locate the data on the screen using the **Page Up** and **Page Down** buttons.
  - b) Click Modify.
  - c) Select the data on the screen.
  - d) Edit the data. If the column contains BLOB data, a pop-up menu will appear with the option to import, export, set null, or view. BLOB type columns allow content to be stored, FILE type columns give the option to store content (as a system file object) or store the file name (creating a user file object). Export allows the user to output BLOB or system file objects. Set null deletes the BLOB or file object. View opens the BLOB or file object in an application dependent on the view chosen.



- e) Click **Confirm**. The data is edited in the selected table.
- 7. To delete data:
  - a) Locate the data on the screen using the **Page Up** and **Page Down** buttons.
  - b) Click Modify.
  - c) Select the data on the screen.
  - d) Click Delete.
  - e) Click **Confirm**. The data is deleted from the selected table.

## 5.7 Renaming a Table

A table may be renamed any time after its creation. Be sure to check dependencies before renaming a table. Renaming a table will remove all dependencies on the table.

- **T**o rename a table:
  - 1. Expand the table node of the tree.
  - 2. Select the table to change the name of from the tree. The table Schema page will appear.

	erties Permiss		ndencie		its   Edit	Data	
📝 <u>M</u> odify	🎝 Confirm 🛛 🖄	Cancel a	<u>R</u> enan	ne			
Primary Key(s):					<b>*</b> De	el 🔺 Up	▼ <u>D</u> own
Name	Туре	Precision	Scale	Nullable	Primary	Default	Constraint
LOGINID	char	20					
REQUESTTIME	timestamp						
REQUEST	long varchar						
ATTACHMENT	file			1			
RESPONSETIME	timestamp			1			
RESPONSE	long varchar			1			
REQUESTID	serial			1			

3. Click Rename. The Rename Table window will open.

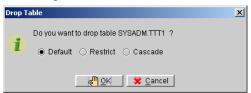
Rename Table	×	
Old owner name:	SYSADM	
Old table name:		
New owner name:	SYSADM	
New table name:	DISTRIBUTORS	
<u>0</u> K	<u>C</u> ancel <u>H</u> elp	

4. Enter a new owner name and table name into the appropriate fields and click **OK**.

## 5.8 Dropping a Table

You can drop a table that is no longer required in the database.

- **T**o drop a table:
  - 1. Select the table you want to delete from the tree.
  - Click Drop. Alternatively, right click the tree node of the table and select Drop Table from the popup menu. A window will open to confirm that you want to drop the selected table.



- 3. DBMaker provides three options for dropping table. The **Default** option is same as dropping table without option specified, this behavior will not check if any dependent object exits when dropping table, and the dependent objects would become invalid then; the **Restrict** option will check the security, and whether there is synonym, view, table replication, index, text index or trigger depends on it, and the option only allows dropping the table that no other objects depend it; the **Cascade** option will drop the table and all the other dependent objects. Choose an option you wonder.
- 4. Click OK.

## 5.9 Constraint Syntax

The following table lists comparators that can be used with the VALUE key word to create valid table, column, domain, or replication constraints. These comparators may also be used to create WHERE conditions for filtering data or creating views, or WHEN conditions for creating triggers.

You can combine simple conditions with the logical operators AND, OR, and NOT to form compound conditions. You can use the keyword AND to combine two search conditions that must both be true. You can use the keyword OR to combine two search conditions when one or the other (or both) must be true. Finally, you can use the keyword NOT to select rows where a search condition is false

COMPARATOR	DESCRIPTION
Relational Operators	These may be one of the following: >, >=, <=, <, =, and <>. The relational operator condition is satisfied when the expression on either side of the relational operator fulfills the relation set up by the operator.
BETWEEN	This comparison takes the form: x BETWEEN y AND z. The BETWEEN condition is satisfied when the value or expression to the left of the BETWEEN keyword lies in the range (denoted by the AND keyword) of the two expressions on the right of the keyword.
IN	This comparison takes the form: x IN (y, z,). The IN condition is satisfied when the value or expression to the left of the IN keyword is included in the list of values to the right of the keyword.
IS NULL	This takes the form: x IS NULL. The IS NULL condition is satisfied when the value or expression to the left of the IS NULL keywords is a NULL value.
IS NOT NULL	This takes the form: x IS NOT NULL. The IS NOT NULL condition is satisfied when the value or expression to the left of the IS NOT NULL keywords contains a value other than a NULL value.

#### **Ol** JDBA Tool User's Guide

COMPARATOR	DESCRIPTION
LIKE	This takes the form: x LIKE 'y' ESCAPE 'z'. The LIKE condition is satisfied when the string value or expression to the left of the LIKE keyword meets the criteria specified in the case-sensitive quoted string to the right of the keyword. You can use the percent symbol (%) and the underscore symbol (_) as wildcards in the quoted strings. The percent symbol matches zero or more characters, and the underscore symbol matches exactly one character. The ESCAPE clause is optional and allows you to define an escape character so you can include the percent and underscore symbols in the quoted string without having them interpreted as wildcards. To include a single-quote character in a quoted string, use two consecutive single- quotes.
МАТСН	This takes the form: x NOT CASE MATCH 'y'. The MATCH condition is satisfied when the quoted string to the right of the MATCH keyword matches the entire string value or expression to the left of the keyword. The NOT and CASE keywords are optional. The NOT keyword inverts the search results, and the CASE keyword makes the search case-sensitive.
CONTAIN	This takes the form: x NOT CASE CONTAIN 'y'. The CONTAIN condition is satisfied when the quoted string to the right of the CONTAIN keyword matches any part of the string value or expression to the left of the keyword. The NOT and CASE keywords are optional. The NOT keyword inverts the search results, and the CASE keyword makes the search case-sensitive.

Table 5-1 Constraint Syntax Comparators

•

# Working with Views

6

*DBMaker* provides the ability to define a virtual table, called a *view*. The view definition is stored in the database, but the actual data that you see in the view is not physically stored anywhere. Rather, the data is stored in the base tables from which the view's rows are derived. You can create views for flexible data queries on tables. You can use views to browse data in multiple tables. JDBA Tool allows you to create, browse, update, and drop views.

## 6.1 Creating a View

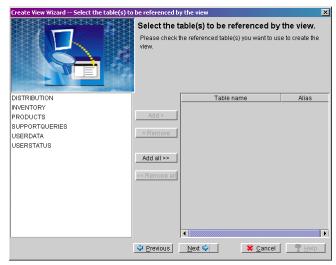
Once data has been entered in the database tables, you can use the tables to create views.

- **T**o create a view:
  - 1. Select the **View** object from the tree. The owner name, view name, and time of creation of all views on the database will be displayed on a table in the **View** page.
  - 2. Click Create. The Create View Wizard Introduction window is displayed.
  - 3. Click Next. The Name the View window is opened.

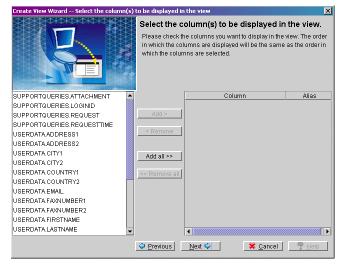
Create View Wizard Name the View	×
Name the view.	
Please enter a unique name for the view.	
	Schema Name : SYSADM View Name :
	Do you want to continue with this Wizard or go to the SQL editor? © Continue with Wizard ○ Edit SQL script directly
	🗘 <u>P</u> revious Next 🏟 🗱 <u>C</u> ancel 🔮 Help

- 4. Select the schema name from the **Schema Name** drop down list.
- 5. Enter the name of the view in the **View Name** field.
- 6. Select the **Continue with Wizard** option button to continue with the wizard. Select the **Edit SQL script directly** option button to jump to the last step of the wizard (see step 14)

7. Click the Next button. The Select the table(s) to be referenced by the view dialog box is displayed.

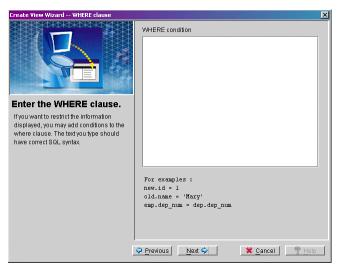


- 8. Select tables to use in the view by double clicking on the table names on the left. Alternatively, use the buttons in the middle to add or remove columns. Selected tables will appear on the right.
- 9. A table can be added to a view more than once. If this is done, an alias for the table must be given. The alias is a new name for the table that allows for columns in the table to be referenced more than once. To add an alias:
  - a) Select a table that has already been added to the view.
  - **b**) Enter an alias name into the field under the **Alias** heading. The default name appears as **TableAliasName#**.



10. Click Next. The Select the column(s) to be displayed in the view window will open.

11. Select columns to include in the view by double clicking on the column names on the left. Alternatively, use the buttons in the middle to add or remove columns. Selected columns will appear on the right. Columns added more than once must have an alias. Column aliases are created the same way as table aliases.

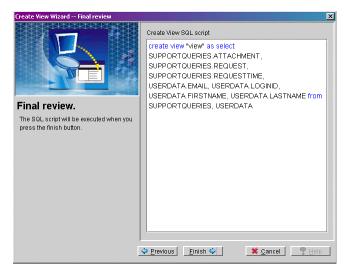


12. Click Next. The WHERE clause window will open.

13. Enter a condition by which the data in the view is to be filtered.

**NOTE** WHERE statements must follow SQL syntax. See the section on Constraint Syntax at the end of chapter 4 for more information.

14. Click Next. The Final review window will open.



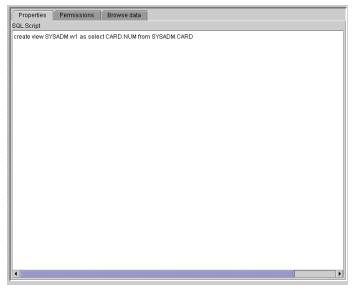
- 15. If you wish to alter the view data after reviewing the SQL script, enter new script into the **Create View SQL script** field or click the **Previous** button to display previous screens in the wizard.
- 16. Click the **Finish** button after reviewing the SQL script.
- 17. A conformation message appears. Click **OK**.



## 6.2 Checking View Properties

You can check the properties of a view including the tables and columns used as well as ownership.

- **T**o check view properties:
  - 1. Click the **View** object in the tree. This will display all the views in the database.
  - 2. Select the view that you want to see the properties of. The **Properties** page will open.



## 6.3 Granting View Privileges

You can allow other users/groups to access your view by granting them privileges. You can also revoke access to a view for a user/group at any point of time.

- **T**o grant view privileges:
  - 1. Select the **View** object in the tree.
  - 2. Select the view that you want to change user privileges for. The **Properties** page appears.
  - 3. Click the **Permissions** tab on the top of the window. The permission details will be displayed.

Properties Permissions Browse data					
Modify Confirm Cancel					
Туре	User/Group	Select			
8	DELPHI				
8	SYSADM	1			
A A A A A A A A A A A A A A A A A A A	VOTEADM				
R R	PUBLIC	1			
<u></u>		1			

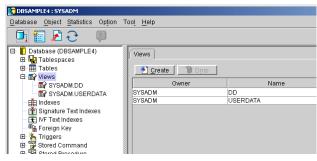
#### 4. Click the **Modify** button.

- 5. Select the user/group that you want to grant or revoke select privilege to the view.
- 6. Click the **Select** column next to the selected User/Group. A check mark indicates that the user or group has permission on the view.
- 7. Click the **Confirm** button.

### 6.4 Browsing Views

You can quickly and efficiently browse the data contained in a view. You can sort this data using the filter data function in JDBATool. For optimal efficiency break exceptional large views into several parts. This will increase the ease and speed that you will be able to browse the view's data. The maximum number of records that can be browsed in a single instance is 5000.

- **T**o browse a view:
  - 1. Click the **Views** icon from the tree. A list of all the views in the database will appear beneath the **Views** icon.



2. Select the view you want to browse from the list of views. The view appears in the panel to the right.

Properties Permissions Browse data
SQL Script
create view SYSADM.DD as select CARD.NUM, CARD.FIRSTNAME, CARD.LAST

3. Click the **Browse data** tab in the panel on the right. The **Browse data** window opens in the panel on the right.

ſ	Properties Permissions Browse data									
	S Filter A Page Up A Page Down & First A Last									
L	8 r	ecords selec	ted. (1 - 8)							
I	▲	NUM	FIRSTNAME	LASTNAME	TITLE	BMP				
lí		1	Eddie	Chang	Manager	<blob> 66</blob>				
Ш		2	Hook	Hu	Software E	<blob> 66</blob>				
Ш		3	Jackie	Yu	Software E	<blob> 66</blob>				
Ш		4	Ray	Sung	Software E	<blob> 66</blob>				
Ш		5	Louis	Liu	Software E	<blob> 66</blob>				
Ш		6	Trent	Clowater	Software E	<blob> 66</blob>				
Ш		7	Oscar	Tseng	Software E	<blob> 66</blob>				
Ш		8	Jerry	Liu	Manager	<blob> 66</blob>				
I										

- a) To quickly browse the view page by page use the **Page Up and Page Down** buttons.
- b) Click the **First** button to jump to the first entry in the view.
- c) Click the **Last** button to jump to the last entry in the view.
- 4. Click the **Filter** button to set sort rules for browsing the view. The **Data Filter** dialog box appears.

Data Filter	×
Enter WHERE clause to filter data:	
🥐 OK 🛛 🗱 Cancel 🔤 Help	

- a) Enter a WHERE clause or an ORDER BY clause to filter the data when browsing a view.
- **NOTE** WHERE statements must follow SQL syntax. See the section on Constraint Syntax at the end of chapter **4** for more information.

## 6.5 Dropping a View

If the view is no longer required, it might be deleted by following the procedure given below.

- **T**o drop a view:
  - 1. Click the **View** object in the tree. This will display all the views in the database.
  - 2. Select the view you intend to drop. The view is selected.

Views					
Ereate Drop					
Owner	Name	Creation Time	Status		
SYSADM	USER_DATA	2001/12/10 18:49:47	Valid		

3. Click the **Drop** button at the top of the window. The **Drop View** dialog box is displayed.

Drop Vi	ew	×
	Do you want to drop view SYSADM.VV1 ?	
1	● Default 🔿 Restrict 🔿 Cascade	
	و المعادم المعا معادم المعادم ال	

**NOTE** Alternatively, right click the view to be dropped from the tree, a pop-up menu will open. Select **Drop** from the pop-up menu.

- 4. DBMaker provides three options for dropping view. The **Default** option is same as dropping view without option specified, this behavior will not check if any synonym exits when dropping view, and the synonym would become invalid then; the **Restrict** option will check the security and whether there is synonym, this option only allows dropping the view without synonym; the **Cascade** option drops both the view and the synonym. Choose one option you wonder.
- 5. Click **OK**. The message clears. The remaining views in the database will be displayed.

## Working with Indexes

7

An index is used to facilitate random access of table rows; it is a sub-table of the table containing the accessing rows. The index table contains the key columns of its parent table. Indexes are particularly useful for tables that hold large amounts of data, or tables that are frequently accessed. An index can be *unique* or *non-unique*. In a unique index, no more than one row can have the same key value, with the exception that any number of rows may have NULL values.

## 7.1 Renaming an Index

An existing index may be renamed. The renaming only affects the index name in the system catalog; it will not rebuild the index in the database.

- **T**o rename an index:
  - 1. Click the **Index** object in the tree. A list of all indexes in the database is displayed on the **Properties** page.
  - 2. Select the index has to be renamed.
  - 3. Click the **Rename**. The Rename Index message box is displayed.

Rename Index		×
Old index name	PRIMARYKEY	
New index name		1
<u> </u>	Cancel PHelp	

- 4. Input the new index name in the proper filed.
- 5. Click **OK**. The index name is renamed successfully.

## 7.2 Creating an Index

An index should be created when one or more rows in a table will be used in search queries. Indexing the rows will also allow sorting of data to be performed.

- **T**o create an index:
  - 1. Click the **Indexes** object in the tree. The indexes in the database are listed.

Database DRGAMPLEAI Properties	(Restored)					
er Tatiespaces	formersed.	Retrona 1				
Section 2	TROOTAND CARD CARD CORTINE CARD CARD CARD CARD TO TO CARD TO CARD CARD CARD CARD CARD CARD CARD CARD	INDEX PERMATINE T NCEX1 PERMATINE T PERMATINE T PERMATINE T PERMATINE T DX_CREATE	TRADUCTURE DETTALLOSA DETTALLOSA DETALLOSA DETALLOSA DETALLOSA DETALLOSA DETALLOSA DETALLOSA DETALLOSA DETALLOSA DETALLOSA DETALLOSA DETALLOSA DETALLOSA DETALLOSA DETALLOSA	Nat Uniq Pranary Pranary Pranary Pranary Nat Uniq Nat Uniq Nat Uniq Nat Uniq Nat Uniq Pranary Pranary Pranary Pranary	CHERINAL IC IC IC IC IC IC IC IC IC IC IC IC IC	Created Tive 2009/11/11/17/20 2009/11/11/17/20 2009/11/11/17/20 2009/11/11/17/20 2009/11/11/17/20 2009/11/11/17/20 2009/11/11/17/20 2009/11/11/17/20 2009/11/11/17/20 2009/11/11/17/20 2009/11/11/17/20 2009/11/11/17/20 2009/11/11/17/20 2009/11/11/17/20

2. Click the **Create** button. The **Create Index Wizard** is displayed.



3. Click the Next button. The Name the Index window is displayed.

Create Index Wizard Name the Index			×
	Table Name :	T2	▼
	Tablespace :	DEFTABLESPACE	•
	Index Name :	ind1	
J	♀ Previous	Next 💠	<u>X C</u> ancel <u>Y H</u> elp

- 4. From the **Table Name** menu, select the table name that the index will refer to.
- 5. Select a tablespace to build the index in. Building an index on a different tablespace may result in better disk I/O, especially if the tablespaces reside on separate disks.

- 6. Enter a name for the Index in the **Index Name** field.
- 7. Click the Next button. This will open the Select the column(s) to be indexed window.

Create Index Wizard Select the column(s)	to be indexed		×		
Choose the column(s) to be indexed. You can select one to sixteen columns to be indexed. For each column you can specify the sorting order as a seconding or descending. The sequence of selecting the column(s) will determine the column(s) order in the index. Only the first 127 columns in the table can be in an index.					
C1		Column Name	Desc		
C2	add > < remove				
	add all >>				
	<< remove all				
	expression >				
]	Previous <u>N</u> ext	🗘 🛛 🗱 Cancel	<u>H</u> elp		

- 8. A list of available columns on the selected table appears on the left hand list box. Select the columns that you want to use in the index by double clicking on the column name or selecting the column and clicking the **Add** button. The **Add all** button can be used to add all columns to the index. All the columns selected for the creation of the index will be displayed in the list box to the right. Columns in the index can be likewise removed by double clicking on the column name or selecting the column and clicking the **Remove** button.
- 9. The **expression** buttion allows you to input an express for the index.
- 10. To change the sorting order to descending for a column:
  - a) Select a column from the list box to the right.
  - **b**) Click the cell in the **Desc** column for the selected column in the list box to the right. A check mark in the box indicates that the order for that column's index is descending

**NOTE** *By default, the sort order is ascending.* 

Create Index Wizard Advanced Informatio	n
Advanced options.	
You can specify the index as unique so that no more than one row can have the same key value. The fill factor you enter will specify how dense the keys will be in the index pages. If you intend to update data frequently, you should set a lower fill factor value.	
	🗌 Unique
	Fill Factor : 100 %
Ĩ	♀ Previous Next ♀ Seconcel ♀ Help

11. Click the **Next** button. The **Advanced Information** window appears.

- 12. If you want the index to be unique, select the Unique option button.
- 13. To change the default fill factor, enter a percentage in the **Fill Factor** field.
- 14. Click the Next button. The Final review dialog box is displayed.

Create Index Wizard Final review	<u>×</u>
Create Index Wizard - Final review	Create Index SQL script  Create Index Ind1 on SYSADM.T2 (C1, c1+c2) IN DEFTABLESPACE fillfactor 100
	Previous     Emish ()

15. Click the **Finish** button after checking that the SQL script is correct. The **Information** dialog box appears.



16. Click **OK**.

### 7.3 Dropping an Index

You can drop an index that is no longer required in a database.

- **T**o drop an Index:
  - 1. Click the Index object in the tree. The indexes in the database are listed.
  - 2. Select the index to be dropped and click the Drop button. The Drop Index dialog box is displayed.

Drop Ir	ndex	×
1	Do you want to drop index IND1 ?	
	OK <b>X</b> ancel	

3. Click OK. All the remaining indexes in the database will be displayed on the Properties page.

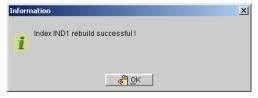
### 7.4 Rebuilding an Index

If you have made a number of changes to the table, you should rebuild the index associated with that table. Through the rebuilding process, the old index is deleted and a new one is created.

- To rebuild an index:
  - 1. Click the **Index** object in the tree. A list of all indexes in the database is displayed on the **Properties** page.
  - 2. Select the Index that has to be rebuilt.
  - 3. Click **Rebuild**. The **Rebuid** message box is displayed.



4. Click **OK**. The **Information** message box is displayed.



### 7.5 Renaming an Index

An existing index may be renamed. The renaming only affects the index name in the system catalog; it will not rebuild the index in the database.

- **•** To rename an index:
  - 6. Click the **Index** object in the tree. A list of all indexes in the database is displayed on the **Properties** page.
  - 7. Select the index has to be renamed.
  - 8. Click the **Rename**. The Rename Index message box is displayed.

Rename Index		×
Old index name	PRIMARYKEY	
New index name		
<u> </u>	Cancel Pelp	

- 9. Input the new index name in the proper filed.
- 10. Click **OK**. The index name is renamed successfully.

### 7.6 Updating Index Statistics

If your database is extremely large, it will take a lot of time to update the statistics values of all schema objects. An alternative method is to update statistics on only those specific schema objects that have been modified since the last update. You can also set the sampling rate, which is the percentage of the records used to calculate the statistics.

- **T**o update index statistics:
  - 1. Click the **Index** object in the tree. A list of all the indexes in the database is displayed.

🎙  🔁 🖓 🦳							
Cutabase (DBSAFLE4)  Cutabase	Help Properties Breams N. SysApM S	Table Name CARD DATATYPE_NUM EMP REFER_INFO T2 T3 USER_INFO USER_INFO	Index PRIMARYKEY INDEX1 PRIMARYKEY PRIMARYKEY PRIMARYKEY PRIMARYKEY DX_COUNTRY DX_COUNTRY	Tablespace DEFTALESPA. DEFTALESPA. DEFTALESPA. DEFTALESPA. DEFTALESPA. DEFTALESPA. DEFTALESPA. DEFTALESPA. DEFTALESPA. DEFTALESPA. DEFTALESPA. DEFTALESPA.	Not Uniq Primary Primary Primary Primary Not Uniq Not Uniq Not Uniq Primary Primary Primary	C15ERIAL ID RID C1 EMAIL C0UNTRY CREATE_DATE LAST_ACCESS ID TID VID	Creation Time 2005/12/6 173149 2005/12/6 173149 2005/12/6 173150 2005/12/6 173150 2005/12/6 173150 2005/12/6 173150 2005/12/6 173150 2005/12/6 173150 2005/12/6 173150 2005/12/6 173151

2. Click the **Statistics** tab. The **Statistics** page is displayed.

3. If you want to change the percentage of the data used to calculate updated statistics, select the **Sample Ratio** box and enter a percentage to sample.

4. Click the **Update Statistics** button. The following window is displayed.



5. Click **OK**.

Information	×
Statistics have been updated.	
¢ <sup>¶</sup> Ωκ	

6. Click OK.

### 7.7 Renaming an Index

An existing index may be renamed. The renaming only affects the index name in the system catalog; it will not rebuild the index in the database.

- **•** To rename an index:
  - 11. Click the **Index** object in the tree. A list of all indexes in the database is displayed on the **Properties** page.
  - 12. Select the index has to be renamed.
  - 13. Click the **Rename**. The Rename Index message box is displayed.

Rename Index		×
Old index name	PRIMARYKEY	
New index name		
<u> </u>	🛛 🌋 <u>C</u> ancel 🦉 <u>H</u> elp	

- 14. Input the new index name in the proper filed.
- 15. Click **OK**. The index name is renamed successfully.

8

# Working with Signature Text Indexes

A text index is a mechanism that provides fast access to rows of a table containing columns with one or more words or phrases as text. Text indexes contain a representation of all the text found in the text columns on which they are based. However, the data is encoded and structured to make retrieval much faster than directly from the table. Once you create a text index on a table, its operation is transparent to users of the database. The DBMS uses the text index to improve full-text query performance whenever possible.

Signature text indexes are created within the same tablespace as the columns that the index is being created for. Signature text indexes are well suited for building on columns that contain a combined total of 200 or fewer MB of data. For larger text indexes, consider building an inverted file (IVF) text index. For detailed information on IVF text indexes, refer to *Working with IVF Text Indexes*.

### 8.1 Creating a Signature Text Index

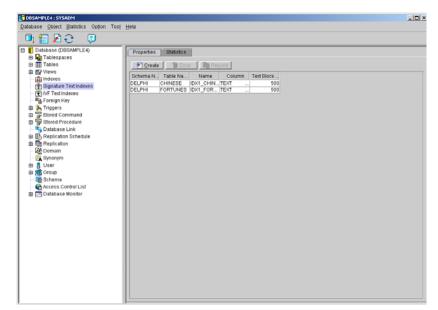
Signature text indexes can be built on all character type columns, including CHAR, VARCHAR, LONG VARCHAR, NCHAR, NVARCHAR, NCLOB, and FILE types. A table can have multiple text indexes, and text indexes can be built on multiple columns.

To ensure optimal performance for a signature text index, specify the total text size and the scale. The total text size is an approximation of the total number of megabytes of storage that are used by the columns on which the text index is to be built. The total text size can range from 10-200 MB, and the default total text size value is 32 MB.

The scale is the relative size of the text index to the total text size expressed as a percentage. Generally the larger the scale the better the query performance. The default scale is 50 percent.

Text indexes may be sorted by using the order by feature.

- **T**o create a Signature Text Index:
  - 1. Click the **Signature Text Index** object in the tree. The **Properties** page appears.



2. Click Create. The Introduction window for the Create Signature Text Index Wizard is displayed.



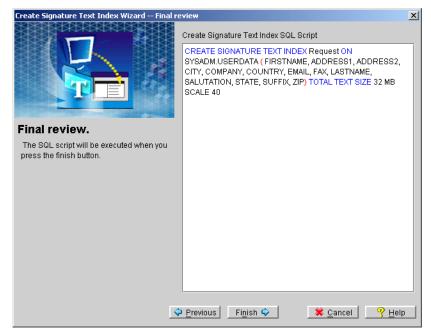
3. Click Next. The Name the signature text index window is displayed.

- 4. Select the name of the table from which the text index is to be created from the **Table Name** menu.
- 5. Enter the name of the text index in the **Text Index Name** field.
- 6. A list of available columns on the selected table appears on the left hand list box. Select the columns that you want to use in the signature text index by double clicking on the column name or selecting the column and clicking the **Add** button. The **Add all** button can be used to add all columns to the index. All the columns selected for the creation of the text index will be displayed in the list box to the right. Columns in the text index can be likewise removed by double clicking on the column name or selecting the column and clicking the **Remove** button.

Create Signature Text Index Wizard Advan	ced Settings			X
Advanced Settings. Total text sisze is the estimated total size of all documents. The range is 1 ~ 200. The default value is 32. The unit of size is mega-byte (MB). Scale is the expected	Total text size :	32	<u> </u>	В
index size-to-total text size ratio. If a user set total text size to 20MB and expects the	Scale :	40	▲ % (10 ~ 20	10)
text index to use 10MB of storage, then he should set scale to 50 (50%). The	🗌 Use order-by fe	ature		
larger scale, the better search performance. The range is 10 ~ 200. The	Order Column :			
defaultvalue is 40 (40%).	ACCESS_LEVE		~	
	Ascending	O Des	cending	
	Previous <u>N</u> ext	\$	🗱 <u>C</u> ancel 🛛 🧐	Help

7. Click Next. The Advanced Settings window will open.

- 8. To change the signature text index settings:
  - To change the total text size, enter a value into **Total Text Size** between 1 and 200.
  - To change the scale, enter a value into the **Scale** field between 10 and 200.
- 9. To present data as it relates to another column in the table select the **Use order-by feature** check box.
  - a) Select the column that the text index will follow the order of from the **Order Column** menu.
  - **b**) Select the **Ascending** option button to order data in the text index by the Order Column's ascending order.
  - c) Select the **Descending** option button to order data in the text index by the Order Column's descending order.



10. Click Next. The Final review window will open.

- 11. To alter the SQL script, enter new script into the **Create Signature Text Index SQL script** field or click **Previous** to display the previous screens in the wizard.
- 12. To complete the view creation after reviewing the SQL script, click **Finish**. The **Information** dialog box is displayed.



13. Click OK.

### 8.2 Dropping a Signature Text Index

You can drop a text index that is no longer required.

- **T**o drop a signature text index:
  - 1. Click the **Signature Text Indexes** object in the tree. All the text indexes in the database will be displayed in the **Properties** page.
  - 2. Select the **Signature Text Index** that has to be dropped by clicking on it.

Properties	Statistics				
Treate Drop B Rebuild					
Table Ow	Table Na	Name	Column	Text Block	
DELPHI	CHINESE	IDX1_CHIN	TEXT	500	
DELPHI	FORTUNES	IDX1_FOR	TEXT	500	
SYSADM	USERDATA	REQUEST	FIRSTNAM	500	

3. Click **Drop**. A confirmation window is displayed to confirm that you want to drop the signature text index.

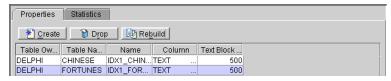
Drop Si	gnature Text Index	×
i	Do you want to drop signature text index REQUEST ?	
	🥼 <u>O</u> K 🛛 🗯 <u>C</u> ancel	

4. Click **OK** and the remaining signature text indexes in the database will be displayed.

### 8.3 Rebuilding a Signature Text Index

If a number of changes have been made to the table or to the column on which a text index was created, then the text index should be rebuilt. When a text index is rebuilt, it will be updated to include all changes to the table or column.

- **T**o rebuild a signature text index:
  - 1. Click the **Signature Text Indexes** object in the tree. The **Properties** page is displayed.
  - 2. Select the signature text index that has to be rebuilt.



3. Click **Rebuild**. The **Rebuild** dialog will open.



- 4. Select an incremental rebuild or full rebuild.
- 5. Click **OK**. A message saying the signature text index has been rebuilt is displayed.



6. Click **OK**. The message clears.

### 8.4 Checking Signature Text Index Statistics

The statistics of a signature text index may periodically be checked. Statistics include the table owner and name, the text index name, the number of text blocks and the average block size.

- **•** To view text index statistics:
  - 1. Select **Signature Text Indexes** from the tree. The **Properties** page is displayed.
  - 2. Click the **Statistics** tab. The statistics of the text indexes will be displayed. These include the names of the signature text indexes, the average block size of the indexes and the number of text blocks.

Properties Statistics						
Statistics for Signatur	Statistics for Signature Text Index(es):					
Table Owner	Table Name	Name	# Text Block	Average Block Size		
DELPHI	CHINESE	IDX1_CHINESE	319	178		
DELPHI	FORTUNES	IDX1_FORTUNES	3543	164		

9

# Working with IVF Text Indexes

Inverted file (IVF) text indexes are a type of text index built on files separate from the tablespace that the columns are stored in. As a result, query performance is significantly better for larger text indexes. You need to create a logical path for the IVF text index files to be stored in before creating an IVF text index. Logical paths are specified in the JConfiguration Tool or by modifying the DMConfig.ini file. Once the path is specified, DBMaker handles the creation of files for use in the IVF text index.

Since IVF text indexes are a part of the operating system's file system, they may be liable to fragmentation. Be sure to specify a logical path on a reserved partition and periodically defragment the partition to ensure optimal performance.

Once you create an IVF text index on a table, its operation is transparent to users of the database. The DBMS uses the IVF text index to improve full-text query performance whenever possible.

### 9.1 Creating an IVF Text Index

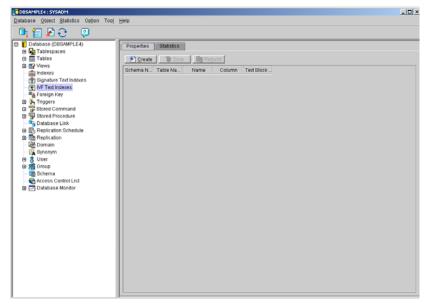
IVF Text indexes can be built on all character type columns, including CHAR, VARCHAR, LONG VARCHAR, NCHAR, NVARCHAR, NCLOB, and FILE types. A table can have multiple text indexes, but a text index can only be built on a column. If you need to perform full-text search for other columns, you should build an index for each column.

The three parameters used for IVF text indexes include the storage path, the total text size and the scale. The storage path is the location of the IVF text index in the file system. A path must be specified in the configuration file before using an IVF text index. For more information on the storage path for IVF text indexes, refer to the *JConfiguration Tool Reference*.

The total text size is an approximation of the total number of megabytes of storage that are used by the columns on which the text index is to be built. The total text size can range from 10-10,000 MB, and the default total text size value is 32 MB.

IVF text indexes may be sorted by using the **order by** feature.

- **T**o create an IVF Text Index:
  - 1. Click the **IVF Text Index** object in the tree. The **Properties** page appears.

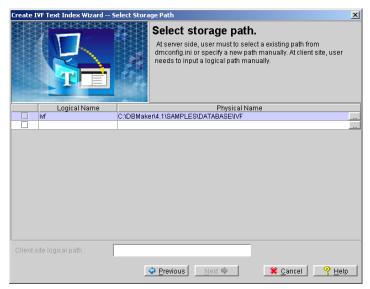


2. Click **Create**. The **Introduction** window for the **Create Text Index Wizard** is displayed.

Create IVF Text Index Wizard Name the IV	F Text Index Name	1
Name of IVF text index.		
Please input a correct lvf text index name and choose a table to filter selected table columns.	IVF Text Index Name :	
	Table Name : DELPHI.CHINESE	
E	Previous Next • Cancel <u>? H</u> elp	

3. Click Next. The Name the Text Index window is displayed.

- 4. Select the name of the table from which the text index is to be created from the **Table Name** menu.
- 5. Enter the name of the text index in the **IVF Text Index Name** field.
- 6. A list of available columns on the selected table appears on the left hand list box. Select the columns that you want to use in the IVF text index by double clicking on the column name or selecting the column and clicking the **Add** button. The **Add all** button can be used to add all columns to the index. All the columns selected for the creation of the text index will be displayed in the list box to the right. Columns in the text index can be likewise removed by double clicking on the column name or selecting the column and clicking the **Remove** button.



7. Click Next. The Select Storage Path window will open

8. Select a storage path for the IVF text index by selecting the check box in the row corresponding to the IVF text index path. The paths and logical names that appear correspond to those specified in the configuration file. If you have not yet specified a path for storing IVF text indexes, open the JConfiguration Tool and add a new **IVF Text Index Storage Path** on the **User Files** page. For detailed instructions on how to use the JConfiguration Tool, refer to the *JConfiguration Tool Reference*.

- eate IVF Text Index Wizard -- Total Text Size and Order by Column × Total Text Size. TEXT SIZE specifies the approximate total size of documents will be indexed in the futures. The unit of size is mega-byte (MB). According to size, DBMaker will 🗧 (1 ~ 10000)MB 500 decide how many partitions will be Total text size : made. It may ranges between 1 MB to 10000 MB, and the default value is 500 MB. ORDER BY specifies which column 🗌 Use order-by feature has to be sorted first. ASC means ascendant order and DESC means descendant order. Ascending Previous 🗱 Cancel 🛛 🤗 Help
- 9. Click Next. The Total Text Size and Order by Column window will open.

- 10. To change the IVF text index settings:
  - To change the total text size, enter a value into **Total Text Size** between 1 and 10,000.
- 11. To present data as it relates to another column in the table select the Use order-by feature check box.
  - a) Select the column that the text index will follow the order of from the **Order Column** menu.
  - **b**) Select the **Ascending** option button to order data in the text index by the Order Column's ascending order.
  - c) Select the **Descending** option button to order data in the text index by the Order Column's descending order.
- 12. Click Next. The Final review window will open.
- 13. To alter the SQL script, enter new script into the **Create Text Index SQL** script field or click **Previous** to display the previous screens in the wizard.

14. To complete the view creation after reviewing the SQL script, click **Finish**. The **Information** dialog box is displayed.



15. Click OK.

### 9.2 Dropping an IVF Text Index

You can drop a text index that is no longer required.

- **T**o drop an IVF text index:
  - 1. Click the **IVF Text Indexes** object in the tree. All the text indexes in the database will be displayed in the **Properties** page.

Properties	Statistics				
🛛 <u> 8</u> reate	Create Drop Rebuild				
Table Ow	Table Na	Name	Column	Text Block	
SYSADM	USERDATA	IVFIDX	ADDRESS	500	

2. Select the **IVF Text Index** that has to be dropped by clicking on it.



**3**. Click **Drop**. A confirmation window is displayed to confirm that you want to drop the IVF text index.

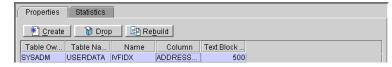


4. Click **OK** and the remaining IVF text indexes in the database will be displayed.

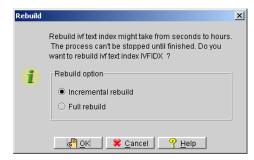
### 9.3 Rebuilding an IVF Text Index

If a number of changes have been made to the table or to the column on which a text index was created, then the text index should be rebuilt. When an IVF text index is rebuilt, it will be updated to include all changes to the table or column.

- **T**o rebuild an IVF text index:
  - 5. Click the **Text Indexes** object in the tree. The **Properties** page is displayed.
  - 6. Select the IVF text index that has to be rebuilt.



7. Click **Rebuild**. The **Rebuild** dialog will open.



- 8. Select an incremental rebuild or full rebuild.
- Click OK. A message saying the IVF text index has been rebuilt is displayed.
- 10. Click **OK**. The message clears.

### 9.4 Checking IVF Text Index Statistics

The statistics of an IVF text index may periodically be checked. Statistics include the table owner and name, the text index name, the number of text blocks and the average block size.

- **•** To view text index statistics:
  - 1. Select **IVF Text** Indexes from the tree. The **Properties** page is displayed.
  - 2. Click the **Statistics** tab. The statistics of the text indexes will be displayed. These include the names of the text indexes, the average block size of the IVF text indexes and the number of text blocks.

ſ	Properties Statistics					
l	Statistics for IVF Text I	ndex(es):				
l	Table Owner	Table Name	Name	# Text Block	Average Block Size	
	SYSADM	USERDATA	IVFIDX	0	0	

## **10 Using Foreign Keys**

A foreign key is the relationship that a column or combination of columns in a table has with the primary key or unique index from another table. A foreign key contains the same values and denotes the relationship between the two tables.

In this section, you will create a foreign key for a table. You will also drop a foreign key that is no longer required in the database.

### 10.1 Creating a Foreign Key

A foreign key is used to refer to another table by specifying the referencing and referenced columns. Both the referencing and referenced columns should be mapped to each other. The mapping columns should be the same type and length. The referenced columns should be NOT NULL, but the referencing columns can be NULL .The referenced columns should be a primary key or unique index.

#### Adding a Foreign Key

Creating a foreign key consists of several phases. The first phase consists of selecting the table that contains the referencing columns, selecting the columns, and naming the foreign key.

Foreign key columns in the referencing table must map exactly to the primary key columns or unique index columns of the referenced table. The number of columns that are used in the foreign key and the schema of those columns must be the same in both the referencing and referenced tables.

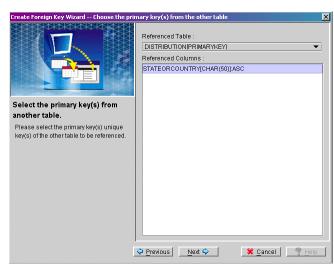
- **•** To add a foreign key:
  - 1. Select **Foreign Key** from the tree. The **Properties** page appears.

🖣  🔊 근 🛛 🖉 👘	Help							
Chabase (DSOMPLE4) Chabase (DSO	Properties Create Scheme N. Tab SvRADM T3 SvRADM T4 VOTEACM VOTE VOTEACM VOTE VOTEACM VOTE VOTEACM VOTE	Ie Na FK1 FK1 FK1 FK1 FK1 FK1 FK1 FK1	Columns C2 REFER TID TID TID TID TID TID TID YID	Reference. SYSADM 72 SYSADM 72 SYSADM 72 VOTEADM VOTEADM VOTEADM. VOTEADM.	C1 RID TID TID TID IID	Update Ac. No Action No Action Cascade Cascade Cascade Cascade	Delete Art. No Action Costade Costade Costade Costade Costade Costade Costade	

2. Click **Create**. The **Create Foreign Key** – **Introduction** window is displayed. Select **Next** at the bottom of the page, the **Name the Foreign Key** window is displayed.

Create Foreign Key Wizard Name the Forei	ign Key	X
	Foreign Key Name : Country Table Name : USERDATA Column Order : COUNTRY1	
Name the foreign key and choose	Column	Foreign Ke
the column(s) as foreign key.	ADDRESS1	
	ADDRESS2	
Please enter the foreign key name and	CITY1	
click the checkbox beside the column	CITY2	
names.	COUNTRY1	
	COUNTRY2	
	EMAIL	
	FAXNUMBER1	
	FAXNUMBER2	
	FIRSTNAME	
	LASTNAME	88
	LOGINID	
	MIDDLENAME	
	PASSWORD	
	PHONENUMBER1	
		100000000
		🦞 <u>H</u> elp

- 3. Enter the foreign key name in the **Foreign Key Name** text field.
- 4. Select the referencing table name.
- 5. Click checkboxes beside the column names to indicate which columns to include in the foreign key.



6. Click Next. The Choose the primary key(s) from the other table window of the Create Foreign Key Wizard is displayed.

7. Select the name of the referenced table from the **Referenced Table** menu.

**NOTE** *Only tables containing primary keys or unique indexes that match the schema of the foreign key are shown.* 

8. All the selected table columns that are primary keys or unique indexes will be displayed.

Create Foreign Key Wizard Update action a	and Delete action
Enter update and delete action.	
Please select the update and delete action.	Update Action :
	NO ACTION
	Delete Action : NO ACTION

9. Click **Next**. The **Update action and Delete action** window will open.

#### **Setting Foreign Key Options**

You can choose a foreign key as well as select foreign key options. The following table shows the effect of available foreign key options.

FOREIGN KEY OPTION	DESCRIPTION
Set Null	Records in the foreign key column are set to Null if the user updates / deletes the corresponding records in the primary key or unique index column
Cascade	The corresponding records in the referencing table are also updated or deleted.
Set Default	The foreign key record is set to a default value if the user updates / deletes corresponding records in the primary key or unique index column.

FOREIGN KEY OPTION	DESCRIPTION
No Action	There is no action on the foreign key column if the user updates / deletes corresponding records in the
	primary key or unique index column.

Table 10-1Foreign Key Options

- **T**o set foreign key options:
  - 1. Choose one of the following foreign key settings from the **Update Action** menu:
    - No Action
    - Cascade
    - Set Default
    - Set Null

Upon update of the referenced table the chosen update action will occur.

- 2. Choose one of the following foreign key settings from the **Delete Action** menu:
  - No Action
  - Cascade
  - Set Default
  - Set Null

Upon update of the referenced table the chosen delete action will occur.

**NOTE** *The default setting is No Action.* 

3. Click **Next**. A window that allows the final review of all the SQL commands you provided to create the foreign key is displayed as shown below.

Create Foreign Key Wizard Final review	×
Create Foreign Key Wizard Final review	Create Foreign Key SQL script atter table USERDATA foreign Key *Country* (COUNTRY1) references SYSADM DISTRIBUTION( *STATEORCOUNTRY*) on update NO ACTION on delete NO ACTION
	Previous

4. Click **Finish**. The **Properties** page will reappear with the new foreign key in the list.

### **10.2** Dropping a Foreign key

If a foreign key is no longer required, it can be dropped from the database.

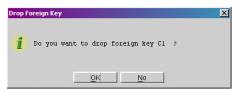
- **T**o drop a Foreign key:
  - 1. Select the **Foreign Key** object from the tree. The **Properties** page is displayed.

Properties							
<u>*</u> ] <u>C</u> reate	Drop						
Table Own	Table Name	Name	Columns	Reference	Reference	Update Act	Delete Acti
SYSADM	INVENTORY	PRODUCT	PRODUCT	SYSADM.P	PRODUCT	No Action	No Action
SYSADM	USERDATA	C1	COUNTRY1	SYSADM.D	STATEOR	No Action	No Action
SYSADM	USERDATA	COUNTRY	COUNTRY1	SYSADM.D	STATEOR	No Action	No Action
SYSADM	USERSTA	ID	LOGINID	SYSADM.U	LOGINID	Cascade	Cascade

2. Select the foreign key that is to be dropped by clicking on it.

Properties							
<u></u> reate	Drop						
Table Own	Table Name	Name	Columns	Reference	Reference	Update Act	Delete Acti.
SYSADM	INVENTORY	PRODUCT	PRODUCT	SYSADM.P	PRODUCT	No Action	No Action
SYSADM	USERDATA	C1	COUNTRY1	SYSADM.D	STATEOR	No Action	No Action
SYSADM	USERDATA	COUNTRY	COUNTRY1	SYSADM.D	STATEOR	No Action	No Action
SYSADM	USERSTA	ID	LOGINID	SYSADM.U	LOGINID	Cascade	Cascade

3. Click **Drop**. The **Drop Foreign Key** dialog box appears.



4. Click **OK**. The remaining foreign keys in the database will be displayed.

Properties							
Drop							
Table Name	Name	Columns	Reference	Reference	Update Act	Delete Acti	
INVENTORY	PRODUCT	PRODUCT	SYSADM.P	PRODUCT	No Action	No Action	
USERDATA	COUNTRY	COUNTRY1	SYSADM.D	STATEOR	No Action	No Action	
USERSTA	ID	LOGINID	SYSADM.U	LOGINID	Cascade	Cascade	
	Table Name INVENTORY USERDATA	INVENTORY PRODUCT USERDATA COUNTRY	Table Name         Name         Columns           INVENTORY         PRODUCT         PRODUCT           USERDATA         COUNTRY         COUNTRY1	Table Name         Name         Columns         Reference           INVENTORY         PRODUCT         PRODUCT         SYSADM.P           USERDATA         COUNTRY         COUNTRY         SYSADM.D	Table Name         Columns         Reference         Reference           INVENTORY         PRODUCT         PRODUCT         SYSADM P         PRODUCT           USERDATA         COUNTRY         COUNTRY         SYSADM.D         STATEOR	Table Name         Name         Columns         Reference         Reference         Update Act           INVENTORY         PRODUCT         PRODUCT         SYSADM.P         PRODUCT         No Action           USERDATA         COUNTRY         COUNTRY         COUNTRY         SYSADM.D         STATEOR         No Action	

## 11 Using Triggers

Triggers are predefined commands that are automatically executed in response to specific events, regardless of which user or application program generated the events. Triggers allow you to customize your database in ways that may not be possible with standard SQL commands. You can use triggers to:

- Implement business rules
- Create an audit trail of database activities
- Derive additional values from existing data
- Replicate data across multiple tables
- Perform security authorization procedures
- Control data integrity
- Define unconventional integrity constraints

In this section, you will create a trigger with various trigger options. Once this is done, you will drop a trigger from a database.

## 11.1 Creating a Trigger

To create a trigger on a table, you must be the owner of the table or have DBA security privileges on the table. You must also have the necessary object privileges on all objects referenced in the trigger definition to successfully create the trigger. Creating a trigger involves the following set of actions:

- Assigning a trigger name and table.
- Specifying trigger action time.
- Indicating the referencing clause.
- Entering the WHEN condition clause.
- Entering SQL statements for the trigger action

### Assigning a Trigger Name and Table

When creating a trigger you need to assign a trigger name and indicate the table in which the trigger is created.

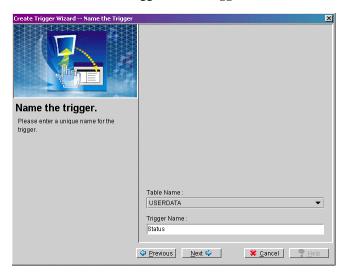
- **•** To specify a trigger name and table:
  - 1. Click the **Trigger** object in the tree. The **Triggers** page is displayed.

<u>∎∎⊉⊖</u> ₽								
Database (DBSAMPLE4) E Label Construction (DBSAMPLE4)	Triggers							
Tables	Creat	Dro	. [					
Trews		17			1			
indexes		Table Na	Name	Enable	Event	Time	Type	
P Signature Text Indexes	SYSADM	TRIGGERT.			Insert	After	For each row	
Text Indexes	SYSADM	TRIGGERT.		r	Insert	Before	For each row	
B Foreign Key	VOTEADM	ITEM	TG1		Insert	After	For each row	
Triggers	VOTEADM	ITEM	TG2		Delete	After	For each row	
E Stored Command	SYSADM	TRIGGERT			Delete	Before	For each row	
<ul> <li>Stored Command</li> <li>Stored Procedure</li> </ul>	SYSADM	TRIGGERT.	TRIGGERU	R	Update	After	For each row	
⊕ 3월 Group - 월 Schema - 육 Access Control List ⊕ ☑ Database Monitor								

2. Click **Create**. The **Introduction** window of the **Create Trigger Wizard** is displayed.



- 3. Click Next. The Name the Trigger window is displayed.
- 4. Select the table name in which the Trigger will be based on from the **Table Name** menu.
- 5. Enter the name of the trigger in the **Trigger Name** field.



6. Click Next. The Choose the Trigger Action Time window will open.

### **Specifying Trigger Action Settings**

Once you have indicated the trigger name and the table in which the trigger is created, you can then specify the type of actions the trigger will perform. The settings are indicated as follows:

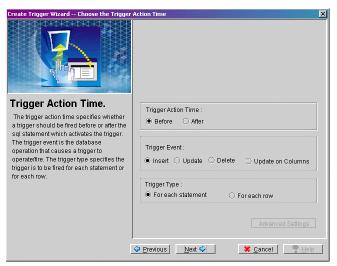
Action Time: The trigger action time specifies whether a trigger should fire before or after the SQL statement that activates the trigger. You can use the BEFORE and AFTER keywords to specify the trigger action time. The BEFORE keyword indicates the trigger action will fire before the trigger statement. The AFTER keyword indicates the trigger action will fire after the trigger statement. You can only specify one trigger time for each trigger.

**Trigger Event:** The trigger event is the database operation that causes a trigger to execute (or fire). The trigger event may be an INSERT, UPDATE, or DELETE statement that operates on the trigger table. You can only specify one trigger event for each trigger.

**Trigger Type**: The trigger type specifies how many times the trigger will fire for each trigger event. There are two types of triggers: row triggers and statement triggers. The FOR EACH ROW keywords specify a row trigger, which fires a trigger action once for each row modified by the trigger event. The FOR EACH STATEMENT keyword specifies a statement trigger, which fires a trigger action once for each trigger event.

**Referencing Clause**. If the selected Trigger type is FOR EACH ROW, the advanced setting tab is highlighted. Click this tab to define the REFERENCING clause. The REFERENCING clause defines correlation names for the old and new values of a column. This is primarily used when you cannot use the default OLD and NEW names because of a conflict with a table with the same name.

- **T**o specify trigger action settings:
  - 1. From the **Name the Trigger** window of the **Create Trigger Wizard**, click **Next**. The **Choose the Trigger Action Time** window will open.



- 2. Select one of the following trigger action time options:
  - To set the trigger to fire after the SQL statement, click the After option button.
  - To set the trigger to fire before the SQL statement, click the **Before** option button.
- 3. Select one of the following trigger event options:
  - To choose the INSERT command as the trigger event, choose the **Insert** option button in the **Trigger Event** group.
  - To choose the UPDATE command as the trigger event, choose the **Update** option button in the **Trigger Event** group.
  - To choose the DELETE command as the trigger event, choose the **Delete** option button in the **Trigger Event** group.
- 4. Select one of the following trigger type options from the **Trigger Type** field.

- Selecting the **For each row** option button sets the trigger statement to execute on each row modified by the trigger event.
- Selecting the **For each statement** option button sets the trigger statement to execute upon each instance of the trigger event.
- 5. If the For each statement option button is selected, clicking Next will open the Specify a WHEN condition clause window. If the For each row option button is selected, clicking Next will open the Create Trigger Advanced Settings window.

### Indicating the Referencing Clause

Once you have indicated trigger options, you can then specify the referencing clause of the trigger. You will need to select these options if you selected the FOR EACH ROW as the trigger type. The REFERENCING clause defines correlation names for the old and new values of a column. This is primarily used when you cannot use the default OLD and NEW names because a column has the same name.

- **•** To indicate the referencing clause:
  - From the Choose the Trigger Action Time window of the Create Trigger Wizard click Next. The Create Trigger Advanced Settings window is displayed.

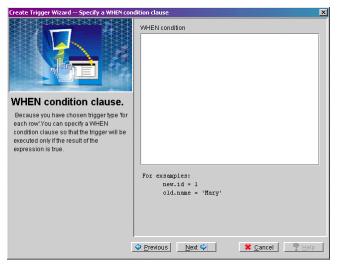
Create Trigger Advanced Settings	×
Referencing clause.	
In the trigger action, you can use the keywords OLD and NEW to specify the old and new value of the field. However, in some cases, OLD and NEW might be used as other object's name. So, you may use the referencing clause to define correlating names.	OLD :
	<u>Cancel</u> <u>OK</u> <u>Help</u>

- 2. When you create a For each row type trigger,
- 3. Enter a substitute name to refer to the old value in the **OLD** field.
- 4. Enter a substitute name to refer to the new value in the **NEW** field.
- 5. Click Next. The Specify a WHEN condition clause window will open.

#### **Entering the WHEN condition clause**

Once the settings for the trigger action are complete, you may specify a WHEN clause to place constraints on the actions that will cause the trigger to fire. The WHEN statement must follow proper SQL syntax. See the section on *Constraint Syntax* at the end of Chapter 4 for more information.

- **T**o Specify a WHEN condition:
  - 1. From the **Choose the Trigger Action Time** window of the Create Trigger Wizard (if "**For each statement**" has been specified) or from the **Create Trigger Advanced Settings** window, click **Next**. The **Specify a WHEN condition clause** window is opened.

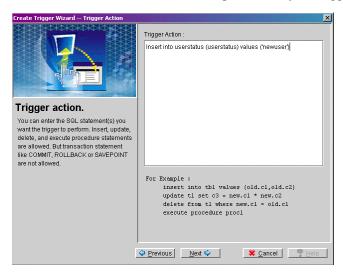


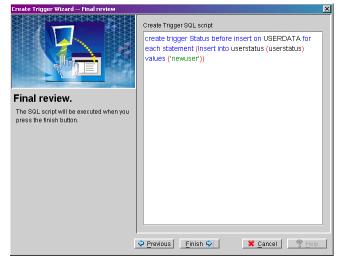
2. Enter the WHEN condition and click **Next**. The **Trigger Action** window will open.

#### Entering SQL statements for the trigger action

Once the trigger event and its constraints have been defined, the trigger action is set. The trigger action is the command or set of commands that the trigger will carry out on all data that meet the constraints when the trigger is fired.

- **T**o Specify SQL statements for the trigger action:
  - 1. From the **Specify a WHEN condition clause**, click **Next**. The **Trigger Action** window will open.
  - 2. Enter the SQL statements that are to be performed by the trigger.





3. Click Next. The Final review window will open.

- 4. Review the final SQL script. Click **Finish** if no more changes are to be made. A message saying the trigger is created successfully is displayed.
- 5. Click OK.

## 11.2 Dropping a Trigger

When a table's schema is altered and then a trigger on that table is fired, DBMaker will try to execute the trigger according to the new table definition. However, if the specified column in a triggering event or action is dropped, the trigger execution will fail and the triggering statement will fail too. In this situation, users need to drop the trigger or modify the trigger definition according to the new table schema. Upon deleting a table, the trigger that references that table will also be dropped.

- **T**o delete a trigger:
  - 1. Click the object **Trigger** in the tree. All the triggers in the database will be displayed as shown.

Triggers * Create	Drop	0				
Table Ow	Table Na	Name	Enable	Event	Time	Туре
SYSADM	TRIGGERT	INSERT	r	Insert	After	For each row
SYSADM	TRIGGERT	INSERTSP	r	Insert	Before	For each row
VOTEADM	ITEM	TG1	r	Insert	After	For each row
VOTEADM	ITEM	TG2	r	Delete	After	For each row
SYSADM	TRIGGERT	TRIGGERD	r	Delete	Before	For each row
SYSADM	TRIGGERT	TRIGGERU	r	Update	After	For each row

2. Select the trigger that is to be dropped by clicking on it.

Triggers						
<u>E</u> reate	Droj	p				
Table Ow	Table Na	Name	Enable	Event	Time	Type
SYSADM	TRIGGERT	INSERT	r	Insert	After	For each row
SYSADM	TRIGGERT	INSERTSP	~	Insert	Before	For each row
VOTEADM	ITEM	TG1	r	Insert	After	For each row
VOTEADM	ITEM	TG2	r	Delete	After	For each row
SYSADM	TRIGGERT	TRIGGERD	r	Delete	Before	For each row
SYSADM	TRIGGERT	TRIGGERU	r	Update	After	For each row

3. Click **Drop**. A confirmation window will open to confirm if the trigger is to be dropped.

Drop Trigger	×
Do you want to drop trigger TG1 ?	
୍ଣ <u>୦</u> ୯ କୁଆରେ କୁ	

4. Click **OK**.

### 11.3 Modifying a Trigger

After creating a trigger, it can be modified or disabled. Changing the trigger's SQL code can modify the triggering event, trigger action, or trigger type.

- **T**o modify a trigger:
  - 1. Click the object **Trigger** in the tree. All the triggers in the database will be displayed on the **Triggers** page.

Triggers						
<u> </u>	Drop					
Table Ow	Table Na	Name	Enable	Event	Time	Type
SYSADM	TRIGGERT	INSERT	r	Insert	After	For each row
SYSADM	TRIGGERT	INSERTSP	~	Insert	Before	For each row
VOTEADM	ITEM	TG1	~	Insert	After	For each row
VOTEADM	ITEM	TG2	r	Delete	After	For each row
SYSADM	TRIGGERT	TRIGGERD	r	Delete	Before	For each row
SYSADM	TRIGGERT	TRIGGERU	r	Update	After	For each row

2. Double click the trigger to be modified, or expand the Triggers node in the tree and select a trigger from the tree. The **Properties** page will appear.

<ul> <li>Database (DBSAMPL</li> <li>Hundre Tablespaces</li> </ul>	Properties
⊞ III Tables ⊞ III Views III Indexes	Modify Confirm Cancel
	SOL Script: CREATE TRIGOER Insert AFTER INSERT ON SYSADM.TriggerTable1 FOR EACH ROW (INSERT INTO SYS ADM/TriggerTable2 VALUES (new.C1int, new.C1int, new.C2Char, new.C2Char, new.C3Varchar, new.C3Varchar

3. Click the **Modify** button.

12	
	Properties
	Modify 💫 Confirm Zancel
	🗹 Enable
	SQL Script:
	ALTER TRIGOER INSERT REPLACE WITH AFTER INSERT ON SYSADM TriggerTable1 FOR EACH ROW (IN SERT INTO SYSADM.TriggerTable2 VALUES (new.C1Int, new.C1Int, new.C2Char, new.C2Char, new.C3Varc har, new.C3Varchar, CURCATEO))

- 4. To disable the trigger, remove the check mark next to **Enable**.
- 5. To make changes to the SQL script, click in the appropriate place in the **SQL Script** field and edit the statement.
- 6. Click the **Confirm** button. The modified trigger will be displayed.

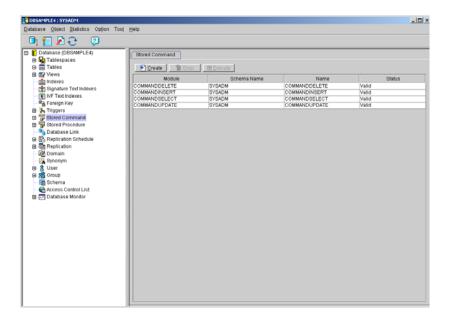
# 12 Working with Stored Commands

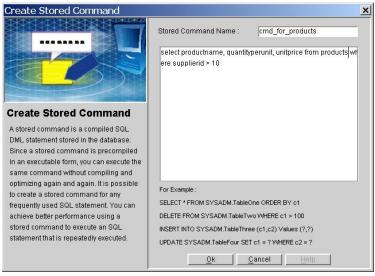
A stored command is a compiled SQL DML statement stored in the database. Since a stored command is precompiled in an executable form, you can execute the same command without repeatedly compiling and optimizing it. It is possible to create a stored command for any frequently used SQL statement.

### 12.1 Creating a Stored Command

For better performance with frequently used statements, the creation of a stored command is recommended.

- **T**o Create a Stored Command:
  - 1. Click the object **Stored Command** in the tree. The **Stored Command** window will open.





2. Click Create. The Create Stored Command window will open.

- 3. Enter the stored command name into the **Stored Command Name** field.
- 4. Enter the SQL command.
- 5. Click **OK**. The newly created stored command is displayed with the rest of the stored commands in the database.

### 12.2 Executing a Stored Command

After creating a stored command, you can execute it directly or in an application program. If you execute a stored command that has input parameters, JDBA tool will prompt you to provide its value when executing the stored command. When you execute a stored command, number of input parameters should be equal to number of input parameters in the stored command.

- **T**o Execute a Stored Command:
  - 1. Open the **Stored Command** node and then select the stored command that is to be executed. The stored command **Properties** page will open.

DBSAMPLE4 : SYSADM			
<u>D</u> atabase <u>O</u> bject <u>S</u> tatistics	s Op <u>t</u> ion Too <u>l H</u> elp		
📑 🖬 🔏 😌	<b>?</b>		
Database (DBSAN A B Q Tablespaces	Properties Permission		
⊞ III Tables ⊞ III Views	Execute		
- 🏥 Indexes	Module Name:	COMMANDDELETE	
Signature Text	Owner Name:	SYSADM	2000000
Foreign Key	Command Name:	COMMANDDELETE	
SYSADM.T	Statement		
VOTEADM	DELETE FROM SYSADM.alltyp	e WHERE c1=?	
SYSADM.T			
SYSADM.T			
Stored Comm: SYSADM.C SYSADM.C SYSADM.C SYSADM.C SYSADM.C			
SYSADM.C			200000
🔛 🍟 Stored Proced 🧱			000000
□     □    □			
Replication     Domain			
🚽 🗖 Synonym			
🖻 🖁 User 📃			
SYSADM			
			-
Information about COMMANDE	DELETE .SYSADM.COMMA	NDDELETE	

**NOTE** Double clicking on the Stored Command node of the tree also displays the *Properties window.* 

Execute Result			>
PRODUCTNAME	QUANTITYPERUNIT	UNITPRICE	
NuNuCa Nus-Nougat-Creme	20 - 450 g glasses	14.0000	
Gumbar Gummibarchen	100 - 250 g bags	31.2300	1005
Schoggi Schokolade	100 - 100 g pieces	43.9000	1000
Rossle Sauerkraut	25 - 825 g cans	45.6000	100
Thuringer Rostbratwurst	50 bags x 30 sausgs.	123.7900	100
Nord-Ost Matjeshering	10 - 200 g glasses	25.8900	1000
Gorgonzola Telino	12 - 100 g pkgs	12.5000	100
Mascarpone Fabioli	24 - 200 g pkgs.	32.0000	A N N
Geitost	500 g	2.5000	1000
Sasquatch Ale	24 - 12 oz bottles	14.0000	1000
Steeleye Stout	24 - 12 oz bottles	18.0000	100
Inlagd Sill	24 - 250 g jars	19.0000	1000
Gravad lax	12 - 500 g pkgs.	26.0000	1000
Cote de Blaye	12 - 75 cl bottles	263.5000	1
Chartreuse verte	750 cc per bottle	18.0000	
Boston Crab Meat	24 - 4 oz tins	18.4000	1
Jack's New England Clam Chowder	12 - 12 oz cans	9.6500	1
Singaporean Hokkien Fried Mee	32 - 1 kg pkgs.	14.0000	
lpoh Coffee	16 - 500 g tins	46.0000	1
Gula Malacca	20 - 2 kg bags	19.4500	1
Rogede sild	1k pkg.	9.5000	1
Spegesild	4 - 450 g glasses	12.0000	1
Zaanse koeken	10 - 4 oz boxes	9.5000	
Chocolade	10 pkgs.	12.7500	
Maxilaku	24 - 50 g pkgs.	20.0000	1

2. Click **Execute**. The result of the executed stored command will be displayed.

3. Click **OK**. This clears the result window.

## 12.3 Dropping a Stored Command

If a stored command is no longer required, it can be dropped.

- **T**o drop a stored command:
  - 1. Click the object **Stored Command** in the tree. The **Stored Command** page will open.
  - 2. Select the stored command that is to be dropped by clicking on it. It will highlight blue.

					DBSAMPLE4 : SYSADM
Database (DBSAN       Stored Command         □       Tablespaces         □       Tables         □       Tables         □       Totas         □       Tables         □       Totas         □       Totas <t< td=""><td></td><td></td><td></td><td>s Op<u>t</u>ion Too<u>l H</u>elp</td><td>Database Object Statistics</td></t<>				s Op <u>t</u> ion Too <u>l H</u> elp	Database Object Statistics
Image: Solide Command     Solide Command       Image: Solide Command     Image: Solide Command				<b>P</b>	미 🛅 🔎 근
Indexes         Module         Owner         Name         Status           Image: Status         COMMANDDELETE         SYSADM         COMMANDDELETE         Valid           Image: Status         COMMANDDELETE         SYSADM         COMMANDDELETE         Valid           Image: Status         COMMANDDELETE         SYSADM         COMMANDDELETE         Valid           Image: Status         COMMANDELETE         SYSADM         COMMANDUSELECT         Valid           Image: Status         COMMANDUPOTE         SYSADM         COMMANDUPDATE         Valid			op 🔄 Execute		🕀 😡 Tablespaces 🕀 🌐 Tables
Text Index:         COMMANDINSERT         SYSADM         COMMANDISERT         Valid           The Foreign Key         COMMANDUSELECT         SYSADM         COMMANDELECT         Valid           Torgers         COMMANDUPDATE         SYSADM         COMMANDUPDATE         Valid	ime Status	Name	Owner	Module	
Triggers         COMMANDSELECT         SYSADM         COMMANDSELECT         Valid           Image: Sysadm         COMMANDUPDATE         SYSADM         COMMANDUPDATE         Valid	LETE Valid	COMMANDDELETE	SYSADM	COMMANDDELETE	— 🚠 Signature Text
🗇 🖌 Triggers 🔰 COMMANDUPDATE SYSADM COMMANDUPDATE Valid					
- 3 SYSADM T	'DATE Valid	COMMANDUPDATE	SYSADM	COMMANDUPDATE	
Image: System T					VOTEADM. VOTEAD
number of stored commands is 4				ndsis 4	The number of stored commar

3. Click **Drop**. The **Drop Stored Command** dialog box will open to confirm if the stored command is to be dropped.

Drop S	tored Command	×
i	Do you want to drop stored command COMMANDDELETE ?	

4. Click **OK**. The remaining stored commands in the database will be displayed.

### 12.4 Granting Stored Command Privileges

By default only the owner of a stored command or a user with DBA authority or higher have the execute privilege for the stored command. The owner or a user with DBA authority or higher may grant execute privilege to allow the stored command to be called by other users. The execute privilege can also be revoked from other users with resource authority by the owner of the stored command. A user with authority or higher has all privileges on all stored commands and can revoke those privileges even from the owner of the stored command (unless the owner has DBA authority or higher).

- **T**o grant or revoke privileges on a Stored Command:
  - 1. Open the **Stored Command** node and then select the stored command that is to be executed. The stored command **Properties** page will open.

**NOTE** Double clicking on the stored command node of the tree also displays the **Properties** window.

DBSAMPLE4 : SYSADM			
Database Object Statistics Opt	țion Too <u>l H</u> elp		
📑 🔝 🔎 🖓			
Database (DBSAN A B W Tablespaces	operties Permission		
🕀 🗰 Tables 🕀 🔐 Views	Modify Donfirm	K <u>C</u> ancel	
🛛 🟥 Indexes	Туре	User/Group	Execute
🕂 📺 Signature Text	8	DELPHI	
IVF Text Indexe	8	SYSADM	$\checkmark$
Foreign Key	<u> </u>	VOTEADM	
SYSADM.T	สั	PUBLIC	
- SYSADM.T			
- 🖌 VOTEADM.			
VOTEADM			
- ዀ SYSADM.T			
SYSADM.T			
E Stored Comm			
SYSADM.C SYSADM.C SYSADM.C SYSADM.C			
- 🛱 SYSADM.C			
- 🛱 SYSADM.C			
🖽 🍟 Stored Proced 🧾 🕴			
— 뜱 Database Link			
🖽 🔂 Replication Sc			
⊞ 🏪 Replication — 🙀 Domain			
- 🖳 Synonym			
🗆 🔏 User			
8 DELPHI			
- 🖁 SYSADM			
Information about COMMANDDELET	E .SYSADM.COMMAN	NDDELETE	

2. Click the **Permission** tab. The stored command **Permission** page will open.

- 3. Select the User/Group to whom you want to grant or revoke the privilege.
- 4. Click Modify.
- 5. Click the **Execute** column beside the **User/Group** to grant or revoke the execute privilege. A check mark indicates that the user/group has the execute privilege.
- 6. Click **Confirm**.

## 13 Working with Stored Procedures

A stored procedure is a special kind of user-defined function that contains embedded SQL statements. This allows you to bypass repeated SQL compilation and optimization, increasing the performance of frequently repeated tasks. You can execute a stored procedure as a command in interactive SQL, or invoke it in application programs, trigger actions, or other stored procedures.

You can accomplish a wide range of objectives with stored procedures, including improving database performance, simplifying the writing of applications, and limiting or monitoring access to a database.

Because a stored procedure is stored in an executable object in the database, it is available to every application running on the database. Several applications can use the same stored procedure and hence the development time for an application is reduced.

### 13.1 Creating a Stored Procedure

DBMaker provides two kinds language for user to create stored procedure, one is ESQL/C and another is Java.

An ESQL/C stored procedure can perform any function a C application can, including calling other C functions and system calls. A C compiler is needed for writing ESQL/C stored procedures. If you want to write your stored procedure under UNIX, generally a C compiler is already available and all you need to do is make sure it is included in your path. If your OS platform is Windows, you need to install Visual C++ version 4.2 or greater.

Given Java's popularity today; it is certainly possible that members of a development team are more proficient in Java than ESQL. To create java stored procedure, user must first define the value of the DB\_SPDIR in the dmconfig.ini and copy physical jar file manually to the DB\_SPDIR/jar/username/ directory. Then, execute the add jarfile sql statement to register the jar file into the database. For the details about the add jar file sql statement, please refer to the chapter 13.5.

- **•** To create a Stored Procedure:
  - 1. Click the object **Stored Procedure** in the tree. The **Stored Procedures** page will appear.

atabase Object Statistics Option Tool	Ueih		
	-		
Database (DBSAMPLE4)	Stored Procedure Jar File		
Tablespaces			
Tables	Create Drop	Execute	
	Module	Schema Name	Name
- mindexes	DMCOPYTBSP	SYSTEM	COPYTABLE
Signature Text Indexes	DMSYSTEMSP	SYSTEM	GETSYSTEMOPTION
INF Text Indexes	DMSYSTEMSP	SYSTEM	SETSYSTEMOPTION
- Roreign Key	DMSYSTEMSP	SYSTEM	SOADD
🕀 🔥 Triggers	DMSYSTEMSP	SYSTEM	SOCREATE
Stored Command	DMSYSTEMSP	SYSTEM	SODROP
Stored Procedure	DMSYSTEMSP	SYSTEM	SOLOCK
SYSADM.INSERTALLTYPE	DMSYSTEMSP	SYSTEM	SOREAD
- B SYSADM.OUTPUTALLTYPE	DMSYSTEMSP	SYSTEM	SOSET
- SYSADM.PROC1	DMSYSTEMSP	SYSTEM	SOUNLOCK
- 1 SYSADM.RETURNALLTYPE	DMMLSP	SYSTEM	XMLEXPORT
SYSADM SP_TRIGGER	DMOMLSP	SYSTEM	XMLIMPORT
SYSTEM.COPYTABLE	DMATINSP	SYSTEM	XIM
SYSTEM GETSYSTEMOPTION	INSERTALLTYPE	SYSADM	INSERTALLTYPE
SYSTEM SETSYSTEMOPTION	OUTPUTALLTYPE	SYSADM	OUTPUTALLTYPE
SYSTEM SOADD	PROC1	SYSADM	PR0C1
SYSTEM SOCREATE	RETURNALLTYPE	SYSADM	RETURNALLTYPE
-W SYSTEM.SODROP	SP_TRIGGER	SYSADM	SP_TRIGGER
- SYSTEM.SOLOCK			
SYSTEM.SOREAD			
- B SYSTEM.SOSET			
- W SYSTEM SOUNLOCK			
- W SYSTEM JONLEXPORT			
- P SYSTEM XMLIMPORT			
- 😗 SYSTEM.XTM			
SYSTEM XTT			
- Patabase Link			
Replication Schedule			
Replication			
Domain			
- 🔂 Synonym	2		

2. Click **Create**. The **Introduction** window of the **Create Stored Procedure** wizard will open.



3. Click **Next**. The Language Type wizard appares.

🚼 Create Schema Wizard Language type		×
Language type		
The database support two types of language for stored procedure. One is ESQL/C, and another is Java.		
	Language type:	
	● ESQL/C 🔘 Java	
🗘 <u>P</u> revio	ous Next 🗘 🏾 🗱	Cancel <u>? H</u> elp

- 4. You can choose the type of language to create a stored procedure. If you choose the **ESQL/C**, see 5; if you choose the Java, see 9.
- 5. Click the **Next, The final review** will open, input the ESQL/C statement in the right console or click the **import** to import from a file.

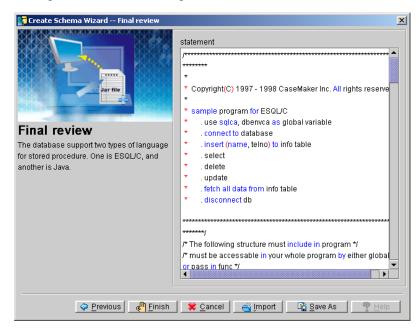


6. Clicking **Import** will open the **Open** window. Files can be imported from any source, including the SPDIR directory of other databases on the server or network drives. Select the desired file by typing in the path in the **File name** field, or browse through the directory tree until the correct path is found.

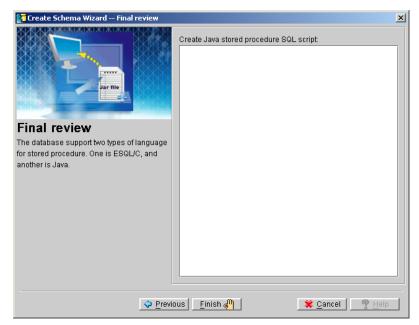
👹 Open			
Look <u>i</u> n:	🗖 bin	▼ 🛱 🛱	
🗂 fo			
🗂 SUB00000	)		
🗂 SUB0000D/	W		
ゴ userFile			
🗋 a1.ec			
all_nor_att.	00		
all_nor_att.s	s0		
🗅 all nor ala	1.60		
File <u>n</u> ame:	a1.ec		Open
Files of type:	All Files (*.*)		

7. Click **Open** to open the file.

8. The **Final review** window will reappear as in the example below if the imported file contains properly formatted (ASCII) text, or if you choose to manually enter the code. Click **Save As** to store the stored procedure to another location, or click **Finish** to compile and store the stored procedure in the database.



9. Click the **Next, The final review** will open, input the Java stored procedure SQL script in the right console. Then click **Finish**.



10. If the Stored Procedure compiles correctly, the following message will appear.

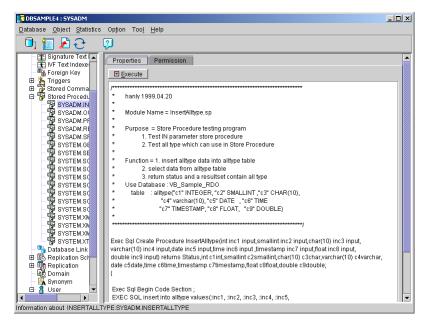


11. Click OK.

### 13.2 Executing a Stored Procedure

After creating a stored procedure, you can execute it directly or in an application program. If you execute a stored procedure that has input parameters, JDBA tool will prompt you to provide the parameter's value when executing the stored procedure. When you execute a stored procedure, number of input parameters should be equal to number of input parameters in the stored procedure.

- **T**o execute a stored procedure:
  - 1. Open the **Stored Procedure** node and then select the stored procedure that is to be executed. The stored procedure **Properties** page is opened.



**NOTE** Double clicking a Stored Procedure on the right panel will display the same window.

- 2. Click **Execute**. The result of the executed stored procedure is displayed.
- 3. Click **OK**. This clears the result window.

## 13.3 Dropping a Stored Procedure

If a stored procedure is no longer required, it can be dropped.

- **T**o drop a stored procedure:
  - 1. Click the **Stored Procedure** object in the tree. The stored procedure page with all the stored procedures in the database is displayed.

atabase Object Statistics Option Tool Help	•		
Database (DBSAMPLE4)     A Tablespaces     Tablespaces	Stored Procedure Jar File		
E Views	Create 🛛 Drop 🖻	Execute	
m Indexes	Module	Schema Name	Name
- Pro Signature Text Indexes	DMCOPYTBSP	SYSTEM	COPYTABLE
TE IVF Text Indexes	DMSYSTEMSP	SYSTEM	GETSYSTEMOPTION
R Foreign Key	DMSYSTEMSP	SYSTEM	SETSYSTEMOPTION
	DMSYSTEMSP	SYSTEM	SOADD
Triggers	DMSYSTEMSP	SYSTEM	SOCREATE
Stored Command	DMSYSTEMSP	SYSTEM	SODROP
Stored Procedure	DMSYSTEMSP	SYSTEM	SOLOCK
- W SYSADMINSERTALLTYPE	DMSYSTEMSP	SYSTEM	SOREAD
- SYSADM.OUTPUTALLTYPE	DMSYSTEMSP	SYSTEM	SOSET
- B SYSADM PROC1	DMSYSTEMSP	SYSTEM	SOUNLOCK
- SYSADM.RETURNALLTYPE	DMXMLSP DMXMLSP	SYSTEM	XMLEXPORT
SYSADM.SP_TRIGGER	DMXMLSP	SYSTEM	XTM
SYSTEM.COPYTABLE	DMXTMSP	SYSTEM	XTT
SYSTEM.GETSYSTEMOPTION	INSERTALLTYPE	SYSADM	INSERTALLTYPE
SYSTEM.SETSYSTEMOPTION	OUTPUTALLTYPE	SYSADM	OUTPUTALLTYPE
SYSTEM.SOADD	PROC1	SYSADM	PROC1
	RETURNALLTYPE	SYSADM	RETURNALLTYPE
- SYSTEM.SOCREATE	SP_TRIGGER	SYSADM	SP_TRIGGER
- 💱 SYSTEM.SODROP	ar_INIVER	a randim	ar_moven
S FYSTEM SOLOCK SYSTEM SOREAD SYSTEM SOREAD SYSTEM SOREAD SYSTEM SOLADORT SYSTEM XML MPORT SYSTEM XML SYSTEM XML STANDART STAND			

- 2. Select the Stored Procedure that is to be dropped.
- 3. Click **Drop**. A **Drop Stored Procedure** dialog box is displayed to confirm if the stored procedure is to be dropped.



4. Click OK.

#### **13.4 Granting Privileges on Stored Procedures**

You must have the execute privilege for a stored procedure to execute it. In order to allow a stored procedure to be used by others, you can grant execute privilege on a stored procedure to other database users. If you do not wish others to execute a stored procedure, you can revoke execute privilege of the stored procedure from them. However, you can only grant or revoke the execute privilege of stored procedures. You have the execute privilege on all stored procedures in database if you are a DBA.

- **T**o grant or revoke privileges on a stored procedure:
  - 1. Open the **Stored Procedure** node and then select the stored procedure that is to be executed. The stored procedure **Properties** page is opened.

**NOTE** Double clicking on the Stored Procedure node from the tree also displays the **Properties** window.

BSAMPLE4 : SYSADM		
Database Object Statistics Option Tool Help		
🖳 🛅 🔊 😌 🔤		
Image: Signature Text     Properties     Permission       Image: Signature Text     Image: Signature Text     Image: Signature Text       Image: Signature Text     Image: Signature Text     Image: Signature Text       Image: Signature Text     Image: Signature Text     Image: Signature Text       Image: Signature Text     Image: Signature Text     Image: Signature Text       Image: Signature Text     Image: Signature Text     Image: Signature Text       Image: Signature Text     Image: Signature Text     Image: Signature Text       Image: Signature Text     Image: Signature Text     Image: Signature Text       Image: Signature Text     Image: Signature Text     Image: Signature Text       Image: Signature Text     Image: Signature Text     Image: Signature Text       Image: Signature Text     Image: Signature Text     Image: Signature Text       Image: Signature Text     Image: Signature Text     Image: Signature Text       Image: Signature Text     Image: Signature Text     Image: Signature Text       Image: Signature Text     Image: Signature Text     Image: Signature Text       Image: Signature Text     Image: Signature Text     Image: Signature Text       Image: Signature Text     Image: Signature Text     Image: Signature Text       Image: Signature Text     Image: Signature Text     Image: Signature Text       Image: Sig	<b>X</b> Cancel	
B Stored Comma	User/Group	Execute
	DELPHI	
SYSADM.IN	SYSADM VOTEADM	
SYSADM.PF	PUBLIC	
SYSADM OL SYSADM PF SYSADM RF SYSADM RF SYSTEM SC SYSTEM		
SYSADM.SF		
- 🖗 SYSTEM.SC		
SYSTEM.SC		
SYSTEM.SC		
- 🛱 SYSTEM.SC		
SYSTEM.XN		
SYSTEM.XN		
- Tatabase Link		
🖽 🚯 Replication Sch		
🕀 🊎 Replication		
- 🐼 Domain		
Synonym		
Information about INSERTALLTYPE.SYSADM.INSERTALLTYPE		

2. Click the **Permission** tab. The **Permission** page is displayed.

- 3. Select the User/Group to whom you want to grant or revoke the privilege.
- 4. Click Modify.
- 5. Click the **Execute** column beside the **User/Group** to grant the execute privilege. A check mark indicates that the user has the execute privilege. By clicking on it again, you can revoke the privilege.
- 6. Click **Confirm**.

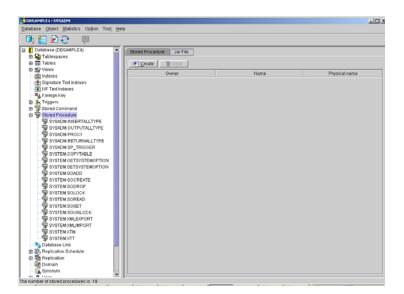
#### 13.5 Add jarfile for Java Stored Procedure

Before creating Java stored procedure, you should register you jar file into the database.

- **T**o create a Jarfile:
  - 1. Click the object **Stored Procedure** in the tree. The Stored Procedures page will appear.

Containes (DEMAPLE)     C	🖻 🛅 🛃 근 🖉 👘			
Composition     Compositend     Compositend     Compositend     Compositend     Composit		Stored Procedure Jar File		
■ Week     Mode     Schema Name     OPT/74LE       ■ Mode     Botates Tot Indexes     OCOP/782P     States       ■ Mode     Botates Tot Indexes     OCOP/782P       ■ Mode     States Tot Indexes     OCOP/782P       ■ Mode     States Tot Indexes     OCOP/782P       ■ Mode     States Command     OCOP/782P       ■ States Command     OCOP/782P     States       ■ States Comone     States     States				
Indexs     Deck     Deck     Deck       Biguater Tet Indexs     Coll     Coll     Coll     Coll       Model     Coll     Coll     Coll     Coll       Model <t< th=""><th></th><th>💽 Create 👔 Drop E</th><th>• Execute</th><th></th></t<>		💽 Create 👔 Drop E	• Execute	
tel douber Trainderes Coopyrage		Module	Schema Name	Name
Image: State in the set indexes     Consist set indexes     Consist set indexes       Image: State indexes     Consist set indexes     Consist set indexes       Image: State indexes     Consist set indexes     Consist set indexes       Image: State indexes     Consist set indexes     Consist set indexes       Image: State indexes     Consist set indexes     Consist set indexes       Image: State indexes     Consist set indexes     Consist set indexes       Image: State indexes     Consist set indexes     Consist set indexes       Image: State indexes     Consist set indexes     Consist set indexes       Image: State indexes     Consist set indexes     Consist set indexes       Image: State indexes     Consist set indexes     Consist set indexes       Image: State indexes     Consist set indexes     Consist set indexes       Image: State indexes     Consist set indexes     Consist set indexes       Image: State indexes     Consist set indexes     Consist set indexes       Image: State indexes     Consist set indexes     Consist set indexes       Image: State indexes     Consist set indexes     Consist set indexes       Image: State indexes     Consist set indexes     Consist set indexes       Image: State indexes     Consist set indexes     Consist set indexes       Image: State indexes     Consist set indexes				
Image: State State State     Desiver Taxip     Post Field     State St				
■ Origin Key     ■ Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation       ■ Obsyntation     ■ Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation       ■ Obsyntation     ■ Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation       ■ Obsyntation     ■ Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation       ■ Obsyntation     ■ Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation       ■ Obsyntation     ■ Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation       ■ Obsyntation     ■ Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation       ■ Obsyntation     ■ Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation       ■ Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation       ■ Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation       ■ Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation       ■ Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation       ■ Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation     ● Obsyntation       ■ Obsyntation     ■ Obsyntation     ■ Obsyntation <t< td=""><td></td><td></td><td></td><td></td></t<>				
B Binder Stread Command B Binder Stread Command B Binder Stread Command B Binder Stread Command B Stread Stread Command B Stread Command B Stread Command B Stread Command B Stread Stread Command B Stread Stread Command B Stread Command B Stread Stread Command B Str	- Reference Foreign Key		SYSTEM	
■     Bisset Processing     Dissist Field     Society       ■     Bisset Processing     Dissist Field     Dissist Field       ■     Bisset Processing     Dissist Field     Dissist Field       ■     Bisset Processing     Dissist Field     Dissist Field       ■     Bisset Processing     Bisset Processing     Dissist Field       ■     Bisset Processing     Dissist Field     Dissist Field       ■     Dissist Field     Dissist Field     Dissist Field       ■     D	Trippers	DMSYSTEMSP	SYSTEM	SOCREATE
• Bissed Processor               Onsignification               Onsignification <td>🕀 🚏 Stored Command</td> <td></td> <td></td> <td></td>	🕀 🚏 Stored Command			
PSSAUMINEERIALTYPE         Obsight Signal           PSSAUMINEERIALTYPE         Dowsystemsp           PSSAUMINEERIALTYPE         PSSAUMINEERIALTYPE           PSSAUMINEERIALTYPE         PSSAUMINERIALTYPE           PSSAUMINEERIALTYPE         PSSAUMINEERIALTYPE           PSSAUMINEERIALTYPE         PSSAUMINEERIALTYPE           PSSAUMINEERIALTYPE         PSSAUMINEERIALTYPE           PSSAUMINEERIALTYPE         PSSAUMINEERIALTYPE           PSSAUMINEERIALTYPE         PSSAUMINEERIALTYPE           PSSAUMINEERIALTYPE         PSSAUMINEERIALTYPE				
• SYSTEM OUTPUTALITYPE               ONSYSTEMSP             ONSTEM               OOSITE               OTSITE               OOSITE               OOSITE               OOSITE               OOSITE               OOSITE               OOSITE               OOSITE		DMSYSTEMSP	SYSTEM	SOREAD
■ Brsdow Proc1     ■ Brsdow Proc1       ■ Brsdow Brstwein Sonorp     ■ Brstwein Sonorp       ■ Brstwein Sonorp     Brstwein Sonorp       ■ Brstwein Brodow     Brstwein Sonorp       ■ Brstweine Link     ■ Brstweine Brodow       ■ Brstewarte Mark     ■ Brstweine Brodow		DMSYSTEMSP	SYSTEM	SOSET
		DMSYSTEMSP	SYSTEM	SOUNLOCK
Straduk sp. TraioGeR     Okartusia     Okartusia     Okartusia       Stratu kapita     Okartusia     Okartusia     Okartusia       Stratu kapita     Stratukapita     Okartusia     Okartusia       Stratukapita     Stratukapita     Stratukapita     Stratukapita       Stratukapita     Stratukapita     Stratukapi		DMOMLSP	SYSTEM	XMLEXPORT
■ SostEM COPTABLE     SostEM STT       ■ SostEM COPTABLE     SostEM STT       ■ SostEM Sock     SostEM Store       ■ SostEM Sock     SostEM Sock       ■ Resident Sock     Sock		DMOMLSP	SYSTEM	XMLIMPORT
● GistEm GETWOFTION         INDERTALTYPE         DIADM         INDERTALTYPE           ■ SistEm SETSISTEMOPTION         INDERTALTYPE         DIADM         OUTPOTALTYPE           ■ SistEm SETSISTEMOPTION         INDERTALTYPE         DISADM         OUTPOTALTYPE           ● SistEm SOREAD         ■ SistEm SOREAD         ■ SistEm SOREAD         ■ SistEm SOREAD           ● SistEm SOREAD         ■ SistEm SOREAD         ■ SistEm SOREAD         ■ SistEm SOREAD           ● SistEm SOREAD         ■ SistEm SOREAD         ■ SistEm SOREAD         ■ SistEm SOREAD           ● SistEm SOREAD         ■ SistEm SOREAT         ■ SistEm SOREAD         ■ SistEm SOREAD           ● SistEm SOREAD         ■ SistEm SOREAD         ■ SistEm SOREAD         ■ SistEm SOREAD           ● SistEm SOREAD         ■ SistEm SOREAD         ■ SistEm SOREAD         ■ SistEm SOREAD		DMXTMSP	SYSTEM	XTM
■ Sistem Sersitem Sonce     OUTPUTALITYE     Sistem Control       ● Sistem Sonce     PROCT     Sistem Monte       ● Sistem Sonce     Sistem Monte     Sistem Monte       ● Sistem Monte     Proct     Sistem Monte       ● Sistem Sonce     Sistem Monte     Sistem Monte       ● Sistem Monte     Proct     Sistem Monte		DMOCTTSP	SYSTEM	XTT
BystTim SoAbo         PROC1         SYSADM         PROC1           BystTim SORADE         PROC1         SYSADM         PROC1           BystTim SORADE         PROC1         SYSADM         RETURNALITYPE           BystTim SORADE         SP_TRIGGER         SYSADM         SP_TRIGGER           BystTim SORADE         SP_TRIGGER         SYSADM         SP_TRIGGER           BystTim SORADE         SP_TRIGGER         SYSADM         SP_TRIGGER           BystTim SORADE         SYSTEM SORADE         SYSADM         SP_TRIGGER           BystTim SORADE         SYSTEM SORADE         SYSADM         SP_TRIGGER           BystTim SORADE         SYSTEM SORADE         SYSADM         SP_TRIGGER           BystTim SORADE         SYSADM         SP_TRIGGER         SYSADM	- SYSTEM.GETSYSTEMOPTION	INSERTALLTYPE	SYSADM	INSERTALLTYPE
Point and a conception     Point and a conception       Point and a conception	- SYSTEM.SETSYSTEMOPTION	OUTPUTALLTYPE	SYSADM	OUTPUTALLTYPE
Image: system soorearre         Image: system	SYSTEM SOADD		SYSADM	
Image: System soneope     Image: System soneope     Image: System soneope       Image: System soneope     Image: System soneope     Image: System soneope       Image: System soneope     Image: System soneope     Image: System soneope       Image: System soneope     Image: System soneope     Image: System soneope       Image: System soneope     Image: System soneope     Image: System soneope       Image: System soneope     Image: System soneope     Image: System soneope       Image: System soneope     Image: System soneope     Image: System soneope       Image: System soneope     Image: System soneope     Image: System soneope       Image: System soneope     Image: System soneope     Image: System soneope       Image: System soneope     Image: System soneope     Image: System soneope       Image: System soneope     Image: System soneope     Image: System soneope       Image: System soneope     Image: System soneope     Image: System soneope       Image: System soneope     Image: System soneope     Image: System soneope       Image: System soneope     Image: System soneope     Image: System soneope       Image: System soneope     Image: System soneope     Image: System soneope       Image: System soneope     Image: System soneope     Image: System soneope       Image: System soneope     Image: System soneope     Image: System soneope <t< td=""><td></td><td>RETURNALLTYPE</td><td>SYSADM</td><td></td></t<>		RETURNALLTYPE	SYSADM	
Bisterie SoneAc Bisterie SoneAc Bister		SP_TRIGGER	SYSADM	SP_TRIGGER
STER SORAD     Server     Sorad				
명 INSTEM SOGET 영 ENTEM SOUNDOCK 영 ENTEM SOUNDOCK 영 INSTEM SOUNDOCK 영 INSTEM SOUNDOCK 영 INSTEM SOUNDOCK 영 INSTEM SCHOOL 명 Resistation Schedule 명 Resistation				
<sup>1</sup> B OTTEM SOURJOCK <sup>1</sup> B OTTEM SOURJOCK <sup>1</sup> B OTTEM SOURJOCK <sup>1</sup> B OTTEM SOURJOCH <sup>1</sup> B OTTEM SOURJO				
SYSTEM COLLEXPORT       SP SYSTEM COLLEXPORT       SP SYSTEM.XTM       SP SYSTEM.XTT       Sp Contasse Link       ED Replication Schedule       Sp Replication				
Image: Statistic Statistics       Image: Statistics				
BostEmukTM     B				
□         ■	- W SYSTEM XMUMPORT			
□         ■	SYSTEM XTM			
S Database Link				
B Replication Schedule     Beplication				
a 💀 Replication				
- Hg Uomain				
Synorym				
	- Distant			

2. Click the **Jar File**.the Jar File page will open.



3. Click Create. The Add Jarfile wizard appears.

Add jarfile wizard Introduction	×
	Welcome to the Add Jarfile Wizard. The database supports java stored procedure. Add jarfile is to register user java code to the database. This wizard helps user to add jarfile by going through the following steps. 1. Name of the jarfile and specify the physical filename. 2. Final relivew for SQL script.
	Next 🗘 🕺 🌋 Cancel 🤗 Help

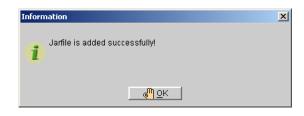
4. Click **Next**. The **Name of the jarfile and specify the physical filename** wizard appears.

Add jarfile wizard Add the jarfile		×
Name of the jarfile and		
specify the physical		
filename.		
When naming the jarfile, the name should unique in the database system catalog.		
· · · · · · · · · · · · · · · · · · ·	Jarfile name :	
	Jarfile physical path :	
	◆ Previous Next ♦ ★ Cancel 9 Help	

- 5. Input the Jarfile name and the Jarfile physical path separately in the proper filed.
- 6. Click **Next**. The Final review wizard appears.

Add jarfile wizard Final review		×
	Add jarfile script :	
Final reivew.           The SQL script will be executed when you press the Finish button.	Add jarfile script : ADD JARFILE javafile javatool	
2	Previous Finish 🗘 🌋 Cancel <u> ? H</u> elp	

7. Review the script in the right console and if you are sure about it, click **Finish.** The added Jarfile window will appear.

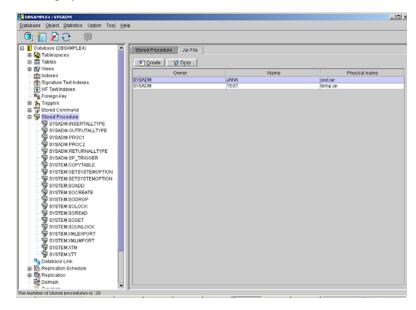


8. Click OK.

#### 13.6 Drop jarfile

When a jarfile is no longer required, you can drop it.

- **T**o drop a jarfile:
  - 1. Click the **Stored Procedure** icon from the tree, the Stored Procedure page will appear in the right panel, and then click the Jar File page. A list of the all the Jarfile you have added is displayed.



2. Choose the Jarfile you want to drop, Click the **Drop** in the top of the page. The **Remove Jar File** confirmation dialog box appears.



3. Click OK. The message clears. The remaining Jarfiles in the database will be displayed.

## 14 Working with Database Links

DBMaker effectively links multiple client applications and multiple database servers. Each client has a direct connection to a single database server, which is known as the Coordinator Database to that client. Through the Coordinator Database, the client can connect to other remote databases, which are also known as Participant Databases. You can access a remote database by using database links defined in the Coordinator Database.

A database link creates a connection to a remote database, and contains the login information and password necessary for connecting to the remote database. This allows you to connect to a remote database with a different user name than you are using in the Coordinator Database, or to connect to a remote database where you do not have an account but can still connect using a public link. It also makes data in a distributed database environment location transparent. The link definition, which also contains the login information and password, is stored in the Coordinator Database.

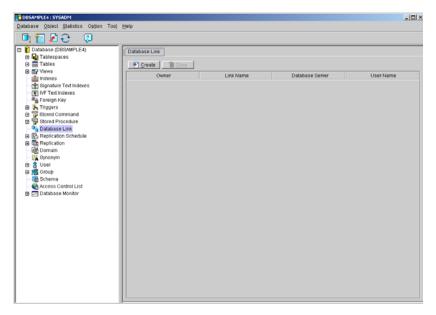
Database links are also useful for the management of synchronous table replication, and can be used to define the connection between source and destination tables.

#### 14.1 Creating a Database Link

Only users with DBA authority or higher can create public database links for all users of that database. Other users can create private database links for themselves. Multiple users may create private database links using the same name. If a private database link is created with a name identical to a public database link, the private database link will override the public database link.

DBMaker will create a public link by default if you do not specify the type of link to create. If you do not specify the User Name and password, your current login name and password will be used by default.

- **T**o create a database Link:
  - 1. Select the object **Database Link** in the tree. A list of all database links in the database is displayed.



Freate Database Link		×
Create Database Link		
A database link creates a connection to a remote database, and contains the login information and password necessary for connecting to the remote database. This allows you to connect to a remote database with a different user name than you are using in the Coordinator Database, or to connect to a remote database that you do not have an account in using a public link. It also makes data in a distributed database environment location transparent.	Database Link Name : Database Name : User Name : Password : Owner Public Public	Private

2. Click Create. The Create Database Link window is displayed.

- **3**. Enter the database link name.
- 4. Select the database to be the coordinator database from the **Database Name** menu.
- 5. The default user name for the selected coordinator database is displayed in the **User Name** field. A new name can be entered.
- 6. Enter the password.
- 7. If the owner of the database link is private (exclusively for a single user), select the **Private** option button. If the database link is to be used by multiple users, select the **Public** option button. The default setting is **Public**.
- 8. Click **OK**. The newly created database link can be seen in the list of all the database links.

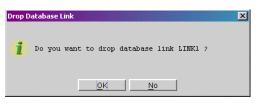
#### 14.2 Dropping a Database Link

If the database link is no longer required, drop it.

- **T**o drop a database link:
  - 9. Select the object **Database Link** in the tree. A list of all database links in the database is displayed.
  - 10. Select the database link that is to be dropped.



11. Click Drop. The Drop Database Link dialog box is displayed.



12. Click OK.

### 15

# Working with Replication Schedule

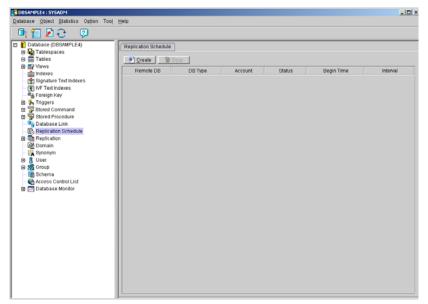
Replication schedules are user-defined schedules that tell the replication daemon when to begin the process of updating replicated data to destination (subscriber) databases. Replication that is carried out by this process is called asynchronous table replication. 'Asynchronous' means the modification to the remote site is delayed. The time difference from source to destination database depends on the replication schedule. Each destination database must have its own replication schedule. Modifications to local tables are stored in replication logs, and are replicated to the destination table(s) according to the replication schedule. Using replication logs enables DBMaker to treat the local transaction and the remote transaction independently, allowing you to update local tables normally even if the remote connection is not available. This allows asynchronous table replications to tolerate network and remote database failures, since DBMaker will keep trying to replicate until any failures are corrected or until the user specified number of attempts to reconnect is reached.

Asynchronous table replication depends on the establishment of a replication schedule. Likewise, developing a replication schedule without an asynchronous table replication that uses it is meaningless. A replication schedule should first be developed. Afterward, the asynchronous table replication can be successfully created.

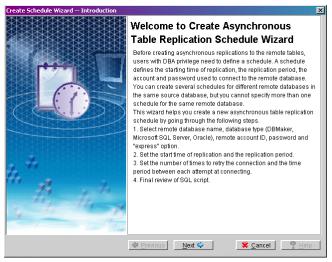
#### 15.1 Creating a Replication Schedule

Before creating asynchronous replications to remote tables, a user with DBA privilege needs to define a *schedule*. A schedule defines the starting time of replication, the replicating period, and the account and password used to connect to the remote database. Several schedules for different remote databases in the same source database may be created, but no more than one schedule can be made for the same remote database.

- **T**o create a Replication Schedule:
  - 1. Select the object **Replication Schedule** from the tree. The following window is displayed.



2. Click Create. The Create Schedule Wizard – Introduction window is opened.



3. Click Next. The Select the Remote Database Name window is opened.

Create Schedule Wizard Select the Remote	Database Name
	Enter Data Manually     Remote Database Name :
	Remote Database Type : DBMaker
Select the Remote	
Database Name	Remote Database Name :
You can choose to type in the remote	Visual FoxPro Database 🔹
database name manually or select the	Remote Database Type :
remote database using the ODBC Data Source Administrator (in windows only).	DBMaker
You can also select Express	
Asynchronous Table Replication (Express	Remote User ID :
ATR) if replication is to occur between	
DBMaker type databases.Express ATR is more efficient than normal ATR because it	Password :
compresses command data into packets	
instead of sending ODBC function calls.	
	Express
<u> </u>	Previous Next 🗣 🏾 🗱 Cancel 🦉 Help

- 4. If you choose to enter the remote database name manually, click the **Enter Data Manually** check box and enter the Remote Database Name.
- 5. Select the **Remote Database Type** from the menu.

- 6. If you do not choose to enter data manually, you can select the **Remote Database Name** and the **Remote Database Type** from the respective menus.
- 7. Enter the **User ID** for the remote database
- 8. Enter the **password**
- 9. Click the **Express** check box if you want to enable express asynchronous table replication
- 10. Click Next. The Start Time of Replication and Replication Period window will open.

Create Schedule Wizard Start Time of Rep	lication and Replication Period	×
Start Time of Replication		
and Replication Period		
Set the asynchronous table replication start time and the time interval between subsequent replications.		
	Start Date :	Start Time :
	2001/11/23	13:45:20
	L	uent replications
	Days:	Hours:Min:Sec
	1	00:00:00
I		🗱 <u>C</u> ancel  👷 Help

- 11. Enter the date on which the Asynchronous Table Replication is to be started in the **Start Date** box.
- 12. Enter the starting time of Asynchronous Table Replication in the **Start Time** box.
- **13.** In the **Time interval between subsequent replications** field: Enter the number of days between which the Asynchronous Table Replication will be done in the Days combo box.
- 14. Enter the interval of time in which the Asynchronous Table Replication will be done by entering the time interval in hours, minutes and seconds in the Hours:Min:Sec combo box. The total time between replications is equal to the sum of the Days and Hours:Min:Sec fields.
- 15. Click Next. The Reconnection Options window is displayed.

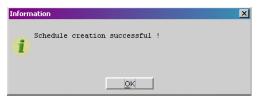
Create Schedule Wizard Reconnection Op	tions
Reconnection Options	
Set the number of times to reattempt to connect with the remote database, and the time interval to wait between attempts.	Times to Retry : Interval (Seconds) : Do not check schema Stop on error
	Previous     Next          Xext      Xext

- 16. Enter the number of times the replication process has to be retried if any failure occurs and replication has not been completed in the **Times to Retry** combo box. Using the upward and downward arrows, you can increase or decrease the number.
- 17. Enter the time duration the replication process has to wait before trying again in the **Interval** box. Using the upward and downward arrows, you can increase or decrease the number.
- 18. Click the **Do not check schema** check box if you do not want the Replication process to check the table schema before replicating.
- 19. Click the **Stop on error** check box if you want the Replication process to stop if any error is encountered.
  - **NOTE** The Stop on error check box will be disabled if you want an Express Asynchronous Table Replication.



20. Click Next. The following window is displayed.

- 21. The SQL script for replication schedule creation is displayed. You can modify it if required.
- 22. Click Finish. The Information dialog box is displayed as follows.



23. Click **OK** and the message will disappear.

#### **15.2 Dropping a Replication Schedule**

If you do not want to use a replication schedule any more it can be dropped.

- **T**o drop a replication schedule:
  - 1. Select the object **Replication Schedule** from the tree. The list of all the replication schedules in the database is displayed.
  - 2. Select the replication schedule that is to be dropped. It will highlight blue.

DBSAMPLE4 : SYSADM					_ 🗆 🗵
Database Object Statistics Option Tool	Help				
📑 🔚 🔎 근 🛛 🕫					
Database (DBSAMPLE4)	hedule				
Tables     Tobles     Create     Create	Drop				
- Indexes Remote DE	B DB Type	Account	Status	Begin Time	Interval
- 🛉 Signature Text Indexe: WEBDB	DBMaker	SYSADM	OK	2003/05/18 12:41:28	86400
E versalasian II					

3. Click **Drop**. A confirmation window will open.

Drop S	chedule							×
<b>i</b>	Do you ?	want to	drop	schedule	for	replication	to	A
			<u>0</u> K	<u><u> </u></u>	0			

4. Click OK.

#### 15.3 Modifying a Replication Schedule

If a replication schedule has to be changed, it can be modified by the following procedure.

- **T**o modify a replication schedule:
  - 1. Open the node **Replication Schedule** in the tree and select the replication schedule that is to be modified. The following screen is displayed.

D0SAMPLE4 : SYSADM			
Database Object Statistics Option T	looj Help		
🕛 🔚 🖻 근 🛛 🔍			
Orbitass (DGCMUL4)     Orbitass (DGCMUL4)     Orbitass (DGCMUL4)     Orbitass (DGCMUL4)     Orbitass     Ofbota     Orbitass     Orbitas     Orbitas     Orbitas     Orbitas     Orbit	Replication Schedule	Systema         Systemate           ASACCESS DATABASE         DBMaker           DBMaker         MATT           DC         DO0 0000           D         DO0 000000           D	

- 2. Click the **Modify** button. All the replication schedule information is displayed. The **Target Database** name and **Database Type** are disabled and they cannot be modified.
- 3. The User Name can be changed.
- 4. By clicking **Suspend**, you can change the status of the replication schedule to suspend. Once the status of the replication schedule is changed to suspend, you can click **Resume** to change the status to **OK**.
- 5. The **Begin Time** of the replication schedule can be modified.

- 6. The interval of time in which replication has to be done, the number of days and time interval can be modified.
- 7. The number of times to **Retry** and the interval of time between 2 consecutive retries can also be modified.
- 8. Replication is to be **Stopped on Error** can be changed to **Yes** or **No**.
- 9. The **With no Check** button is disabled; whether or not schema is to be checked before replication cannot be changed.
- 10. Click Confirm.
- 11. Click the **Synchronous** button to synchronize replication. A window is opened as shown.

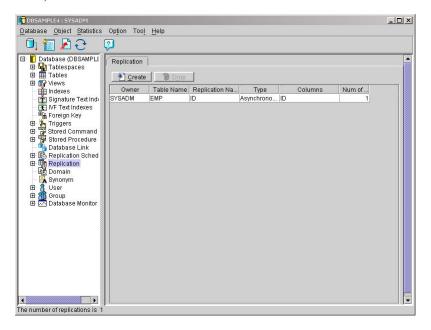
9	ynchronize		×
	Synchronize replic:	ation	
	🔿 No Wait	<ul> <li>Wait</li> </ul>	
	<u>o</u> k	<u>C</u> ancel	Help

- 12. Click the **Wait** option button or click the **No Wait** option.
  - Wait the user must wait for the completion of synchronization before he/she can do other operation.
  - No Wait after triggering the synchronization process, the user can continue other processes instead of waiting for the completion of the synchronization process.
- 13. Click OK.

## 16 Managing Table Replication

DBMaker allows data to be shared between databases by means of table replication. Table replication can take place simultaneously (synchronous table replication), or by means of the distributor daemon, which periodically updates data on the destination (target) database (Asynchronous Table Replication or ATR). JDBA Tool provides easy to use tools for creation and management of synchronous and asynchronous table replication.

- **T**o View Table Replications:
  - 1. Select **Replication** from the tree, the **Replication** page will display. You can view a list of replications by owner, source table name, replication name, replication type (synchronous or asynchronous), source columns, and the number of subscribers to the replication (the number of destination tables).



2. Selecting a replication from the tree or the list on the **Replication** page will open the page for that replication. You can view the link names, owners, table names, column names, and settings for each link to a destination table.

Replication							
📩 者 者	scriber	0	l <u>R</u> emove Subscri	ber			
Asynchronous Rep	olication:						
Base table:	9	SYSADM.USERDATA					
Project columns:	2	ATE1	ATE1 COUNTRY1 POSTALCODE1				
Database Link Table O			Table Name	Colum		Flush	Clear
TUTORIAL	SYSADM		USERDATA	LOGINID	FIR	N	N

#### **16.1** Synchronous Table Replication

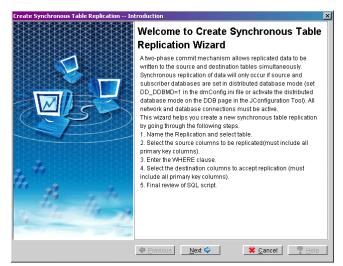
Table replication is used to ensure consistency of data across multiple databases. Synchronous means the modification to the remote site is immediate. The replication modifies the remote table at the same time it modifies the local table. Thus, after establishing a replication, any update on the source table will become a DDB (distributed database) action. This affects the local database's behavior; if the remote database server is cannot be contacted, an update on local database will fail.

#### **Adding Synchronous Table Replication**

Synchronous table replication must be created for it to occur. Furthermore, distributed database mode must be enabled in all databases engaged in synchronous table replication. The schema of the destination columns must match the schema of the source columns. Primary key columns in the source table must be replicated.

- **T**o create a Synchronous Table Replication:
  - 1. Select **Create** from the top of the **Replication** page. The **Create Replication** window will appear.

Create Replication	×
🖽 Create Async. Table Replication	
the Create Sync. Table Replication	
	1
<u>OK</u> <u>Cancel</u> <u>H</u> elp	



2. Select Synchronous Table Replication from the menu, the Synchronous Table Replication Wizard will begin.

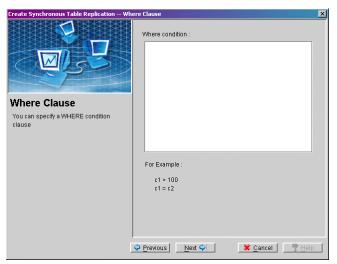
- 3.
- Click Next. The Synchronous Table Replication Wizard will appear.

reate Synchronous Table Replication Nan	me the Replication	×
Name the Replication		
Select the Table Name and name the synchronous table replication		
	Table Name :	
	SYSADM.DISTRIBUTION	•
	Replication Name :	
[	↓	🦞 <u>H</u> elp

- 4. Identify the source table to replicate and name the replication. Select the source table from the **Table Name** menu at the bottom of the window. Enter a name into the **Replication Name** field
- 5. Click Next. The Select Source Columns to be Replicated window will appear.

Create Synchronous Table Replication Selo	ect Source Columns to be Replicated			
ATTACHMENT LOGIND REQUEST REQUESTTIME	add > <remove add="" all="">&gt;    add all &gt;&gt;    &lt;<remove <="" all="" td=""></remove></remove>			

- 6. Select source columns from the source table. A list of available columns on the selected table appears on the left hand list box. Select source columns by double clicking on the column name or selecting the column and clicking the **add** button. The **add all** button can be used to add all columns to the replication. All the selected source columns will be displayed in the list box to the right. Columns can be likewise removed from the replication by double clicking on the column name or selecting the column and clicking the **remove** button.
  - **NOTE** *You must select all primary key columns from the source table for replication.*



7. Click Next. The Where Clause window will open.

- 8. Add a WHERE condition clause to the SQL script, if desired. This is useful if you want to place constraints on the data that is to be replicated.
  - **NOTE** The WHERE clause must follow proper SQL syntax. Refer to the section on Constraint Syntax at the end of chapter 4 for more information.

Create Synchronous Ta	ble Replication Sele	ect Destination Colum	15	×
	SE	Select Destin Press the add button		
Database Link	Table Owner	Table Name	Projected Column Name	Options
<b></b>			Add	Remove
	Ī	Previous	t 🗘 🚺 🗱 Cancel	<u>P</u> Help

9. Click Next. The Select Destination Columns window will appear.

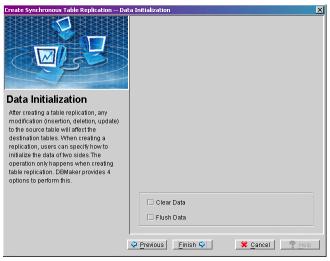
10. Add destination tables to the replication. Click Add. The Select **Destination Database** window will open.

Create Synchronous Table Replication Sele	ect Destination Database 🛛 🔀
Select the Destination	
Database	
You can select the destination session, it can be a database or a database link.	
	Database Session / Link Name :
I	Previous Next 🏟 🌋 Cancel 🤶 Help

- 11. You can choose to enter the destination database information from the **Database Session / Link Name** menu at the bottom of the page.
- 12. Click Next. The Select the Destination Table and Columns window will open.

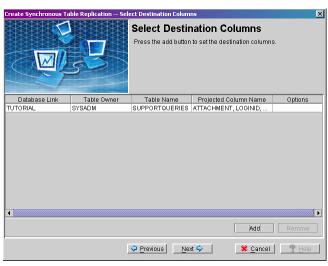


- **13**. Select a destination table from the **Table Name** menu. A list of available columns on the selected table will appear on the left hand list box.
- 14. Select destination columns by double clicking on the column name or selecting the column and clicking **add** button. The **add all** button can be used to add all columns. All the selected destination columns will be displayed in the list box to the right. Columns can be likewise removed from the replication by double clicking on the column name or selecting the column and clicking the **remove** button.



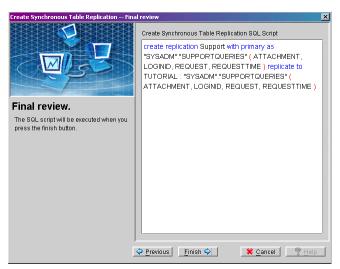
15. Select Next. The Data Initialization window will appear.

- 16. Select the desired options by checking the check box next to the appropriate option.
  - Clear Data: all data in the destination table is deleted when the replication is created.
  - Flush Data: copies all data that matches search criteria into the destination table.



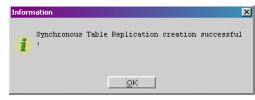
17. Click Next. The Select Destination Columns window will reappear.

18. Click Add and repeat steps 7 – 13 if you want to add more columns, otherwise click Next.



19. Review the SQL script. You can edit the script manually by placing the cursor in the text field or clicking on **Previous** to return to prior windows.

Click **Finish** when you are satisfied with the SQL statement. The **Information** dialog box appears



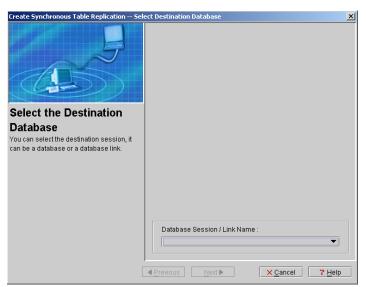
20. Click OK

#### Adding Subscribers to a Synchronous Replication

After a replication has been created, other subscribers may be added to the replication. Other tables in the same database, or other databases can be subscribers. Subscriber destination tables must meet all requirements of synchronous table replication: the schema of source and destination columns must match, and the databases must have an active link

- **T**o add subscribers to a synchronous replication:
  - 1. Select the **Replication** node from the tree. A list of replications appears on the **Replication** page to the right.
  - 2. Select a replication from the list. The replication page will show subscriber information about the selected database in a table. Furthermore, the buttons **Add Subscriber** and **Remove Subscriber** will appear at the top of the page.

Replication							
Md Sut	oscriber	1	<u>Remove Subscri</u>	ber			
Synchronous Rep	lication:						
Base table:		SYSADM.USERDATA					
Project columns:		MIDD	LENAME	COUNTRY1	L	OGINID	
Database Link	Table O	wner	Table Name	Columns		Flush	Clear
TRAINING	SYSADM		TRAINEES	COUNTRY	E	N	N



3. Click Add Subscriber. The Select Destination Database window will open.

4. Choose a database session from the **Database Session** / Link Name menu at the bottom of the page. Click Next.



- 5. The **Select Destination Columns** window will prompt you to select destination columns and a destination table.
- 6. Select a destination table from the **Table Name** menu. A list of available columns on the selected table will appear on the left hand list box.
- 7. Select destination columns by double clicking on the column name or selecting the column and clicking the **add** button. The **add all** button can be used to add all columns. All the selected destination columns will be displayed in the list box to the right. Columns can be likewise removed from the replication by double clicking on the column name or selecting the column and clicking the **remove** button.
  - **NOTE** *The schema of the destination columns must match the schema of the source columns.*

Create Synchronous Table Replication Dat	a Initialization	x
Details a table replication, update) to the source table will affect the destination tables. When creating a table replication, update) to the source table will affect the destination tables. When creating a replication, users can specify how to initialize the data of two sides. The operation only happens when creating table replication. DBMaker provides a options to perform this.		
	🗌 Clear Data	
	☐ Flush Data	
[	<u> </u>	

8. Select **Next** after the desired columns have been selected.

- 9. The **Data Initialization** window offers you two options. Select the desired options by checking the check box next to the appropriate option.
  - **Clear Data**: all data in the destination table is deleted when the replication is created.
  - Flush Data: copies all data that matches a search criteria into the destination table.
- 10. Select **Finish**. The new replication will be added to the list of subscriptions.

Replication							
📩 街 Add Sut	oscriber	1	Remove Subscri	iber			
Synchronous Rep	lication:						
Base table:		SYSAD	M.USERDATA				
Project columns:		MIDD	LENAME	COUNTRY1	LC	DGINID	
Database Link	Table Ov	vner	Table Name	Columns		Flush	Clear
мосна	SYSADM		TRAINEES	COUNTRY	E	N	N
TRAINING	SYSADM		TRAINEES	COUNTRY	E	N	N

#### 16.2 Asynchronous Table Replication

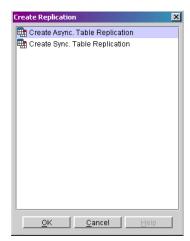
'Asynchronous' means that the modification to the remote site will be delayed. It is significantly slower than synchronous table replication. The time difference from source to destination database depends on a user-defined schedule. This is the replication schedule. Modifications to local tables are stored in replication logs, and are replicated to the remote table according to the predefined schedule. Using replication logs enables DBMaker to treat the local transaction and the remote transaction independently, allowing you to update local tables normally even if the remote connection is not available. This allows asynchronous table replications to tolerate network and remote database failures, since DBMaker will keep trying to replicate until any failures are corrected or until the user specified number of attempts to reconnect is reached.

Asynchronous table replication uses ODBC function calls to communicate with remote databases. This might give poor performance in a Wide Area Network (WAN) environment. To achieve better performance in a WAN, DBMaker provides another mechanism named Express Asynchronous table replication whereby SQL Commands and related data applied to the source table are packed and sent to the remote database. Since other DBMS packages do not support this protocol, Express Asynchronous Table Replication cannot work with heterogeneous replication. It also does not support the STOP ON ERROR option.

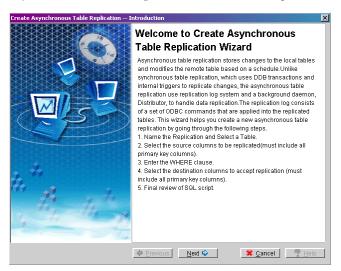
#### Adding Asynchronous Table Replication

A replication schedule must exist for asynchronous table replication to occur, and all associated settings for the replication schedule set. Furthermore, the schema of the destination columns must match the schema of the source columns and primary key columns in the source table must be replicated.

- **T**o create an Asynchronous Table Replication:
  - 1. Select **Create** from the top of the **Replication** page. The **Create Replication** window will appear.



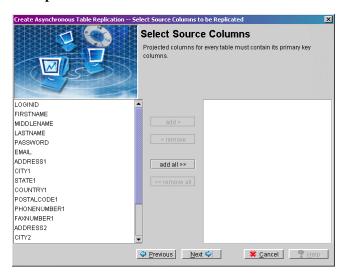
2. Select Asynchronous Table Replication from the menu, the Create Asynchronous Table Replication Wizard will begin.



Create Asynchronous Table Replication Na	me the Replication
Name the Replication	
Select the source table and name the asynchronous table replication	
	Table Name :
	SYSADM.DISTRIBUTION
	Replication Name :
_	Previous     Next

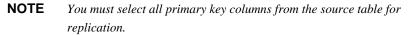
3. Select Next. The Name the Replication window will appear.

4. The **Asynchronous Table Replication Wizard** will prompt you to identify the source table to replicate and name the replication. Select the source table from the **Table Name** menu at the bottom of the window. Enter a name into the **Replication Name** field and Click **Next**.



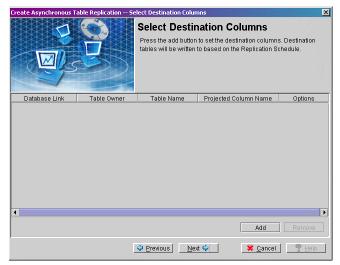
- 5. The Select Source Columns to be Replicated window will prompt you to select source columns from the source table. A list of available columns on the selected table appears on the left hand list box. Select source columns by double clicking on the column name or selecting the column and clicking add. The add all button can be used to add all columns to the replication. All the selected source columns will be displayed in the list box to the right. Columns can be likewise removed from the replication by double clicking on the column name or selecting the column selecting by double clicking.
- 6. Click **Next** after the desired columns have been selected.

Create Asynchronous Table Replication Wh	ere Clause	<
	Where condition :	
Where Clause		
VOLCE CLAUSE You can specify a WHERE condition clause	For Example : c1 > 100 c1 = c2	
	🌳 Previous 🔋 Next 🗣 🔹 🧏 Cancel 🚺 😤 Help	

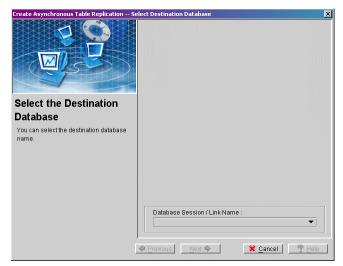


- 7. The **Where Clause** window allows you to add a WHERE condition clause to the SQL script. This is useful if you want to place constraints on the data that is to be replicated. Click **Next** to continue.
  - **NOTE** The WHERE clause must follow proper SQL syntax. Refer to the section on Constraint Syntax at the end of chapter 4 for more information.

8. The **Asynchronous Table Replication Wizard** will next prompt you to add destination columns to the replication.



9. Click Add at the bottom of the Select Destination Columns window. The Select Destination Database window will open.



10. You can choose to enter the destination database information manually or from the **Database Session / Link Name** menu at the bottom of the page.

To enter the information manually, select the **Enter Data Manually** check box and provide the required information in the fields below.

11. Click Next.

Login					×
	Database	Name :	TUTOR	IAL	
	User	Name :	SYSAD	м	
	Pa	ssword :			
	<u>O</u> k	<u>C</u> ai	ncel	<u>P</u> Help	

- 12. JDBA will prompt you to log on to the destination database. Enter a User Name and Password for a user with DBA authority or SYSADM.
- 13. Click **OK**, the **Select Destination Columns** window will open.

Create Asynchronous Table Replication Se	lect Destination Columns	×
	Select the Destination Table and Columns Select a table to accept replicated data from the source table. Select columns from the selected table. The schema of replicated columns in the destination table and source table must be the same.	
Table Name :	<b>•</b>	
	add > < remove add all >> << remove all	
	Previous     Next      Eancel	

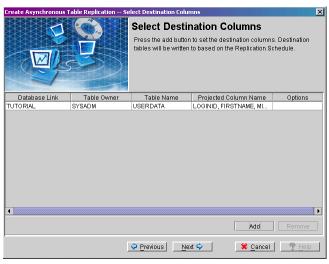
- 14. The **Select Destination Columns** window will prompt you to select destination columns and a destination table.
- 15. Select a destination table from the **Table Name** menu. A list of available columns on the selected table will appear on the left hand list box.
- 16. Select destination columns by double clicking on the column name or selecting the column and clicking the **add** button. The **add all** button can be used to add all columns. All the selected destination columns will be displayed in the list box to the right. Columns can be likewise removed

from the replication by double clicking on the column name or selecting the column and clicking the **remove** button.

- **NOTE** *The schema of the destination columns must match the schema of the source columns.*
- 17. Click **Next** after the desired columns have been selected.

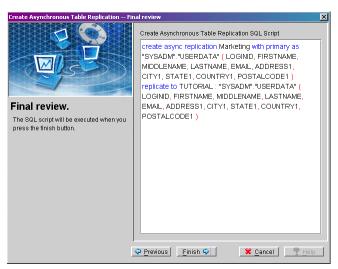
Create Asynchronous Table Replication Da	ata Initialization 🗙
Data Initialization	
After creating a table replication, any modification (insertion, deletion, update) to the source table will affect the destination tables. When creating a replication, users can specify how to initialize the data of two sides. This option can only be set when creating table replication.	
	🗌 Clear Data
	🗔 Flush Data
	🗌 No Cascade
	Previous     Finish          X Cancel     Y Help

- 18. The **Data Initialization** window offers you three options. Select the desired options by checking the check box next to the appropriate option.
  - **Clear Data**: all data in the destination table is deleted when the replication is created.
  - Flush Data: copies all data that matches search criteria into the destination table.
  - No Cascade: prevents replicated data from being replicated from the destination tables. If this option is not selected, data can be replicated from the source database to the destination databases down to other databases that are subscribers to the destination databases.



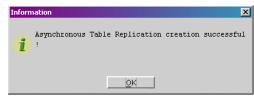
19. Click Next. The Select Destination Columns window will reappear.

20. Click Add and repeat steps 7 – 13 if you want to add more columns, otherwise click Next.



21. Review the SQL script. You can edit the script manually by placing the cursor in the text field or click **Previous** to return to prior windows. Click

**Finish** when you are satisfied with the SQL statement. The **Information** dialog box appears.



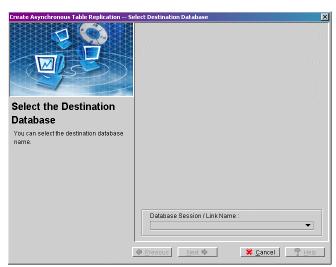
22. Click OK.

#### Adding Subscribers to an Asynchronous Replication

After a replication has been created, other subscribers may be added to the replication. Other tables in the same database, or other databases can be subscribers. Subscriber destination tables must meet all requirements of asynchronous table replication: the schema of source and destination columns must match, and a replication schedule must exist.

- **T**o add subscriber tables to an Asynchronous Replication:
  - 1. Select the **Replication** node from the tree. A list of replications appears on the **Replication** page to the right.
  - Select a replication from the list. The replication page will show subscriber information about the selected database in a table. Furthermore, the buttons Add Subscriber and Remove Subscriber will appear at the top of the page.

Replication							
<u>*</u> dd Sut	oscriber	2	Remove Subscril	per			
Asynchronous Re	plication:						
Base table:		SYSAE	SYSADM.USERDATA				
Project columns:		ATE1 COUNTRY1 POSTALCODE1					
Database Link	Table O	wner	Table Name	Columns	Flu	Jsh C	lear
TUTORIAL	SYSADM		USERDATA	LOGINID	N	N	



3. Click Add Subscriber. The Select Destination Database wizard window will open.

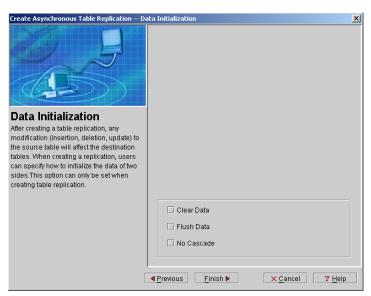
4. Select the destination database from the **Database Session / Link Name** menu. Click **Next**.



 JDBA will prompt you to log on to the destination database. Enter a User Name and Password for a user with DBA authority or SYSADM. Click OK, the Select Destination Columns window will open.



- 6. The **Select Destination Columns** window will prompt you to select destination columns and a destination table.
- 7. Select a destination table from the **Table Name** menu. A list of available columns on the selected table will appear on the left hand list box.
- 8. Select destination columns by double clicking on the column name or selecting the column and clicking the **add** button. The **add all** button can be used to add all columns. All the selected destination columns will be displayed in the list box to the right. Columns can be likewise removed from the replication by double clicking on the column name or selecting the column and clicking the **remove** button.
  - **NOTE** *The schema of the destination columns must match the schema of the source columns.*



9. Select **Next** after the desired columns have been selected.

- 10. The **Data Initialization** window offers you two options. Select the desired options by checking the check box next to the appropriate option.
  - **Clear Data**: all data in the destination table is deleted when the replication is created.
  - Flush Data: copies all data that matches search criteria into the destination table.
  - **No Cascade**: prevents replicated data from being replicated from the destination tables. If this option is not selected, data can be replicated from the source database to the destination databases down to other databases that are subscribers to the destination databases.

11. Select **Finish**. The new database link will appear in the table on the **Replication** page.

Replication							
Md Sut	oscriber	1	Remove Subscri	ber			
Asynchronous Re	eplication:						
Base table:		SYSAD	DM.USERDATA				
Project columns:		'ATE1	COU	NTRY1	POSTAL	CODE1	
Database Link	Table O	wner	Table Name	Co	lumns	Flush	Clear
TRAIN	SYSADM		USERDATA	LOGINID	FIR	N	N
TUTORIAL	SYSADM		USERDATA	LOGINID	FIR	N	N

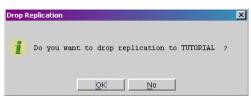
#### 16.3 Dropping a Subscriber

Subscribers may be dropped when the data no longer needs to be replicated. Subscribers should be dropped whenever the subscriber's destination columns or databases are deleted.

- **T**o drop a subscriber:
  - 1. Select the **Replication** node from the tree. The tree will expand, showing a list of replications below the **Replication** node on the tree.
  - Select a replication from the tree. The replication page will show subscriber information about the selected database in a table. Furthermore, the buttons Add Subscriber and Remove Subscriber will appear at the top of the page.

Replication							
<u>A</u> dd Sut	oscriber		Remove Subscril	ber			
Asynchronous Re	eplication:						
Base table:		SYSAD	M.USERDATA				
Project columns:		'ATE1	COU	NTRY1	POSTALC	ODE1	
Database Link	Table Ov	wner	Table Name		Columns	Flush	Clear
TRAIN	SYSADM		USERDATA	LOGINID	FIR	N	N
TUTORIAL	SYSADM		USERDATA	LOGINID	FIR	N	N

- 3. Select a database link to drop a subscription (it will highlight blue).
- 4. Click **Remove Subscriber**. The **Information** dialog box will appear asking conformation.



5. Click OK.

#### 16.4 Dropping a Replication

A replication may be dropped if there are no subscribers an no further need to replicate the data.

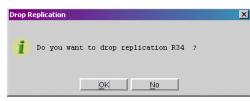
- **T**o drop a replication:
  - 1. Select the **Replication** node from the tree. A list of replications appears on the **Replication** page to the right.

	Bound I Show I	
	Create Urop	
SYSADM LISERDATA MARKETING Asynchrono LOGINID	Owner Table Name Replication Na Type Columns	Num of
OTONDIM COERDATA MARKETING Asynchrono ECONNE	ADM USERDATA MARKETING Asynchrono LOGINID	2
SYSADM USERDATA R34 Asynchrono LOGINID	ADM USERDATA R34 Asynchrono LOGINID	2
SYSADM USERDATA TRAINING Synchronous FIRSTNAME	ADM USERDATA TRAINING Synchronous FIRSTNAME	2

2. Select a replication from the list (it will highlight blue). The **Drop** button at the top of the page will activate.

Replication					
🔭 <u>C</u> reate	Drop				
Owner	Table Name	Replication Na	Туре	Columns	Num of
SYSADM	USERDATA	MARKETING	Asynchrono	LOGINID	 2
SYSADM	USERDATA	R34	Asynchrono	LOGINID	 2
SYSADM	USERDATA	TRAINING	Synchronous	FIRSTNAME	 2

3. Click **Drop**. The **Information** dialog box will appear asking conformation.



4. Click OK.

# **17 Working with Domains**

A domain is a type of integrity constraint you can use when defining a column. Domains specify the data type of the column, and may also specify a default value and a value constraint. When you define a column using a domain, the column inherits the properties of the domain (data type, default value, and value constraint) without requiring you to explicitly specify them.

Specifying the default value and value constraint using domains achieves the same results as specifying them in a standard column definition. If you specify a default value for a column, it will override the default value specified in a domain. If you specify any value constraints in the column definition, they will be used in addition to the value constraints specified in the domain. If you do define a column using a domain and specify additional value constraints, you should ensure the additional value constraints do not conflict with those defined in the domain.

### 17.1 Creating a Domain

Defining a domain name, an optional default value and an optional constraint creates a domain. Any data type supported by DBMaker except the SERIAL type can be used in domains.

- **T**o create a Domain:
  - 1. Select the object **Domain** from the tree. The following window is displayed.

D05AMPLE4 : SYSADM		
Database Object Statistics Option Tool	Help	
🔍 🛅 🛃 근 🖉		
Database (DBSAMPLE4)	Domain	
🕀 🙀 Tablespaces	F	
Tables     Trables     Trables     Trables	Create Drop	
indexes	Schema N Name Type Size Scale Constraint Default	
P Signature Text Indexes	SYSTEM MSWORDT LONG VARB	
IVF Text Indexes	SYSTEM HTMLTYPE LONG VAR SYSTEM XMLTYPE LONG VAR	
- Foreign Key	SYSTEM XWLTYPE LONG VAK SYSTEM MSWORDFL. FILE	
🗃 💃 Triggers	SYSTEM HTMLFILET FILE	
Stored Command	SYSTEM XMLFILETY FILE	
Stored Procedure		
- 🎭 Database Link		
Replication Schedule		
- The Replication		
Synonym		
B User		
B 🚮 Group		
- 📻 Schema		
Access Control List		
Database Monitor		
_		



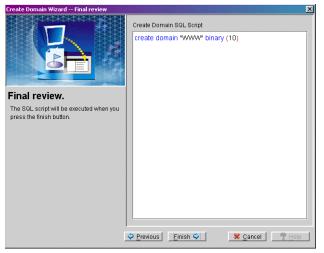
2. Click **Create**. The **Create Domain Wizard** window is opened.

3. Click Next.

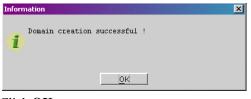
Create Domain Wizard Name the Domain	X
	Domain Name :
	Data Type :
	binary
	Precision : Scale :
Name the domain.	100
Please enter an unique domain name. If you specify a default value for a column, it will override the default value specified in its domain. If you specify any value	Default :
constraints in the column definition,they	Constraint :
constraints in the column definition, they will be used in addition to the value constraints specified in the domain. If you do define a column using a domain and specify additional value constraints, you should ensure the additional value constraints do not conflict with those defined in the domain.	
<u> </u>	Previous Next 🗣 🏾 🗱 Cancel 🔮 Help

- 4. Enter the **Domain Name**.
- 5. Select a data type from the **Data Type** menu.
- 6. Enter the **Precision** and **Scale** information corresponding to the selected Data Type.

- 7. Enter the **Default** value.
- 8. Enter the **Constraint** of the column. Constraints must follow proper SQL syntax. See the section *Constraint Syntax* at the end of Chapter 4
- 9. Click Next.



- 10. Check the SQL script and make changes if required.
- 11. Click **Finish**. The **Information** dialog box appears.



12. Click OK.

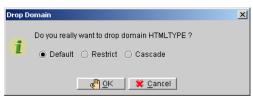
### 17.2 Dropping a Domain

If a domain is no longer required, it can be dropped.

- **T**o drop a Domain:
  - 1. Select the object **Domain** from the tree. The list of all the Domains in the database is displayed.
  - 2. Select the Domain that is to be dropped as shown below.

👌 <u>C</u> reate	Drop					
Schema N	Name	Type	Size	Scale	Constraint	Default
SYSTEM	MSWORDT	LONG VARB				
SYSTEM	HTMLTYPE	LONG VAR				
SYSTEM	XMLTYPE	LONG VAR				
SYSTEM	MSWORDFI	FILE				
SYSTEM	HTMLFILET	FILE				
SYSTEM	XMLFILETY	FILE				

**3**. Click **Drop**. A confirmation window is shown to confirm if you want to drop the Domain.



- 4. DBMaker provides three options for dropping domain. The **Default** option is same as dropping domain without option specified, this behavior will not check if any column refers it when dropping domain, and the reference columns would become invalid then; the **Restrict** option will check the security and whether there are columns refer it, this option only allows dropping the domain that no column depends on it; the **Cascade** option will drop the domain and modify the column type. Choose one option you wonder.
- 5. Click OK.

# **18 Working with Synonyms**

A *synonym* is an alias for any table or view. Since a synonym is simply an alias, it requires no storage other than its definition in the system catalog.

Synonyms are useful for simplifying a fully qualified table or view name. DBMaker normally identifies tables and views with fully qualified names that are composites of the owner and object names. By using a synonym anyone can access a table or view through the corresponding synonym without having to make use of the fully qualified name. Since a synonym has no owner name, all synonyms in the database must be unique for DBMaker to identify it.

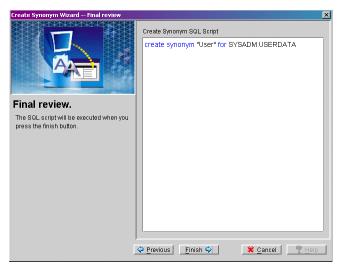
### 18.1 Creating a Synonym

You can create a synonym for a table or view.

- **T**o create a synonym for a table or view:
  - 1. Select the object **Synonym** from the tree and click the **Create** button.
  - 2. The Create Synonym Wizard Introduction window will open.
  - 3. Click Next. The Name the Synonym window will open.

Create Synonym Wizard Name the Synonyr	n 🗙
Name the synonym.	
Synonyms are userful for simplifying a fully qualified table or view name. DBMaker normally identifies tables and views with fully qualified names that are composites of the owner and object names. By using a synonym anyone can access a table or view through the corresponding synonym without having to make use of the fully qualified name. Because a synonym has no owner name, all synonyms in the database must be unique so that DBMaker can identify them.	Synonym Name : Database Name : WEBDB Synonym Table / View Table / View : (TABLE) SYSADM INVENTORY
	Previous Next A

- 4. Enter the **Synonym Name**.
- 5. Select the **Table/View** name from the menu.



6. Click **Next**. The **Final Review** window will open.

- 7. Check the SQL script and make changes if required. Click **Finish**.
- 8. The **Information** dialog box will open.



9. Click OK.

### 18.2 Dropping a Synonym

If a synonym is no longer required, it can be dropped.

- **T**o drop a Synonym:
  - 1. Select the object **Synonym** from the tree and select the Synonym from the list.

Synonym					
<u>C</u> reate	👸 Drop				
Schema Name	Synonym Name	Schema Name	Table/View na	Link	
SYSADM	S1	SYSADM	T1		

2. Click **Drop**. The **Drop Synonym** window will open to confirm if you want to drop the window.



3. Click OK.

# 19 Query by example (QBE)

QBE is both a query language and the DBMaker database system including it. The query by example (QBE) interface provides you with a streamline, user-friendly, effective and efficient interface for creating SQL query strings. The interface will guide you through the creation of SQL query strings so that you need no previous programming knowledge. For advanced users the interface makes the creation of SQL query strings a quick and easy process. The QBE interface provides a number of functions to make the creation of SQL query string a quickly completed task. These functions include:

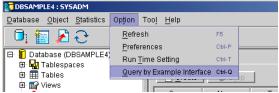
- Single or multi table query support.
- Table\Column alias name support.
- WHERE CLAUSE improvement: LIKE; MATCH; CONTAIN; IN/NOT IN; IS NULL/IS NOT NULL; BETWEEN.
- Wildcard support.
- Use DISTINCT function to remove duplicate record.
- Projection column operation: +, -, \*, /, ||.
- Projection column aggregate/UDF function: AVG/COUNT/MAX/MIN/SUM.
- GROUP BY/HAVING clause support.
- ORDER BY CLAUSE support

• Manual SQL Query editing support.

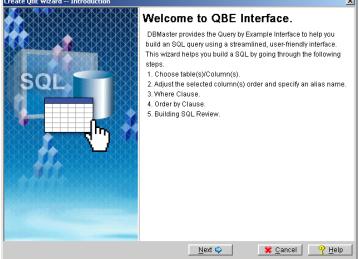
The QBE interface guides you through a number of steps while creating your SQL query string. When creating an SQL string the string can be based on a single or multi tables. The interface provides a complete list of all tables and views in the database.

The next step is choosing which columns, in the table, will be affected by the query string. You can set an alias name for the tables or the columns. Use the GROUP BY clause to produce summary data within a group. And you can also set the table and column order.

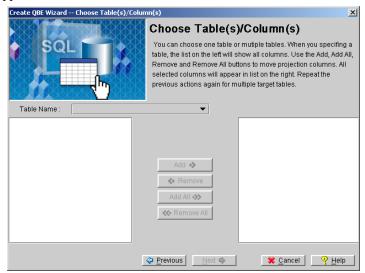
- To create an SQL query string using QBE:
  - 1. Select Option from the menu bar. A drop down list appears.



2. Select Query by Example Interface from the drop down list. The Create QBE Wizard Introduction dialog box appears.



3. Click the Next button. The Choose Table(s)/Column(s) dialog box appears.



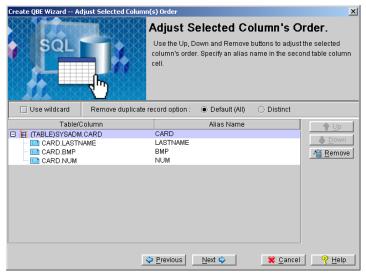
4. You can choose one table/view or multiple tables/views from the **Table Name** drop down list. When you specifying a table or view, the columns contained in the selected table(s)/view(s) appear in the panel to the left in the dialog box.

Create QBE Wizard	Choose Table(s)/Colun	mn(s)	×
sqi		Choose Table(s)/Column(s) You can choose one table or multiple tables. When you specifing a table, the list on the left will show all columns. Use the Add, Add All Remove and Remove All buttons to move projection columns. All selected columns will appear in list on the right. Repeat the previous actions again for multiple target tables.	
Table Name :	(TABLE)SYSADM.CARD	▼	
CARD.BMP CARD.FIRSTNAME CARD.LASTNAME CARD.NUM CARD.TITLE		Add 🧇 Remove Add All ≫ Remove All	
	1	Previous     Next      Zancel     Previous	

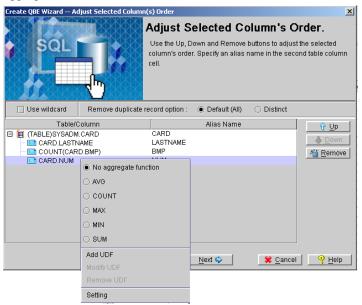
5. When the list of available columns on the selected table/view appears on the left hand list box. Select columns by double clicking on the column name or selecting the column and clicking the Add button. The Add all button can be used to add all columns to the replication. All the selected columns will be displayed in the list box to the right. Columns can be likewise removed from the replication by double clicking on the column name or selecting the column and clicking the **Remove** button.

Create QBE Wizard	Choose Table(s)/Colur	nn(s)	×
sqi		You can choose one t table, the list on the let Remove and Remove selected columns will	e(s)/Column(s) able or mutiple tables. When you specifing a twill show all columns. Use the Add, Add All, All buttons to move projection columns. All appear in list on the right. Repeat the for multiple target tables.
Table Name :	(TABLE)SYSADM.CARD	•	
CARD.FIRSTNAME CARD.TITLE		Add 🐟	CARD.LASTNAME CARD.BMP CARD.NUM
	[	Previous Next	🗘 🛛 🗱 Cancel 🔤 🦓 Help

- **NOTE** *To select multiple columns hold down the Ctrl key and use the mouse to select the column.*
- 6. Click the **Next** button. The Adjust **Selected Column's Order** dialog box appears.



- 7. Enabling the **Use wildcard** setting can help user to fetch all table records using wildcard.
- 8. Remove duplicate record option:
- To fetch all records by default mean, select the Default (ALL) option button.
- To fetch data flexible, select the Distinct option button. Example, if a table has some duplicate data record, using Distinct option can remove those duplicate data records when SQL query be executing.
- 9. To expand the table to view all the available columns double click the table or click the expanding icon ( ⊕ ) at the side of table name.
- 10. Select a column from the column list, the selected column is highlighted, user can right-click it, it will pop-up a menu to let user set one aggregate function or remove it from the projected column. QBE support five aggregate functions: AVG/COUNT /MAX/MIN/SUM.



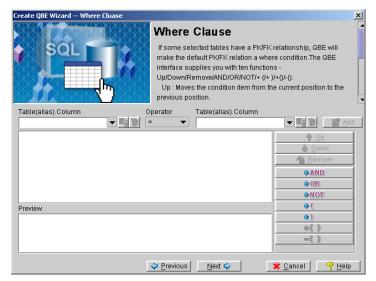
11. DBMaker support UDF functions, QBE can apply them into projected columns or where clause column compare. Click the **Add UDF** button to launch the following dialog.

Choose suitable UDF function
Column name : NUM
Column type : SERIAL
Match function name : SIN
Description :
The SIN function returns the sine of number, expressed in radians, as a double precision floating-point number.
numberDouble: Number to find the sine for Return valueDouble: The sine of number
SIN (number)
Example :
Example
The following returns the value of 4.79425538604203e-001. SIN(0.5)
د المعالم معالم

- Column Name and Column Type fields show the selected column's name and type.
- Select a UDF from the Match Function Name drop down list, the selected UDF appears in the Description area. To explain the UDF more clearly, there have some examples in the Example area.
- Click OK.
- 12. Click the **Modify UDF/Remove UDF** buttons to modify or remove the selected UDF function.
- **13**. Click the **Setting** button. The **Projected Column Operation** window appears.

Projected Column Operation	×
Operator	Table(alias).Column
+	✓ ▲dd
COUNT(CARD.NUM)	🕈 Up
	🕹 Down
	Mi Remove
Preview	
COUNT(CARD.NUM)	
<u>е</u> м <u>о</u> к	🛛 🗱 Cancel 🦳 🤗 <u>H</u> elp

- You can choose one operator from the Operator drop down list.
- Choose one column from the Table(alias).Column drop down list.
- Click the Add button. The operation appears in the Preview area below of the window.
- Use the Up, Down, Remove buttons to adjust the selected column's order.
- Click OK.
- 14. Double click the **Alias Name** field for a column to specify an alias name.
- 15. Select a column from the **Table/Column** field using the mouse. The selected columns will be highlighted. Click the **Up**, **Down** or **Remove** button to adjust or drop the selected column.
- 16. Click the Next button. The Where Clause window appears.



- 17. To set a Where clause:
- 18. Select a column from the **Table(alias).Column(alias)** drop down list on the left.
- Select an operator from the Operator drop down list. QBE support following operators: =, >, <, >=, <=, <>, +, -, \*, /, ||, between, is null/is not null, in/not in, like/not like, match/not match, contain/not contain.
- Enter a value in the Table(alias).Column(alias) field on the right or select a column from the drop down list.
- Click the Add button, the where condition appears in the panel below of the window.

Create QBE Wizard Where Clu	ase			X		
		Where Clause				
SQL		If some selected tables have a PK/FK relationship, QBE will make the default PK/FK relation a where condition.The QBE interface supplies you with ten functions - Up/Down/Remove/AND/OR/NOT/+ (/+)/+0/-0. Up : Moves the condition item from the current position to the previous position.				
Table(alias).Column		erator	Table(alias).Column			
CARD.LASTNAME	· 📑 🗑 =	•	wang	- <u></u> <u>-</u> <u>A</u> dd		
C				<u>∲ U</u> p		
CARD.LASTNAME = wang				🕹 Down		
)				i <u>R</u> emove		
				Q AND		
				<u>Q OR</u>		
				<b>⇔</b> NOT′		
Preview				<b>Q</b> (		
( CARD.LASTNAME = wang )				(4)		
				<b>Q</b> ()		
				-( )		
1						
	<	Previous	<u>N</u> ext 🔷	🗱 <u>C</u> ancel 🛛 🤗 <u>H</u> elp		

- **NOTE** If some selected tables have a PK/FK relationship, QBE will make the default PK/FK relation a where condition.
- 19. If you want to add a UDF function, you can click the **Import** button ( on the right of the **Table(alias).Column(alias)** field to add a UDF function.
- **20.** Click the **Export** button (20) to cancel the selected UDF function.
- 21. The QBE interface supplies you with ten functions:
- Up: Moves the condition item from the current position to the previous position.
- Down: Moves the condition item from current position to the next position.
- Remove: Removes the selected condition item.
- AND : Adds an AND operator into the next position
- OR: Adds an OR operator into the next position.
- NOT: Adds a NOT operator into the previous position.
- + (: Adds a left bracket into the previous position.

- +): Adds a right bracket into the next position.
- + (): Adds brackets into the selected condition item.
- - (): Removes brackets from the selected condition item.
- 22. Click Next. The Group by Clause window appears.

Create QBE Wizard Group By Clause		×
	🖉 Group By Claus	se
SQL Group by:	Select columns to use gro	up by clause.
CARD LASTNAME CARD.BMP CARD.NUM	Add 🍫	
	♀ Previous Next ♀	🗱 Cancel  🤗 Help

- 23. Select columns to use **Group By Clause**. A group is a set of rows that have the same values of group by columns. A single row of aggregate results is produced for each group.
- 24. Click **Next**. The **having clause** window appears. From this window the user can refer to steps 12-16 for details.

Create QBE Wizard Having Clause	(			
SQL	QBE suppo clause; pres launch a dia interface su Up/Down/Re	Clause rts UDF function at specifie sing left button of right side log to show UDF definition pplies you with ten function emove/AND/OR/NOT/+ (/+ ) s the condition item from th	e specified column, it will and sample.The QBE s - /+0/-0.	
	operator = •	Table(alias).Column	Adl	
Preview				

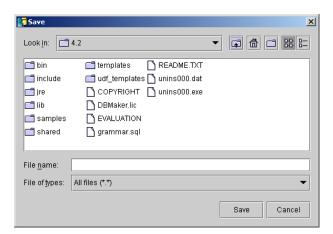
25. Click the **Next** button when you are satisfied with the clauses. The **Order by Clause** window appears.

Create QBE Wizard Order by Clause		×
	Order by Clause	
SQL Order by:	Select columns to use the order by clause.	
CARD.BMP		
CARD.NUM		
	Add 🚸	
	& Remove	
	Add All ≫	
	< Remove All	
		<u> 9 H</u> elp

- 26. Select the sort order for the columns using the **Order by Clause** dialog box. The order by clause can sort query results by the values contained in selected columns.
- 27. Click the **Next** button. The **Building SQL Review** dialog box appears. QBE make a SQL script automatically, you can modify it manually. For the final SQL, you can save an external file, create it as stored command, create it as view or preview the execution SQL result.

Create QBE Wizard Building SQL Review			×		
	View the SQL by QBE building				
SQL the second	Select CARD.LASTNAME, CARD.NUM, CARD.BMP from CARD where (CARD.LASTNAME=CARD.NUM)				
Build SQL Review					
After the all previous steps set, QBE make a SQL automatically, you can modify SQL manually. For the final SQL, you can save an external file, create it as stored command, create it as view or preview the execution SQL result.					
	Save	Preview			
	🚏 Create a <u>s</u> stored command	😭 Create as view			
4	Previous	🗮 <u>C</u> lose 🥂 <u>Y</u> elp			

- 28. To save the query:
- 29. Click the **Save** button. The **Save** dialog box appears.



- Enter a name and location for the query in the dialog box and click the Save button.
- **30**. To save the query as a stored command:
- 31. Click the **Save as stored command** button. The **Input stored command** name dialog box appears.



- Enter a name in the Stored command name field.
- Click OK. A message saying the stored command is created successfully is displayed.

	X
ation Successful!	
J or 1	
	ation Successful!

• Click OK. The created SQL command saves as stored command appears in the stored command list.

- **32**. To preview the query:
- 33. Click the **Preview** button. The Preview **QBE Result** dialog box appears.

Preview QBE Res	ult			×
合 Page <u>U</u> p	🐥 Page Do <u>w</u> n	First	疉 Last	
8 records selected.	(1 - 8)			
LASTNAME	NUM	BMP		
Chang		<blob> 6666</blob>		
Hu		<blob> 6666</blob>		
Yu		<blob> 6666</blob>		
Sung		<blob> 6666</blob>		
Liu		<blob> 6666</blob>		
Clowater	6	<blob> 6666</blob>		
Tseng		<blob> 6666</blob>		
Liu	8	<blob> 6666</blob>		
<u></u>				
	!	<u>ok</u> <u>y H</u> elp		

- Browse the results using the scroll bars. For large results use the Page Up, Page Down, First and Last buttons.
- 34. To create a view on the query:
- **35**. Click the **Create as view** button. The **Input View Name** dialog box appears.

Input view name :			×
View name :			
ећ ок	💥 Cancel	🥂 Help	1

- Enter a name for the view in the View name field.
- Click OK. A message saying the view is created successfully is displayed.



- Click OK.
- **36**. Click **Previous** to return to prior windows or click the **Close** button when you are satisfied with the QBE.

# 20 Managing Users

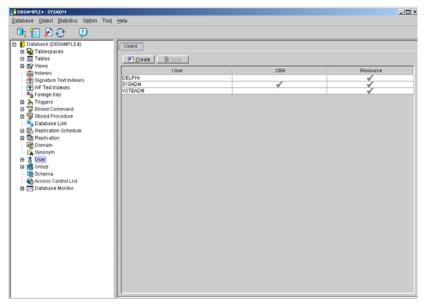
DBMaker supports multiple users and allows database privileges to be granted or revoked to those users. JDBA tool provides an easy to use interface for creating new users, changing user passwords, and adding or revoking user privileges. User names have a maximum length of thirty-two characters, passwords have a maximum length of sixteen characters, and both may contain letters, numbers, the underscore character, and the symbols \$ and #. The first character may not be a number. You must be logged onto the database as SYSADM to be able to create a new user or change database authority for any user.

Object privileges include the SELECT, INSERT, DELETE, UPDATE, INDEX, ALTER, and REFERENCE privileges for tables and views, and the EXECUTE privilege for stored commands and stored procedures. Object privileges may be granted or revoked by the user that created the object, or by a user with DBA authority or higher.

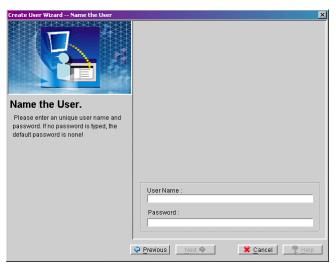
### 20.1 Creating a New User Account

New accounts should always be created when a specific access profile is required for an individual. It is also useful to create user accounts for all individuals accessing the database to facilitate user management. User names have a maximum length of thirty-two characters, passwords have a maximum length of sixteen characters, and both may contain letters, numbers, the underscore character, and the symbols \$ and #. The first character may not be a number.

- **T**o create a new user account:
  - 1. Open the User node on the object tree. The Users window will open.



2. Click **Create** from the top of the **Users** page. The **Create User Wizard** will start.

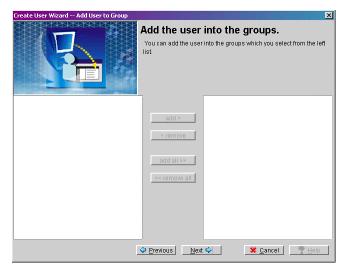


3. Click Next. The Name the User window will open.

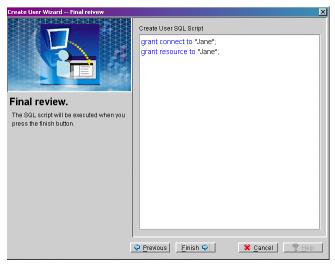
- 4. Enter a name into the User Name field, and a password in the Password field.
- 5. Click Next. The Grant DBA or Resource to User window will open.

Grant DBA or Resource to User		×
DBA, Resource Authority		
Users with DBA authority have all privileges on all objects in the database and can grant, change, or revoke object privileges for any user in the database except SYSADM and other DBA users. Users with resource authority are allowed to create new tables or views, and can grant privileges on his/her own tables to other users.		
	Security Privileges	
	DBA	Resource
I	♀ Previous	<b>X</b> Cancel <b>P</b> Help

6. Select which type of database authority the new user will have. If no authority level is selected, the new user is granted connect authority. Click **Next**, the following window will open.



7. A list of available groups appears on the left list box. Select a group by double clicking on the group name or selecting the group(s) and clicking the **add** button. The **add all** button can be used to select all groups to add the user into. All the selected groups will be displayed in the list box to the right. Groups can be, likewise removed by double clicking on the group name, or by selecting the name and clicking the **remove** button.



8. Click **Next**, the **Final review** page will appear.

9. Review the SQL script that has been created. You can add to the SQL script in the **Create User SQL Script** field if necessary by clicking on the field. Click **Finish** to execute the SQL command. The **Information** dialog box will appear.



10. Click OK.

### 20.2 Changing Security Level

There are two security mechanisms in DBMaker: user authority level and object privilege. Authority determines the level of access and control the user has to grant or revoke object privileges, as well as the ability to create new objects. Object privilege determines the level of access and control an individual user has over database objects, such as tables, views, stored procedures, and stored commands.

### **Setting Authority Level**

There are three levels of authority: CONNECT, RESOURCE, and DBA.

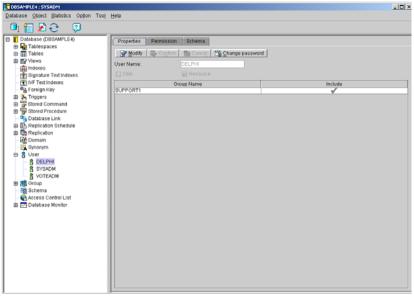
Any users that are created but have not yet been granted RESOURCE or DBA authority will have CONNECT authority by default. A user with CONNECT authority may create temporary tables in a database, or perform queries on any data to which they have explicitly been granted permission.

A user that is created and granted RESOURCE authority can create, alter, and drop tables, domains, and indexes. As the owner of any objects they create, users with RESOURCE authority may grant and revoke object privileges to other users and create synonyms and views for any objects they own.

DBA authority has all same capabilities as RESOURCE authority, but may additionally create tablespaces and files. Users with DBA authority can also grant or revoke object privileges for schema objects owned by other users (except for system schema objects).

- **T**o set a user's authority level:
  - 1. Open the **User** node on the object tree. The **Users** page will open.

2. The current authority level of the user will be displayed on the users table. Double click the user name in the tree or on the users table. The **Properties** page will be displayed.



- 3. Select **Modify** to change the user's database authority.
- A check mark next to the type of database authority indicates the user has that privilege. Clicking the check box toggles the authority of the user. Click **Confirm** to save the changes, or **Cancel** to discard them.

#### **Granting and Removing Object Privileges**

Object privileges control which database objects a user can access and the actions they can perform. There are seven object privileges: SELECT, INSERT, DELETE, UPDATE, INDEX, ALTER, and REFERENCE.

SELECT privilege allows you to select the data in a database object. This privilege applies to the entire object and cannot be granted on specific columns.

INSERT privilege allows you to insert new data into a database object. This privilege can also be restricted to specific columns.

DELETE privilege allows you to delete data from a database object. This privilege applies to the entire object and cannot be granted on specific columns.

UPDATE privilege allows you to update data in a database object. This privilege can also be restricted to specific columns.

INDEX privilege allows you to create an index on a database object. This privilege applies to the entire object and cannot be granted on specific columns.

ALTER privilege allows you to alter the schema of a database object. This privilege applies to the entire object and cannot be granted on specific columns.

REFERENCE privilege allows you to create referential constraints (such as foreign keys) on a database object. This privilege can also be restricted to specific columns.

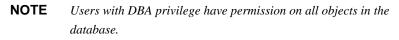
EXECUTE privilege allows the user to use a stored procedure or command.

The user who creates a schema object is the owner of that object. The owner and any user with DBA or SYSADM security privileges automatically have all object privileges on that object. System catalog tables belong to a special virtual user called SYSTEM. All users including the SYSADM have only SELECT privilege on system catalog tables. You cannot grant additional object privileges on the system catalog tables.

You cannot grant privileges on specific columns and on the entire database object at the same time. If you wish to do so you must use the command twice, once to grant privileges on specific columns, and once to grant privileges on the entire table. It is possible to grant object privileges to all users simultaneously by granting the privileges to PUBLIC. All current and future users will then have those privileges on the database object.

- **T**o Grant or Remove Object Privileges:
  - 5. Open the User node on the object tree. The Users page will open.
  - 6. Double click the user name in the tree or on the users table. The **Properties** page will open.
  - 7. Select the **Permission** tab at the top of the page. The **Permission** page will appear.

Database Object Statistics Option To	ool Help								
🖣  🕅 🔁 🖓 👘									
Database (DBSAMPLE4)	Properties Permission S	thema							
🕀 🙀 Tablespaces									
🖽 🏢 Tables	Modify Confirm	Cancel							
Image Weeks	Object	Select	Delete	Insert	Update	Alter	Index	Reference	Execute
- Indexes	DELPHICHINESE	Select			Opdate	Alter		Reference	Execute
Signature Text Indexes	DELPHIFORTUNES	<u> </u>	1	4	4		1	4	
IVF Text Indexes	SYSADM.ALLTYPE		- V	- W	¥.	- ¥	¥	4	
Ba Foreign Key	SYSADM.CARD								
Triggers	SYSADM.DATATYPE_BIN								
Stored Command	SYSADM.DATATYPE_BLOB								
	SYSADM.DATATYPE_CHAR								
Stored Procedure	SYSADM.DATATYPE_DATE								
- 🍋 Database Link	SYSADM.DATATYPE FILE								
Replication Schedule	TT SYSADM.DATATYPE_NUM								
Replication	T SYSADM.EMP								
- Et Domain	T SYSADM HISTORY								
- 📴 Synonym	SYSADM.INFO								
B 8 User	T SYSADM.PATIENT								
- 8 DELPHI	SYSADM.RDOCOLUMNBLOB								
8 SYSADM	SYSADM.RDO_TEST1								
8 VOTEADM	SYSADM.REFER_INFO								
B Sroup	SYSADM.T1								
	SYSADM.T2								
- 🌉 Schema	SYSADM.T3								
- 🏠 Access Control List	SYSADM.TESTSAMPLE								
🖻 🖂 Database Monitor	SYSADM.TRIGGERTABLE1								
	SYSADM.TRIGGERTABLE2								
	SYSADM.USER_INFO								
	VOTEADM.ITEM								
	VOTEADM.TOPIC								
	VOTEADM.VOTE								
	SYSADM.CMD1								
	SYSADM.CMD1 SYSADM.CMD1							-	
	SYSADM.CMD1							-	
	SYSADM.CMD1							-	
	SYSADM.CMD1							-	
	STSADM.CMD2							-	



8. Click **Modify** to alter the user's object privilege. Choose which type of privilege to grant to the user on each object. Click the column and row corresponding to the object privilege to be granted and the object to grant the privilege to. Privileges can be likewise removed. A check mark will appear for each privilege selected as in the table below.

atabase Object Statistics Option To	ol Help								
🖣 🗐 📓 근 🛛 🗭									
Database (DBSAMPLE4)	Properties Permission 3	shema							
🔁 🔛 Tablespaces									
🖽 🎹 Tables	Modify 🔂 Confirm	Cancel							
Wews	Object	Select	Delete	Insert	Update	Alter	Index	Reference	Execute
- Indexes		1	1	1	1	1	1	1	
<ul> <li>Bignature Text Indexes</li> </ul>	DELPHICHINESE	5	1	5	J	5	5	1	
- IVF Text Indexes	SYSADM ALL TYPE								
- Revealing Key	SYSADM.CARD								
🗃 🛵 Triggers	SYSADM.DATATYPE_BIN								
Stored Command	SYSADM.CAND SYSADM.DATATYPE_BIN SYSADM.DATATYPE_BLOB SYSADM.DATATYPE_CHAR								
Stored Procedure	SYSADM.DATATYPE_CHAR								
- 💁 Database Link	SYSADM.DATATYPE_DATE								
Replication Schedule	SYSADM.DATATYPE_FILE								
Replication	TT SYSADM.DATATYPE_NUM								
- Domain	TT SYSADM.EMP								
	SYSADM.HISTORY								
- 🖳 Synonym	SYSADM.INFO								
🖶 🖁 User	SYSADM.PATIENT SYSADM.RDOCOLUMNBLOB								
- 8 DELPHI									
- 🖀 SYSADM	SYSADM.RDO_TEST1								
NOTEADM	T SYSADM.T1								
🖻 🌃 Group	SYSADM.T2			-					
- 🚮 Schema	T SYSADM.T3								
- 🗛 Access Control List	T SYSADM.TESTSAMPLE								
🖬 🏧 Database Monitor	SYSADM.TESTSAMPLE SYSADM.TRIOGERTABLE1								
	SYSADM.TRIGGERTABLE2								
	SYSADM.TRIGGERTABLE2								
	VOTEADM.ITEM								
	VOTEADM.TOPIC	-	1	1	1	-	1	1	
	VOTEADM.TOPIC VOTEADM.VOTE						-		
	VOTEADM.VOTEITEM								
	SYSADM.CMD1								
	SYSADM.CMD1								
	SYSADM.CMD1								
	SYSADM.CMD1								
	SYSADM.CMD1								
	SYSADM.CMD2								

9. Click **Confirm** to save the changes, or **Cancel** to discard them.

### 20.3 Changing a User's Password

Passwords may be changed for a user if they have forgotten their old password or are requesting a new one. User names have a maximum length of thirty-two characters, passwords have a maximum length of sixteen characters, and both may contain letters, numbers, the underscore character, and the symbols \$ and #. The first character may not be a number..

- **T**o change a user's password:
  - 1. Open the **User** node on the object tree. The **Users** page will open.
  - 2. Double click the user name in the tree or on the users table. The **Properties** page will be displayed.
  - 3. Select the **Change password** button to open the **Change Password** dialog box. Enter a new password and confirm it by reentering it in the **Confirm Password** field.

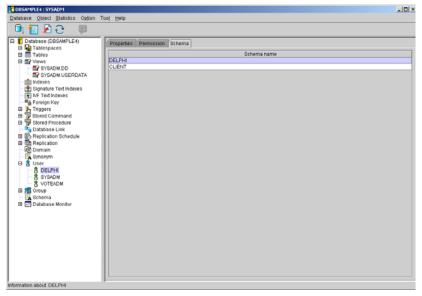
Change password	×
User Name :	DELPHI
Old Password:	
New Password:	
Confirm Password:	
<u>୍କି ୦</u> ୪	🗱 <u>C</u> ancel 🦉 Help

4. Click **OK** to change the password.

## 20.4 Browsing Assigned Schema

You can quickly browse the schemas that are assigned to each user in the Schema page.

- **•** To browse schema assigned to the user:
  - 1. Open the **User** node on the object tree. The **Users** page will open.
  - 2. Double click the user name in the tree or on the users table. The **Properties** page will open.
  - 3. Select the **Schema** tab at the top of the page. The **Schema** page will appear.



4. All of the schemas in the database that are assigned to the user are displayed on this page.

### 20.5 Deleting a User Account

User accounts should be deleted when the account is no longer active.

- **T**o remove a user account from the database:
  - 1. Open the **User** node on the object tree. The Users page will open.
  - 2. Select the user account to be deleted from the table by clicking once (the user account will highlight blue).

Users		
👫 Create 👔 Drop		
User	DBA	Resource
DELPHI		1
SYSADM	1	1
U1	1	
VOTEADM		1

3. Click Drop. A window will appear asking confirmation.

Revoke	e Connect			x
-	Drop User U	1?		
1	Default	⊖ Restrict	🔿 Cascade	
		<mark>ଜ୍ଞା</mark> <u>୦</u> ୯	X Cancel	

- 4. DBMaker provides three options for dropping user. The **Default** option is same as dropping user without option specified, this behavior will revoke the account directly; the **Restrict** option will check user's schema and schema 's table; the **Cascad** option drops the user and the user's shema and the schema's table together.
- 5. Click **OK** to remove the user from the database.

# 21 Managing Groups

Groups simplify the management of object privileges in a database with a large number of users. You can use a group to collect several users and/or groups. Any object privileges you grant to the group are automatically granted to all members of the group.

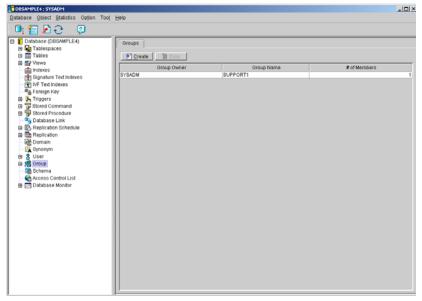
Members added to a group after object privileges have been granted gain those object privileges in addition to object privileges that have been granted to them directly. Members removed from a group lose object privileges that have been granted to the group, but retain any privileges that have been granted to them directly.

You can also specify a group name in place of a user name, as long as the group you are trying to add does not contain the group you are adding it to. User and group names have a maximum length of eight characters, and may contain letters, numbers, the underscore character, and the symbols \$ and #. The first character may not be a number.

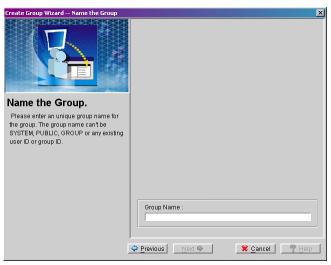
### 21.1 Creating a New Group

New group accounts should always be created when a specific access profile is required for a group of individuals. It is also useful to create group accounts that represent the structure of your organization, business, etc.

- To create a new group:
  - 1. Select the **Group** node from the object tree. The **Groups** window will appear displaying all existing groups, the group owner, and the number of members in the group.



2. Click Create. The Create New Group wizard will start.

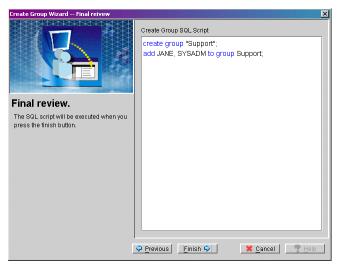


3. Click Next. The Name the Group window will appear.

4. Enter the group name into the **Group Name** field. Click **Next**, the **Select Other Groups or Users to be Members** window will open.

Create Group Wizard Select Other Groups	or lisers to be Members			
	Add other groups or users to the group as members. You can add other groups or users to the group as members. Note: A group cannot be added as a new member of fiself. Members of a group can be any existing user ID or group ID.			
(User) JANE (User) SYSADM	add > < remove add all >> << remove all			
	Previous     Next			

5. A list of available users/groups appears on the left list box. Select a user/ group by double clicking on the name or selecting the user(s)/ group(s) and clicking the **add** button. The **add all** button can be used to select all users/ groups to the newly created group. All the selected users/ groups will be displayed in the list box to the right. Selected users/groups can be, likewise removed by double clicking on the name, or by selecting the users/groups and clicking the **remove** button. Click **Next**, the **Final review** page will appear.



6. Review the SQL script that has been created. You can add to the SQL script in the **Create Group SQL Script** field if necessary by clicking on the field. Click **Finish** to execute the SQL command. The **Information** dialog box will appear.



7. Click OK.

## 21.2 Adding and Removing Group Members

Members should be removed or added to groups according to their access needs or position within your organization. Users may be added to groups from the group properties page or the user's property page.

- **T**o add or remove members from a group:
  - 1. Select the **Group** node from the object tree. The **Groups** window will appear displaying all existing groups, the group owner, and the number of members in the group.

<u>≧</u> DBSAMPLE4 : SYSADM	
Database Object Statistics Option Tool Help	
🔍 🗑 🔁 😌 🛛 🔍	
Control (CostMPLEA)     Trabispace     Trabisp	

- 2. Select a group from the tree or double click the group in the **Groups** table. The group **properties** page will appear. The group **properties** table shows all existing users and groups for the database. If a check mark is present in the include column next to a user or group, then they are a member of the group indicated in the **Group Name** field.
- 3. Click **Modify** from the top of the **Properties** page to include more users or groups or to remove users or groups from the selected group. A check in the

**Include** column indicates that the user or group is a member of the selected group.

Properties Permission		
📄 Modify 🛛 🞝 Confirm 🛛 🟝 C	ancel	
Group Name: SUPP	ORT	
User/Group	Туре	Include
DELPHI	8	✓
JANE	8	✓
SYSADM	8	✓
VOTEADM		

- **NOTE** Users may also be added to groups by selecting the user from the user's node, and checking the **Include** column on the group that they are to be a member of.
- 4. Click **Confirm** to save the changes, or **Cancel** to discard them.

### 21.3 Managing Group Object Privileges

Object privileges control which database objects a user can access and the actions they can perform. There are seven object privileges: SELECT, INSERT, DELETE, UPDATE, INDEX, ALTER, and REFERENCE.

SELECT privilege allows you to select the data in a database object. This privilege applies to the entire object and cannot be granted on specific columns.

INSERT privilege allows you to insert new data into a database object. This privilege can also be restricted to specific columns.

DELETE privilege allows you to delete data from a database object. This privilege applies to the entire object and cannot be granted on specific columns.

UPDATE privilege allows you to update data in a database object. This privilege can also be restricted to specific columns.

INDEX privilege allows you to create an index on a database object. This privilege applies to the entire object and cannot be granted on specific columns.

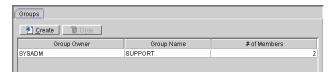
ALTER privilege allows you to alter the schema of a database object. This privilege applies to the entire object and cannot be granted on specific columns.

REFERENCE privilege allows you to create referential constraints (such as foreign keys) on a database object. This privilege can also be restricted to specific columns.

EXECUTE privilege allows the user to use a stored procedure or command.

It is possible to grant object privileges to all users simultaneously by granting the privileges to PUBLIC. All current and future users will then have those privileges on the database object.

- **T**o Grant or Remove Group Object Privileges:
  - 1. Select the **Group** node from the object tree. The **Groups** window will appear displaying all existing groups, the group owner, and the number of members in the group.



2. Double click the group name in the tree or in the group table. The **Properties** page will be displayed.

Properties Permission		
Modify 🔀 Confirm 🖄 C Group Name: SUPP	Cancel	
User/Group	Туре	Include
JANE	8	✓
SYSADM	8	✓

3. Select the **Permission** tab at the top of the page. The **Permission** page will appear.

Properties Permission								
Modify 🔀 Confirm 🖄 Cancel								
Object	Select	Delete	Insert	Update	Alter	Index	Reference	Execute
SYSADM.DISTRIBU								
SYSADM.INVENTORY								
SYSADM.PRODUCTS								
SYSADM.SUPPORT	-					<ul> <li>Image: A second s</li></ul>	Image: A start of the start	
SYSADM.USERDATA	-					<ul> <li>Image: A second s</li></ul>	<ul> <li>✓</li> </ul>	
SYSADM.USERSTA	-					<ul> <li>Image: A second s</li></ul>	$\checkmark$	
M SYSADM.VIEW								
SYSADM.CMD1								
BMSYSTEMSP.SYS								
BMSYSTEMSP.SYS								
BMSYSTEMSP.SYS								
B DMSYSTEMSP.SYS								
B DMSYSTEMSP.SYS								
B DMSYSTEMSP.SYS								
BMSYSTEMSP.SYS								
B DMSYSTEMSP.SYS								
BMSYSTEMSP.SYS								
BMXMLSP.SYSTEM								
BMXMLSP.SYSTEM								

4. Click **Modify** to alter the user's object privilege. Choose which type of privilege to grant to the user on each object. Click the column and row corresponding to the object privilege to be granted and the object to grant the privilege to. Privileges can be likewise removed. A check mark will appear for each privilege selected.

5. Click **Confirm** to save the changes, or **Cancel** to discard them.

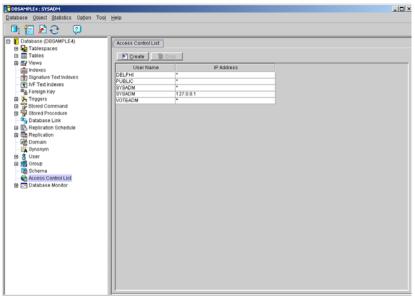
## 22 Controling Access

Access Control List provides an ability to determine whether allow some users from some IPs to connect to the database. DBA can use it to allow or block some users come from any network address. You can easily create or drop the Access Control List with the JTOOL interface. After creating a new database, there are three defaulted tuples in the list. They are (PUBLIC,\*, allow) (SYSADM, 127.0.0.1, allow) and (SYSADM,\*, allow), respectively. Please notice that the record (SYSADM,127.0.0.1,allow) cannot be removed because we always allow SYSADM to connect to database from local machine

### **Broswing Access Control List**

You can quickly browse the Access Control List in a database by selecting the Access Control List icon from the data structure tree. The schema's name and owner are displayed in the panel to the right of the data structure tree.

- **T**o browse Access Control List:
  - 1. Click the Access Control List icon from the tree. A list of all users' name and the IP address in the database is displayed.



2. Browse the listed on the right panel by using the upward and downward arrows.

### **Creating Access Controling List**

Creating a schema using JDBATool is a very intuitive process. You are guided through the process by a user-friendly user interface.

DBMaker uses the new keyword "PUBLIC" to mean that all users that want to connect to database. DBA can't create a user name with "PUBLIC".

- **T**o create Access Control List:
  - 1. Click the Access Control List icon from the tree. The Access Control List page appears.

Database Object Statistics Oppion Tool Help         Image: Statistics Ink         Image: Statistics Ink         Image: Statistics Ink         Image: Replication Difference         Image: Replication Difference         Image: Replication Difference         Image: Replication Difference
Database (DBSAMPLE4)     Database (DBSAMP
Contracting acces     Contracting acces
E Tables     E Table     E Tables     E Table     E Table
B @ Vervs     UserName     IP Address     VUELC     SYSADM     IP     Stored Procedure     Stor
User Name     IP Address       Im Indexes     DE/PHI       Image: Strain Stra
Bignature Text Indexes     DEL/PHI       CFW FT Endnexes     FUBIC       Gas Foreign Kay     ST3ADM       Big Stored Command     FUBIC       Gas Stored Command     FUBIC       Gas Stored Procedure     FUBIC       Gas Replication Schedule     FUBIC       Gas Replication Schedule     FUBIC       Gas Replication Schedule     FUBIC
CY V Test Indexes     SYSADM *     SYSA
A Triggers     VOTEADM     VOTEADM
B ' Stored Command B ' Stored Procedure ' Database Link G Replication Schedule B 맨 Replication Schedule
명 등 Stored Procedure 을 Ostabase Link 용 문, Replication Schedule B 문, Replication
🖶 🚯 Replication Schedule
🗃 🐘 Replication
- 强 Synonym
B) 👸 User
en 🖀 Group
- Te Schema - Ch Access Control List
Database Monitor

2. Click the Create button in the Access Control List window. The Create Access Control List Wizard Introduction window appears.



3. Click the Next button in the Create Access Control List Wizard Introduction window. The List of Allowed User window appears.

Create Access Control List Wizard List of <i>i</i>	Allowed User	×	
	User	Allow	
	SYSADM		
	VOTEADM		
	DELPHI		
01010101010111010			
x 100101010101 -			
10101010101010			
100000000000			
List of allowed user.			
When checking some users meaning			
those users can allow connect to			
database on next step setting IP			
address.			
	1		
	(2 Desidence   Maria et al 1	el 🤊 Hein	
		el <u>? H</u> elp	

4. Choose the user you want to allow Allow field.



5. Click the Next button in the List of Allowed User window. The List of Allowed IP Address window appears.

Create Access Control List Wizard List of A	llowed IP Address	x
	Input allowed IP address	
List of allowed IP address.		
To input allowed accessing database IP list, the format is xxxxxxxxxxxxx, x means digital number. It also accept wild card in IP format. Every IP should quote by single quote and separate by comma, like 168.1.2.**,192.168.3.4*		
2	♀ <u>Previous</u> <u>N</u> ext ♀ <u></u> <b>X</b> ervious <u>Previous</u> <u>Y</u> elp	

6. Input the IP address you want to allow in the Input allowed IP address field.

7. Click the Next button the Final review window appears. From this window the user can edit the SQL code in the Create Schema SQL Script field



8. Click the Finish button when you are satisfied with the result SQL Script. A conformation message will appear stating that the creation of the ACL was successful. The created Access Control List will appear in the Access Control List window to the right.

Information	×
Access Control List Creation Successful!	
<u>وال 0</u> K	

### **Dropping Access Controling List**

If an ACL is no longer required, it can be dropped.

- **T**o drop a ACL:
  - 1. Select the object Access Controling List from the tree and select the ACL from the list.

Access Control List		
💽 <u>C</u> reate 🛛 🔞 🕻	Dīob	
User Name	IP Address	
USER1	192.168.0.*	
SYSADM	192.168.*.*	
SYSADM	127.0.0.1	
PUBLIC		
SYSADM		

2. Click Drop. The Drop ACL window will open to confirm if you want to drop the ACL

Drop A	CL	x
1	Do you want to drop ACL address 192.168.0.* from user USER1 ?	
	@K	

3. Click OK if you are sure to drop it.

# 23 Data Transfer

The Data Transfer Tool provides an user-friendly interface for transferring data in and out of the database. The tool performs the following types of data transformation:

- Import from text
- Import from XML file
- Import from ODBC
- Export to text
- Export to XML
- Batch transfer

Each type of data transformation is performed through a wizard. Each wizard guides the user through every step in the data transformation process, and gives descriptive information on the purpose of each step and the effect of different choices on the result.

The Data Transfer Tool is a separate application it may be opened from windows start>programs>DBMaker 4.1>DataTransfer, or opened from within JDBA Tool. It consists of a main console and a menu bar, as illustrated in *Figure 23-1*. The main console provides five options: import from text, import from XML, import from ODBC, export to text, and export to XML. The Menu Bar consists of three menus: the Transfer menu, the Option menu, and the Help menu. The Transfer menu provides the same transfer functions as the main console, with the addition of the

batch transfer function. The option menu can be used to change the language that the UI is displayed in; currently English, Japanese, and Chinese (traditional) are the supported languages. The help menu provides access to the help system for JDBA Tool.

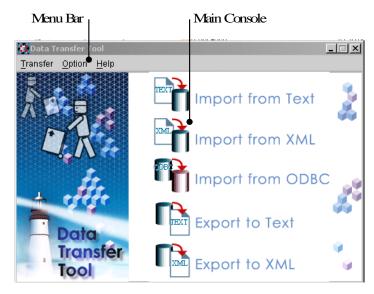


Figure 23-1 The Data Transfer Tool main window

- **T**o open the Data Transfer Tool:
  - 4. Start JDBA Tool and connect to the database that data is to be transferred to or from.
  - 5. Select **Data Transfer** from the Tool menu. The Data Transfer tool window will open.

## 23.1 Importing Data from Text

The ability to import table data from a text file is an important feature in a database, and is made easy with the Data Transfer Tool. Text data must be properly formatted to be acceptable for import. Data may be imported to the database only from a properly formatted text file. This section describes the types of formatting that Data Transfer Tool supports, and then describes how to import text to the database using the tool.

Before attempting to import data from a text file, you should be sure that the file is in a format that will result in coherent structured data within the database. Certain programs output data in a fixed text format, if this is the case, check the format of the output file that you want to import. Some important settings to consider in the format of a text file include the following:

- Row Delimiter: Determines the type of character that signifies a break between the rows of a table. Possible characters: {CR/LF} (Carriage return / line feed. In Windows applications, a new line in the text is normally stored as a pair of CR LF characters. In Unix applications, a new line is normally stored as a LF character. Some applications use only a CR character to store a new line), {CR}, {semicolon} (;), {comma} (,), {tab}, {vertical bar} (), (semicolon}{LF}, or {comma}{LF}.
- Column Delimiter: Determines the type of character that signifies a break between columns in each row. Possible characters: semicolon, comma, or vertical bar.
- Text Qualifier: Determines how each tuple of any data type except BINARY, LONGVARBINARY, or numeric data types (integer, smallint, serial, decimal, double, float) is enclosed. Possible values: none, single quote, or double quote.
- Binary Qualifier: Determines how each tuple of BINARY or LONGVARBINARY type data is enclosed. Possible values: none, single quote, or double quote.

- Binary Padding: Binary type data may have a character appended to it.
- Fixed Field: Instead of using a row delimiter, the text file may be formatted with fixed fields. This means a number of spaces, or fields, defines each column.
- Include column name: The first line in a text file may be used to define the column names. The format is "*column1*"."*table name*"."*owner name*"; "*column2*"."*table name*"."*owner name*"; etc. In this case the column delimiter is set to semicolon (;).
- Include table schema: The first line in a text file may be used to define the column schema (or the second line if the first line was used to define column names). The format is *data type(scale,precision);data type(scale,precision)* etc. In this case, the column delimiter is set to semicolon (;).
- Use NULL to display null data: Columns that contain no data display "NULL".
- File link name for FILE type data: The file name for system or user file objects is displayed.
- Use escape character "/": This character is used when qualifiers or delimiter characters appear in the data. If the data contains a reserved character, the reserved character will be enclosed by an escape character (/) so that the text import engine recognizes it as data, not a qualifier or delimiter.
- Use temp files to store LONGVARBINARY or LONGVARCHAR type data column content: BLOB data is stored as a separate, linked file (as a file object), and the name of the file containing the BLOB is displayed.

Data may be imported to a new table or an existing table. Three options are available when importing data to an existing table. The destination table may be replaced, removing the schema and data of the original table. The rows of the destination table may be replaced, meaning schema is retained, but data is removed. The last option is to append rows to the destination table, in which case the table's original schema and data is preserved, and the data from the text file is appended as new rows. In the last two cases, be aware that the schema of the destination table must be such that it is able to accept the imported data. For example, a set of integer data can be imported into a column of CHAR type data, but not vice-versa. Refer to the *SQL Command and Function Reference* for more information on acceptable formats for supported data types in DBMaker.

**S** Example

The following text file contains owner, table, and column information in the first line, and the table's schema in the second line. Subsequent lines contain raw data. Semicolons delimit columns. Single quotes qualify non-binary data; double quotes qualify binary data. The LONGVARCHAR and LONGVARBINARY columns display temporary file names (the data has been stored as file objects), and binary data is padded with "9".

```
"SYSADM"."EXPORT"."LOGINID"; "SYSADM"."EXPORT"."REQUEST"; "SYSADM"."EXPORT"."REQUES
TTIME"; "SYSADM". "EXPORT". "ATTACHMENT"; "SYSADM". "EXPORT". "BINARY C"; "SYSADM". "EXPO
RT"."DECIMAL_C"
SQL CHAR(20); SQL LONGVARCHAR; SQL TIMESTAMP; SQL FILE; SQL BINARY(10); SQL DECIMAL(10
, 3)
                      '; 'blobtmpdir2\\blbtmpf0.txt'; '2001-09-09
'A_HOWARD
12:47:05.000'; 'C:\\DBMAKER\\4.1\\BIN\\WEBDB\\FO\\ZZ00000B.GIF'; "1000000000000000
000"9;10.250
'A HOWARD
                      '; 'blobtmpdir2\\blbtmpf1.txt'; '2001-09-22
10:14:21.000';'C:\\DBMAKER\\4.1\\BIN\\WEBDB\\FO\\ZZ00000C.GIF';"20000000000000000
000"9;13.550
                      '; 'blobtmpdir2\\blbtmpf2.txt'; '2001-10-04
'A_HOWARD
16:22:06.000'; 'C:\\DBMAKER\\4.1\\BIN\\WEBDB\\FO\\ZZ00000D.GIF'; "3000000000000000
000"9;27.333
```

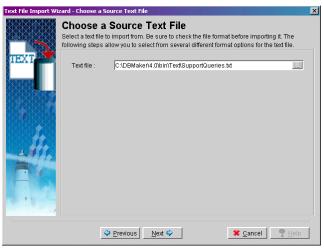
- **•** To import a text file to a database
  - 1. Open the Data Transfer Tool.
  - 2. Select **Import Text File** from the main console or the **Transfer** menu. The Welcome to Import from Text File Wizard window will open, displaying a summary of the steps to be taken in the wizard

Text File Import Wi	zard - Welcome to Import from Text File Wizard	×
TEXT	Welcome to Import from Text File Wizard The ability to import table data for a text file is an important feature in a database, and is made easy with the Data Transfer Tool. Text data must be properly formatted to be acceptable for import. This wizard helps you import text data to the database through the following steps: 1. Choose a source text file 2. Text file format setting li 3. Text file format setting li 4. Choose a destination data source 5. Transfer setting	
	Previous Next 🗘 😤 Cancel 🤶 Help	

3. Click Next. The Choose a Source Text File window will open.

Text File Import Wi	zard - Choose a Sou	irce Text File		J	×
TEXT	Select a text file to i	Source Text Fil import from. Be sure to ch aw you to select from seve	eck the file format before		
	\$	Previous Next 🗣	× <u>c</u>	ancel 🦉 Help	

4. Enter the full path of a text file to import or click the browse button to search for a text file.



5. After you have selected a text file, click **Next**, the **Text File Format Setting 1** window will open.

ext File Import Wi	delimiter. Next, select whether the text file delimiters are special characters that ind another begins. Column delimiters may i	The source text file. First, set the type of row uses a column delimiter or fixed fields. Column icate where data from one column ends and include text or binary qualifiers as well as binary faker will use a set number of spaces (separator
	Row delimiter :       (CR)(LF)         Column format setting         Column delimiter         Column delimiter :         Semicolon         Text qualifier :         Binary qualifier :         Double Qu         Binary padding :         0	Fixed field   Image: space in the space
	Previous	🗱 <u>C</u> ancel 🦉 Help

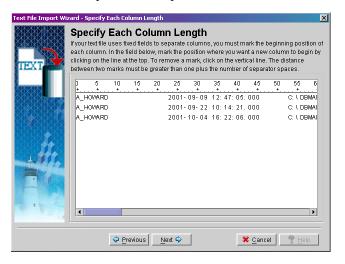
- 6. Open the text file in a text editor to check the format of the data.
- 7. Select the appropriate settings for the format of the text file you are importing.

- Text File Format Setting II

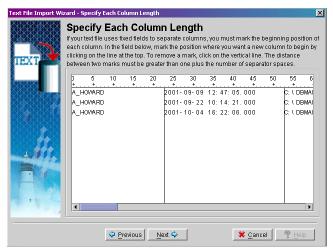
   Year File Format Setting III

   Year File Format Setting III</
- 8. Click Next, the Text File Format Setting 2 window will open.

- 9. Finish selecting the appropriate settings for the format of the text file you are importing. Click **Next**.
- If you selected Fixed field from the Text File Format Setting 1 window, the Specify Column Length window will open. If you selected Column Delimiter, then proceed to step 12.



11. Click the horizontal line where you want to indicate the beginning of a column. A vertical line will appear, marking the column break. Use the scroll bar at the bottom to advance to other columns. Click **Next**.



12. The Choose Destination Data Source window will open.

Text File Import Wi	zard - Choose a Destination Data Source	×
TEXT	Choose a Destination Data Source Select a database to import your data to from the 'Database' menu.	
	User name : Password :	
	♀ Previous         Next ♥           ★ Cancel         ♥ Help	

13. Select the database to import data to from the **Database** menu.

Text File Import Wi	zard - Choose a De	stination Da	ita Source			×
	Choose a l Select a database					
TEXT	Database :	TUTORIA		 •		
	User name :	SYSADM		 		
	Password :	ļ		 		
1.11						
-						
		- 1			1	_
	\$	<u>P</u> revious	<u>N</u> ext ᅌ	🗱 <u>C</u> ancel	<u><u><u></u></u><u>H</u>elp</u>	

14. Enter a user name and password into the appropriate fields.

**NOTE** A user must have INSERT privilege to import a text file.

15. Click Next. The Transfer Setting window will open.

TEXT	existing table's sch	king on the arrow. If y ema must exactly mat cose to replace the ol	ch with that of the i	data from the '	file you v	want to
	Table name :	SupportRequest		-		
	Create desti     Create desti		<ul> <li>Delete row</li> <li>Append row</li> </ul>			9
	Source Col	Destination Col	Туре	Precision	Scale	Nullable
	LOGINID	LOGINID	char	20		r
	REQUEST	REQUEST	long varchar			
1.111	REQUESTTIME	REQUESTTIME	timestamp			Ľ
and the second second	ATTACHMENT	ATTACHMENT	file			Ľ
Survey Barry		BINARY C	binary	10		
	BINARY_C					

16. Enter a new table name into the **Table Name** field, or select a table from the menu. Selecting a table from the menu will allow you to choose to replace the destination table, delete rows in the destination table, or append new

rows to the destination table. Click **Execute** to import the text file. A confirmation dialog box will appear.

Information	×
Import text file :C:\DBMaker\4.0\bin\Text database : TUTORIAL succ	
<u></u> k	

17. Click OK

## 23.2 Importing Data from XML

XML files may also be imported into the database. XML tags may first be defined in a *Document Type Definition* (DTD) file before being imported into the database. Furthermore, the DTD may define the schema in a way that is acceptable to the database.

It is important to consider the structure of the XML file you wish to import. To ensure that the structure of the XML file and associated DTD have compatible structure, examine the structure of XML files produced by the Data Transfer Tool: Export to XML File wizard. Examples may be found in section 23.5, *Exporting Data to XML*. Files produced using the Export to XML wizard always can be imported, however, the extent to which a table's schema is reproduced varies. The setting that influences table schema the most is the Column as Element / Attribute setting.

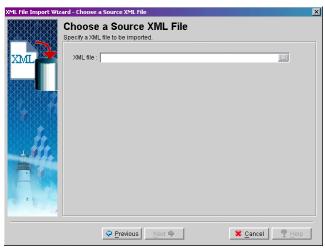
- Column as Element: Stores data items in elements. If table schema information exists as element attributes (data type, column name, length, etc.) in the DTD, then columns will be created with names and of the appropriate data type and length. Columns are child elements, and the table is represented as the parent element. File objects must be referenced as entities in the DTD file if Column as Element is chosen.
- Column as Attribute: Stores data in an attribute of an element. Each element is a record. If column names are represented as attributes of the root element (the table) in the DTD, and each tag in the XML file represents one record, then Column as Attribute should be chosen.
- To import data from an XML file:
  - 1. Open the Data Transfer Tool.

2. Select **Import XML File** from the main console or the **Transfer** menu. The **Welcome to Import from XML File Wizard** window will open, displaying a summary of the steps to be taken in the wizard.

 XML File Import Wizard - Welcome to Import from Xml File Wizard
 Xml

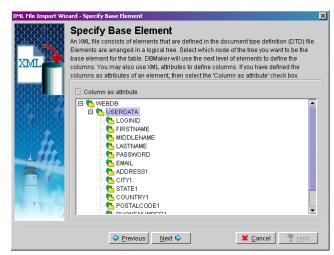


3. Click Next. The Choose a Source XML File window will open.



4. Enter the full path of a text file to import or click the browse button to search for a text file.

5. Click **Next**. If the XML file has a structure acceptable to DBMaker's parser, the **Specify Base Element** window will open.



- 6. The nodes of the tree structure represent the elements in the XML file. Click the nodes on the tree until they are fully expanded. Select a parent element to be the table name. The child elements will become the columns of the table. Check **Column as attribute** if appropriate.
- 7. Click Next. The Choose a Destination Data Source window will open.

XML File Import Wiz	ard - Choose a Destination Data Source	1
	Choose a Destination Data Source Select a database to import your data to from the 'Database' menu.	
XML	Database : 📃 🔫	and the second se
XXXXXXX	User name :	
	Password :	
	♀ Previous         Next ♥         ¥ Cancel         ♥ Help	

- 8. Select the database to import data to from the **Database** menu.
- 9. Enter a user name and password into the appropriate fields.

**NOTE** *DBA authority or higher is required to import a text file.* 

10. Click Next. The Transfer Setting window will open.

	ard - Transfer Setti Transfer Set							
		w table by entering a						
existing table by clicking on the arrow. If you are inserting data into an existing table, the existing table's schema must exactly match with that of the data from the file you want to								
	import. You may ch	oose to replace the o	ld rows in the desti	nation table o	ir add new rows	s to		
XXXX	Table name :			-				
	Create dest	ination table	O Delete row	s in destinati	on table			
	O Replace de	stination table	O Append rov	vs to destinal	tion table			
	Source Col	Destination Col	Туре	Precision S	Scale Nullable			
	LOGINID	LOGINID	char	20		-		
	FIRSTNAME	FIRSTNAME	char	30	Ľ			
4111	MIDDLENAME	MIDDLENAME	char	30	Ľ			
States of the second	LASTNAME	LASTNAME	char	30	Ľ			
	PASSWORD	PASSWORD	char	20	Ľ	2/1/10		
	EMAIL	EMAIL	char	100	Ľ			
	ADDRESS1	ADDRESS1	char	100	Ľ			
	CITY1	CITY1	char	50	r	•		

- 11. Enter a new table name into the **Table Name** field, or select a table from the menu. Selecting a table from the menu will allow you to choose to replace the destination table, delete rows in the destination table, or append new rows to the destination table. Click **Execute** to import the XML file. A confirmation dialog box will appear.
- 12. Click OK.

## 23.3 Importing Data from ODBC

A large number of software developers have developed applications to be Open Database Connectivity (ODBC) compatible. ODBC is an industry standard for sharing data between diverse data sources. DBMaker can import data from any ODBC compliant data source through the Import from ODBC wizard.

Data may be imported by three methods:

- Directly from tables.
- Writing one or more SQL SELECT statements.
- Importing through an XML batch file.

Furthermore, you may specify the mapping of column data through the transformation function. The transformation function supports direct column-to-column mapping or mapping through SQL SELECT and SQL INSERT statements.

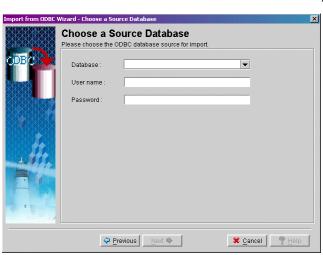
When importing data directly from tables or through SQL SELECT statements it is possible to save a 'map' of the data transformation to an XML batch file. The saved XML batch file is a well-formed XML document with a form that can be parsed by the data transfer tool. Batch files may be used to import table schema from a data source to multiple DBMaker databases.

- **T**o import data from an ODBC database:
  - 1. Open the Data Transfer Tool.

2. Select **Import XML File** from the main console or the **Transfer** menu. The **Welcome to Import from XML File Wizard** window will open,

displaying a summary of the steps to be taken in the wizard.





3. Click Next. The Choose a Source Database window will open.

- 4. Select the database to export data from in the **Database** menu.
- 5. Enter a user name and password into the appropriate fields.

**NOTE** *DBA authority or higher is required to export a text file.* 

6. Click Next. The Choose a Destination Data Source window will open.

Import from ODBC \	Wizard - Choose a Destir	ation Data Source		×
		tination Data Sou		
ODEC	Database :		▼	
	User name :			
	Password :			
3.4.6				
	Prev	ous Next 🌩	🗮 <u>C</u> ancel	<u>H</u> elp

- 7. Select the database to import data to from the **Database** menu.
- 8. Enter a user name and password into the appropriate fields.

**NOTE** *DBA authority or higher is required to import a text file.* 

9. Click **Next**, the **Table Copy or Query** window will open.

Import from ODBC \	Wizard - Table Copy or Query	×
	Table Copy or Query           Specify whether you want to copy data from existing tables/views or customize queries to retrieve the data from the source database.	
CORGE C	Copy from : • Table	
	○ SQL query	
	O Batch file	
	♀ Previous Next ♀ ★ Cancel ♀ Help	

- 10. Select from one of the three methods for data transfer:
  - To import data from a list of tables, select **Table**.
  - To import data using a series of SQL SELECT statements, select **SQL query**.
  - To import data through an XML file, select Batch file

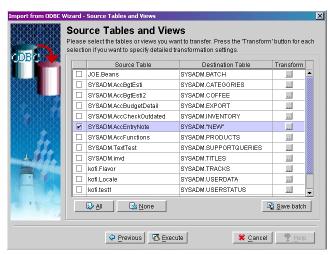
### Importing ODBC Data from Tables

ODBC data may be imported from variety of sources by selecting tables directly from the source database. The Import from ODBC Wizard provides an intuitive graphical interface for selecting tables and setting how data should be transformed during the import process.

- **T**o import ODBC data from a list of tables
  - 1. In the Import from ODBC wizard, select a source and destination database, and then select **Table** from the **Table Copy or Query** window.
  - 2. Click Next. The Source Tables and Views window will open.

B	selection if you want to specify detailed Source Table	Destination Table	Transform
	JOE.Beans	SYSADM BATCH	
	SYSADM.AccBgtEsti	SYSADM.CATEGORIES	
	SYSADM.AccBgtEsti2	SYSADM.COFFEE	
	SYSADM.AccBudgetDetail	SYSADM.EXPORT	
	SYSADM.AccCheckOutdated	SYSADM.INVENTORY	
T I I I I I I I I I I I I I I I I I I I	SYSADM.AccEntryNote	SYSADM."NEW"	
	SYSADM.AccFunctions	SYSADM.PRODUCTS	
	SYSADM.TextTest	SYSADM.SUPPORTQUERIES	
	SYSADM.invd	SYSADM.TITLES	
And	🔲 kofi.Flavor	SYSADM.TRACKS	
	🔲 kofi.Locale	SYSADM.USERDATA	
	🔲 kofi.test1	SYSADM.USERSTATUS	
11	All 🔀 None		Leve batch

3. All tables from the source database will appear in the **Source Table** column. Check the box to the left of each table to import.



4. For each source table or view selected, click the **Destination Table** field. If desired, change the name of the destination table by selecting a new table from the menu or entering a new name.

	SYSADM.AccEntryNote	SYSADM."NEW"	
	SYSADM.AccFunctions		
	SYSADM.TextTest	SYSADM.BATCH	
	SYSADM.invd	SYSADM.CATEGORIES	
	kofi.Flavor	SYSADM.COFFEE	
	kofi.Locale	SYSADM.EXPORT	
	kofi.test1	SYSADM.INVENTORY	
Ľ	Kollitesti	SYSADM."NEW"	<u> </u>
	All 🔯 None	SYSADM.PRODUCTS	<u>Save batch</u>

5.	You may modify column mapping or the result set to import by clicking on
	the <b>Transform</b> button of the corresponding source and destination table.

Column Mapping an	d Transformation					
	Column Ma	pping and	Transformatio	n		
OB	Source table :	SYSADM.AccE	ntryNote			
	Destination table :	AccEntryNote				
XXXXX	Column mapping	Transformation				
	Create destin     Create destin		<ul> <li>Delete rows in d</li> <li>Append rows to</li> </ul>			
	Source Col	Destination Col	Туре	Precision	Scale	Nullable
	VouCat	VouCat	char	1		
	Note1	Note1	char	40		Ľ
	Note2	Note2	char	40		Ľ
1111	SerialNo	SerialNo	integer			Ľ
		<u>ا</u> له الم	<u>D</u> k 🗱 <u>C</u> ancel	P <u>H</u> elp		

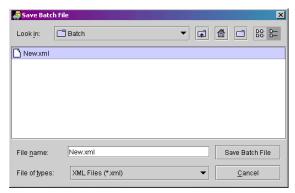
6. Change the name of the destination column by selecting a new column from the menu or entering a new name.

Source Col	Destination Col	Туре	Precision S	cale Nullable
VouCat	VouCat 🗸 🗸	char	1	
Note1	Note1	char	40	Ľ
Note2	Note2	char	40	Ľ
SerialNo	SerialNo	integer		V

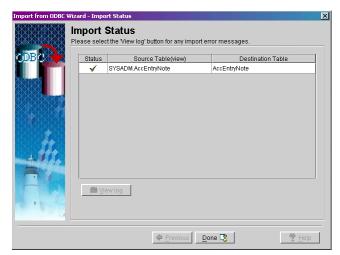
7. Click the **Transformation** tab to specify constraints on the result set. Enter a valid SQL SELECT statement into the **Select SQL** field, and a valid SQL INSERT statement into the **Insert SQL** field.

Column mapping Transformation
Select SQL
Insert SQL

- 8. Click **OK** to return to the **Source Tables and Views** window.
- 9. You may also choose to save the map of the import ODBC schema to an XML file by clicking **Save batch**. The **Save Batch File** will open.



- Select or create an XML file to save the imported ODBC map schema to. Click Save Batch File to create the XML file. The Source Tables and Views window will reappear.
- 11. Click **Execute** to import the source data. The Import Status window will appear.

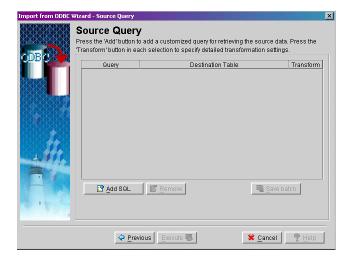


12. If errors appear, click **View log** and scroll to the bottom to see the error message. If no errors occurred, click **Done**.

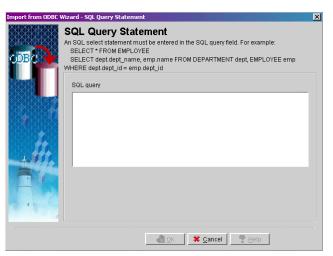
#### Importing ODBC Data Using SQL SELECT Statements

Data may also be imported from ODBC sources by creating a series of SQL SELECT statements. If you have knowledge of the schema of tables you want to import, this may be a faster option.

- **T**o import ODBC data using a series of SQL SELECT statements
  - 1. In the Import from ODBC wizard, select a source and destination database, and then select **Table** from the **Table Copy or Query** window.
  - 2. Click Next. The Source Query window will open.



3. Click Add SQL. The SQL Query Statement window will open.



- 4. Enter a valid SQL SELECT statement into the **SQL Query** field.
- 5. Click **OK**. The **Source Query** window will reappear.

Import from ODBC 1	Wizard - Source Query			×
		/ o add a customized query for retrievir ach selection to specify detailed trans		
ODBOXX 4	Query	Destination Table		Transform
	Query0			<u>.</u>
	Add SQL		· Save ba	
	Prev	vious Execute 🐻	🗱 <u>C</u> ancel	n Help

mport from ODBC	Wizard - Source Quer	у		X
		F <b>TY</b> In to add a customized query each selection to specify de		
	Query Query0	Destin: SYSADM.COFFEE	ation Table	Transform
±#,				
	Add SQL	Remove	5 Save	batch
	\$ <u></u>	revious Execute 🖏	💥 <u>C</u> ancel	P Help

6. Select or create a destination table from the **Destination Table** column.

7. You may add more SQL query statements by clicking **Add SQL**, or modify the mapping of source and destination columns by clicking the **Transform** button.

Source table :	Query0				
Destination table	: SYSADM.COF	FEE			
Column mapping	Transformation				
O Create desti O Replace des		<ul> <li>Delete rows i</li> <li>Append rows</li> </ul>			
Source Col	Destination Col	Туре	Precision	Scale	Nullable
Aroma	ACIDITY	char	10		r
Body	AROMA	char	10		Ľ
Acidity	BODY	char	10		r
Texture	HARVEST	date			r
Plot	PLOT	char	20		r
Harvest	TEXTURE	char	10		r

8. Change the name of the destination column by selecting a new column from the menu or entering a new name.

	Transformation				
O Create destination table		O Delete rows in d			
<ul> <li>Replace destination table</li> </ul>		<ul> <li>Append rows to destination table</li> </ul>			
Source Col	Destination Col	Type	Precision	Scale	Nullable
Aroma	ACIDITY 🔻	char	10		Ľ
Body		char	10		
Acidity	ACIDITY	char	10		r
Texture	AROMA	date			Ľ
Plot	BODY	char	20		r
Harvest	HARVEST PLOT	char	10		Ľ
	TEXTURE				
		-			

9. Click the **Transformation** tab to specify constraints on the result set. Enter a valid SQL SELECT statement into the **Select SQL** field, and a valid SQL INSERT statement into the **Insert SQL** field.

Column mapping Transformation
Select SQL
Insert SQL

10. Click **OK** to return to the **Source Tables and Views** window.

11. You may also choose to save the map of the imported ODBC schema to an XML file by clicking **Save batch**. The **Save Batch File** will open.

ave Bate	ch File	×
Look <u>i</u> n:	🗖 Batch	
New.xml		
File <u>n</u> ame:	New.xml	Save Batch File
File of types	s: XML Files (*.xml)	▼ <u>C</u> ancel

- 12. Select or create an XML file to save the import ODBC map schema to. Click **Save Batch File** to create the XML file. The **Source Tables and Views** window will reappear.
- 13. Click **Execute** to import the source data. The Import Status window will appear.

nport from ODBC Wi	izard – Impo I <b>mport</b>			
	Please sele	ct the 'View log' button for any imp	ort error messages.	
DBC	Status	Source Table(view)	Destination Table	
	✓	QueryO	SYSADM.COFFEE	
		ew log		
		Previous	Done 🔹	<u>H</u> elp

14. If errors appear, click **View log** and scroll to the bottom to see the error message. If no errors occurred, click **Done**.

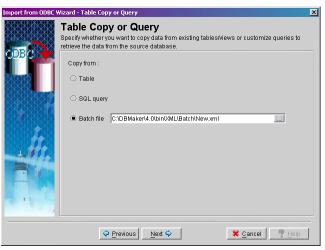
#### Importing ODBC Data Through an XML Batch File

It is also possible to use an XML Batch file to specify which tables are to be imported. Users have the option to create an XML batch file when importing ODBC data from tables or with SQL Select statements. Batch files may be used to import table schema from a data source to multiple DBMaker databases

- To import data through an XML batch file
  - 1. In the Import from ODBC wizard, select a source and destination database, and then select **Batch file** from the **Table Copy or Query** window. The **Open** window will open.

a Open				×
Look in:	T XML	•	<b>a</b>	
📑 Attribute				
📑 Batch				
🗂 Element				
File <u>n</u> ame:				<u>O</u> pen
File of types	: XML Files (*.xml)		•	<u>C</u> ancel

2. Select an XML file from which to import the ODBC map schema.



3. Click **Open**. The **Table Copy or Query** window will reappear.

4. Click **Next**. The **Source Tables and Views** window will open, displaying a mapping schema according to the XML file.

		select the tables or views you w on if you want to specify detailed	ant to transfer. Press the 'Transform transformation settings.	ı' button for eac
		Source Table	Destination Table	Transform
		JOE.Beans	SYSADM."NEW"	
588 I I I		SYSADM.AccBgtEsti	SYSADM.SUPPORTREQUEST	
		SYSADM.AccBgtEsti2		
		SYSADM.AccBudgetDetail		
\$\$\$\$Q		SYSADM.AccCheckOutdated		
	Ľ	SYSADM.AccEntryNote	AccEntryNote	
		SYSADM.AccFunctions		
116		SYSADM.TextTest		
4. 111		SYSADM.invd		
the second second		kofi.Flavor		
		kofi.Locale		
		kofi.test1		
1		All 🔯 <u>N</u> one		🛓 <u>S</u> ave batch

5. All tables from the source database will appear in the **Source Table** column. Check the box to the left of additional tables to import.

6. For each source table or view selected, click the **Destination Table** field. If desired, change the name of the destination table by selecting a new table from the menu or entering a new name.

SYSADM.AccEntryNote	AccEntryNote 💌	
SYSADM.AccFunctions		
SYSADM.TextTest	SYSADM."NEW"	
SYSADM.invd	SYSADM.SUPPORTREQUEST	
kofi.Flavor		
kofi.Locale		
kofi.test1		
All 🔀 None	F	<u>Save batch</u>

7. You may modify column mapping or the result set to import by clicking on the **Transform** button of the corresponding source and destination table.

BC	Source table : Destination table	SYSADM.AccE AccEntryNote	ntryNote			
x\$	Column mapping	Transformation				
	Create destin     Create destin		<ul> <li>Delete rows</li> <li>Append row</li> </ul>			
	Source Col	Destination Col	Туре	Precision	Scale	Nullable
	VouCat	VouCat	char	1		
	Note1	Note1	char	40		Ľ
	Note2	Note2	char	40		Ľ
	SerialNo	SerialNo	integer			r
-						

8. Change the name of the destination column by selecting a new column from the menu or entering a new name.

Source Col	Destination Col	Туре	Precision	Scale	Nullable
VouCat	VouCat 💌	char	1		
Note1	Note1	char	40		r
Note2	Note2	char	40		r
SerialNo	SerialNo	integer			r

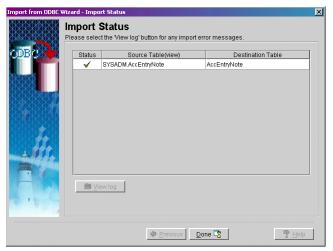
9. Click the **Transformation** tab to specify constraints on the result set. Enter a valid SQL SELECT statement into the **Select SQL** field, and a valid SQL INSERT statement into the **Insert SQL** field.

Column mapping Transformation
Select SQL
Insert SQL

- 10. Click **OK** to return to the **Source Tables and Views** window.
- 11. You may also choose to save the map of the import ODBC schema to an XML file by clicking **Save batch**. The **Save Batch File** will open.

Save Bate	tch File	×
Look <u>i</u> n:	📑 Batch 💌 🖬 💼	
🗋 New.xml	I	
File <u>n</u> ame:	Save B	atch File
File of types	s: XML Files (*.xml) 💌 🖸	ncel

12. Select or create an XML file to save the imported ODBC map schema to. Click **Save Batch File** to create the XML file. The **Source Tables and Views** window will reappear.



**13**. Click **Execute** to import the source data. The Import Status window will appear.

14. If errors appear, click **View log** and scroll to the bottom to see the error message. If no errors occurred, click **Done**.

## 23.4 Exporting Data to Text

Data may be exported from the database to form a structured text file. This section describes the different text file formats that the Data Transfer tool can produce. Consider the following settings affecting the format of the text file before exporting data.

- Row Delimiter: Determines the type of character that signifies a break between the rows of a table. Possible characters: {CR/LF} (Carriage return / line feed. In Windows applications, a new line in the text is normally stored as a pair of CR LF characters. In Unix applications, a new line is normally stored as a LF character. Some applications use only a CR character to store a new line), {CR}, {semicolon} (;), {comma} (,),{tab}, {vertical bar} (|), (semicolon}{LF}, or {comma}{LF}.
- Column Delimiter: Determines the type of character that signifies a break between columns in each row. Possible characters: semicolon, comma, or vertical bar.
- Text Qualifier: Determines how each tuple of any data type except BINARY, LONGVARBINARY, or numeric data types (integer, smallint, serial, decimal, double, float) is enclosed. Possible values: none, single quote, or double quote.
- Binary Qualifier: Determines how each tuple of BINARY or LONGVARBINARY type data is enclosed. Possible values: none, single quote, or double quote.
- Binary Padding: A character appended to each tuple containing binary data.
- Fixed Field: Instead of using a row delimiter, the text file may be formatted with fixed fields. This means a number of spaces, or fields, defines each column.
- Include column name: The first line in a text file may be used to define the column names. The format is "column1"."table name"."owner

*name"; "column2". "table name". "owner name";* etc. In this case the column delimiter is set to semicolon (;).

- Include table schema: The first line in a text file may be used to define the column schema (or the second line if the first line was used to define column names). The format is *data type(scale,precision); data type(scale,precision)* etc. In this case the column delimiter is set to semicolon (;).
- Use NULL to display null data: Columns that contain no data output "NULL".
- File link name for FILE type data: The file name for system or user file objects is displayed.
- Use escape character "/": This character is used when qualifiers or delimiter characters appear in the data. If the data contains a reserved character, the reserved character will be enclosed by an escape character (/).
- Use temp files to store LONGVARBINARY or LONGVARCHAR type data column content: BLOB data is stored as a separate, linked file (as a file object), and the name of the file containing the BLOB is displayed.

Data can be exported by selecting individual columns from a table, or through a valid SQL SELECT statement. For more information on SQL syntax, refer to the *SQL Command and Function Reference*.

#### Example

The following is text produced by the Data Transfer Tool Export to Text wizard. The table's name and schema will be displayed on the first two lines. The data has been exported with fixed fields to delimit columns and CR to delimit rows. File link names appear where LONGVARCHAR data once stored as BLOBs in the table have been exported as file objects.

"SYSADM"."SUPPORTQUERIES"."LOGINID" "SYSADM"."SUPPORTQUERIES"."REQUESTTIME"					
"SYSADM"."SUPPORTQUERIES"."ATTACHMENT" "SYSADM"."SUPPORTQUERIES"."DECIMAL_C"					
SQL_CHAR(10)	SQL_TIMESTAMP	SQL_LONGVARCHAR	SQL_DECIM	AL(10, 3)	
A_HOWARD	2001-09-09 12:47:05.000	C:\WEBDB\FO\ZZ0000	00.GIF	10.250	
A_HOWARD	2001-09-22 10:14:21.000	C:\WEBDB\FO\ZZ0000	01.GIF	13.550	

A_HOWARD	2001-10-04 16:22:06.000	C:\WEBDB\FO\ZZ000002.GIF	27.333
A_HOWARD	2001-10-09 17:44:56.000	C:\WEBDB\FO\ZZ000003.GIF	16.140
A_HOWARD	2001-10-12 09:12:38.000	C:\WEBDB\FO\ZZ000004.GIF	88.847
A_HOWARD	2001-10-31 23:16:11.000	C:\WEBDB\FO\ZZ000005.JPG	841.336

- To export a table to a text file
  - 1. Open the Data Transfer Tool.
  - 2. Select **Export Text File** from the main console or the **Transfer** menu. The Welcome to Import from Text File Wizard window will open, displaying a summary of the steps to be taken in the wizard.



3. Click Next. The Choose a Data Source window will open.

Export to Text File 1	Vizard - Choose a Data Source 🔀 🔀
	Choose a Data Source The data source is one of the databases on your server machine. Specify a login ID and password if necessary. Your account must have permission on the database object you are exporting.
TEXT	Database : 📃 💌
	Password:
<u>.</u>	
1	
	Previous Next I Cancel Previous

- 4. Select the database to export data from in the **Database** menu.
- 5. Enter a user name and password into the appropriate fields.

**NOTE** A user must have SELECT privilege to export a text file.

Export to Text File 1	Wizard - Choose a D	Data Source X
	The data source is	Data Source s one of the databases on your server machine. Specify a login ID and ssary. Your account must have permission on the database object you are
TEXT	Database :	WEBDB
	User name :	SYSADM
	Password :	
	\$	Previous Next 💠

6. After you have selected a database, click Next, the Table or Query Export window will open.

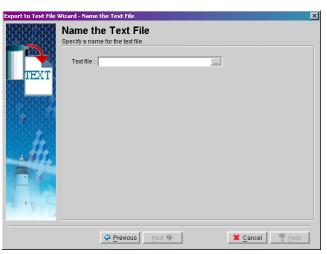


- 7. Select Table to export data from a table. Select SQL query to export data from the result set of an SQL SELECT statement.
- 8. If you selected Table from the Table or Query Export window, the Table Export window will open. If you selected SQL query, then proceed to step 13.
- 9. Click Next, the Table Export window will open.

Export to Text File	Wizard - Table export
Export to Text File	Wizard - Table export       Table export       Choose a table and specify table columns for export. You can export all columns or select individual columns. Columns are added in the order you select them. Click and drag columns in the right-hand field to change their order.       Table name :       Select column(s) to export
•	
	Previous Next 🔷

- 10. Select a table to export from the Table name menu. A list of columns in the table will appear in the Select columns to export field.
- 11. Select columns by clicking on the column name and clicking Add, or select all columns by clicking Add All. Selected column names will appear in the right hand field.
- 12. Click Next. The Name The Text File window will appear (proceed to step 16).
- 13. If you selected SQL query from the Table or Query Export window, the Query Export window will open.
- 14. Enter a valid SQL select statement into the SQL query field.





15. Click Next. The Name The Text File window will appear.

- 16. Enter the full path of a text file in the Text file field, or select one using the browse button.
- 17. Click Next. The Text File Format Setting 1 window will open.

Export to Text File V	Vizard - Text File Format Setting I	×
TEXT	return on Unix and Linux OS. Next, select whe fixed fields. Column delimiters are special ch column ends and another begins. Column de well as binary padding. If fixed fields are used spaces (separator spaces) to separate colum	elimiters may include text or binary qualifiers as I then DBMaker will use a set number of
	Row delimiter: (CR)(LF) Column format setting Column delimiter: Column delimiter: Semicolon Text qualifier: Single Quote Binary qualifier: Double Qu Binary padding: 0	Fixed field Number of separate space : 3
	<u>♀ P</u> revious <u>N</u> ext ♀	🗱 <u>C</u> ancel  🔮 <u>H</u> elp

- 18. Select the appropriate settings for the format of the text file you will create.
- 19. Click Next. The Text File Format Setting 2 window will open.



- 20. Finish selecting the appropriate settings for the format of the text file you are creating. Click **Execute** to export the data to the text file. A confirmation dialog box will appear.
- 21. Click OK.

# 23.5 Exporting Data to XML

DBMaker supports the export of data from a table to an XML file. Columns may be stored as individual elements, or as attributes of the table element. When an XML file is created, an associated DTD file is created. The DTD contains information necessary for defining the elements and attributes of the XML file. The structure of both the DTD and XML file will vary depending on whether the columns are stored as attributes or elements.

Consider how the following settings affect the XML file produced by the Export to XML wizard.

- Column as Element: If columns are represented as elements in the resultant files, then schema information will be retained as element attributes (data type, column name, length, etc.) in the DTD. Columns are child elements, and the table is represented as the parent element. If the XML file is later imported back into the database, then the table's structure will be exactly replicated. File objects are referenced as entities in the DTD file if Column as Element is chosen.
- Column as Attribute: Columns are represented as attributes of the table element in the DTD. There is no record of the table's schema. An element in the XML file represents each record.
- Export file link name for FILE type data: The original full path will reference system and user file objects if this option is selected. If this option is not selected, file type data will be treated as Long Varbinary.
- Translate all tag names to uppercase: All tag names are converted to uppercase characters.
- Build temp file to store LONGVARCHAR and LONGVARBINARY data type column constant: If this option is chosen, BLOB data will be stored in a temporary directory under the directory the XML file resides in. If this option is not selected, BLOB data is stored directly in the XML file.

- XML file cannot include DTD file reference: if this option is selected, no DTD is created. No information about the elements will be preserved in the DTD if this option is selected.
- ➔ Example 1

Assume the table 'supportqueries' with columns 'LOGINID' CHAR(10); 'REQUEST' SQL\_LONGVARCHAR; 'REQUESTTIME' SQL\_TIMESTAMP; 'ATTACHMENT' 'SQL\_FILE; 'BINARY\_C' SQL\_BINARY(10); DECIMAL\_C SQL\_DECIMAL(10, 3). The table has two records. The entire table is exported to an XML file with columns as elements. File link names are exported, temp files are built to store BLOB data, and the DTD is included. The resulting XML file follows:

```
<?xml version="1.0" encoding="BIG5"?>
<!DOCTYPE WEBDB SYSTEM "Support.dtd">
<WEBDB>
  <SUPPORTQUERIES>
   <LOGINID>A_HOWARD
                                 </LOGINID>
    <REQUEST>&BLBTMP_TXT0;</REQUEST>
    <REQUESTTIME>2001-09-09 12:47:05.000</REQUESTTIME>
    <attachment>&DBMAKER FO 0;</attachment>
    <BINARY C>1000000000000000000/BINARY C>
    <DECIMAL_C>10.250</DECIMAL_C>
  </SUPPORTQUERIES>
  <SUPPORTOUERIES>
    <LOGINID>A_HOWARD
                                 </LOGINID>
    <REQUEST>&BLBTMP_TXT1;</REQUEST>
    <REQUESTTIME>2001-09-22 10:14:21.000</REQUESTTIME>
    <ATTACHMENT>&DBMAKER_FO_1;</ATTACHMENT>
    <BINARY C>200000000000000000000/BINARY C>
    <DECIMAL_C>13.550</DECIMAL_C>
  </SUPPORTOUERIES>
</WEBDB>
```

The associated DTD follows:

<!ELEMENT SUPPORTQUERIES (LOGINID, REQUEST, REQUESTTIME, ATTACHMENT, BINARY\_C, DECIMAL\_C)> <!ELEMENT LOGINID (#PCDATA)>

```
<!ATTLIST LOGINID
     TYPE CDATA #FIXED "SQL_CHAR"
     NAME CDATA #FIXED "LOGINID"
     LENGTH CDATA #FIXED "20"
     ISNULL (true false) 'true'
     xml:space (default|preserve) 'preserve'
 >
<! ELEMENT REQUEST (#PCDATA)>
 <!ATTLIST REQUEST
     TYPE CDATA #FIXED "SQL_LONGVARCHAR"
     NAME CDATA #FIXED "REQUEST"
     ISNULL (true false) 'true'
     xml:space (default|preserve) 'preserve'
 >
<!ELEMENT REQUESTTIME (#PCDATA)>
 <!ATTLIST REQUESTTIME
     TYPE CDATA #FIXED "SQL_TIMESTAMP"
     NAME CDATA #FIXED "REQUESTTIME"
     STORAGE CDATA #FIXED "29"
     ISNULL (true false) 'true'
     xml:space (default preserve) 'preserve'
 >
<! ELEMENT ATTACHMENT (#PCDATA)>
 <!ATTLIST ATTACHMENT
     TYPE CDATA #FIXED "SQL_FILE"
     NAME CDATA #FIXED "ATTACHMENT"
     ISNULL (true false) 'true'
     xml:space (default preserve) 'preserve'
 >
<!ELEMENT BINARY_C (#PCDATA)>
 <!ATTLIST BINARY C
     TYPE CDATA #FIXED "SQL_BINARY"
     NAME CDATA #FIXED "BINARY_C"
     LENGTH CDATA #FIXED "10"
     ISNULL (true false) 'true'
     xml:space (default|preserve) 'preserve'
 >
<!ELEMENT DECIMAL_C (#PCDATA)>
 <!ATTLIST DECIMAL C
```

```
TYPE CDATA #FIXED "SQL_DECIMAL"
NAME CDATA #FIXED "DECIMAL_C"
LENGTH CDATA #FIXED "(10, 3)"
ISNULL (true|false) 'true'
xml:space (default|preserve) 'preserve'
>
<!ENTITY BLBTMP_TXT0 SYSTEM "blobtmpdir0\blbtmpf0.txt">
<!ENTITY DBMAKER_FO_0 SYSTEM "C:\DBMAKER\4.1\BIN\WEBDB\F0\ZZ000000.GIF">
<!ENTITY BLBTMP_TXT1 SYSTEM "blobtmpdir0\blbtmpf1.txt">
<!ENTITY BLBTMP_TXT1 SYSTEM "blobtmpdir0\blbtmpf1.txt">
<!ENTITY BLBTMP_TXT2 SYSTEM "C:\DBMAKER\4.1\BIN\WEBDB\F0\ZZ000001.GIF">
<!ENTITY BLBTMP_TXT1 SYSTEM "blobtmpdir0\blbtmpf1.txt">
<!ENTITY BLBTMP_TXT2 SYSTEM "blobtmpdir0\blbtmpf2.txt">
```

#### Example 2

Given the same table as example 1, but with the entire table exported with columns as attributes. The resulting XML file follows:

```
<?xml version="1.0" encoding="BIG5"?>
<!DOCTYPE WEBDB SYSTEM "Support.dtd">
<WEBDB>
<SUPPORTQUERIES
LOGINID="A_HOWARD&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x20;&#x2
```

#### The associated DTD follows:

ELEMENT SUPPORTQUERIES</th <th>EMPTY&gt;</th> <th></th>	EMPTY>	
ATTLIST SUPPORTQUERIE</td <td>IS</td> <td></td>	IS	
LOGINID	CDATA #IMPLIED	
REQUESTTIME	CDATA #IMPLIED	
ATTACHMENT	ENTITY #IMPLIED	
BINARY_C	CDATA #IMPLIED	
DECIMAL_C	CDATA #IMPLIED	

<!ELEMENT WEBDB (SUPPORTQUERIES\*)>

- **T**o export a table to an XML file:
  - 1. Open the Data Transfer Tool.
  - 2. Select **Export to XML** from the main console or the **Transfer** menu. The **Welcome to Export to XML File Wizard** window will appear.

Export to XML File Wi	izard - Welcome to Export to XML File Wizard
	Welcome to Export to XML File Wizard DBMaker supports exporting data from a database to an XML file. This wizard will guide you through the process of exporting data to an XML file with the following steps. 1. Choose a data source 2. Table or query export 3. Table export 5. XML file format setting 6. Customized XML header 7. Customized element name

3. Click Next. The Choose a Data Source window will open.

Export to XML File V	Vizard - Choose a Data Source 🔀
	Choose a Data Source Data source is one of dmconfig.ini file sections. You need specify login ID and password if necessary.
XML	Database : 🔹
	Password :
	Previous     Next

- 4. Select a database from the **Database** menu. Enter a user name and password into the appropriate fields.
- 5. Click Next. The Table or Query Export window will appear.

xport to XML File W	Vizard - Table or Query Export	×
	Table or Query Export You can choose to export columns for a table or a result set from an SQL query. Table export provides an interface for selecting individual columns from the table. Query export exports the result set from an SQL statement.	
XML	Copy from : Table SQL query	
	Previous     Next      Equation     Section	

- 6. If you selected **Table** from the **Table or Query Export** window, the **Table Export** window will open. If you selected **SQL query**, then proceed to step 13.
- 7. Click **Next**, the **Table Export** window will open.

Export to XML File V	Wizard - Table Export	×
Export to XML File V	With and - Table Export  Table Export  Choose a table and specify table columns for export. You can export all columns or select individual columns. Columns are added in the order you select them. Click and drag columns in the right-hand field to change their order.  Table name : Select column(s) to export	×
	Add II	
	Previous Next (*)	]

- 8. Select a table to export from the **Table name** menu. A list of columns in the table will appear in the **Select columns to export** field.
- 9. Select columns by clicking on the column name and clicking **Add**, or select all columns by clicking **Add All**. Selected column names will appear in the right hand field.

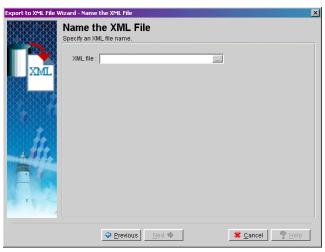
Export to XML File W	individual columns. ( columns in the right- Table name :	specfiy table Columns are hand field to (Table)US	e added in the order you s change their order.	can export all columns or select them. Click and drag	
	Select column(s) tr CITY2 STATE2 COUNTRY2 POSTALCODE2 PHONENUMBER2 FAXNUMBER2		Add 🚸 🛠 Remove Add All ॐ Kernove All	LOGINID FIRSTNAME MIDDLENAME LASTNAME PASSWORD EMAIL ADDRESS1 CITY1 STATE1 COUNTRY1 POSTALCODE1 PHONENUMBER1 FAXNUMBER1	
	<u> </u>	revious	Next 🗘	🗱 <u>C</u> ancel 🦉	Help

- 10. Click Next. The Name The XML File window will appear (proceed to step 16).
- 11. If you selected **SQL query** from the **Table or Query Export** window, the **Query Export** window will open.



12. Enter a valid SQL select statement into the **SQL query** field.

13. Click Next. The Name The XML File window will appear.



14. Enter the full path of an XML file to export to, or select one by using the browse button.

15. Click Next. The XML File Format Setting window will open.



- 16. Select the appropriate settings for the format of the XML file you will create.
- 17. Click Next. The Customized XML Header window will open.



18. Enter appropriate information, such as namespace and style sheet definitions, if relevant.

	database name, Table tag	denotes the table.	nts in your output file. Root tag deno Simply enter new names into these s into the 'Replace Tag Name' colu	two fields.
XML	Root tag name :	WEBDB		
	Table tag name :	USERDAT.	A	
	Column tag name			
	Source Col	umn	Replace Tag_Name	
~~~~	LOGINID			<b>^</b>
\$ \$ \$ \$ \$ \$ \$	FIRSTNAME			
	MIDDLENAME			
	LASTNAME			14.41
the second second	PASSWORD			
	EMAIL			
and the set	ADDRESS1			-

19. Click Next. The Customized Element Name window will appear.

- 20. It is possible to modify the tag definitions. Enter new tag definitions into the **Replace Tag Name** column. The name of the corresponding column will be changed in the resulting XML file.
- 21. Click **Execute** to export the table to the XML file. A confirmation window will appear.
- 22. Click OK.

# 24 Monitoring a Database

DBMaker provides two interfaces for monitoring the status of a database: the Database Monitor Tool and the Database Monitor tree object.

The Database Monitor Tool provides a graphical representation of various aspects of the database over time. It is ideally suited for monitoring overall database performance.

The Database Monitor tree object should be familiar to users who have experience with previous versions of JDBA Tool. It provides a series of tables that allow the viewer to monitor the status of individual connections.

# 24.1 Database Monitor Tool

The Database Monitor Tool is a separate user interface that may be accessed through the Tool menu of the JDBA Tool or through the Windows Start menu. Opening the Database Monitor Tool allows performance related statistics to be viewed on a graph that plots a statistical value on the Y-axis and time on the X-axis. Statistical parameters (or 'objects') to display on the graph are selected from a menu at the bottom of the screen. Each statistical parameter is sampled for a period of time, and the values are plotted on the x-axis. The scale of the graph determines the sample period.

The Database Monitor Tool provides an interface to customize aspects of the view, including the following:

- Items: track up to 34 statistical parameters
- Customize the line color, line width, and scale of each item
- Select from sample periods of 5 seconds, 2 minutes, 1 hour, and 1 day.
- Specify the grid color and background color of the chart.
- Specify the scale of the chart's Y-axis.

The Database Monitor Tool can track 34 different performance-related statistical parameters. The statistical parameters are summarized in Table 20-1.

Parameter	DESCRIPTION
Number of Transactions Started	The number of transactions started within the sample period.
Number of Transactions Committed	The number of transactions committed within the sample period.
Number of Transactions Aborted	The number of transactions aborted during the sample period.
Number of Checkpoints	The number of checkpoints that occurred within the sample period.

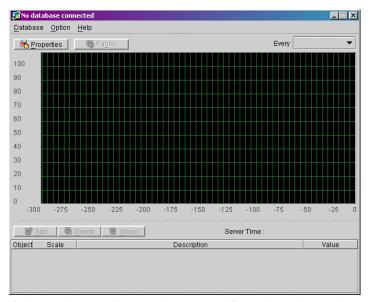
Number of Lock	The total number of locks requested during the
Requests	sample period.
Number of Deadlocks	The number of deadlocks occurring within the
Detected	sample period.
Number of Journal	The number of journal blocks read from file
Block Reads	within the sample period.
Number of Journal	The number of journal blocks written to file
Block Writes	within the sample period.
Number of Journal	The number of journal records generated during
Record Writes	the sample period.
Number of Journal	The number events within the sample period
Forced Writes	that flush dirty journal buffer to disk.
Number of Commit	The number of transactions within the sample
Waits	period waiting for group commit transactions.
Number of Logical	The number of page/frame read events from the
Reads	data buffer within the sample period.
Number of Logical	The number of page/frame write events from
Writes	the data buffer within the sample period.
Number of Physical	The number of page/frame read events from
Reads	disk within the sample period.
Number of Physical	The number of page/frame write events from
Writes	disk within the sample period.
Number of Index Page	The number of index pages split within the
Splits Occurring	sample period.
Number of Data Pages	The number of data pages reorganized within
Compressed	the sample period.
Number of Row to	The number of events within the sample period
Page Lock Escalations	causing escalation from row locks to page
	locks.
Number of Page to	The number of events within the sample period
Table Lock Escalations	causing escalation from page locks to table
	locks.
Number of Failed	The number of events within the sample period
Events due to Lock	that failed due to a lock time-out
Timeout	
Number of Events	The number of events within the sample period
Waiting for Locks	that were required to wait for the release of a
	lock on an object.

Number of SELECT	The number of SELECT statements within the
Operations	sample period.
Number of INSERT	The number of INSERT statements within the
Operations	sample period.
Number of UPDATE	The number of UPDATE statements within the
Operations	sample period.
Number of DELETE	The number of DELETE statements within the
Operations	sample period.
Number of	The number of SQLPrepare() calls within the
SQLPrepare() Calls	sample period.
Number of	The number of SQLExecute() calls within the
SQLExecute() Calls	sample period.
Number of	The number of SQLExecDirect() calls within
SQLExecDirect() Calls	the sample period.
Number of Fetches	The number of fetch operations within the
	sample period.
CPU Usage*	The average percentage of total CPU processing
_	capacity experienced within the time period.
Peak Number of	The maximum number of simultaneous
Connections	connections occurring within the sample period.
Free Physical Memory	The average amount of free physical memory
(KB)	occurring within the sample period.
Total Swap Space	The total operating system memory swap space
(Bytes)	allocated on disk.
Free Swap Space	The total operating system memory swap space
(Bytes)	available on disk.

Table 24-1 Database Monitor Tool Statistical Parameters

\*Windows 2000 will only display the percentage of the first CPU in multiprocessor systems.

- d) To view statistical parameters with the Database Monitor Tool:
- 1. Open the Database Monitor Tool from the Windows Start menu or from the Tool menu in the JDBA Tool. The Database Monitor Tool will start.

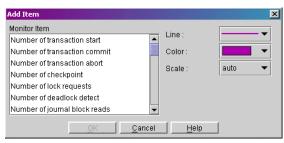


2. If the Database Monitor Tool was started from the Tool menu in JDBA Tool it will be automatically connected to the database. If the Database Monitor Tool was started from the Windows Start menu, you will need to connect to the database. Connect to a database by selecting **Connect Database** from the **Database** menu. The **Login** window will appear.

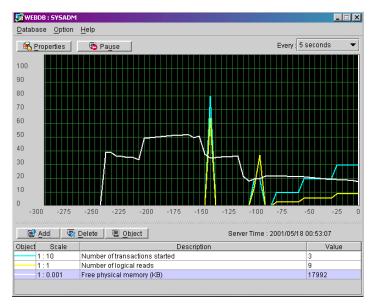
Login		×
Database Name : User Name : Password :	VVEBDB -	<u>O</u> K <u>C</u> ancel <u>H</u> elp
(c) 1995	2001 CASEMaker Inc. All Right	s Reserved.

3. Select a database and enter a username and password into the appropriate fields. You will return to the Database Monitor Tool.

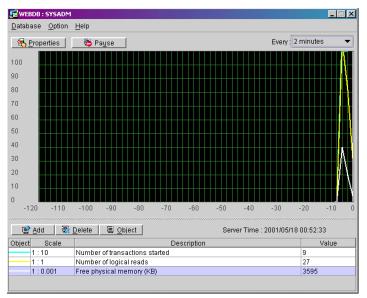
4. Click the **Add** button to add a statistical parameter to the chart. The **Add Item** dialog box will open.



- 5. Select the item to monitor.
- 6. Select the line type, color, and scale.
- 7. Click **OK**. The **Add Item** dialog box will disappear and the monitor item will appear on the graph. Monitoring begins the moment you click **OK**. The newly plotted data will not appear until after the first sample period has elapsed.



8. To change the sample period of the chart, select a value from the **Every** menu. The values of items will change in proportion to the new sample period.

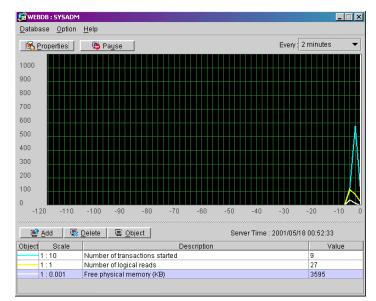


- 9. To change the properties of the chart:
  - a) Click Properties. The Properties dialog will open.

Properties		X
Chart Color		
Background color		•
Grid line color		•
Chart Scope		
Maximum	100	
Minimum	0	
<u> </u>	ncel	<u>H</u> elp

- **b**) Select a background color and grid line color.
- c) Enter a chart scope; minimum value will reflect the bottom of the chart, maximum value will reflect the top of the chart.

- **NOTE** The maximum value must be greater than the minimum value by at least 10, and the difference between minimum and maximum values must be a factor of 10. Maximum range (10 9,000,000). Minimum range (0 8,999,990)
- d) Click OK. The changes will be reflected in the chart.



- 10. To change the line type of an item:
  - a) Select one of the items.
  - b) Click Object. The Line Style window will open.

Line Style	×
Line :	<b>—— —</b>
Color :	<b>—</b>
Scale :	1:10 💌
<u> </u>	<u>C</u> ancel

- c) Select a new line type, color, and scale.
- d) Click OK.
- 11. To delete an item:

- a) Select one of the items.
- **b**) Click **Delete**. The item will be removed from the chart.
- 12. Click **Pause** to stop the progress of the chart.

# 24.2 Export to File Options

The export to file feature allows DBA's to look at log files created by Jmonitor over an extended period of time. The DBA can then analyise the data and then adjust his database for optimal performance.

You have several options when setting the view of the created log files.

- Display the log data in column or row format
- Set the caption break for headings of monitored items by row or day
- Set the number of log files that will be created
- Set the size of the log files that be created

When setting the output of the log file to display in a column or row format. In a column format the log file will list the monitored items in columns. For example:

	[Free swap space (KB)]	[Total swap space (KB)]
2004/06/21 19:45:20	459216	633044
2004/06/21 19:45:25	459408	633044

In a row format the monitored items in the log file will be listed in a row. For example:

Item Name	Data	Time
[Free swap space (KB)]	457176	2004/06/21 19:59:25
[Total swap space (KB)]	633044	2004/06/21 19:59:25

You can set the caption break for headings of monitored items, like Date, Data and Item Names, to appear in the log file after a specified number of rows or days. When specifying the caption break for a number of rows the valid range is between 10 and 200. The default value is 25. When specifiying caption break value in days the valid range is 1 to 30, with the default value set at 2. The JMonitor export monitor item to external file function supports multi file exporting. You can set the number of log files for exporting. The exporting file function will create a new file and rename the previous exporting file with another file name. The current monitor item information will write into the new log file. The file count follows an ascending value. The valid range is between 10 and 20, with the default value set at 10.

#### For example

If we set the file count as 10, the first log created will be **Message.log**. After **Message.log** reaches its maximum size (which is set in the File Size field), the system will create a new log **Message0.log**. The contents of **Message.log** are transferred to **Message0.log**. The most current data is stored in **Message.log**.Once the log **Message.log** reaches its specified maximum size **Message1.log** is created. The contents of **Message.log** are transferred to **Message0.log**. The transferred to **Message0.log** are transferred to **Message0.log**. The contents of **Message1.log** is created.

The file size option allows you to limit the size of the logs being created to a manageable size. The valid range is between 1MB to 10MB, with the default value set at 1MB.

- c) To access the export to file options:
- 1. Select **Option** from the menu bar. A menu list appears.
- 2. Select **Preferences** from the menu list. The **Preferences** dialog box appears.

Preferences X
☑ Enable the export to external file function
Log directory : C:\DBMaker\4.2\bin
Output Format Setting - Row/Column
O Row view
Column view
Output File Setting - Count/Size
File size : 1 (M)
File count: 10
Break Line Caption Setting
Break by row
Repaint caption every (rows) : 25
) Break by day
Repaint caption every (days) : 2
OK 🗱 CancelHelp

- **3**. Set the **Enable the export to external file function** check box. The fields in the **Preferences** dialog box become active. (This check box is set by default. To disable the feature clear the check box.)
- 4. Enter a file path for the log files in the **Log directory** field. Or select a path by clicking the **Browse** button. The default path is ...\*DBMaker*\4.2\*bin*.
- 5. Select an output format from the **Output Format Setting Row\Column** portion of the dialog box.
- 6. Set the out put file size number of files to be created in the **Output File Settings Count\Size** portion of the dialog box.
- 7. Select the caption break for the log files in the **Break Line Caption Setting** portion of the dialog box.
- 8. Click **OK** after setting all options. You are returned to the **JMonitor** screen.

# 24.3 Database Monitor (Tree)

JDBA Tool provides monitoring functions that allow you to view the status of individual user connections, transactions, and upper memory handling. The statistics provided by the monitoring functions can be useful for database performance evaluation and tuning. There are four main database-monitoring functions provided by JDBA Tool: Session information, Lock status, Database status, and Pending Transaction status.

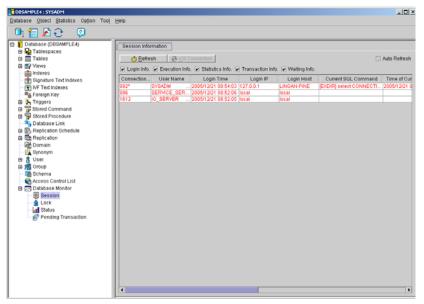
- Session information shows all connections with the database (users, backup demon, IO daemon...), and information related to the connection. Sessions can be terminated by the DBA with the Kill connection function.
- Lock status is for viewing database objects that have locks on them, and the type of lock on the object.
- Database status allows the DBA to view statistics relating to journal files and buffers, as well as view the current database setup.
- Pending Transaction status provides information on distributed transactions that have been prepared to commit but have not been committed yet.

## **Monitoring Database Sessions**

Session information allows you to view information that relates to users connected to the database and resources used by each user. Session Information is divided into five categories:

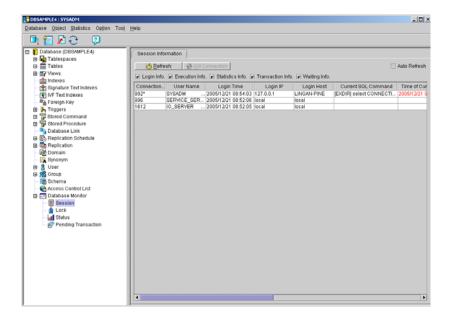
- Login Information
- Execution Information
- Statistical Information
- Transaction Information
- Waiting Information

- **d**) To view Session Information:
- 1. Select the **Database Monitor** node from the tree. Four nodes will appear, select the **Session** node. The following window will appear.



2. You can view session information by sliding the scroll bar at the bottom of the page, or by selecting the appropriate check boxes next to each category.

3. After a refresh, newly updated information is shown in red. Any information that remained the same is shown in black.



#### LOGIN INFORMATION

This category contains the user's name and information relevant to the connection and computer the user is logged into.

Session Inform	nation				
🚫 Refresh 🛛 🔂 Kill Connection 🔽 Auto Refresh					
🗹 Login Info. 🗌 Execution Info. 🗌 Statistics Info. 🗌 Transaction Info. 🗌 Waiting Info.					
Connection	User Name	Login Time	Login IP	Login Host	
1364*	SYSADM	2001/11/23 18:03:02	192.72.116.118	MATT	Í
1624	SERVICE_SER	2001/11/23 16:26:26	local	local	
1604	IO_SERVER	2001/11/23 16:26:26	local	local	
1600	GTRECO_SER	2001/11/23 16:26:26	local	local	

Figure 24-1 Session Information: Login Information

COLUMN NAME	DESCRIPTION
Connection ID:	The ID of the session.

COLUMN NAME	DESCRIPTION
User_Name:	The name of the user using the session.
Login_Time:	The time that the user connected to the database.
Login_IP_Addr:	The IP address of the user using the session.
Login_Host:	The host computer using the session.

Table 24-2 Login Information

### **EXECUTION INFORMATION**

This category describes the type and status of SQL commands being executed by each user.

Session Infor	mation		
🖒 <u>R</u> efre	sh 🛛 🥵 Kill Connection		🗌 Auto Refresh
🗌 Login Info.	🗷 Execution Info. 🗌 Statisti	cs Info. 🔲 Transactio	n Info. 🔲 Waiting Info.
Connection	Current SQL Command	Time of Current SQ	
1364*	[EXDIR] select CONNECTI	2001/11/23 18:59:05	Í
1624			
1024			
1624			

Figure 24-2 Session Information: Execution Information

COLUMN NAME	DESCRIPTION
Connection ID:	The ID of the session.

COLUMN NAME	DESCRIPTION
Current SQL Command	The most recently executed SQL command and the command status. The command status can be the following:
	[PRE] - The SQL command is being prepared.
	[EXEC] - The SQL command is being executed from SQLExecute call.
	[EXDIR] - The SQL command is being executed from SQLExecDirect call.
	[FETCH] - The operation is in the fetch data phase.
	[EXIT] - The SQL command is finished with the prepare, execute or fetch operation.
Time of Current SQL Command	The time when the most recently used SQL command was executed.

Table 24-3 Execution Information

### STATISTICAL INFORMATION

This category displays statistics relevant to the data.

Session Infor	mation						
🖒 <u>R</u> efre	sh 🔬	<u> K</u> ill Conn	ection				🗌 Auto Refresh
 Login Info. 🔲 Execution Info. 🗹 Statistics Info. 🗌 Transaction Info. 🗌 Waiting Info.							
Connection	#Scan	# Insert	# Update	# Delete	# Trans	Average	
1364*	543	40	11	5	90	101	
1624	59	0	0	0	1	0	
1604	0	0	0	0	0	0	
1600	15	0	0	0	15	0	

Figure 24-3 Session Information: Statistical Information

COLUMN NAME	DESCRIPTION		
Connection ID:	The ID of the session.		
#Scan:	The number of SELECT operations in the session.		

COLUMN NAME	DESCRIPTION
#Insert:	The number of INSERT operations in the session.
#Update:	The number of UPDATE operations in the session.
#Delete:	The number of DELETE operations in the session.
#Tranx:	The number of transactions in the session.
Average Journal Bytes Per Transaction	The average number of journal bytes used per transaction in the session.

Table 24-4 Statistical Information

### TRANSACTION INFORMATION

Displays journal file activity, specifically the start and end points of transactions within the journal.

Session In	formation							
<u>ර R</u> e	fresh 🛉	🛃 <u>K</u> ill Conn	ection					🗌 Auto Refresh
🗌 Login Inf	io. 🗌 Execut	ion Info. 🗌	Statistics Ir	nfo. 🗹 Trai	nsaction	n Info.	🗌 Waiting I	nfo.
Connectio	n First Wri.	First Wri	#Journ	Journal				
1364*	0	0	0	0				
1624	0	0	0	0				
1604	0	0	0	0				
1600	0	0	0	0				

Figure 24-4 Session	Information:	Transaction	Information

COLUMN NAME	DESCRIPTION
Connection ID:	The ID of the session.
First Written Journal block of Current Transaction	The first journal block that is fully written to in the current transaction
First Written Journal file of Current Transaction	The first journal file that is fully written to in the current transaction.

COLUMN NAME	DESCRIPTION
# Journal Bytes of Current Transaction	The total amount of journal data used in the current transaction in the session.
Journal Blocks Distance of Current Transaction	The distance of the current journal block from the first written journal block in the current transaction.

Table 24-5 Transaction Information

## WAITING INFORMATION

Displays information on which users are waiting for locks on objects and which users have the locks on the objects being waited for.

Session Inform	nation		
🙁 🖒 Refres	sh 🛛 🔂 🖄	Il Connection	🗌 Auto Refresh
🗌 Login Info.	Execution Ir	nfo. 🗌 Statistic	es Info. 🔲 Transaction Info. 🗹 Waiting Info.
Connection	Waiting For	Be Waited By	
1364*			
1624			
1604			
1600			

Figure 24-5 Session Information: Waiting Information

COLUMN NAME	DESCRIPTION
Connection ID:	The ID of the session.
Waiting For	The connection ID number of a user that has a lock on an object that the current user's transaction is waiting for
Be Waited By	The connection ID of a user that is waiting for release of a lock on an object held by the current user.

Table 24-6 Waiting Information

# **Killing Connections**

You can choose to terminate an active connection.

- e) To kill a connection:
- 1. Select the **Database Monitor** node from the tree. Four nodes will appear, select the **Session** node. The **Session Information** page will appear.
- 2. Select a connection from the list in the **Session Information** table. It will highlight blue and the **Kill Connection** field will be active.

Session Infor	mation				
🙁 🖒 <u>R</u> efre	sh 🔰 🔂 <u>K</u> ill C	onnection		[	🗹 Auto Refresh
🗹 Login Info.	Execution Info.	🗹 Statistics Info. 🗹	Transaction Info.	🖌 Waiting Info.	
Connection	User Name	Login Time	Login IP	Login Host	Current SQ
1528	JANE	2001/11/23 19:03:18	192.72.116.118	MATT	
1364*	SYSADM	2001/11/23 18:03:02	192.72.116.118	MATT	[EXDIR] select
1624	SERVICE_SER	2001/11/23 16:26:26	local	local	
1604	IO_SERVER	2001/11/23 16:26:26	local	local	
1600	GTRECO SER	2001/11/23 16:26:26	local	local	

3. Clicking Kill Connection will terminate the connection.

Session Infor		onnection		6	Auto Refresh
🖌 Login Info.	🗹 Execution Info.	🗹 Statistics Info. 🗹	Transaction Info.	🖌 Waiting Info.	
Connection	User Name	Login Time	Login IP	Login Host	Current SQ
1364*	SYSADM	2001/11/23 18:03:02	192.72.116.118	MATT	[EXDIR] select
1624	SERVICE_SER	2001/11/23 16:26:26	local	local	
1604	IO_SERVER	2001/11/23 16:26:26	local	local	
1600	OTDEGG OFD	2001/11/23 16:26:26	lacal	local	

# **Monitoring Database Locks**

You can monitor details of the locks used in the database. This information includes the lock table, lock granularity, lock status, and lock modes for all data objects.

错误!	未找到引用源。	summarizes the items on the lock page:

Ітем	DESCRIPTION
Object Name:	The object name for a locked object, or an object that a lock is requested for.

Ітем	DESCRIPTION
Level:	The current lock level. Four lock levels exist for an object: System, Table, Page, and Row.
Object ID	A identifying number unique to each table, page, or row in the database.
Login Name	Name of the user that has the lock on the object.
Connection ID:	The ID of the session
Lock Mode:	The current lock mode of an object. The shown lock modes are either S, IS, IX, X and SIX. IS, SIX, and IX denote that the object has an intention lock; part of the lock on the object is specified at a lower granularity.
Waiting Mode:	The lock mode that the user is requesting. It can be "none", indicating that the user does not desire a new lock on the object, or "S", "IS", "IX", "X" or "SIX", indicating that the user has requested the corresponding lock type on the object and is waiting for the lock.
Status:	Status indicates the condition of the Waiting Mode. "Granted" indicates that the user has been granted the requested lock and should correspond to a waiting mode of "none". "Waiting" indicates that the user has not yet been granted the requested object lock and should correspond to a Waiting mode of "S", "IS", "IX", "X" or "SIX". "Convert" indicates that the user has requested a change in lock level (for example, from "S" to "X") and the user is waiting for the new lock level on the object.

Table 24-7 Database Lock items

**f**) To view database lock status:

1. Select the **Lock** node from the **Database Monitor** node in the tree. The following window will appear.

<u>o</u> <u>R</u> efresh I Show system	J table	Object:	All		•		uto Refres
Show system		Connection			<b>•</b>		
Object Name	Level	Object ID		Connection ID	Lock Mode	Waiting Mode	Status
JOE.AccBgtEsti	SYSTEM	0.124.4	JOE	1088	8	NONE	GRANTE
JOE.AccBgtEsti	TABLE		JOE	1088	IX	NONE	GRANTEI
JOE.AccBgtEsti	PAGE	2.8.0	JOE	1088	X	NONE	GRANTE

- 2. Click **Refresh** at any time to update the statistics shown on this page. You may also choose what information to display on the **Lock** page.
  - Selecting **Show System Table** allows you to see any locks placed on the system table.
  - Selecting **Show System Level** allows the DBA to see locks placed on objects in the system level.
  - You can choose to view locks only on certain objects. Select an object name from the **Object** menu.
  - You can choose to view locks on all objects associated with a user. Select a connection ID from the **Connection ID** menu.

# **Monitoring Database Status**

The database status node of the database monitor tree item gives access to database statistics stored in the SYSINFO system table. Database status items are grouped into eight categories of related items. Each category is grouped together on a tabbed page. The categories include the following:

- Locks
- Connections
- Data Operations
- Database Info
- System Info
- Page and I/O
- Journal
- Transaction

## VIEWING LOCK STATUS

Lock status items are statistics related to the cumulative number of locks, lock escalations, deadlocks, and failed events due to lock timeouts. The lock status page displays lock information statistics from the SYSINFO table. Lock status items and their corresponding SYSINFO.INFO values are summarized in 错误! 未找到引 用源。.

LOCK STATUS ITEM	DESCRIPTION
Number of Page Locks Escalation	The accumulated number of row locks that have been escalated to page locks. (NUM_ROW_LOCK_UPG)
Number of Table Locks Escalation	The accumulated number of page locks that have been escalated to table locks. (NUM_PAGE_LOCK_UPG)

LOCK STATUS ITEM	DESCRIPTION
Number of fail locks because of timeout	The accumulated number of actions failing due to a timeout while waiting to acquire a lock on an object. (NUM_LOCK_TIMEOUT)
Number of Locks Waited	The accumulated number of events waiting to place locks on objects. (NUM_LOCK_WAIT)
Number of Locks Requested	The accumulated number of locks requested on data objects. (NUM_LOCK_REQUEST)
Number of deadlocks detected	The accumulated number of deadlocks detected. (NUM_DEADLOCK)

Table 24-8 Lock Status Items

- g) To view Lock Status:
- 1. Select the **Status** node from the **Database Monitor** node in the tree.
- 2. Select the **Lock** tab. The following page will be displayed.

Page & I/O	Journal	Transaction
lumber of page locks escalation		0
lumber of table locks escalation		0
lumber of fail locks because of timeou	t	0
lumber of locks waited		0
lumber of locks requested		4652
lumber of deadlocks detected		0

### VIEWING CONNECTION STATUS

The connection status page displays connection information statistics from the SYSINFO table. Connection status items and their corresponding SYSINFO.INFO values are summarized in 错误! 未找到引用源。.

CONNECTION STATUS	DESCRIPTION
Maximum number of allowed connections for a database	The hard limitation of connections. This value is determined by the DB_MaxCo keyword when the database is created or started with a new journal. (NUM_MAX_HARD_CONNECT)

CONNECTION STATUS	DESCRIPTION
Maximum number of allowed connections at a time	The soft limitation of connections, which is less than or equal to the number of hard connections (NUM_MAX_SOFT_CONNECT)
Number of currently active connections	The current number of connections to the database (NUM_CONNECT)
Maximum number of active connections at a time	Records the largest number of active connections experienced by the database since the database was started (NUM_PEAK_CONNECT)

Table 24-9 Connection Status items

- h) To view Connection Status:
- 1. Select the **Status** node from the **Database Monitor** node in the tree.
- 2. Select the **Connection** tab. The following page will be displayed.

Lock Connection Data Operation	Database Info. System	Info.
Page & I/O	Journal	Transaction
Maximum number of allowed connection	240	
Maximum number of allowed connection	32	
Number of currently active connections		5
Maximum number of active connection:	5	

# VIEWING DATA OPERATION STATUS

The data operation status page displays data operation statistics from the SYSINFO table. Data operation status items and their corresponding SYSINFO.INFO values are summarized in 错误! 未找到引用源。.

DATA OPERATION STATUS ITEM	DESCRIPTION
Number of SELECT Operations	The total number of SELECT operations performed since the database was started. (NUM_SQL_SELECT)
Number of INSERT (including INSERT INTO) Operations	The total number of SELECT operations performed since the database was started. (NUM_SQL_INSERT)

DATA OPERATION STATUS ITEM	DESCRIPTION
Number of UPDATE Operations	The total number of UPDATE operations performed since the database was started. (NUM_SQL_UPDATE)
Number of DELETE Operations	The total number of DELETE operations performed since the database was started. (NUM_SQL_DELETE)
Number of SQLPrepare() calls to server	The total number of SQLPrepare() calls to the database since the database was started. (NUM_SQL_PREPARE)
Number of SQLExecute() calls to server	The total number of SQLExecute()calls to the database since the database was started. (NUM_SQL_EXECUTE)
Number of SQLExecDirect() calls to server	The total number of SQLExecDirect()calls to the database since the database was started. (NUM_SQL_EXEDIRECT)
Number of passing fetched data across the network	The total number of fetch operations performed by clients since the database was started. (NUM_SQL_FETCH)

### Table 24-10 Data Operations Status items

- i) To view Data Operation Status:
- 1. Select the **Status** node from the **Database Monitor** node in the tree.
- 2. Select the **Data Operation** tab. The following page will be displayed.

Page & I/O Journa	Transaction
Number of SELECT operation	279
Number of INSERT (including INSERT INTO) operation	0
Number of UPDATE operation	0
Number of DELETE operation	0
Number of SQLPrepare() call to server	0
Number of SQLExecute() call to server 0	
Number of SQLExecDirect() call to server 307	
Number of passing fetched data across the network	0

# VIEWING DATABASE INFORMATION

The database information page displays database information statistics from the SYSINFO table. Database information items and their corresponding SYSINFO.INFO values are summarized in 错误! 未找到引用源。.

DATABASE INFORMATION ITEMS	DESCRIPTION
Time of the counter of SYSINFO being started	The last time and date that data in the SYSINFO table was reset. The SYSINFO table gets reset when one of the counters overflows, or the SET SYSINFO CLEAR command is used. (SYSINFO_RESET_TIME)
Total size of DCCA	Total memory size of the Database Communication and Control Area (DCCA). Refer to the <i>Database</i> <i>Administrators Guide</i> for detailed descriptions of the DCCA. (DCCA_SIZE)
Available size of DCCA	Amount of memory available in the DCCA. (FREE_DCCA_SIZE)
DDB Mode	Distributed Database Mode. (DDB_MODE)
Backup Mode	Indicates whether incremental backups can be performed. It also indicates whether the incremental backup will include BLOB files, 1 means to backup the data file only, and 2 means to backup both data and BLOB files. (BACKUP_MODE)
User File Object Mode	Shows if user file objects have been enabled. A value of 1 means user file objects are enabled. (USER_FO_MODE)
Read-Only Mode	Shows if the database has been started in read-only mode. A value of 1 means he database has been started in read-only mode. (READ_ONLY_MODE)
Blob Frame Size (Bytes)	The size of each BLOB frame in bytes. (FRAME_SIZE)
Time of database creation	The date and time the database was created. (CREATE_DB_TIME)
Time of database start	The date and time the database was last started. (START_DB_TIME)

DATABASE INFORMATION ITEMS	DESCRIPTION
DBMaker version	The version number of the DBMaker engine. (VERSION)
Database file version	The version number of the database (FILE_VERSION)
Time of database startup with force new journal	The date and time the database was last started in new journal mode. (FORCE_NEW_JNL_TIME)
Time of turning the journal on	The most recent date and time the journal was started. (END_NO_JNL_TIME)
Time of turning the journal off	The most recent date and time the journal was stopped. (START_NO_JNL_TIME)

Table 24-11 Database Information Items

- **j**) To view Database Information:
- 1. Select the **Status** node from the **Database Monitor** node in the tree.
- 2. Select the **Database Info** tab. The following page will be displayed.

Lock Connection Data Operation Database Info. System	n Info.	
Page & I/O Journal	Transaction	
Time of the counter of SYSINFO being restarted	2001/11/23 16:26:26	
Total size of DCCA (byte)	17903616	
Available size of DCCA (byte)	452216	
Distributed database mode	ON	
Backup mode	BACKUP-DATA-AND-BLOB	
User file object mode	OFF	
Read-only mode	OFF	
BLOB frame size	16384	
Time of database creation	2001/11/05 14:52:40	
Time of database start	2001/11/23 16:26:26	
DBMaker version	3.92	
Database file version	3.92	
Time of the database startup with force new journal		
Time of turning the journal on		
Time of turning the journal off		

# VIEWING SYSTEM INFORMATION

The system information page displays operating system statistics from the SYSINFO table. System information items and their corresponding SYSINFO.INFO values are summarized in 错误! 未找到引用源。.

SYSTEM INFORMATION	DESCRIPTION
The average CPU load during a short period (about 5 seconds)	The maximum percentage of total CPU processing capacity experienced within a time period. (CPU_USAGE)
Total physical memory	The total physical memory available to the system (TOTAL_MEMORY)
The current free physical memory (KB)	The amount of free physical memory. (TOTAL_FREE_MEMORY)
Total swap space (Bytes)	The total operating system memory swap space allocated on disk. (TOTAL_SWAP_SPACE)
The current free swap space (Bytes)	The total operating system memory swap space available on disk. (TOTAL_FREE_SWAP_SPACE)

Table 24-12 System Information items

- **k**) To view System Information:
- 1. Select the **Status** node from the **Database Monitor** node in the tree.
- 2. Select the **System Info** tab. The following page will be displayed.

	Page & I/O	Journal	Transaction
The aver	age CPU load during a short p	eriod (about 5 seconds)	
otal phy	/sical memory (byte)		267943936
The current free physical memory (byte) 962		9629696	
Total sw	ap space (byte)		648757248
he curr	ent free swap space (byte)		346411008

# VIEWING PAGE AND I/O STATUS

The page and I/O status page displays operating system statistics from the SYSINFO table. Page and I/O status items and their corresponding SYSINFO.INFO values are summarized in 错误! 未找到引用源。.

PAGE AND I/O STATUS ITEMS	DESCRIPTION
Number of Index Page Splits Occurring	The accumulated number of index pages split in the current run time. (NUM_IDX_SPLIT)
Number of Data Pages Compressed	The accumulated number of data pages reorganized in the current run time. (NUM_PAGE_COMPRESS)
Number of Physical Reads	The accumulated page number of page/frame disk reads in the current run time. (NUM_PHYSICAL_READ)
Number of Physical Writes	The accumulated number of page/frame disk writes in the current run time. (NUM_PHYSICAL_WRITE)
Number of Logical Reads	The accumulated page number of logical reads (reading data from page buffer cache) in the current run time. (NUM_LOGICAL_READ)
Number of Logical Writes	The accumulated number of logical writes (writing data into page buffer cache) in the current run time. (NUM_LOGICAL_WRITE)
Number of Page Buffers	The number of page buffers currently used by the database. (NUM_PAGE_BUF)

Table 24-13 Page and I/O Status items

- **I)** To view Page and I/O Status:
- 1. Select the **Status** node from the **Database Monitor** node in the tree.
- 2. Select the Page & I/O tab. The following page will be displayed.

Page & I/O	Journal	Transaction
Number of index page splits occurring		0
Number of data pages compressed		1
Number of physical disk reads (page)		154
Number of physical disk writes (page)		26
Number of logical reads (page)		4190
Number of logical writes (page)		88
Number of page buffers (page)		4000

# VIEWING JOURNAL STATUS

The journal status page displays operating system statistics from the SYSINFO table. Journal status items and their corresponding SYSINFO.INFO values are summarized in 错误! 未找到引用源。.

JOURNAL STATUS ITEMS	DESCRIPTION
Number of journal blocks read from journal files	The accumulated number of journal block reads in the current run time. (NUM_JNL_BLK_READ)
Number of journal blocks written to journal files	The accumulated number of journal block writes in the current run time. (NUM_JNL_BLK_WRITE)
Number of journal records generated	The accumulated number of journal record writes in the current run time. (NUM_JNL_REC_WRITE)
Number of journal forced writes	The accumulated number of journal force writes in the current run time. (NUM_JNL_FRC_WRITE)
Number of journal files	The number of blocks set in a journal file. (NUM_JOURNAL_FILE)
Number of journal blocks in a file	The number of journal blocks in each journal file. (NUM_JOURNAL_BLOCKS)
Number of free journal blocks	The current number of free journal blocks in all journal files. (NUM_JNR_BLOCK_FREE)
File number of the currently used journal file	For databases with multiple journal files, the number of the current journal file (CURRENT_JOURNAL_FN)
The current block number of the journal file	The number of the currently used journal block. (CURRENT_JOURNAL_BN)

Table 24-14 Journal Status items

m) To view Journal Status:

1. Select the **Status** node from the **Database Monitor** node in the tree.

Page & I/O Journal	Transaction
Number of journal blocks read from journal files (block)	25
Number of journal blocks written to journal files (block)	120
Number of journal records generated	85
Number of journal forced writes	10
Number of journal files	2
Number of journal blocks in a file (block)	16000
Number of free journal blocks (block)	22449
The file number of the currently used journal file	0
The current block number of the journal file	9537

2. Select the **Journal** tab. The following page will be displayed.

# VIEWING TRANSACTION STATUS

The transaction status page displays operating system statistics from the SYSINFO table. Transaction status items and their corresponding SYSINFO.INFO values are summarized in 错误! 未找到引用源。.

TRANSACTION STATUS	DESCRIPTION
Number of started transactions	The cumulative number of transactions started during the current runtime. (NUM_STARTED_TRANX)
Number of committed transactions	The cumulative number of committed transactions during the current runtime. (NUM_COMMITED_TRANX)
Number of aborted transactions	The cumulative number of transactions aborted in the current runtime. (NUM_ABORTED_TRANX)
Number of specified checkpoints	The cumulative number of checkpoints made during the current runtime. (NUM_CHECKPOINTS)
Number of transactions waiting group commit	The cumulative number of transactions waiting for a group commit action during the current runtime. (NUM_COMMIT_WAITER)

Table 24-15 Transaction Status items

- **n**) To view Transaction Status:
- 1. Select the **Status** node from the **Database Monitor** node in the tree.

Page & I/O	Journal	Transaction	_
Number of started transactions		342	
Number of committed transactions		326	
Number of aborted transactions		11	
Number of specified checkpoints		16	
Number of transactions waiting group	commit	0	

2. Select the **Transaction** tab. The following page will be displayed.

# **Monitoring Pending Transactions**

In a distributed database environment, transactions can be made across multiple databases. To effectively manage this, DBMaker uses a two-phase commit method. The user inputs a command affecting the remote databases at the coordinator database. First, the coordinator database sends the command to the appropriate remote databases where they prepare to commit the transaction. After confirmation that all remote databases are prepared, the coordinator database sends a COMMIT transaction command to the remote databases, where the transaction is completed. It is possible that a network failure can occur between these two phases. The global transaction recovery daemon is responsible for logging all such errors and holding them as pending transactions until they can be committed at a later time. Pending transactions can be viewed using the JDBA Tool and can also be committed or aborted.

- **o)** To view pending transactions:
- 1. Select **Pending Transaction** from the **Database Monitor** node of the tree
- 2. A list of current pending transactions will appear.

Pending Transaction Information	_	
O         Refresh         Commit	Abort	
		Olahal Transaction ID
Transaction Format	Prepared Time	Global Transaction ID

- 3. Select the **Refresh** button to view the current pending transaction status.
  - **p**) To commit pending transactions:
- 1. Select **Pending Transaction** from the **Database Monitor** node of the tree
- 2. A list of current pending transactions will appear.

Ommit Abort		
Transaction Format	Prepared Time	Global Transaction ID
4478019	2000/07/18 03:06:28	c1d37040943dc4d84f6bfd845d3c8cd3
4478019	2000/07/18 03:06:28	c1d37040943dc4d84f6bfd845d3c8cd3
22873	2000/07/31 03:27:30	DB1-3984f10b
22873	2000/07/31 03:39:51	DB1-3984f31c
22873	2000/07/31 03:39:51	DB1-3984f31c:DB2-3984f4dc#1
22873	2000/07/31 03:30:25	DB1-3984f116
22873	2000/07/31 03:30:25	DB1-3984f116:DB2-00000000#1
22873	2000/07/31 03:42:51	DB1-3984f33a
22873	2000/07/31 03:42:51	DB1-3984f33a;DB2-3984f4e6#1

3. Select the transaction to commit from the list in the main console. It will highlight blue.

Commit Abort		
Transaction Format	Prepared Time	Global Transaction ID
4478019	2000/07/18 03:06:28	c1d37040943dc4d84f6bfd845d3c8cd3
4478019	2000/07/18 03:06:28	c1d37040943dc4d84f6bfd845d3c8cd3
22873	2000/07/31 03:27:30	DB1-3984f10b
22873	2000/07/31 03:39:51	DB1-3984f31c
22873	2000/07/31 03:39:51	DB1-3984f31c:DB2-3984f4dc#1
22873	2000/07/31 03:30:25	DB1-3984f116
22873	2000/07/31 03:30:25	DB1-3984f116:DB2-00000000#1
22873	2000/07/31 03:42:51	DB1-3984f33a
22873	2000/07/31 03:42:51	DB1-3984f33a:DB2-3984f4e6#1

4. Click the **Commit** button at the top of the page. The transaction will commit and will no longer appear in the list. The next transaction will highlight blue.

<u>Commit</u> <u>Abort</u>		
Transaction Format	Prepared Time	Global Transaction ID
4478019	2000/07/18 03:06:28	c1d37040943dc4d84f6bfd845d3c8cdd
22873	2000/07/31 03:27:30	DB1-3984f10b
22873	2000/07/31 03:39:51	DB1-3984f31c
22873	2000/07/31 03:39:51	DB1-3984f31c:DB2-3984f4dc#1
22873	2000/07/31 03:30:25	DB1-3984f116
22873	2000/07/31 03:30:25	DB1-3984f116:DB2-00000000#1
22873	2000/07/31 03:42:51	DB1-3984f33a
22873	2000/07/31 03:42:51	DB1-3984f33a;DB2-3984f4e6#1

- **q**) To abort pending transactions:
- 1. Select **Pending Transaction** from the **Database Monitor** node of the tree
- 2. A list of current pending transactions will appear.

Pending Transaction Information		
Commit Abort		
Transaction Format	Prepared Time	Global Transaction ID
4478019	2000/07/18 03:06:28	c1d37040943dc4d84f6bfd845d3c8cd3
4478019	2000/07/18 03:06:28	c1d37040943dc4d84f6bfd845d3c8cd3
22873	2000/07/31 03:27:30	DB1-3984f10b
22873	2000/07/31 03:39:51	DB1-3984f31c
22873	2000/07/31 03:39:51	DB1-3984f31c:DB2-3984f4dc#1
22873	2000/07/31 03:30:25	DB1-3984f116
22873	2000/07/31 03:30:25	DB1-3984f116:DB2-00000000#1
22873	2000/07/31 03:42:51	DB1-3984f33a
22873	2000/07/31 03:42:51	DB1-3984f33a:DB2-3984f4e6#1

3. Select the transaction to abort from the list in the main console. It will highlight blue.

Pending Transaction Information           Organization           Openmit         Abort		
Transaction Format	Prepared Time	Global Transaction ID
4478019	2000/07/18 03:06:28	c1d37040943dc4d84f6bfd845d3c8cd3
4478019	2000/07/18 03:06:28	c1d37040943dc4d84f6bfd845d3c8cd3
22873	2000/07/31 03:27:30	DB1-3984f10b
22873	2000/07/31 03:39:51	DB1-3984f31c
22873	2000/07/31 03:39:51	DB1-3984f31c:DB2-3984f4dc#1
22873	2000/07/31 03:30:25	DB1-3984f116
22873	2000/07/31 03:30:25	DB1-3984f116:DB2-00000000#1
22873	2000/07/31 03:42:51	DB1-3984f33a
22873	2000/07/31 03:42:51	DB1-3984f33a:DB2-3984f4e6#1

4. Click the **Abort** button at the top of the page. The transaction will abort and will no longer appear in the list. The next transaction will highlight blue.

# 25 Setting JDBA Options

The JDBA Options menu gives access to the following menu items:

- Preferences: Provides a method for adjusting the way certain information is presented in the user interface. Preferences include language setting, auto-refresh, table, and SQL command display options.
- Run Time settings: The Run Time Settings window provides an interface for changing database configuration parameters while the database is running. Settings include Backup settings, file object settings, system control settings (including distributed database mode and autoextend tablespace options), and connection settings.
- Refresh: The Refresh option gets current database information to display on the JDBA window, and renews the screen.

# 25.1 Altering Run Time Settings

Certain database configuration parameters may be changed while the database is on-line. JDBA Tool provides an interface for changing these settings quickly. These settings include:

- Backup settings: Allow you to modify automatic full and incremental backup frequency and location, set file object backup mode, or disable the backup server daemon.
- File object settings: Allow you to enable or disable user file objects and modify the location of system file objects.
- System control settings: Allow you to enable distributed database mode for synchronous table replication, and set the number of pages or frames to extend autoextend tablespaces.
- Connection settings: Give the option to block new connections.
  - **r**) To access the Run Time settings window:
- 1. Select **Run Time Settings** from the **Option** menu on the menu bar.



- Run Time Setting X Database name : WEBDE 🗹 write to dmconfig.ini Backup File Object System Control Connection -Backup Mode-File object backup mode Turn on data and blob backup mode Do not backup file objects 🔘 Backup system file objects only O Turn off backup mode O Backup system and user file objects Backup Directory: C:\DBMaker\4.0\bin\WebDB\Backup 🗌 Use Compact Backup Mode Journal Full Percentage : 
  Use Default Value 0 50 - 100 <u>∧</u>% Begin Time : 1970/01/01 yyyy/mm/dd 00:00:00 hh:mm:ss Interval Time : 0 🖕 days 00:00:00 hh:mm:ss 0K <u>C</u>ancel
- 2. The Run Time Setting dialog appears.

- 3. To use the updated settings in the next session, make sure that the **write to dmconfig.ini** check box is enabled.
- 4. To allow the updated settings to apply to the current session only, clear the checkmark in the **dmconfig.ini** check box.

**NOTE** The write to dmconfig.ini option is only available on the server side.

- 5. Set the following options:
  - Backup Settings
  - File Object Settings
  - System Control
  - Connection

# **Changing Backup Settings**

Incremental Backup settings that may be altered in the runtime include the following: file object backup mode, backup location, and deactivation of backup BLOB or deactivation of backup data. During runtime, backup modes may only be changed to a state where less data is backed up (except in the case of file objects).

This may be useful, for example, if the database administrator wants to free up resources by changing the backup mode from "backup data and BLOB" to "backup data"

Run Time Setting	
Database name : DBSAMPLE4	✓ write to dmconfig.ini
Backup File Object System Control Connect	ion
Backup mode	File object backup mode
🔿 Turn on data and blob backup mode	Do not backup file objects
🔿 Turn on data backup mode	○ Backup system file objects only
Turn off backup mode	O Backup system and user file objects
Backup directory : <u>C:DBMakeri4.0:SAMPL</u> Use compact backup mode Journal full percentage : • Use default va	
Begin time : 1970/01/01 www/mm/d	d 00:00:00 hh:mm:ss
Interval time : 0 days 00:00:00	

Figure 25-1 The Backup page of the Run Time Settings dialog

### BACKUP MODE

You can choose to turn off the incremental backup mode, or turn off just backup BLOB mode. Run time settings only allow for deactivation of the incremental backup mode, either deactivating backup BLOB, or deactivating backup data.

To change the backup mode to Backup Data or Backup Data and BLOB you must shut down the database, start the database, select the **Setup** button, and make the changes to the **Backup** page of the **Start Database Advanced Settings** window.

The following backup modes are available.

BACKUP MODE	DESCRIPTION
Turn off backup mode	Disables the incremental backup daemon. In this mode the journal files are not backed up.

BACKUP MODE	DESCRIPTION
Turn on data backup mode	Sets the incremental backup daemon to backup all data journal pages.
Turn on data and BLOB backup mode is	BLOB data is written to the journal and the incremental backup daemon backs up all journal files.

Table 25-1 Backup Modes

### FILE OBJECT BACKUP MODE

You can choose what types of file objects to backup during incremental backups by changing the file object backup mode. The following file object backup modes are available.

FO BACKUP MODE	DESCRIPTION
Do not backup file	No file objects are backed up during full or
objects	incremental backups
Backup system file	System file objects are backed up during
objects	any full or incremental backup.
Backup system and	System and user file objects are backed up
user file objects	during any full or incremental backup.

Table 25-2 File Object Backup Modes

### **BACKUP DIRECTORY**

These are the directories where the backup server puts all full backup files and incremental backup (journal) files. You can create multiple backup directories on different disks from the database files to prevent the loss of both the database and the backup files in the event of a media error. The default path for backup files is the database directory */backup* and is automatically created by DBMaker. The total length of any backup directory path must not exceed 255 characters. A maximum of 32 backup paths can be set. It is important to note that file objects must back up in the first backup file path.

## USE COMPACT BACKUP MODE

User Compact Backup Mode ensures that only needed journal files are copied by the Backup Server when performing a backup. As a result, storage space is saved in the backup location. However, it also means restoring a database may take more time.

### JOURNAL FULL PERCENTAGE

The user may want to allow DBMaker to create an incremental backup before the journal file is completely full. The journal trigger value specifies the percentage a journal file must fill before the Backup Server performs an on-line incremental backup. You can specify a percentage between 50 and 100 for the journal trigger value. You can combine the journal trigger value with the backup schedule to backup your database on a regular schedule.

### INCREMENTAL BACKUP BEGIN TIME

To set the time in which the first incremental backup will begin for the database, enter the date in the yyyy/mm/dd field, as well as the time in the hh:mm:ss field. Reenter the numbers if they appear incorrectly the first time; JConfiguration Tool automatically enters values into the first two spaces of the yyyy field and the first space of the hh field if values are entered into other fields.

### INCREMENTAL BACKUP INTERVAL TIME

The number in the combo box specifies the time interval at which the Incremental Backup occurs in days. Next to the combo box is a field for time input, which specifies the time interval in hours, minutes, and seconds. The total time interval is determined by adding the two values together, so inputting 1 into the **days** field and inputting 12:00:00 into the **hh:mm:ss** field would cause an incremental backup to be made every day and a half.

- s) To change backup settings:
- 1. Select a backup mode from the **backup mode** box.

- To change the backup mode to backup data only, select the **Turn on data backup mode** option button.
- To turn off the backup mode, click the **Turn off backup mode** option button.
- 2. Select a file object backup mode from the **File object backup mode** box.
  - To not backup file objects, select the **Do not backup file objects** option button.
  - To backup system file objects, click the **Backup system file objects** option button.
  - To backup system and user file objects, click the **Backup system and** user file objects option button.
- 3. Enter a path into or select the **Edit** button next to the **Backup Directory** field to indicate a destination for the full and incremental backup files. The **Backup Directory Setting** dialog box appears.
  - a) Enter the back up file paths in the **Directory** fields.
  - b) Set the size of the backup files in the Size fields.
  - c) Click **OK** when you have finished setting all backup paths. You are returned to the **Backup** screen.
- 4. To enable compact backup, click on the Use Compact Backup Mode check box.
- 5. Incremental backups can be set to automatically execute when journal files have filled to a set percentage. Next to Journal Full Percentage:
  - Select the **Use Default Value** option button to set incremental backups to execute when any journal file is completely filled.
  - Enter a value from 50 to 100 in the 50 100 % field to set incremental backups to execute when any journal file is filled to the value entered.
- 6. Indicate a date and a time at which incremental backups are to begin in the **Begin Time** fields.
- 7. Enter the number of days, hours, minutes, and seconds between each successive incremental backup in the **Interval\_Time** time fields.
- 8. Select one of the other tabs at the top (to change other runtime settings) or select **OK** from the bottom of the **Run Time Settings** window

# **Changing File Object Settings**

Selecting the **File Object** tab in the **Run Time Settings** window allows the user to enable external user file objects and change the storage location of system file objects. DBMaker can automatically create subdirectories within the FO directory. Each subdirectory is filled with new file objects up to a threshold value. When the threshold is reached, DBMaker creates a new FO subdirectory.

Run Time Setting				×
Database name : WEBDB		~	vrite to dmconfig.ini	
Backup File Object System Co	introl Connectio	on		
🗌 Enable user file object				
File Object Directory : C3	DBMaker\4.0\bin	WebDB\fo		
Files per FO subdirectory :	<ul> <li>Always in th</li> <li>100 ~ 1000</li> </ul>		ory	
		<u>o</u> k	<u>Cancel</u> <u>H</u> elp	

Figure 25-2 The File Object page of the Run Time Settings dialog

- d) To change file object settings:
- 1. Select the **File Object** tab from the **Run Time Setting** window.
- 2. To enable the database to use external file objects, click on the **Enable User** File Object check box.
- 3. Enter a path into or select the browse button next to the **System File Object Directory** field to indicate the location of the System File Object Directory.
- 4. Select from **Files per FO Subdirectory**:
  - To have DBMaker always store system file objects in the system file object directory, select always in the same directory.

- To have DBMaker create subdirectories with a set number of file objects in each subdirectory, select the option button next to 100 ~10000 and enter the threshold number of file objects (between 100 and 10000) at which a subdirectory is declared full and a new one created.
- 5. Select one of the other tabs at the top (to change other runtime settings) or select OK from the bottom of the Run Time Settings window.

# **Changing System Control Settings**

The system control page allows settings to be changed that directly affect database performance. It also allows distributed mode to be enabled during the runtime and allows for the number of pages to extend a file when an autoextend tablespace is full.

Run Time Setting			×
Database name : WEBDB	-	💌 write to dr	nconfig.ini
Backup File Object System Control Connecti	on		
Synchronize journal file write-to-disk upon Disabling this setting will dramatically increase however, transaction records may be lost if the	e performance	e of commit transa	iction,
Display SQL command monitor Disabled Show SQL command and approximate time Show SQL command and exact time			
☑ Enable distributed database mode Pages to extend when extending file 20	)		<u>م</u> ح
	<u>0</u> K	<u>C</u> ancel	Help

Figure 25-3The System Control page of the Run Time Setting dialog

### JOURNAL FILE SYNCHRONIZATION

Under normal operating conditions, when a transaction is committed, DBMaker initiates a two-step process with regards to the journal blocks involved in the

transaction. The first step is to flush the relevant journal blocks into the file system of the operating system, or the operating system's cache. The second step is to force the operating system to write these journal blocks to disk, so that the transaction is preserved in the event of a system crash.

It is possible to greatly increase the performance of the commit transaction process if the second step of this process is omitted. The journal blocks in this case remain in the operating system's cache until the operating system writes them to disk. However, if the system crashes at this point, the records of any transactions that were still in the operating system's cache will be lost.

### DISPLAY MODE OF SQL COMMAND MONITOR

**Display Mode** affects the display content of the **SQL\_CMD** and **TIME\_OF\_SQL\_CMD** columns in the **SYSUSER** system table. JDBA Tool Users can view information about users accessing the database with the Database Monitor function. **Session Information** displays users currently connected to the database. The columns *Current SQL command* and *Time of Current SQL Command* display the most recent SQL transaction committed by the user and the time of execution, respectively. Display Mode of SQL Command Monitor sets the configuration for how these attributes will be displayed. No SQL commands are shown if Disabled is clicked. The most recent SQL command executed by the user and its approximate time of execution are shown if Show SQL command and approximate time of execution are shown if Show SQL command and exact time is clicked. The most recent SQL command and exact time is clicked. The default mode is Show SQL command and exact time is clicked. The default mode is Show SQL command and approximate time of execution uses more CPU resources and slows down the database. The default mode is Show SQL command and approximate time

### ENABLE DISTRIBUTED DATABASE MODE

This setting enables the database to be used in distributed mode. It must be enabled for synchronous table replication to work. Synchronous table replication is set using the JDBA Tool. For more information on distributed data, synchronous table replication, or coordinator and participant databases, refer to the JDBA Tool User's Guide, or the Database Administrator's Guide.

### PAGES TO EXTEND WHEN EXTENDING A FILE

When all pages in a data file or BLOB file are full, DBMaker can automatically extend the number of pages or frames in the file to allow the database to grow. The **Number of Pages to Extend While Extending File** setting tells DBMaker how many pages or frames to add to the full file in the event that it is full. If the database administrator expects that the database will grow very quickly, then a higher number should be picked to lessen the frequency at which the file is appended. One page is equal to approximately 4KB.

- e) To change System Settings:
- 1. To disable synchronized journal block writing to disk, remove the check mark from the **Synchronize journal file write-to-disk upon commit transaction** checkbox.
- 2. Select a setting for the SQL command monitor:
  - Select **Disabled** to not display any SQL commands
  - Select Show SQL command and approximate time to show the most recent SQL command executed by the user and its approximate time of execution.
  - Select Show SQL command and exact time to show the most recent SQL command executed by the user and its exact time of execution.
- 3. To enable distributed database mode, check the **Enable Distributed Database Mode** box.
- 4. Enter the number of pages to extend a file in the Number of Pages to Extend While Extending File field.
- 5. Select one of the other tabs at the top (to change other runtime settings) or select OK from the bottom of the Run Time Setting window.

# **Changing Connection Settings**

The Connection page of the Run Time Setting dialog allows you to prevent new connections handles from being made. This is useful if the database is experiencing

performance problems and needs to be evaluated, or to allow more processor resources to be used for critical database operations. Database administrators may enable or disable this function at any time from the DBMaker server.

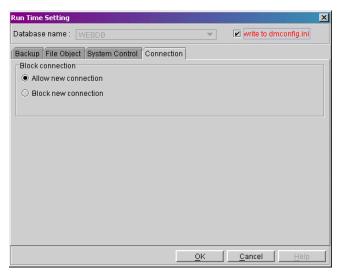


Figure 25-4 The Connection page of the Run Time Setting dialog

- f) To change connection settings:
- 1. To allow new connections to be made to the database, select **Allow new connection**.
- 2. To prevent new connections from being made to the database, select **Block new connection**.

# 25.2 Setting Preferences

JDBA Tool allows you to set preferences for the GUI. The following settings are available in the user preference window:

**Language Preference**: JDBA Tool supports English, Chinese, and Japanese interfaces.

**Refresh rate**: Determines the rate at which database monitor information is updated to the screen.

Show System Table: Shows system objects in the tree view.

**Show SQL Script**: Allows the DBA to view and edit the SQL script that corresponds to functions carried out in JDBA Tool.

g) To Access the Preferences window:

1. Select **Preferences** from the **Option** menu on the menu bar.



2. The User Preference window will appear with the General page displayed.

# **Setting General Options**

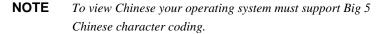
Items included on the General Options page of the **User Preference** window are language selection and auto refresh options. Language selection toggles the GUI language; currently English and Chinese are supported by the user interface.

The **Auto Refresh for Database Monitor** check box activates or deactivates the automatic refresh function. All statistics shown in the Database Monitor are periodically automatically updated by the automatic refresh function. The time interval is indicated in the **Auto Refresh Time** field.

<u>i</u>
English
ase Monitor

Figure 25-5 The General page of the User Preference Window

- **h**) To change the GUI language setting:
- 1. Select the language for the GUI from the **Language Choice** drop down menu.



×
English
English
Chinese
Japanese

- i) To Change the Auto Refresh for Database Monitor settings:
- 1. Selecting the check box toggles the automatic refresh function
- 2. To change the Auto Refresh Time, click the field and enter a new value.

**NOTE** Setting a low **Auto Refresh Time** will use more processor resources and can substantially slow down the database.

# **Setting Table Options**

The Table page of the User Preference window contains the following settings:

- Show System Table: Shows system objects in the tree view.
- **Show SQL Script**: Allows the DBA to view and edit the SQL script that corresponds to functions carried out in JDBA Tool.
- **Records Retrieved**: sets the number of records to retrieve from a table at one time when viewing a large number of records.

You can choose to disable this feature by changing the setting in the user preference window, or by enabling **do not show SQL command** at the bottom of the **Alter SQL Command** window.

User preference				×
General Table				
🗌 Show system table				
🗌 Show SQL script				
Records retrieved:		50		
<u>0</u> K	<u>C</u> ar	ncel	Help	

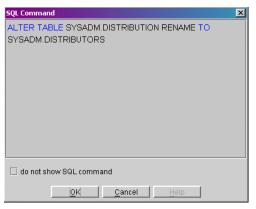
Figure 25-6 The Table page of the User Preference Window.

- j) To view system tables in the tree view:
- 1. Select the check box next to **Show system table**. A check mark in the box indicates that system tables are shown.

k) To view SQL scripts:

1. Select the check box next to **Show SQL script**. A check mark in the box indicates that the **Alter SQL Command** window will open before execution.

Subsequent actions in JDBA that have a corresponding SQL Command will open a window as in the following figure:



- **I)** To Alter SQL Scripts before execution:
- 1. Select the check box next to **Show SQL script** on the **Table Page** of the **User Preferences** window. A check mark in the box indicates that the **Alter SQL Command** window will open before execution.
- 2. Follow the procedure of the function that you want to apply to the database.
- 3. Selecting **OK** at the end of the procedure will open the **Alter SQL Command** window. You can edit the command in the text field.
- 4. Selecting **OK** will execute the command; selecting Cancel will abort the whole command.

# Glossary

#### Asynchronous Table Replication

A set of columns selected to form a projection that is replicated to the destination tables of another database. Asynchronous table replication occurs according to a schedule. Changes made to the source table are saved to a log file that is used to periodically update the destination tables. **BLOB** 

Acronym for Binary Large Objects. A table that consists of one column of LONGVARCHAR or LONGVARBINARY type data.

#### **BLOB** Frames

Measurement unit used to allocate disk space for BLOB type data. *Concurrency Control* 

A system of locks placed on objects to prevent multiple users from simultaneously manipulating the same data sets.

#### **Coordinator Database**

In a distributed database environment, the database that the client connects to. If the client accesses data from another database then that database is a participant database.

#### Daemon

A routine that automatically executes at a set time interval.

#### Data Pages

Data measurement unit for allocation of disk space.

### Destination Database

The database that receives data for table replication. A database containing destination tables for a synchronous or asynchronous replication.

#### **Destination Tables**

Tables that receive replicated data from a source table. The table on the destination database that the data is replicated to.

#### **Distributed Database Environment**

A system of networked remote databases that allow for any table in the system to be accessed by a client on any of the participant (remote) databases.

#### Exclusive Lock (X Lock)

An access block placed on a database object that prevents other users from accessing the object

#### Foreign Key

A column or set of columns whose rows contain the same values as the set of columns in the primary key or unique index of another table.

#### Fragment

Also called a horizontal partition, a fragment is the replication of a given range of data tuples.

#### Journal Blocks

Internal data measurement unit (514 bytes) that DBMaker uses to manage journal data.

#### Journal Buffer

Upper memory where current journal blocks are stored before writing them to disk.

### Journal Pages

Measurement unit for allocation of disk space.

### Lock

Locks allow only one user update and delete permission on the locked object at the time the object is locked.

### Page Buffer

Upper memory allocated for data pages accessed by a user.

### Participant Database

In a distributed database environment, a database that is accessed by the client through a coordinator database.

### Primary Database

The source database for database replication.

### Primary key

A column or set of columns in a table that contain values that uniquely identify the rows in the table.

### Projection

The selected columns from a base table chosen for replication.

#### **Publication**

A data set on the source table available for the replication.

#### Remote Database

A database located on another server from that being accessed by the client.

## **Remote Tables**

Tables on a database located on a server that is different from the one the client is connected to.

#### **Replication Domain**

The replication fragment (horizontal partition) and projection (vertical partition) together are called a replication domain. It is the range of a table's data that is replicated.

## Select Lock (S Lock)

An access block placed on a database object that allows other users to browse the object but not to update or delete any part of it.

# Slave Database

A read-only database that receives data from a database replication *Source Database* 

The database that contains source tables used to replicate.

## Source Table

The table on the source database that the replicated data is from.

# Subscription

The data set on the destination table to receive a publication.

# Synchronous Table Replication

A set of columns selected to form a projection that is replicated to the destination tables of another database. Synchronous table replication occurs simultaneously – changes made to the source table are simultaneously made to the destination table(s).

# Index

Action Time, 11-5 Adding Files to Tablespaces, 4-10 How to, 4-10-4-12 Additional Resources, 1-2 Advanced Table Options, 5-16-5-17 How to, 5-18 Altering Tablespaces, 4-10 Asynchronous Table Replication, 16-16 Adding Subscribers, 16-24 How to, 16-24–16-28 Creating, 16-16 Dropping, 16-30 How to, 16-30 How to Create, 16-17–16-24 Authority Level, 20-16 How to Change, 20-16–20-17 Auto Refresh for Database Monitor, 24-13 Autoextend Tablespaces, 4-3, 4-5 Changing to Regular, 4-15–4-16 How to, 4-15-4-16

Creating, 4-8 Pages to Extend a File, Run Time, 24-11 Backup Mode Run Time Settings, 24-4-24-5 **Backup** Options Run Time Settings, 24-3-24-4 Backup Options, Run Time How to Set, 24-6-24-7 Batch File, 22-16 Browsing Tablespaces, 4-2 How to, 4-3-4-4 Cache. 5-26 Changing Tablespace Mode, 4-15 How to, 4-15-4-16 Command Monitor, 24-10 Commands Stored. See "Stored Commands" Compact Backup Mode, 24-6 Connecting to a Database, 2-7 How to, 2-7-2-9

Connection Settings, 24-12 Connections. 2-7 Execution Information, 23-16-23-17 Lock Waiting Information, 23-19 Login Information, 23-15-23-16 Statistical Information, 23-17-23-18 Status, 23-25 Termination, 23-20 Transaction Information, 23-18–23-19 Constraints Column, 5-7, 5-24 Table, 5-7 Creating Database Links, 14-2 How to, 14-2-14-3 Creating Domains, 17-2 How to, 17-2-17-4 Creating Foreign Keys, 10-2 Adding, 10-2 How to, 10-3–10-6 Setting Options How to, 10-7-10-8 Setting Options, 10-6–10-7 Creating Groups, 21-2 How to, 21-2-21-4 Creating Indexes, 7-2 How to, 7-2-7-6 Creating IVF Text Indexes, 9-2 How to, 9-2-9-7

Creating Replication Schedules, 15-2 How to, 15-2–15-6 Creating Signature Text Indexes, 8-2 How to, 8-2-8-6 Creating Stored Commands, 12-2 How to, 12-2–12-3 Creating Stored Procedures, 13-1–13-2 How to, 13-2–13-5 Creating Synonyms, 18-2 How to, 18-2-18-3 Creating Tables, 5-2 Adding a Foreign Key, 5-11-5-12 How to, 5-12-5-16 Adding a UNIQUE Constraint, 5-9 How to. 5-10-5-11 Completing Table Creation, 5-18–5-19 How to. 5-19 Setting Advanced Table Options, 5-16–5-17 How to, 5-18 Setting Column and Table Constraints, 5-7 How to, 5-8–5-9 Setting Column Options, 5-6 How to. 5-6-5-7 Setting Table, Tablespace, and Schema Options, 5-4 How to, 5-5 Starting the Wizard, 5-2 How to, 5-3-5-4

Creating Tablespaces, 4-5 How to, 4-6-4-9 Creating Triggers, 11-2 Action Settings, 11-5–11-6 How to, 11-6–11-7 Indicating the Reference Clause, 11-7 How to, 11-8 Naming, 11-2 How to, 11-3-11-5 Trigger Action, 11-9 How to, 11-9–11-10 WHEN Condition Clause, 11-8 How to, 11-9 Creating User Accounts, 20-12 How to, 20-12–20-15 Creating Views, 6-2 How to. 6-2-6-6 Data Editing, 5-33 How to, 5-33-5-34 Data Operations, 23-25-23-26 Data Transfer, 22-1-22-2 Exporting to Text, 22-33-22-35 How to, 22-35-22-40 Exporting to XML, 22-41-22-45 How to, 22-45-22-50 How to Open the Data Transfer Tool, 22-2 Importing from ODBC, 22-16

How to, 22-16–22-19 SQL Statements, 22-23 Tables, 22-19 XML Batch, 22-28 Importing from Text, 22-3-22-5 How to:, 22-6-22-11 Importing from XML, 22-12 How to, 22-12-22-15 Database Links, 14-1 Creating, 14-2 How to, 14-2-14-3 Dropping, 14-4 How to, 14-4 Deleting User Accounts, 20-23 How to. 20-23 Dependencies Tables, 5-31 How to. 5-31–5-32 **Directory of Backup Files** Run Time Settings, 24-5 Disconnecting from a Database, 2-10 **Distributed Database Options** Enabling, Runtime, 24-10-24-11 Document Conventions, 1-4 Domains, 17-1 Creating, 17-2 How to, 17-2-17-4 Dropping, 17-5

How to, 17-5 Stored Commands How to, 12-6–12-7 Dropping Subscribers, 16-29 How to, 16-29 Dropping Database Links, 14-4 How to, 14-4 Dropping Domains, 17-5 How to, 17-5 Dropping Foreign Keys, 10-9 How to, 10-9 Dropping Indexes, 7-7 How to, 7-7 Dropping IVF Text Indexes, 9-8 How to. 9-8 **Dropping Replication Schedules**, 15-7 How to, 15-7 Dropping Signature Text Indexes, 8-7 How to, 8-7 Dropping Stored Commands, 12-6 How to, 12-6-12-7 Dropping Stored Procedures, 13-7 How to, 13-7 Dropping Synonyms, 18-4 How to, 18-4 Dropping Table Replication, 16-30 How to, 16-30 Dropping Tables, 5-37

How to, 5-37 Dropping Tablespaces, 4-17-4-18 How to, 4-17-4-18 Dropping Triggers, 11-11 How to. 11-11 Dropping Views, 6-9-6-11 How to, 6-11 Enabling Distributed Database Mode Run Time Settings, 24-10-24-11 Executing Stored Commands, 12-4 How to, 12-4–12-5 Executing Stored Procedures, 13-6 How to, 13-6 Exporting Data. See "Data Transfer" Extending a File Run Time Settings, 24-11 Features. 2-2-2-3 File Objects Run Time Settings, 24-7–24-8 Run Time Settings Backup Mode, 24-5 Fill Factor, 5-26 Foreign Keys, 9-11–10-1 Adding While Creating a Table How to, 5-12–5-16 Adding While Creating a Table, 5-11–5-12 Creating, 10-2 Adding, 10-2 How to, 10-3–10-6

Setting Options, 10-6–10-7 How to, 10-7–10-8 Dropping, 10-9 How to, 10-9 Groups, 21-1 Creating, 21-2 How to, 21-2-21-4 Members, 21-5 How to Add and Remove, 21-5-21-6 Privileges, 21-7 How to Manage, 21-8 How to Add a Foreign Key, 10-3–10-6 Add Files to a Tablespace, 4-10–4-12 Browse Tablespaces, 4-3-4-4 Change System Control Settings:, 24-11 Change Tablespace Mode, 4-15–4-16 Check Dependencies, 5-31–5-32 Check IVF Text Index Statistics, 9-10 Check Signature Text Index Statistics, 8-10 Check Table Statistics, 5-32 Check View Properties, 6-7 Connect to a Database, 2-7–2-9 Create a Database Link. 14-2–14-3 Create a Domain, 17-2–17-4 Create a Group, 21-2-21-4 Create a Replication Schedule, 15-2–15-6 Create a Signature Text Index, 8-2–8-6

Create a Stored Command, 12-2–12-3 Create a Stored Procedure, 13-2–13-5 Create a Synonym, 18-2–18-3 Create a Tablespace, 4-6–4-9 Create a Trigger Action, 11-9–11-10 Create a User Account, 20-12–20-15 Create a View, 6-2-6-6 Create an Index, 7-2–7-6 Create an IVF Text Index, 9-2–9-7 Delete a User Account, 20-23 Drop Subscribers, 16-29 Drop a Database Link, 14-4 Drop a Domain, 17-5 Drop a Foreign Key, 10-9 Drop a Replication Schedule, 15-7 Drop a Signature Text Index, 8-7 Drop a Stored Command, 12-6–12-7 Drop a Stored Procedure, 13-7 Drop a Synonym, 18-4 Drop a Table, 5-37 Drop a Tablespaces, 4-17–4-18 Drop a Trigger, 11-11 Drop a View, 6-11 Drop an Index, 7-7 Drop an IVF Text Index, 9-8 Edit Data, 5-33–5-34 Execute a Stored Command, 12-4–12-5 Execute a Stored Procedure, 13-6

Export a Text File, 22-35-22-40 Export Data to XML, 22-45–22-50 Grant Privileges on Stored Procedures, 13-8-11-9 13-9Grant Privileges on Views, 6-8 Grant Stored Command Privilege, 12-8-12-9 Import data from ODBC, 22-16-22-19 Import Data from XML, 22-12–22-15 Import Text Data, 22-6-22-11 Indicate the Trigger Referencing Clause, 11-8 Manae e Group Privileges, 20-19-20-20 Manage Table Privileges, 5-28–5-30 Modify a File in a Tablespace, 4-14 Modify a Replication Schedule, 15-8-15-9 Modify a Trigger, 11-12 Name a Trigger, 11-3–11-5 Open the Data Transfer Tool, 22-2 Rebuild a Signature Text Index, 8-8-8-9 Rebuild a Text Index, 9-9 Rebuild an Index, 7-8 Rename a Table, 5-35-5-36 Run Time File Object Settings, 24-8-24-9 Set Advanced Table Options, 5-18 Set Column and Table Constraints, 5-8-5-9 Set Column Options, 5-6–5-7 Text Set File Object Run Time Settings, 24-8-24-9 Set Foreign Key Options, 10-7–10-8 Set Run Time Backup Settings, 24-6-24-7 Introduction, 1-1

Set Table Properties, 5-26–5-27 Shrink and Compress Tablespaces, 4-12-4-13 Specify a Trigger WHEN Condition Clause, Specify Trigger Action Settings, 11-6–11-7 Update Index Statistics, 7-9-7-10 Update Tablespace Statistics, 4-16 I/O Status. 23-29-23-30 Import Data. See "Data Transfer Incremental Backup Begin Time, 24-6 Interval Time, 24-6 Journal Trigger Value, 24-6 Run Time Settings, 24-6 Runtime Settings, 24-6 Indexes, 7-1 Creating, 7-2 How to, 7-2-7-6 Dropping, 7-7 How to, 7-7 Rebuilding, 7-8 How to, 7-8 Statistics, 7-9 How to Update, 7-9-7-10 Inverted file, 9-1 Signature, 8-1

IVF Text Indexes, 9-1 Creating, 9-2 How to, 9-2-9-7 Dropping, 9-8 How to, 9-8Rebuilding, 9-9 Statistics, 9-10 How to Check, 9-10 Java Run Time Environment, 2-1 JDBA Tool, 2-1 Workspace, 2-4-2-5 Journal Status, 23-31 Journal File Synchronization, 24-9-24-10 Journal Trigger Value, 24-6 Kill Connection, 23-20 Language Choice, 24-13-24-14 Language Preference, 24-13 Links Database, See "Database Links" Lock Mode, 5-26 Locks Monitoring, 23-20-23-21 Status, 23-24 Menu Bar, 2-5 Modifying a File in a Tablespace, 4-13 How to, 4-14 Modifying Replication Schedules, 15-8

How to, 15-8–15-9 Modifying Tables, 5-20 Adding Columns, 5-24 How to, 5-24–5-25 Column Constraints, 5-24 How to, 5-24 Column Data Type, 5-22 How to, 5-22 Column Default Values, 5-24 How to, 5-24 Column Name, 5-22 How to, 5-22 Column Nullable, 5-23 How to, 5-23 Column Order, 5-21 How to, 5-21 Column Precision and Scale How to, 5-22-5-23 Column Precision and Scale, 5-22 Column Primary Key, 5-23 How to, 5-23 Deleting Columns, 5-25 How to, 5-25 How to, 5-20–5-21 Modifying Triggers, 11-12 How to. 11-12 Monitor, 23-1 Tool, 23-2-23-4

How to Use, 23-5-23-9 Tree. 23-10-23-13 No-cache, 5-26 ODBC Importing, 22-16 How to, 22-16-22-19 SQL Statements, 22-23 Tables, 22-19 XML Batch, 22-28 Options, 24-1 General, 24-13-24-14 Table, 24-15 Page Status, 23-29-23-30 Passwords, 20-21 How to Change, 20-21 Pending Transactions, 23-33 Primary Key, 5-20, 5-23 Privileges, 20-17-20-18 Groups, 21-7 How to Manage, 21-8 How to Change, 20-19-20-20 Stored Commands, 12-8 How to:, 12-8–12-9 Stored Procedures, 13-8 How to, 13-8-13-9 Tables, 5-28 How to Manage, 5-28-5-30 Views, 6-8

How to, 6-8 Procedures Stored. See "Stored Procedures". See "Stored Procedures" Properties of Views, 6-7 How to Check, 6-7 Rebuilding Indexes, 7-8 How to, 7-8Rebuilding IVF Text Indexes, 9-9 **Rebuilding Signature Text Indexes**, 8-8 How to, 8-8-8-9 **Rebuilding Text Indexes** How to, 9-9 Referencing Clause, 11-6 Renaming Tables, 5-35 How to, 5-35-5-36 Replication Table. See "Table Replication" Replication Schedules, 15-1 Creating, 15-2 How to, 15-2-15-6 Dropping, 15-7 How to, 15-7 Modifying, 15-8 How to, 15-8–15-9 Run Time Settings, 24-2 Backup Mode, 24-4–24-5 Backup Options, 24-3-24-4

Command Monitor, 24-10 Compact Backup Mode, 24-6 Connection Settings, 24-12 Directory of Backup Files, 24-5 Enabling Distributed Database Mode, 24-10-24 - 11File Object Backup Mode, 24-5 File Objects, 24-7–24-8 How to Change File Object Settings, 24-8-24-9How to Change System Control Settings, 24-11 How to Select a Database, 24-2-24-3 How to Set Backup Options, 24-6–24-7 Incremental Backup Begin Time, 24-6 Incremental Backup Interval Time, 24-6 Journal File Synchronization, 24-9–24-10 Journal Trigger Value, 24-6 SQL Command Monitor, 24-10 SQL Display Mode, 24-10 System Control Settings, 24-9 Scale, 8-5 Schedules Replication, 15-1. See "Replication Schedule" Security Level Authority Level, 20-16 Users. 20-16 Serial Number, 5-26

Resetting, 5-26 Sessions Execution Information, 23-16–23-17 Lock Waiting Information, 23-19 Login Information, 23-15–23-16 Monitoring, 23-13 Statistical Information, 23-17-23-18 Transaction Information, 23-18–23-19 Show SQL Script, 24-15 Shrinking and Compressing Tablespaces, 4-12 How to, 4-12-4-13 Signature Text Indexes Creating, 8-2 How to, 8-2-8-6 Dropping, 8-7 How to, 8-7 Rebuilding, 8-8 How to, 8-8-8-9 Statistics, 8-10 How to Check, 8-10 SQL Command Monitor Display Mode, 24-10 **Statistics** Database, 23-23, 23-27-23-28 Indexes, 7-9 How to Update, 7-9–7-10 IVF Text Indexes, 9-10

How to Check, 9-10 Signature Text Indexes, 8-10 How to Check, 8-10 Tables, 5-32 Viewing, 23-2–23-4, 23-10–23-13 How to, 23-5-23-9 Status Database, 23-23 **Storage Options** Extending a File, Run Time, 24-11 Stored Commands, 12-1 Creating, 12-2 How to, 12-2-12-3 Dropping, 12-6 Executing, 12-4 How to, 12-4-12-5 Stored Procedures, 13-1 Creating, 13-1-13-2 How to, 13-2–13-5 Dropping, 13-7 How to, 13-7 Executing, 13-6 How to, 13-6 Privileges, 13-8 How to, 13-8–13-9 User Privileges, 12-8 How to, 12-8-12-9 Subscribers

Adding to Asynchronous Table Replication, 16-24 How to, 16-24-16-28 Adding to Synchronous Table Replication, 16 - 12How to, 16-12-16-15 Dropping, 16-29 How to, 16-29 Summary of Features, 2-2-2-3 Synchronous Table Replication, 16-4 Adding Subscribers, 16-12 How to, 16-12–16-15 Creating, 16-4 Dropping, 16-30 How to, 16-30 How to Create, 16-4-16-12 Synonyms, 18-1 Creating, 18-2 How to, 18-2-18-3 Dropping, 18-4 How to, 18-4 Constraints, 5-38-5-39 Syntax, 5-38–5-39 System Control Settings, 24-9 How to Change, 24-11 System Tables Displaying, 24-15 SystemInformation, 23-28-23-29

Table Replication, 16-1	How to,
Asynchronous, 16-16. See "Asynchronous	Dropping
Table Replication	How to,
Dropping, 16-30	Editing D
How to, 16-30	How to,
How to View, 16-2–16-3	Modifyin
Synchronous, 16-4. See "Synchronous Table Replication	Adding C How to, 5
Tables, 5-1	Column (
Creating, 5-2	How to, :
Adding a Foreign Key, 5-11–5-12	
How to, 5-12–5-16	Column l
Adding a UNIQUE Constraint, 5-9	How to, :
How to, 5-10–5-11	Column I
Completing Table Creation, 5-18–5-19	How to, 5
How to, 5-19	Column 1
Setting Advanced Table Options, 5-16–5-17	How to, S
How to, 5-18	Column I
Setting Column and Table Constraints, 5-7	How to, S
How to, 5-8–5-9	Column
Setting Column Options, 5-6	How to, 5
How to, 5-6–5-7, 5-6–5-7	Column l
Setting Table, Tablespace, and Schema	How to, :
Options, 5-4	Column l
How to, 5-5	How to, S
Starting the Wizard, 5-2	Deleting
How to, 5-3–5-4	How to, 5
Dependencies, 5-31	How to, S
Dependencies, 5 51	Drivilago

5-31-5-32 g, 5-37 5-37 Data, 5-33 5-33-5-34 ng, 5-20 Columns, 5-24 5-24-5-25 Constraints, 5-24 5-24 Data Type, 5-22 5-22 Default Values, 5-24 5-24 Name, 5-22 5-22 Nullable, 5-23 5-23 Order, 5-21 5-21 Precision and Scale, 5-22 5-22-5-23 Primary Key, 5-23 5-23 Columns, 5-25 5-25 5-20-5-21 Privileges, 5-28

How to Manage, 5-28-5-30 Properties, 5-26 How to, 5-26-5-27 Renaming, 5-35 How to, 5-35-5-36 Statistics, 5-31, 5-32 How to, 5-32 Tablespaces, 3-1, 3-1, 3-1 Adding Files, 4-10 How to, 4-10-4-12 Altering, 4-10 Autoextend, 4-8 Browsing, 4-2 How to, 4-3-4-4 Changing the Mode, 4-15 How to, 4-15-4-16 Creating, 4-5 How to, 4-6-4-9 Dropping, 4-17–4-18 How to, 4-17-4-18 Modifying a File, 4-13 How to, 4-14 Shrinking and Compressing, 4-12 How to, 4-12-4-13 Updating Statistics, 4-16 How to, 4-16 Technical Support, 1-3 Text

Exporting, 22-33-22-35 How to, 22-35-22-40 Importing, 22-3-22-5 How to:, 22-6-22-11 Text Indexes, 8-1 IVF, 9-1 Rebuilding How to, 9-9Total Text Size, 8-5, 9-6 Transactions Pending, 23-33 Status, 23-32 Transfer Data. See "Data Transfer" Tree. 2-5–2-6 Trigger Event, 11-5 Trigger Type, 11-6 Triggers, 11-1 Creating Naming, 11-2 How to, 11-3-11-5 Creating, 11-2 Action Settings, 11-5–11-6 How to. 11-6–11-7 Indicating the Reference Clause, 11-7 How to. 11-8 Trigger Action, 11-9 How to, 11-9–11-10

WHEN Condition Clause, 11-8 How to, 11-9 Dropping, 11-11 How to, 11-11 Modifying, 11-12 How to, 11-12 **UNIQUE** Constraint, 5-9 How to, 5-10-5-11 **Updating Statistics** Tablespaces, 4-16 How to, 4-16 User Accounts, 19-1–20-11 Creating, 20-12 How to, 20-12–20-15 Deleting, 20-23 How to, 20-23 User Preferences, 24-13 Users, 19-1–20-11 Authority Level, 20-16 How to Change, 20-16-20-17 Creating Accounts, 20-12 How to, 20-12-20-15 Deleting Accounts, 20-23 How to, 20-23

Group Membership, 21-5 How to Add and Remove, 21-5-21-6 Passwords, 20-21 How to Change, 20-21 Privileges, 20-17-20-18 How to Change, 20-19-20-20 Security Level, 20-16 View SQL Command, 24-16 Views, 6-1 Creating, 6-2 How to, 6-2-6-6 Dropping, 6-9-6-11 How to, 6-11 Privileges, 6-8 How to, 6-8 Properties, 6-7 How to Check, 6-7 Workspace, 2-4–2-5 XML Batch File, 22-16 Exporting, 22-41-22-45 How to, 22-45-22-50 Importing, 22-12 How to, 22-12-22-15