action query

A query that copies or changes data. Action queries include append, delete, make-table, and update queries. Delete and update queries change existing data; append and make-table queries copy existing data. In contrast, select queries return data records. An SQL pass-through query may also be an action query.

aggregate function

A function, such as **Sum**, **Count**, **Avg**, and **Var**, that you can use to calculate totals. In writing expressions and in programming, you can use SQL aggregate functions (including the four listed here) and domain aggregate functions to determine various statistics.

alias

Visual Basic: An alternate name you give to an external procedure to avoid conflict with a Visual Basic keyword, public variable, constant, or a name not allowed by the Visual Basic naming conventions.

Structured Query Language (SQL): An alternate name you give to a field or expression in a SELECT statement (using the AS clause).

ANSI Character Set

An 8-bit character set used by Microsoft Windows that allows you to represent up to 256 characters (0 through 255) using your keyboard. The ASCII character set is a subset of the ANSI set.

append query

An action query that adds new records to the end of an existing table or query. Append queries don't return records (rows).

argument

A constant, variable, or expression that supplies additional information to an action, procedure, or method. You use an argument with an operand in an expression to supply additional information required by some action.

ASCII Character Set

American Standard Code for Information Interchange (ASCII) 7-bit character set widely used to represent letters and symbols found on a standard U.S. keyboard. The ASCII character set is the same as the first 128 characters $(0 - 127)$ in the ANSI character set.

asterisk

A character (*) used as a wildcard in SQL LIKE expressions to accept any string of characters. For example, the expression LIKE "*town*" returns records containing the string "town" followed by zero or more characters.

When you create a query or enter an SQL statement, use the asterisk to include all the fields that currently exist in the underlying table or query. For example, `SELECT * FROM MyTable` returns all fields (columns) from the table.

AutoNumber field

A field data type that automatically stores a unique number for each record as it's added to a table. An AutoNumber field always uses the **Long** data type, and numbers generated by an AutoNumber field can't be modified. (Also known as a Counter field.)

base table

A table in a Microsoft Jet database. A table defines the structure of a relational database, and is an object that stores data in records and fields. You can manipulate the structure of a base table by using the DAO objects or data definition SQL statements, and you can modify data in a base table by using **Recordset** objects or action queries.

bookmark

A property of the **Recordset** object that contains a binary string identifying the current record. If you assign the **Bookmark** value to a variable and then move to another record, you can make the earlier record current again by setting the **Bookmark** property to that string variable.

Boolean data type

A **True**/**False** or yes/no value. **Boolean** values are usually stored in Bit fields in a Microsoft Jet database; however, some databases don't support this data type directly.

Boolean expression

An expression that evaluates to either **True** or **False**.

Byte data type

A fundamental data type used to hold small positive integer numbers ranging from 0 to 255.

Cartesian product

The result of joining two relational tables, producing all possible ordered combinations of rows from the first table with all rows from the second table.

Generally, a Cartesian product results from executing an SQL SELECT statement referencing two or more tables in the FROM clause and not including a WHERE or JOIN clause that indicates how the tables are to be joined.

cascading delete

For relationships that enforce referential integrity between tables, an option that causes the deletion of a record from the primary table to automatically delete all related records in the related foreign table or tables.

For example, suppose you establish a relationship between a Customers (primary) table and an Orders (foreign) table with the cascading delete option enabled. When a record in the Customers table is deleted, all orders associated with that customer would also be deleted in the foreign Orders table.

cascading update

For relationships enforcing referential integrity between tables, an option that causes a change to the primary key in a record in the primary table to automatically update the foreign key in all related records in the related foreign table or tables.

For example, suppose you establish a relationship between a Customers (primary) table and an Orders (foreign) table with the cascading update option enabled. When the primary key in a record in the Customers table is changed, all orders associated with that customer would also be changed in the foreign Orders table.

cascade

The process of one action triggering another action. For example, when a cascading update relationship is defined for two (or more) tables, an update to the primary key in the primary table automatically triggers (cascades) changes to the foreign table.

case-sensitive

Capable of distinguishing between uppercase and lowercase letters. A case-sensitive search finds only text that is an exact match of uppercase and lowercase letters. Such a search would, for instance, treat "ZeroLengthStr" and "zerolengthstr" as different. Microsoft Jet database operations are not case-sensitive. However, case sensitivity is a feature of some other database management systems.

class

The formal definition of an object. The class acts as the template from which an instance of an object is created at run time. The class defines the properties of the object and the methods used to control the object's behavior.

collection

An object that contains a set of related objects. An object's position in the collection can change whenever a change occurs in the collection; therefore, the position of any specific object in the collection may vary.

column

The visual representation of a field in a grid. A column defines the data type, size, and other attributes of one field of a row (record) of data. All columns taken as a set define a row (record) in the database. An individual column contains data related in type and purpose throughout the table; that is, a column's definition doesn't change from row to row.

commit

To accept a pending transaction. If you use transaction processing and begin a transaction using DAO, none of the changes made in the transaction are written to the database until you commit or accept the transaction.

consistent

The state of a multiple-table **Recordset** object that allows you to perform only updates that result in a consistent view of the data. For example, in a **Recordset** that is a join of two or more tables (a one-to-many relationship), a consistent query would not allow you to set the many-side key to a value that isn't in the one-side table.

copy buffer

A location created by the Microsoft Jet database engine for the contents of a record that is open for editing. The **Edit** method copies the current record to the copy buffer; the **AddNew** method clears the buffer for a new record and sets the default values; and the **Update** method saves the data from the copy buffer to the database, replacing the current record or inserting the new record. Any statement that resets or moves the current record pointer discards the copy buffer. For example, using the **MoveNext** method or changing the **Index** property of a table would discard the contents of the copy buffer.

connection string

A string used to define the source of data for an external database. The connection string is usually assigned to the **Connect** property of a **QueryDef**, **TableDef**, **Connection**, or **Database** object or as an argument to the **OpenDatabase** method.

AutoNumber data type

A field attribute that automatically stores a unique number for each record as it's added to a table. An AutoNumber field uses the **Long** data type and has its **Attributes** property set to **dbAutoIncrement**. Numbers generated by an AutoNumber field can't be modified. (Also known as a Counter.)

Note For replicated tables in replicated databases, an AutoNumber field is not incremented by 1. Instead, it is assigned a random value between -2,000,000,000 and 2,000,000,000.

criteria

A set of limiting conditions, such as = `"Denmark"` (meaning equal to Denmark) or `> 30000`, used in creating a query or filter to show a specific set of records.

crosstab query

A query that calculates a sum, average, count, or other type of total on records, and then groups the result by two types of information − one down the left side of a grid (row headings) and the other across the top (column headings). For example, the Quarterly Orders by Product query in the Northwind sample database is a crosstab query.

Currency data type

A data type that is useful for calculations involving money or for fixed-point calculations in which accuracy is extremely important. This data type is used to store numbers with up to 15 digits to the left of the decimal point and 4 digits to the right. Because the **Currency** data type uses discrete values for all amounts, binary round-off isn't a factor when calculating totals.

current database

The **Database** object returned by the **CurrentDB**( ) function. A reference of
`DBEngine.Workspaces(0).Databases(0)` returns the first database opened. This concept applies
only to Microsoft Access.

current index

For an indexed table-type **Recordset** object, the index most recently set with the **Index** property. This index is the basis for ordering records in a table-type **Recordset**, and is used by the **Seek** method to locate records. A **Recordset** object can have more than one index but can use only one index at a time (although a **TableDef** object may have several indexes defined on it). The Microsoft Jet database engine may use more than one index to evaluate a query.

current record

The record in a **Recordset** object that you can use to modify or examine data. Use the Move methods to reposition the current record in a recordset. Use the Find methods (with a dynaset- or snapshot-type **Recordset** object) or the **Seek** method (with a table-type **Recordset** object) to change the current record position according to specific criteria.

Only one record in a **Recordset** can be the current record; however, a **Recordset** may have no current record. For example, after a dynaset-type **Recordset** record has been deleted, or when a **Recordset** has no records, the current record is undefined. In this case, operations that refer to the current record result in a trappable error.

current transaction

All changes made to a **Recordset** object after you use the last **BeginTrans** method and before you use the **Rollback** or **CommitTrans** method.

DAO object

An object that is defined by the Data Access Objects (DAO) library. You can use DAO objects, such as the **Database**, **TableDef**, **Recordset**, and **QueryDef** objects, to represent objects that are used to organize and manipulate data, such as tables and queries, in code.

data-definition query

An SQL-specific query that can create, alter, or delete a table, or create or delete an index in a database.

data source

A named Open Database Connectivity (ODBC) resource that specifies the location, driver type, and other parameters needed by an ODBC driver to access an ODBC database. A data source can be any source of database information.

data type

The characteristics of a variable that determine what kind of data the variable can hold. Data types include **Big Integer**, **Binary**, **Byte**, **Boolean**, **Char**, **Currency**, **Date**, **Decimal**, **Double**, **Float**, **GUID**, **Integer**, **Long**, **Long Binary** (**OLE Object**), **Memo**, **Numeric**, **Single**, **String**, **Text**, **Time**, **TimeStamp**, **VarBinary**, **Variant** (default), user-defined types (created with the **Type** statement), and object data types, which include host-defined object data types and DAO object types.

database engine

That part of the database system that retrieves data from and stores data in user and system databases.

date literal

Any sequence of characters with a valid format that is surrounded by number signs (#). Valid formats include the date format specified by the locale settings for your code or the universal date format.

For example, #12/31/92# is the date literal that represents December 31, 1992 where English-U.S. is the locale setting for your application. Use date literals to maximize portability across national languages.

dates and times

Dates and times are stored internally as different parts of a real number.

The value to the left of the decimal represents a date between December 30, 1899 and December 30, 9999, inclusive. Negative values represent dates prior to December 30, 1899.

The value to the right of the decimal represents a time between 0:00:00 and 23:59:59, inclusive. Midday is represented by .5.

DDL (Data Definition Language)

The language used to describe attributes of a database, especially tables, fields, indexes, and storage strategy.

default workspace

The **Workspace** object that DAO automatically establishes when your application first references any DAO object. This **Workspace** is referenced by `DBEngine.Workspaces(0)` or simply `Workspaces(0)`.

delete query

An action query that deletes a set of rows that match the criteria you specify. A delete query doesn't return rows.

design time

The time during which you build an application in the development environment by adding controls, setting control or form properties, and so on. In contrast, during run time, you interact with the application as a user would.

Double data type

A fundamental data type that holds double-precision floating-point numbers in IEEE format. A **Double** variable is stored as a 64-bit (8-byte) number ranging in value from -1.79769313486231E308 to -4.94065645841247E-324 for negative values, from 4.94065645841247E-324 to 1.79769313486231E308 for positive values, and 0.

DLL (dynamic-link library)

A set of routines that can be called from procedures and are loaded and linked into your application at run time.

dynaset

A type of **Recordset** object that returns a dynamic set of pointers to live database data. Like a table- or a snapshot-type **Recordset**, a dynaset returns data in records (rows) and fields (columns). Unlike a table-type **Recordset**, a dynaset-type **Recordset** can be the result of a query that joins two or more tables. The records in a dynaset-type **Recordset** object are updatable if the **Updatable** property of the **Recordset** is **True**, the **Field** being changed is updatable, and the data page containing the current record isn't locked. The data page is locked when the **Update** method is used (when the **LockEdits** property is **False**), or the **Edit** method is used (when the **LockEdits** property is **True**).

equi-join

A join in which records from two tables are combined and added to the **Recordset** object only when there are equal values in the joined fields.

expression

Any combination of operators, constants, literal values, functions, and names of fields, controls, and properties that evaluates to a single value. You can use expressions as settings for many properties and action arguments, to set criteria, or define calculated fields in queries.

external table

A table in a database outside the open Microsoft Jet database. An external table may take the form of another file or it may be a table in another relational database.

exclusive

A type of access that protects data in a database shared over a network. When you open a database in exclusive mode, you prevent others from opening the database.

external database

Either an ODBC database such as Microsoft SQL Server that resides on a remote server, or one of the external databases such as Paradox, dBASE, FoxPro, Microsoft Excel, Microsoft Access, Lotus 1-2-3, HTML, and Text.

field

A category of information stored in a table in a database − a column of data. An element of a database table that contains a specific item of information, such as last name.

field data types

The following table lists the **Field** data types.

DAO Field data type	Constant
Big Integer	**dbBigInt**
Binary	**dbBinary**
Boolean	**dbBoolean**
Byte	**dbByte**
Char	**dbChar**
Currency	**dbCurrency**
Date/Time	**dbDate**
Decimal	**dbDecimal**
Double	**dbDouble**
Float	**dbFloat**
GUID	**dbGUID**
Integer	**dbInteger**
Long	**dbLong**
Long Binary (OLE Object)	**dbLongBinary**
Memo	**dbMemo**
Numeric	**dbNumeric**
Single	**dbSingle**
Text	**dbText**
Time	**dbTime**
TimeStamp	**dbTimeStamp**
VarBinary	**dbVarBinary**

field properties

Attributes of a field that determine what kind of data it contains. **Size** and **Type** are examples.

filter

A set of criteria applied to records in order to create a subset of the records.

foreign key

One or more table fields that refer to the primary key field or fields in another table. A foreign key indicates how the tables are related − the data in the foreign key and primary key fields must match. For example, a list of valid part numbers would contain a foreign key to an inventory table containing references to valid part numbers. Used when establishing referential integrity for a database.

foreign table

A table that provides a foreign key to another table in the database. Generally, you use a foreign table to establish or enforce referential integrity. The foreign table is usually on the "many" side of a one-to-many relationship. An example of a foreign table is a table of customer orders.

form

A window or dialog box. Forms are containers for controls. A multiple-document interface (MDI) form can also act as a container for child forms and some controls.

forward scroll

Move toward the end (**EOF**) of a **Recordset** object.

forward-only – type Recordset

A **Recordset** object in which records can be searched only from beginning to end; the current record position can't be moved back to the first record. Forward-only – type recordsets reduce processing overhead on remote databases. For example, you can use a forward-only – type **Recordset** on a linked remote table to quickly process data in one pass, such as when you're building a customized report.

Function procedure

A procedure that performs a specific task within a Visual Basic program and returns a value. A **Function** procedure begins with a **Function** statement and ends with an **End Function** statement.

group

A collection of user accounts in a **Workgroup** object, identified by group name and personal identifier (PID). Permissions assigned to a group apply to all users in the group.

GUID data type

Globally Unique Identifier/Universally Unique Identifier. A unique identification string used with remote procedure calls. Every interface and object class uses a **GUID** for identification. A **GUID** is a 128-bit value. For example, 12345678-1234-1234-1234-123456789ABC is a syntactically correct **GUID**. The **GUID**s on the client and server must match for the client and server to bind. Vendors of objects can request that Microsoft allocate one or more sets of 256 **GUID**s for their exclusive use. Alternatively, if you have a network card, you can run a tool named Uuidgen.exe, which provides a set of 256 **GUID**s based on the time of day, the date, and a unique number contained in your network card.

inconsistent

The state of a multiple-table **Recordset** object that enables you to update all fields (columns). For example, in a **Recordset** created by joining two tables in a one-to-many join (as in a Customers and Orders table), you can update `Orders.CustomerID` so that it doesn't match `Customers.CustomerID`, unless referential integrity disables the update.

index

A dynamic cross-reference of one or more table data fields (columns) that permits faster retrieval of specific records from a table. As records are added, changed, or deleted, the database management system automatically updates the index to reflect the changes.

When used with a table-type **Recordset** object, the current index determines the order in which data records are returned to the **Recordset**. A table may have several indexes defined for its data.

A DAO **Index** object represents an index for a **TableDef** object.

inner join

A join in which records from two tables are combined and added to a **Recordset** only if the values of the joined fields meet a specified condition. For instance, an equi-join is an inner join in which the values of the joined fields must be equal.

installable ISAM

A driver you can specify that allows access to external database formats such as dBASE, Microsoft Excel, and Paradox. ISAM is an acronym for Indexed Sequential Access Method. The Microsoft Jet database engine installs (loads) these ISAM drivers when referenced by your application. The location of these drivers is maintained in the Microsoft Windows Registry.

instance

Any one of a set of objects sharing the same class. For example, multiple instances of a **Form** class share the same code and are loaded with the same controls with which the **Form** class was designed. During run time, the individual properties of controls on each instance can be set to different values.

Integer data type

A fundamental data type that holds integer numbers. An **Integer** variable is stored as a 16-bit (2-byte) number ranging in value from -32,768 to 32,767.

intrinsic constant

A constant provided by an application. For example, Data Access Objects (DAO) constants are listed in the DAO object library and can be viewed by using the Object Browser.

join

A database operation that combines some or all records from two or more tables, such as an equi-join, outer join, or self-join. Generally, a join refers to an association between a field in one table and a field of the same data type in another table. You create a join with an SQL statement.

When you define a relationship between two tables, you create a join by specifying the primary and foreign table fields. When you add a table to a query, you need to create a join between appropriate fields in the SQL statement that defines the query.

left outer join

An outer join in which all the records from the left side of the LEFT JOIN operation in the query's SQL statement are added to the **Recordset** object, even if there are no matching values in the joined field from the table on the right. Records from the table on the right are combined with those from the table on the left only when there are matching values in the joined fields. When a left-side record has no match, a row of **Null** values is joined on the right side.

left join

A left outer join includes all of the records from the first (left) of two tables, even if there are no matching values for records in the second (right) table.

linked table

A table in another database linked to a Microsoft Jet database. Data for linked tables remains in the external database where it can be manipulated by other applications. (Formerly known as *attached tables*.)

locked

The condition of a data page, **Recordset** object, or **Database** object that makes it read-only to all users except the one who is currently entering data in it.

Long Binary data type

A type of field that can hold 1.2 GB of data. Long Binary fields can contain any type of binary data. (Also known as an *OLE Object* data type in Microsoft Access).

Long data type

A fundamental data type that holds long-integer numbers. A **Long** variable is stored as a 32-bit (4-byte) number ranging in value from -2,147,483,648 to 2,147,483,647.

make table query

An action query that creates a new table from the **Recordset** object of an existing query.

many-only table

A table that doesn't appear as the "one" side of any join in a query.

Memo data type

A field data type. Such fields can contain up to 1.2 GB of text data.

message

A packet of information passed from one application to another.

method

A procedure similar to a function that operates on specific objects.

Microsoft Jet database engine

A database management system that retrieves data from and stores data in user and system databases. The Microsoft Jet database engine can be thought of as a data manager component with which other data access systems, such as Microsoft Access and Visual Basic, are built.

multiuser database

A database that permits more than one user to access and modify the same set of data at the same time. In some cases, the additional "user" may be another instance of your application or another application running on your system that accesses the same data as some other application.

normalize

To minimize the duplication of information in a relational database through effective table design.

Null

A value that indicates missing or unknown data. **Null** values can be entered in fields for which information is unknown and in expressions and queries. In Visual Basic, the **Null** keyword indicates a **Null** value. Some fields, such as those defined as containing the primary key, can't contain **Null** values.

null field

A field containing no characters or values. A null field isn't the same as a zero-length string ("") or a field with a value of 0. A field is set to null when the content of the field is unknown. For example, a Date Completed field in a task table would be left null until a task is completed.

numeric expression

Any expression that results in a number. This can be any combination of variables, constants, functions, and operators that evaluates to a number.

Object Browser

A dialog box you can use to examine the contents of an object library to get information about the objects provided.

object expression

An expression that specifies a particular object. This expression can include any of the object's containers. For example, if your application has an **Application** object that contains a **Document** object that contains a **Text** object, the following are valid object expressions:

```
Application.Document.Text
Application.Text
Document.Text
Text
```

object library

A dynamic-link library (DLL) with one or more type library resources that typically has the extension .olb. You can use the Object Browser to examine the contents of an object library to get information about the objects provided.

object variable

A variable that contains a reference to an object.

ODBC (Open Database Connectivity)

A standard protocol that permits applications to connect to a variety of external database servers or files. ODBC drivers used by the Microsoft Jet database engine permit access to Microsoft SQL Server and several other external databases.

The ODBC application programming interface (API) may also be used to access ODBC drivers and the databases they connect to without using the Microsoft Jet database engine.

ODBC data source

A term used to refer to a database or database server used as a source of data. ODBC data sources are referred to by their Data Source Name (DSN). Data sources can be created by using the Windows Control Panel or the **RegisterDatabase** method.

ODBC driver

A dynamic-link library (DLL) used to connect a specific Open Database Connectivity data source with another (client) application.

OLE

Microsoft's object-based technology that enables you to create applications that contain components from various other applications.

ActiveX object

An object that is exposed to other applications or programming tools through Automation (formerly OLE Automation) interfaces. For example, Microsoft Access can create and manipulate ActiveX objects within Microsoft Word or Microsoft Excel.

OLE Object data type

A field data type you use for objects created in other applications that can be linked or embedded in a Microsoft Jet database. For example, you could use an OLE Object field to store a collection of pictures.

one-to-many relationship

An association between two tables in which:

- The primary key value of each record in the primary table corresponds to the value in the matching field or fields of many records in the related table.
- The primary key value of each record in the related table corresponds to the value in the matching field or fields of one and only one record in the primary table.

one-to-one relationship

An association between two tables in which:

- The primary key value of each record in the primary table corresponds to the value in the matching field or fields of one and only one record in the related table.
- The primary key value of each record in the related table corresponds to the value in the matching field or fields of one and only one record in the primary table.

optimistic

A type of locking in which the data page containing one or more records, including the record being edited, is unavailable to other users only while the record is being updated by the **Update** method, but is available between the **Edit** and **Update** methods. Optimistic locking is used when accessing ODBC databases or when the **LockEdits** property of the **Recordset** object is set to **False**.

outer join

A join in which all the records from one table are added to the **Recordset** object, even if there are no matching values in the joined field from the second table. Records from the second table are combined with those from the first table only when there are matching values in the joined fields. Null records are joined when there is no match.

page

A portion of the database in which record data is stored. Depending on the size of the records, a page may contain more than one record. In Microsoft Jet databases (.mdb), a page is 2048 (2K) bytes in length.

parameter

An element containing a value that you can change to affect the results of the query. For example, a query returning data about an employee might have a parameter for the employee's name. You can then use one **QueryDef** object to find data about any employee by setting the parameter to a specific name before running the query.

parameter query

A query that requires you to provide one or more criteria values, such as Redmond for City, before the query is run. A parameter query isn't, strictly speaking, a separate kind of query; rather, it extends the flexibility of other queries.

parse

To identify the parts of a statement or expression and then validate those parts against the appropriate language rules.

pass-through query

An SQL-specific query you use to send commands directly to a SQL database server (such as Microsoft SQL Server). With pass-through queries, you work with the tables on the server instead of linking them. Pass-through queries are used to execute SQL queries and system-specific commands written by using SQL dialects known only to the server.

A pass-through query may or may not return records. If it does, they are always returned in a snapshot.

permission

One or more attributes that specify what kind of access a user has to data or objects in a database. For example, if a user has read data permission for a table or query, the user can view or retrieve but not edit data in the table or query.

persistent object

An object stored in the database; for example, a database table or **QueryDef** object. Dynaset-type or snapshot-type **Recordset** objects are not considered persistent objects because they are created in memory as needed.

personal identifier (PID)

A case-sensitive alphanumeric string 4-20 characters long that the Microsoft Jet database engine uses in combination with the account name to identify a user or group in a **Workgroup** object. You provide the PID and the account name when you create a new user or group.

pessimistic

A type of locking in which the page containing one or more records, including the record being edited, is unavailable to other users when you use the **Edit** method, and remains unavailable until you use the **Update** method. Pessimistic locking is enabled when the **LockEdits** property of the **Recordset** object is set to **True**.

primary key

One or more fields whose value or values uniquely identify each record in a table. In a relationship, a primary key is used to refer to specific records in one table from another table. A primary key is called a foreign key when it is referred to from another table. You can have only one primary key. An Employees table, for example, could use the social security number for the primary key.

primary table

The "one" side of two related tables in a one-to-many relationship with a foreign table. Generally, a primary key table is used to establish or enforce referential integrity.

property

A named attribute of an object. Properties define object characteristics such as size, color, and screen location, or the state of an object, such as enabled or disabled.

pseudo index

A dynamic cross-reference of one or more table data fields (columns) that permits an ODBC table (server table) without a unique index to be edited. A pseudo index is not an actual index on the server table, but a cross-reference that the Microsoft Jet database engine can use to support table updates. A pseudo index is necessary only if an ODBC table doesn't have a unique index, which allows the table to be updated. You don't need a pseudo index if the table already has a unique index or if there is no need to update the table. (Tables cannot have a unique index if they were intended to be read-only.) In previous versions, pseudo indexes were called *index specifications.*

query

A formalized instruction to a database to either return a set of records or perform a specified action on a set of records as specified in the query. For example, the following SQL query statement returns records:

```
SELECT CompanyName FROM Publishers WHERE Region = 'NY'
```

You can create and run select, action, crosstab, parameter, and SQL-specific queries.

read-only

A type of access to data whereby information can be retrieved but not modified.

record

A set of related data about a person, place, event, or some other item. Table data is stored in records (rows) in the database. Each record is composed of a set of related fields (columns) − each field defining one attribute of information for the record. Taken together, a record defines one specific unit of retrievable information in a database.

referential integrity

Rules that you set to establish and preserve relationships between tables when you add, change, or delete records. Enforcing referential integrity prohibits users from adding records to a joined table for which there is no primary key, changing values in a primary table that would result in orphaned records in a joined table, and deleting records from a primary table when there are matching related records.

If you select the **dbRelationDeleteCascade** or **dbRelationUpdateCascade** option for a relationship, the Microsoft Jet database engine allows changes and deletions but changes or deletes related records to make sure the rules are still enforced.

relationship

An association established between common fields (columns) in two tables. A relationship can be one-to-one, many-to-many, or one-to-many.

requery

To rerun a query to reflect changes to the records, retrieve newly added records, and eliminate deleted records.

reserved word

A word that is part of a language, such as the Microsoft Jet database engine SQL language. Reserved words include the names of statements, predefined functions and data types, methods, operators, and objects. Examples include SELECT, UPDATE, BETWEEN, SET, and INSERT. Don't use reserved words for variable or object names.

right join

A right outer join includes all of the records from the second (right) of two tables, even if there are no matching values for records in the first (left) table.

For example, you could use LEFT JOIN with the Departments (left) and Employees (right) tables to select all departments, including those that have no employees assigned to them. To select all employees, including those who aren't assigned to a department, you would use RIGHT JOIN.

right outer join

An outer join in which all the records from the right side of the RIGHT JOIN operation in the query's SQL statement are added to the **Recordset** object, even if there are no matching values in the joined field from the left table. Records from the left table are combined with those from the right table only when there are matching values in the joined fields.

row

A set of related columns or fields used to hold data. A row is synonymous with a record in the Microsoft Jet database engine. A table is composed of zero or more rows of data.

run time

The time when code is running. During run time, you interact with the code as a user would.

run-time error

An error that occurs when code is running. A run-time error results when a statement attempts an invalid operation.

scope

The attribute of a variable or procedure that determines which sections of which modules recognize it. There are three levels of scope: public, module, and procedure. Variables that you declare with **Public** can be accessed by any module, while variables that you declare in a specific module can be used only within that module. Also, variables that you declare in a **Sub** or **Function** procedure can be used only in that particular procedure.

secure workgroup

A Microsoft Jet database **Workgroup** object to which users log on with a user name and password and in which access to database objects is restricted according to permissions specified for user accounts and groups.

security

A set of features used to specify or restrict the access that specified users or user groups have to data and objects in a database.

select query

A query that asks a question about the data stored in your tables and returns a **Recordset** object without changing the data. Once the **Recordset** data is retrieved, you can examine and make changes to the data in the underlying tables. In contrast, action queries can make changes to your data, but they don't return data records.

self-join

A join in which records from a table are combined with other records from the same table when there are matching values in the joined fields. A self-join can be an inner join or an outer join. A self-join is useful when you ask hierarchical questions, such as a query that shows all the managers and the people who report to them.

server

The database management system designed to share data with client applications; servers and clients are often connected over a network. A database server usually contains and manages a central repository of data that remote client applications can retrieve and manipulate.

session

A session delineates a sequence of operations performed by the Microsoft Jet database engine. A session begins when a user logs on and ends when a user logs off. All operations performed during a session form one transaction scope and are subject to permissions determined by the logon user name and password. Sessions are implemented as **Workspace** objects by DAO.

Short data type

A Microsoft Jet database engine fundamental data type that corresponds to the **Integer** data type defined by Visual Basic for Applications. A **Short** variable is stored as a 16-bit (2-byte) number ranging in value from -32,768 to 32,767.

Single data type

A fundamental data type that holds single-precision floating-point numbers in IEEE format. A **Single** variable is stored as a 32-bit (4-byte) number ranging in value from -3.402823E38 to -1.401298E-45 for negative values, from 1.401298E-45 to 3.402823E38 for positive values, and 0.

snapshot

A fixed copy of a set of records retrieved from the database and copied into memory. A snapshot derived from a Microsoft Jet-connected data source can't be updated. Snapshot-type **Recordset** objects can be created from a base table, a query, or another **Recordset**. All SQL pass-through queries return snapshots.

sort order

A sequencing principle used to order data, alphabetically or numerically. The sort order can be either ascending or descending.

SQL-specific query

A query that can be created only by writing an SQL statement. Subqueries and pass-through, union, and data-definition queries are SQL-specific queries.

SQL statement/string

An expression that defines a Structured Query Language (SQL) command, such as SELECT, UPDATE, or DELETE, and may include clauses such as WHERE and ORDER BY. SQL strings and statements are typically used in queries, **Recordset** objects, and aggregate functions but can also be used to create or modify a database structure.

standard deviation

A parameter that indicates the way in which a probability function is centered around its mean and that is equal to the square root of the moment in which the deviation from the mean is squared. Used to describe sets of values to determine how far the value varies from the arithmetic mean or average.

standard naming conventions

A set of specific rules for naming DAO objects. Names can be up to 64 characters long and can include any combination of letters, numbers, spaces, and special characters except a period (.), an exclamation point (!), a backquote character (`), and brackets ([ ]). You also can't use leading spaces or control characters (ASCII values 0 through 31).

string comparison

The use of an operator to determine whether one string is greater than or equal to another string. If you use **Option Compare Text** in the Declarations section of a module, string comparisons are not case-sensitive. If you use **Option Compare Binary**, comparisons are case-sensitive. If you use **Option Compare Database**, the comparison method is set by the current database.

String data type

A fundamental data type that holds character information. A **String** variable is either fixed-length or variable-length and contains one character per byte. Fixed-length strings are declared to be a specific length and can contain 1 to approximately 64K (2^16) characters. Variable-length strings can be any length up to 2 billion (2^31) characters (approximately 64K [2^16] characters for Microsoft Windows version 3.1 and earlier), less a small amount of storage overhead.

string expression

Any expression that evaluates to a sequence of contiguous characters. Elements of the expression can include a function that returns a string, a string literal, a string constant, a string variable, a string **Variant**, or a function that returns a string **Variant** (**VarType** 8).

Structured Query Language (SQL)

A language used in querying, updating, and managing relational databases. SQL can be used to retrieve, sort, and filter specific data to be extracted from the database.

You can use SQL SELECT statements anywhere a table name, query name, or field name is accepted. For example, you can use an SQL statement in place of a table name in the **OpenRecordset** method.

syntax error

An error that occurs when you enter a line of code that Visual Basic doesn't recognize.

Note   Syntax rules for individual keywords are defined in the Syntax section of the associated Help topic. To get Help on a keyword from within the development environment, select the keyword and press F1.

system object

A database object defined by the Microsoft Jet database engine, such as the table MSysIndexes.

table

The basic unit of data storage in a relational database. A table stores data in records (rows) and fields (columns) and is usually about a particular category of things, such as employees or parts. Also called a base table.

A table-type **Recordset** is a logical representation of a base table in a database.

temporary disk

The disk or directory, identified by the TEMP operating system environment variable, where the Microsoft Jet database engine stores temporary files and result sets. Also known as a temporary drive. Although the TEMP environment variable can point to a RAM disk, this isn't recommended.

TEMP

A TEMP environment variable is set by your autoexec.bat file when you start your system. Generally, TEMP points to an area on your hard disk used by Microsoft Windows and other programs, like the Microsoft Jet database engine, to store information that doesn't need to be saved after you shut down your system. For example, the following line in your autoexec.bat file points the TEMP environment variable to the D:\TempArea folder:

```
SET TEMP=D:\TempArea
```

Text data type

A field data type. Text fields can contain up to 255 characters or the number of characters specified by the **Size** property of the **Field** object, whichever is less. If the **Size** property of the text field is set to 0, the text field can hold up to 255 characters of data.

transaction

A series of changes made to a database's data and schema. Mark the beginning of a transaction with the **BeginTrans** statement, commit the transaction by using the **CommitTrans** statement, and undo all your changes since **BeginTrans** by using the **Rollback** statement.

Transactions are optional and can be nested up to five levels. Transactions increase the speed of operations that change data and enable you to reverse changes easily.

Transactions are global to the referenced database object's **Workspace**.

union query

An SQL-specific select query that creates a snapshot-type **Recordset** object containing data from all specified records in two or more tables with any duplicate records removed. To include the duplicates, add the keyword ALL.

For instance, a union query of the Customers table and the Suppliers table results in a snapshot-type **Recordset** that contains all suppliers that are also customers.

update

The process that saves changes to data in a record. Until the record is saved, changes are stored in a temporary record called the copy buffer. The UPDATE clause in an SQL statement changes data values in one or more records (rows) in a database table.

update query

An action query that changes a set of records according to criteria you specify. An update query doesn't return any records.

user account

An account identified by a user name and personal identifier (PID) that is created to manage access to database objects in a Microsoft Jet database **Workgroup** object.

validation

The process of checking whether entered data meets certain conditions or limitations.

validation properties

Properties used to set conditions on table fields and records. Validation properties include **ValidationRule**, **Required,** and **AllowZeroLength**.

validation rule

A rule that sets limits or conditions on what can be entered in one or more fields. Validation rules can be set for a **Field** or **TableDef** object. Validation rules are checked when you update a record containing fields requiring validation. If the rule is violated, a trappable error results.

variable

A named storage location that can contain data that can be modified during program execution. Each variable has a name that uniquely identifies it within its level of scope. A data type can be specified or not.

Variable names:

- Must begin with an alphabetic character.
- Can't contain an embedded period or type-declaration character.
- Must be unique within the same scope.
- Must be no longer than 255 characters.

Variant data type

A special data type that can contain numeric, string, or date data as well as the special values **Empty** and **Null**. The **VarType** function defines how the data in a **Variant** is treated. All variables become variant types if not explicitly declared as some other type.

variant expression

Any expression that can evaluate to numeric, string, or date data as well as the special values **Empty** and **Null.**

wildcard characters

The asterisk (*), question mark (?), number sign (#), exclamation point (!), hyphen (-), and brackets ([ ]) are wildcard characters. You can use these characters in queries and expressions to include all records, file names, or other items that begin with specific characters or match a certain pattern. You can also use wildcard characters and matching characters to further refine a search when using an SQL statement.

Symbol	Example	Usage
*	*wh** finds what, white, and why **at* finds cat, bat, and what	Matches any number of characters, and can be used anywhere in the character string.
?	*b?ll* finds ball, bell, and bill	Matches any single character.
#	*1#3* finds 103, 113, 123	Matches any single digit.
[ ]	*b[ae]ll* finds ball and bell but not bill	Matches any single character within the brackets.
!	*b[!ae]ll* finds bill and bull but not bell or ball	Matches any character not in the list.
-	*b[a-c]d* finds bad, bbd, and bcd	Matches any one of a range of characters.

Note   The wildcard characters * (asterisk), ? (question mark), # (number sign), and [(opening bracket) can match themselves only if enclosed in brackets.

workgroup

A group of users in a multiuser environment who share data and the same workgroup information file (typically the System.mdw file).

workgroup administrator

A member of the group Admins in a Microsoft Jet database **Workgroup** object. A workgroup administrator can always obtain full permissions for any database object created in the **Workgroup**.

zero-length string

A string containing no characters (""). The **Len** function of a zero-length string returns 0.

asynchronous query

A type of query in which SQL queries return immediately, even though the results are still pending. This enables an application to continue with other processing while the query is pending completion.

Microsoft Jet-connected ODBC data source

An ODBC data source that is accessed by using Data Access Objects (DAO) and the Microsoft Jet database engine.

ODBCDirect data source

A data source that is accessed by using the DAO ODBCDirect features, which bypass the Microsoft Jet database engine.

ODBCDirect

A technology that allows you to access ODBC data sources directly by using DAO features that bypass the Microsoft Jet database engine.

ODBC Driver Manager

A feature that provides the interface from the host language to the specific back-end data source driver.

subquery

A subquery is a SELECT statement nested inside a SELECT, SELECT...INTO, INSERT...INTO, DELETE, or UPDATE statement or inside another subquery.

destination field

A field in a query that will contain the results of your query.

constraint

A limitation of the possible values that users can enter into a field.

variance

The square of the standard deviation. It is a measure of the amount by which all values in a group vary from the average value of the group.

control character

Any key combination that begins with the CTRL or ESC key.

Data Access Objects (DAO)

A programming interface to access and manipulate database objects.

server-side cursor

Cursors that reside on the server, as opposed to residing on the client computer. While client-side cursors copy the keyset to the workstation, server-side cursors use the resources of the database server to maintain the cursor keysets.

array

A variable that contains a finite number of elements that have a common name and data type. Each element of an array is identified by a unique index number. Changes made to one element of an array do not affect the other elements.

constant

A named item that retains a constant value throughout the execution of a program, as opposed to a variable, whose value can change during execution. Each host application can define its own set of constants. Additional constants may be defined by the user with the **Const** statement. Constants can be used anywhere in your code in place of actual values. A constant may be a string or numeric literal, another constant, or any combination that includes arithmetic or logical operators except the **Is** statement and exponentiation. For example:

```
Const strdb = "c:\Program Files\Microsoft Office\Access\Samples\Northwind.mdb"
```

Microsoft Jet database

A database created with the Microsoft Jet database engine. The file name extension for a Microsoft Jet database is .mdb.

clustered index

The physical order of rows is the same as the indexed order of rows.

batch update

A cursor model for clients that work with cursors but don't hold locks on the server or issue updates by row. Instead, the client updates many rows that are buffered locally, and then it issues a batch update. This cursor model also allows the client to drop the connection to the server and re-establish it with the same server or even a different server.

To use batch updating in DAO 3.5, you must use an ODBCDirect workspace, the **DefaultCursorDriver** property must be set to dbUseClientBatchCursor at the time the Connection is opened, and the **Recordset** must be opened with the **OpenRecordset** method's locktype argument set to dbOptimisticBatch.

data pipelining

A process that uses batch optimistic updating to cache server data in a local cursor, close the server connection, open a new connection to another server with the same information schema, and then store the data on the new server.

dynamic cursor

A dynamic set of rows that you can use to add, change, or delete rows from an underlying database table or tables. A dynamic cursor can contain columns from one or more tables in a database. Membership is not fixed.

keyset cursor

A set of rows that you can use to add, change, or delete rows from an underlying database table or tables. Movement within the keyset is unrestricted. A keyset cursor can contain columns from one or more tables in a database. Membership is fixed.

static cursor

A result set where the membership, order, and values are generally fixed when the cursor is opened. If other users update, delete, or insert rows, the cursor doesn't reflect these changes until you close and reopen it.

HTTP

Hypertext Transfer Protocol. The behind-the-scenes Internet protocol that delivers information by way of the World Wide Web. The protocol makes it possible for a user to use a client program to enter a URL (or click a hyperlink) and retrieve text, graphics, sound, and other digital information from a Web server. URLs of files on Web servers begin with **http://**.

FTP

File Transfer Protocol. A protocol that makes it possible for a user to transfer files from one location to another over the Internet. URLs of files on FTP servers begin with **ftp://**.

intranet

A network within an organization that uses Internet technologies (such as the HTTP or FTP protocols). You can use an intranet to navigate between objects, documents, Web pages, and other destinations using hyperlinks.

Internet

A worldwide network of thousands of smaller computer networks and millions of commercial, educational, government, and personal computers. The Internet is like an electronic city with virtual libraries, storefronts, business offices, art galleries, and so on.

ODBCDirect workspace

A workspace that uses ODBCDirect to access an ODBC data source directly, bypassing the Microsoft Jet database engine.

Microsoft Jet workspace

A workspace that uses the Microsoft Jet database engine to access a data source. The data source can be a Microsoft Jet database file (.mdb), an ODBC database, such as a Paradox database, or an ISAM database.

client batch cursor library

A library that provides client-side cursor support for ODBCDirect database applications. This library supports all four types of cursors (keyset, static, dynamic, and forward-only) and provides a number of other features including the ability to dissociate connections and perform optimistic batch updates.

hyperlink data type

A field data type you use for fields that will store hyperlinks. Hyperlink fields contain text or combinations of text and numbers stored as text that are used as a hyperlink address. A hyperlink address can have up to three parts (each part can contain up to 2048 characters and uses the syntax:

displaytext#address#subaddress

compound query

A query that is composed of at least one action query (a query that copies or changes data) and at least one select query (a query that returns a **Recordset** without changing data). In DAO, a compound query is created by putting two or more SQL statements (separated by semicolons) in the **SQL** property of a **QueryDef** object.

Big Integer data type

A data type that stores a signed, exact numeric value with precision 19 (signed) or 20 (unsigned), scale 0 (signed: $-2^{63} \leq n \leq 2^{63}-1$; unsigned: $0 \leq n \leq 2^{64}-1$).

Binary data type

A data type that stores fixed-length binary data. The maximum length is 255 bytes.

Char data type

A data type that stores a fixed-length character string. The length is set by the **Size** property.

Decimal data type

A data type that stores a signed, exact numeric value with precision p and scale s ($1 \leq p \leq 15$; $0 \leq s \leq p$).

Float data type

A data type that stores a signed, approximate numeric value with mantissa precision 15 (zero or absolute value 10-308 to 10308).

Numeric data type

A data type that stores a signed, exact numeric value with precision p and scale s ($1 \le p \le 15$; $0 \le s \le p$).

Time data type

A data type that stores a time value. The value is dependent on the clock setting of the data source.

VarBinary data type

A data type that stores variable-length binary data. The maximum length is 255 bytes.

TimeStamp data type

A data type that stores a TimeStamp. The value is dependent on the clock setting of the data source.

procedural query

An SQL statement that executes a stored procedure.

>conflict table

A table that is generated when a synchronization conflict occurs between two replicas. The conflict table appears only in the replica with rejected changes.

database replication

The process of reproducing a database so that two or more copies (replicas) of the same database can stay synchronized. Changes to the data in a replicated table in one replica are sent and applied to the other replicas in the replica set. Changes made to the design of the database in the Design Master are sent and applied to all replicas in the set.

default synchronization partner

A Synchronizer that is used to automatically synchronize a replica with other replicas in the set. When a replica is created, the Synchronizer managing the source replica becomes the default synchronization partner for the new replica.

default synchronization schedule

A template used by a Synchronizer to define a schedule between a newly managed replica and and its default synchronization partner, when the newly managed replica has no existing synchronization schedule. Once the schedule is defined, you can change the schedule.

Design Master

A database to which system tables, system fields, and replication properties have been added. A Design Master is the first replica in a replica set. You can make changes to the database structure only with the Design Master. Replicas in the same replica set can take turns being the Design Master, but there can be only one Design Master at a time in each replica set.

globally unique identifier (GUID)

A 16-byte field used to establish a unique identifier for replication. GUIDs are used extensively to identify replicas, replica sets, tables, records, and other objects.

Note   In Microsoft Access, GUIDs are referred to as Replication IDs.

local object

A table, query, form, report, macro, or module that remains in the replica where it was created. Neither the object nor changes to the object are dispersed to other members in the replica set.

managed replicas

A replica with an assigned Synchronizer. The Synchronizer delivers changes to and receives changes from other replicas in the set.

Note   If you don't assign a Synchronizer to a replica, you can still synchronize it in your application's code or by using another Synchronizer. However, you can't set synchronization schedules from this replica unless you assign a Synchronizer to the replica.

Microsoft Replication Manager

An application that provides a graphical user interface to manage the location, synchronization schedule, and relationship of one or more replicas with the other replicas in the set. Replication Manager manages the Synchronizer settings that govern replication, while the Synchronizer performs the actual synchronization activities. Replication Manager is part of the Microsoft Office 97, Developer Edition.

object replication

The process of reproducing an object (table, query, report, form, macro, or module) so that two or more copies of the same object are synchronized. Changes made to the design of the object at the Design Master are sent and applied to all replicas in the set.

on-demand synchronization

The exchange of data between two replicas that occurs at the explicit request of the user.

replica

A copy of a database, including its tables, queries, forms, reports, macros, and modules. A replica is a member of a replica set and can be synchronized with other replicas in the set. Changes to the data in a replicated table in one replica are sent and applied to the other members in the replica set.

Note   The Design Master is also a replica.

replica set member

A replica that belongs to a replica set. Members of a replica set share the same database design and can be synchronized with one another.

replica set

Replicas that share the same database design and unique replica set identifier. Synchronization occurs between replica set members.

replica set topology

The order in which changes are propagated from replica to replica. Topology is important because it determines how quickly changes in another replica appear in your replica.

replicated database

A database to which additional tables, fields, and properties have been added to record information about changes to data and the design of replicated objects in the database.

replicate

Produce a replica, or copy, of something − for example, a database.

replicated object

A table, query, form, report, macro, or module that is in all replicas in the replica set. You can change the replicated object only at the Design Master, and these changes are dispersed to other replicas in the replica set during a synchronization.

replication

The process of creating and synchronizing replicas in separate locations. Replication adds system fields, system tables, and replication properties to a database so that changes made to the data in or to the design of a database are sent and applied to all the members of the replica set.

retention period

The number of days the system will retain certain replication system information for a replica. If the retention period expires before a replica is synchronized, the synchronization will fail.

schedule

The times when the Synchronizer will initiate synchronization with other replicas. The minimum increment of time between scheduled synchronizations is 15 minutes. You can set different schedules between any two Synchronizers.

scheduled synchronization

An exchange of data between two replicas that occurs at a predetermined time.

synchronization

The process of updating two replicas in which all updated records and objects are exchanged. The exchange of data between two replicas can be one-way or two-way and may be handled by a Synchronizer.

synchronization conflict

A situation in which users of two replicas have changed the same record. One of the updated records is selected as the "winner," and the record in the "losing" replica is updated to contain this data. The other updated record is placed in a conflict table in the losing replica.

synchronization error

A problem that occurs during synchronization that prevents changes to a record from being completed successfully. This is more serious than a conflict and should be resolved as soon as possible.

Synchronizer

A program that monitors changes to a replica and handles the actual exchange of data between replicas. The Synchronizer operates in the background and appears in the taskbar. You can see the Synchronizers for a replica set in the Synchronization window in Replication Manager.

Note   The previous version of Replication Manager referred to Synchronizers as Transporters.

base computer

A computer used in a star topology. A replica is copied from the hub server and placed on the base computer. This replica can be used to make additional replicas for other computers. *See also* hub server, star topology.

dropbox folder

The shared network location where a Synchronizer can leave or pick up design and data changes.

hub server

A computer used in a star topology. A replica residing on this computer can be used as a synchronization partner with other replicas. *See also* base computer, satellite computer, or star topology.

satellite computer

In a star topology, a computer on which a replica resides. This replica is copied from the base computer and synchronizes with a replica on the hub server by default. *See also* base computer, hub server, star topology.

shared network folder

See dropbox folder.

star topology

A type of organizational map for networked computers. For replication, it refers to a hub server, base computer, and the distribution of members of the replica set on other satellite computers. Topology is important for determining synchronization schedules. *See also* base computer, hub server, satellite computer.

Synchronization window

The area of the Replication Manager where Synchronizers appear. You can move the Synchronizers, and zoom in or zoom out to see more or fewer Synchronizers. You can also click the line between two Synchronizers to edit their synchronization schedule. To understand the different icons in the Synchronization window, click **Legend** on the **View** menu.

partial replica

A database that contains only a subset of the records in a full replica. With a partial replica, you can set filters and identify relationships that define which subset of the records in the full replica should be present in the database.

direct synchronization

A type of synchronization that occurs when the two replicas can be opened simultaneously during the synchronization process.

indirect synchronization

A type of synchronization that occurs when one Synchronizer leaves changes in a dropbox folder for another Synchronizer to pick up and apply to the replica it manages.

unmanaged replica

A replica that is not managed by a Synchronizer. Unmanaged replicas appear on the Synchronization window with a special icon. You cannot set synchronization schedules from an unmanaged replica, although they can be synchronized by another Synchronizer or through DAO code.