Introduction to

Microsoft Access 2000

Practicals

Contents

Microsoft Access 2000

Practical 1

In this practical we will look at the basics of Microsoft Access. You should first <u>read</u> the information given in this practical and <u>then</u> complete the activities listed throughout.

<u>Starting and Quitting Microsoft Access</u>

To start Microsoft Access

Click on the Windows **Start** button; select **Programs**, then **Microsoft Access**.

Or, if displayed on the screen, double-click on the **Microsoft Access icon**.

To quit Microsoft Access

Choose **Exit** from the **File** menu.

<u>Getting Help using Microsoft Access</u>

There are many ways to get assistance when using Microsoft Access. Many of the help options are available through the **Help** menu or by selected the Microsoft Access Help button on the toolbar.

Access Wizards

When you create a new database, table, query, form or report, Microsoft Access displays a dialog box where you can choose whether to start with a blank object and build it yourself or use an Access Wizard to help you build it. An Access Wizard is like a database expert who prompts you with questions about the object you want and then builds the object based on your answers.

Opening a Database

A Microsoft Access database is a collection of objects, not just a single table of data. One database file contains the tables as well as queries, forms, reports and other objects that help you use the information in the database.

When you first load Access, the Microsoft Access dialog box is displayed, as shown in Figure P1-1.
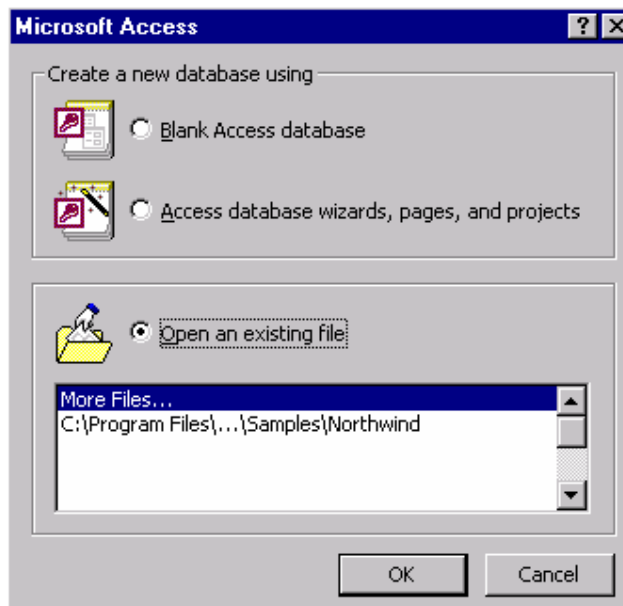
Figure P1-1: The Microsoft Access dialog box.

To Open a Database using Microsoft Access dialog box

To view existing databases select the **Open an existing file** option. The window lists the most recently opened databases, however if you wish to open a database that is not listed

---

highlight **More Files**. Once you have made your selection click on **OK** to continue or **Cancel** to cancel the operation.

To Open a Database

If the Microsoft Access dialog box is not displayed choose **Open** from the **File** menu (or click the Open button on the toolbar).

This displays the Open dialog box. Once you have located your database and identified the file name, choose **Open**. Microsoft Access provides sample databases in the C:\Program Files\Microsoft Office\Office\Samples folder.

The Database Window

When you create or open a database, Microsoft Access displays a Database window in the Microsoft Access window. The Database window is your command centre. From here, you can create, edit and use any object in your database. For example, the Database window for the Northwind database (sometimes called the NWIND database) is shown in Figure P1-2.
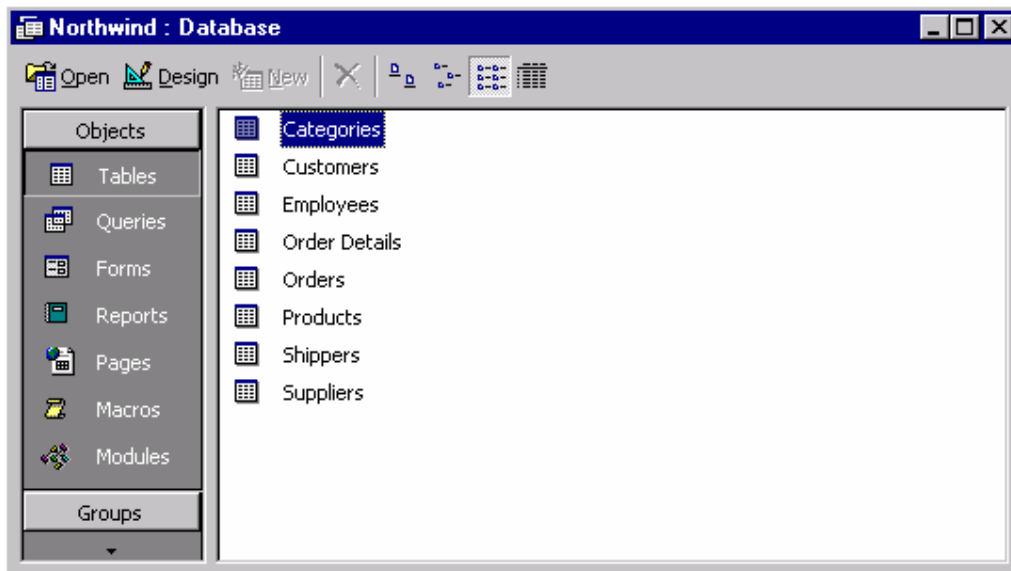
Figure P1-2: The Microsoft Access Database window for the Northwind database.

The object buttons in the Database window provide direct access to every object in your database. For example, to see a list of forms in the database, click the **Forms** button. Microsoft Access displays the list of forms stored in the database. To return to the list of tables, click the **Tables** button.

Viewing Data and Closing a Database

To view data in a table

1. In the Database window, click the **Tables** button to display the list of tables in the database.

2. Double-click the name of the table you want to see.

Microsoft Access displays the table in **Datasheet** view. Datasheet view displays data from the table in columns and rows, similar to a spreadsheet. In a datasheet, you can resize and rearrange the columns (fields) and resize the rows (records). You can scroll vertically to see more records and horizontally to see more fields.

3. When you're ready to return to the Database window, close the Datasheet window.

Or to view the database window while leaving the object (e.g. datasheet) open, click the **Database Window** button on the toolbar.

It's just as easy to see a query's dynaset as it is to see a table. A dynaset is an updatable type of record set, which is any Microsoft Access set of records defined by a table or query that you can treat as an object. Click the **Queries** button in the Database window, and then double-click the query you want to view. Microsoft Access displays the dynaset in datasheet view.

You use the same technique to view a form.

To view data using a form

1. In the Database window, click the **Forms** button to display the list of forms.

2. Double-click the name of the form you want to view. Microsoft Access opens the form and displays the first record of data.

You can also display a form in the Datasheet view. To switch from Form view to Datasheet view, access the **View** menu and select **Datasheet**.

To close a database

1. Switch to the Database window if it isn't active.

2. From the **File** menu, choose **Close**.

Creating a Database

When you create a Microsoft Access database, you create one file that contains all the tables in your database as well as the queries, forms, reports and other objects that help you use the information in the database.

Microsoft Access provides two methods to create a database. You can create a blank database and then add the tables, forms, reports and other objects later and this is the most flexible method, but it requires you to define each database element separately. Or you can use a Database Wizard to create in one operation the required tables, forms and reports for the type of database you choose and this is the easiest way to start creating your database. Either way, you can modify and extend your database at any time after it has been created.

In the following sections, we describe how to create a database using a Database Wizard and then how to create a blank database.

To create a database using the Database Wizard

1. In the Microsoft Access startup window, choose **New** from the **File** menu.

2. The **New** dialog box is displayed. Choose the **Databases** option to list the range of databases that you can create with the Database Wizard. To select the database you need, double-click the icon. The wizard will create what you need to store, enter and summarize your data.

To create a database (without Database Wizard)

1. In the Microsoft Access startup window, choose **New** from the **File** menu. Or click the New button on the toolbar.

Microsoft Access displays the New dialog box. The **General** option displays the File New dialog box that allows you to create a database from scratch and gives your new database a default name (e.g. db1), which you can replace with the name of your choice.

2. In the **File name** box, type the name of your database. A database name can contain up to 64 characters. Microsoft Access automatically appends a mdb extension to your database filename.

3. To store the database in a different directory or drive, select the location of the file you want in the **Save in** list.

4. Choose **Create**. Microsoft Access creates an empty database file and opens the Database window.

Activity P1-3

Create a new blank database called StayHome.mdb and save it to your network folder. This database will hold the tables, forms, reports and other objects for a video rental shop.

Create a Table

Microsoft Access provides three ways to create a blank (empty) table:

- Use the Database Wizard to create in one operation all the tables, forms and reports required for an entire database.
- Use Design view to specify all of your table details from scratch. Use the Table Wizard to choose the fields for your table from a variety of predefined tables such as business contacts, household inventory or medical records.
- Enter data directly into a blank datasheet. When you save the new datasheet, Microsoft Access will analyse your data and automatically assign the appropriate data type and format for each field.

Regardless of which method you use to create a table, you can use table Design view at any time to customize your table further, such as adding new fields, setting default values or creating input masks.

In the following sections we will describe in more detail the process of creating a table using a Table Wizard and then how to create a table using design view.

To create a table using the Table Wizard

1. Start Microsoft Access, and open the database that is to contain the table.

2. In the Database window, click the **Tables** button, and then choose the **New** button. Or select the **Insert** menu and choose **Table**. Microsoft Access displays the New Table dialog box, as shown in Figure P1-3.


Figure P1-3: New Table dialog box.

3. Choose the **Table Wizard** option.

4. You are then prompted to make appropriate choices as you create your table using the Table Wizard. To display the next Table Wizard dialog box, choose the **Next** button. The final dialog box offers you the options to further modify your table, add rows to the table, create a form based on your table using the Table Wizard or finish.

To create a table using Design view

1. In the Database window, click the **Tables** button and choose the **New** button (or choose **Table** from the **Insert** menu).

2. The New Table dialog box is displayed (as shown in Figure P1-3).

3. Choose the **Design View** button to open a blank Table window in Design view, as shown in Figure P1-4.
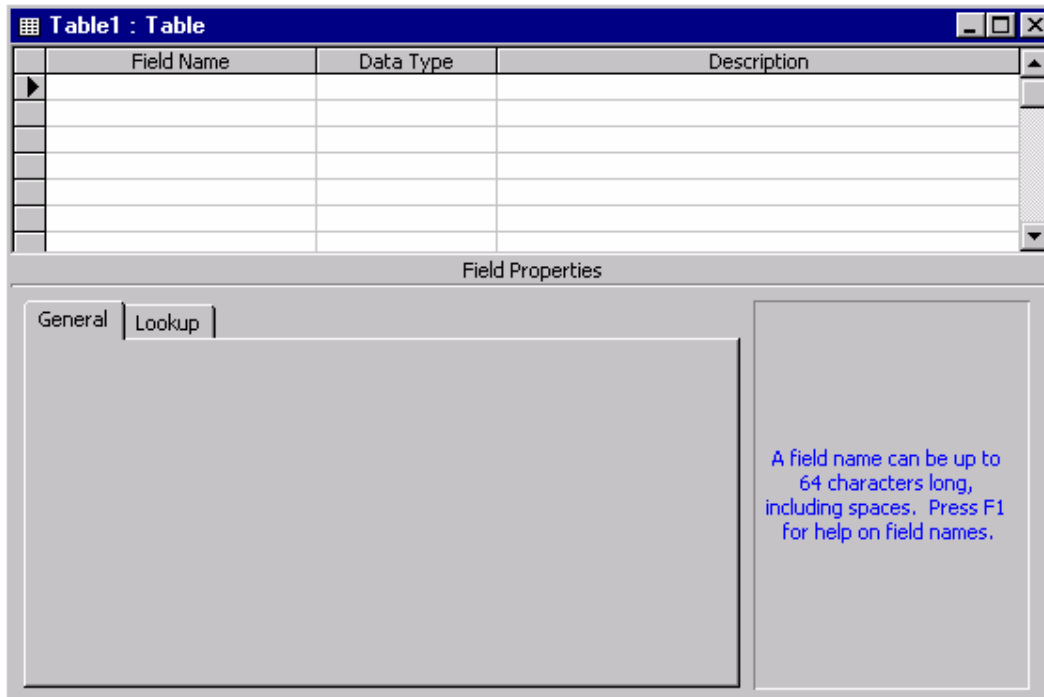
Figure P1-4: Table Design view.

Plan Fields and Data Types

The **Field Name** identifies the data stored in a field. A field name can contain up to 64 characters, including spaces. The **Data Type** tells Microsoft Access what kind of data goes in the field, such as text, numbers, dates or currency.

A brief description of the most commonly used data types is given below:

The **Text** data type is used for words (such as names), for combinations of words and numbers (such as addresses), and for numbers that are not used in mathematical calculations (such as telephone numbers).
The **AutoNumber** data type stores sequential numbers created by Microsoft Access.
The **Date/Time** data type is used for dates and times.
The **Number** data type is used for numbers that can be used in mathematical calculations, and also for fields that are related to other Number fields or to AutoNumber fields.
The **Currency** data type is used for currency values such as francs, dollars, or yen.
The **Yes/No** data type is used for yes or no, true or false values.
The **Memo** data type is used to store long textual descriptions up to a maximum size of 64,000 characters. Memo fields cannot be indexed.

More Information For details about data types, click in the **Data Type** column and press F1.

Add Fields to the Table

To add a field

1. Type the name of the field to be added in the first empty box under **Field Name**.

2. Press **TAB** to move to the **Data Type** box. Microsoft Access gives the field a Text data type. However, if the field is not text, you'll need to select the appropriate data type.

3. To open the list of alternative data types, click the arrow or press ALT+ DOWN ARROW.

4. Press **TAB** to move to the **Description** box. If required, you may enter in a short description for each field to help you remember the purpose of the field.

Set Field Properties

Each field in a table has a set of properties. By changing a field's properties, you can control how Microsoft Access stores, handles, and displays data in a field. For example, you might want your data displayed in a particular format – numbers in scientific notation, perhaps, or dates with the month's name abbreviated. The Format property controls how data is displayed in datasheets, forms, and reports.

To set a field property

1. Click any box in the row that defines the field to be set.

2. Click the box of the required property, and then set or select the appropriate property setting.

To delete a property setting

Select the setting for the property of the field, and then press the **Delete** key

More information   For more information about an individual field property, click the property and press F1.

To set a primary key for a table

Open the table in Design View and select the appropriate row(s) that form the primary key for the table. Then select the **Primary Key** button on the toolbar.

A key icon will appear in the column to the left-hand side of the field or fields selected to be the primary key. You can also set a primary key by selecting the **Edit** menu and then choosing **Primary Key**.

To save a table

1. From the **File** menu, choose **Save** (or click the Save button on the toolbar).

2. If you are saving the table for the first time, type a name for the table and choose **OK**.

To modify the design of an object

1. In the Database window, click the button for the type of object (e.g. Tables, Forms) that you want to modify.

2. In the list that is displayed, select the object you want to modify.

Choose the **Design** button. Microsoft Access opens a window for the object and displays it in Design view.

Activity P1-4

In this practical you will create four tables for the *StayHome* database using Design view. The tables are Member to hold members details, Video to hold details of videos, VideoForRent to hold the details of copies of videos for rent, and RentalAgreement to hold the details of video rentals by members.

The Member table has the following fields (with the data type of each in brackets):
memberNo (AutoNumber), fName (Text), lName (Text), sex (Text), DOB (Date/Time), address (Text), dateJoined (Date/Time), comments (Memo)
The primary key is memberNo
(Also for this table, set the format property of the Sex field to a field size of 1 with an Input Mask >**L**. Also, set this field with a Validation Rule =**'M' or 'F'** and Validation Text **Please enter M or F**. If you do not understand the purpose of the properties associated with each field, remember to use the help facility using the F1 key).

The Video table has the following fields (with the data type of each in brackets):
catalogNo (Text), title (Text), category (Text), dailyRental (Currency), price (Currency), directorNo (Text)
The primary key is catalogNo

The VideoForRent table has the following fields (with the data type of each in brackets):
videoNo (Text), available (Yes/No), catalogNo (Text)
The primary key is videoNo

The RentalAgreement table has the following fields (with the data type of each in brackets):
rentalNo (AutoNumber), dateOut (Date/Time), dateReturn (Date/Time), memberNo (Text), videoNo(Text)
The primary key is rentalNo

(Also for this table, set the format property for the dateOut and dateReturn fields to Medium Date format, e.g. 10-Oct-00. If you do not understand the purpose of the properties associated with this field, remember to use the help facility using the F1 key).

Add and Save Records

Each table in your database has two views: Design view and Datasheet view. You add records to the Datasheet view.

To switch to Datasheet view

From the **View** menu, choose **Datasheet** or click on the Datasheet button. The arrow to the right of the button lists the alternative views of the table.

To add a record of data

Type in the data values and press TAB to the next field.

To save a record of data

Once you have entered all of the required records, press TAB to move to the first empty field below these records.

You do not require to do anything else to save your data. When you leave a record, either by moving to another record or by closing a table, Microsoft access automatically saves the data.

Edit Records and Close a Table

To edit records

There are various ways to edit records. For example:

To move to the next or the previous field, press **TAB** or **SHIFT+TAB**, respectively.
To select or deselect the current field, press **F2**.
To undo changes to the current field or record, press **ESC**.
To replace the value in a field with the value of the same field in the previous record, press **CTRL+'**.

To close a table

From the **File** menu**,** choose **Close**.

Activity P1-5

Add about 5 records into your Member and Video tables and at least 10 records into your VideoForRent and RentalAgreement tables using your own data. The VideoForRent table should hold details of copies of videos described in your Video table and the RentalAgreement table should record the members described in your Member Table renting copies of videos described in your VideoForRent table.

Reopen your tables and practise editing your records. Finally, save and close your table and exit from the *StayHome* database.

Microsoft Access 2000

Practical 2

In this practical, you will learn more on how to edit the structure of tables and how to work with tables. You should first <u>read</u> the information given in this practical and <u>then</u> complete the activities listed throughout.

<u>Delete, Insert, and Rearrange Fields in a Table</u>

In a table's Design view, you can easily review and edit all the fields in the table. You can delete fields or insert new fields wherever you want them. You can also rearrange fields to whatever order you want. Rearranging the fields in Design view rearranges the order of columns, or fields, in Datasheet view.

Use the **View** and buttons on the toolbar to switch between Design view and Datasheet view.

To rearrange fields

1. Open the table in Design view and then select the row to be rearranged by clicking its row selector. The row selector is the first column (shaded) on the left-hand side of the table .

2. Click the row selector again, hold the mouse button down, and then drag the row to the required position in the table.

3. When the pointer is where you want the row placed, release the mouse button. Microsoft Access moves the field.

To delete a field

1. Open the table in Design view.

2. Select the row that defines the field you want to delete by clicking its row selector. From the **Edit** menu, choose **Delete** or **Delete Rows.** (Alternatively, you can press the Delete Rows button on the toolbar).

3. Microsoft Access deletes the field and all its data from your table.

To insert a new field above an existing field

1. Click the row above which you want the new row to appear.

2. From the **Insert** menu, choose **Rows** (or press the Insert Rows button [icon] on the toolbar). Microsoft Access inserts an empty row above the current row.

3. Define your new field in the empty row.

__Activity P2-1__

Restructure the Member table by deleting the comments field. Restructure the Video table by inserting a new field called certificate (Text) below the title field. Restructure the RentalAgreement table by moving the memberNo and videoNo fields before the dateOut field. Save your newly restructured tables.

Create a Field that Looks up or Lists Values in Tables

Using the Lookup Wizard, you can create a field that displays either of two kinds of lists to make data entry simpler:

- A lookup lists that displays values looked up from an existing table or query.
- A value list that displays a fixed set of values that you enter when you create the field.

The Lookup Wizard gives you the option to display the list as a combo box or a list box. The difference between these two types of boxes is in the way that the list of values is displayed to the user and whether it is possible to allow the user to add to the list of values. If you use the list from a table or query's datasheet, the list can only be displayed as a combo box.

The most common type of lookup list displays values looked up from a related table. For example, the SupplierID field in the Products table of the Northwind sample database. This list is created by looking up the SupplierID values in the Supplier table and displaying the corresponding Supplier names. Picking a value from a Lookup list sets the foreign key value in the current record (SupplierID in the Products table) to the primary key value of the corresponding record in the related table (SupplierID in the Supplier table).

A value list looks the same as a lookup list, but consists of a fixed set of values you type in when you create it. A value list should only be used for values that will not change very often and don't need to be stored in a table. For example, a list for a Salutation field may contain the following values, Mr, Mrs, and Ms.

You can add a new lookup or value list field to a table in either design view or datasheet view. However, if the field you want to use as the foreign key for a Lookup table already exists, you must open that field's table in design view to define the Lookup field.

To create a field that looks up and displays data from another table *or* a value list in design view

1. Open the table in Design view.

2. Insert the new field *or* if the field you want to use already exist, click in that field's row.

3. In the data type column, select **Lookup Wizard**.

4. To display data from another table; select option (1) *I want the lookup column to look up values in a table or query* .To display data from a value list; select option (2) *I will type in the values that I want.*

5. Click **Next** and follow the instructions in the remaining Lookup Wizard dialog boxes.

To create a field in datasheet view that looks up and displays data from another table or value list

1. In Datasheet view, click on the column to the right of where you want to insert the field, and then on the **Insert** menu, click **Lookup Column**.

2. In the first dialog box described in part 4 above, select the option that indicates your choice.

3. Click **Next** and follow the instructions in the remaining Lookup Wizard dialog boxes.

Activity P2-2

Convert the certification (e.g. U, PG, 12, 15, 18) field of the Video table into a Lookup field that uses a **value list**, as shown in Figure P2-1.

Figure P2-1: Value list for certification field of Video table.

Activity P2-3

Convert the directorNo field of the Video table into a Lookup field that displays data from another table, as shown in Figure P2-2. To start this activity it is necessary for you to first create a table called Director that will hold the details of directors.

The Director table has the following fields (with the data type of each in brackets):
directorNo (Text), directorName (text)
The primary key is directorNo

When converting the directorNo field to a Lookup field select the option that hides the key column (directorNo) and only display the directorName field in the Video table.

Figure P2-2: The directorNo field of the Video table displaying data from the Director table.

Carolyn Begg (2000)

Resize Columns and Rows and Move Columns in a Datasheet

In Datasheet view, you can resize columns and rows and move columns to fit your immediate needs, similar to the way you can edit a spreadsheet. In addition, you can save your layout so that Microsoft Access always displays the datasheet the way you want it.

To resize a column to fit the data it contains

1. Open the table in Datasheet view.

2. Double-click an edge of the fields selector (column heading) of the column. Microsoft Access resizes the column to fit the data.

To resize rows in a datasheet

1. Position the pointer on the border of any record selector. The pointer changed to ↕ to show that the border can be moved up or down.

2. Drag the border down to make all the rows taller. Drag it up to make all the rows narrower.

3. When the row is the size you want, release the mouse button. Microsoft Access resizes all the rows.

To reorder columns

1. Position the pointer on the field selector (column heading) of the column to be reordered. The pointer changes to ↓ to show that you can select the column.

2. Click the field selector to select the column.

3. Click the field selector again, hold the mouse button down, and drag the column to the left or right, over the other column(s).

4. When the pointer is where you want the column placed, release the mouse button. Microsoft Access reorders the columns.

To save your datasheet layout

On closing the datasheet window you can choose whether you wish to save the current layout of the datasheet.

Activity P2-4

View any of your tables in Datasheet form and practise editing the layout by resizing columns and rows, and by reordering the columns. Do not save your rearranged datasheet.

Print, Minimize, Restore, and Close a Table

You use the same techniques to print, minimize, restore, and close a table that you use in any standard application for Windows. Use these techniques for any Microsoft Access object.

To print a table

With the table open in datasheet view, choose **Print** from the **File** menu (or click the Print button on the toolbar) and then choose **OK**.

To minimize a table

Click the **Minimize** button in the upper-right corner of the table window. Microsoft Access minimizes the table to an icon and places the icon at the bottom of the Microsoft Access window. This moves a table out of the way without closing it.

To restore a table

Double-click the table icon in the Microsoft Access window.

To close a table

From the **File** menu, choose **Close**. If you've made changes to the table design or layout since last saving it, Microsoft Access prompts you to save the changes.

Activity P2-5

Print the datasheet for your Video table. Practise, minimizing, restoring and closing your tables.

Microsoft Access 2000

Practical 3

In this practical you will learn how to create a customized form, how to use it to view data and add new records, and how to print it. You should first <u>read</u> the information given in this practical and <u>then</u> complete the activities listed throughout.

<u>Create a Form with a Form Wizard</u>

You can use a form to view and change your data in a layout other than the datasheet. In this section, we use a Form Wizard to create a customized form and AutoForm to build simple forms automatically. Other Form Wizards provide a variety of layouts and styles for you to choose from. They prompt you with questions about the form you want and then build the form based on your answers. After using a Form Wizard to create your form, you can modify it if you want to.

1. Open the database. In the Database window, click the **Forms** button. Microsoft Access displays the list of forms in the database.

2. Choose the **New** button (or select **Insert** menu, and then choose **Form**). Microsoft Access displays the New Form dialog box.

3. Click on the down-arrow to select the table or query to provide the data for the form.

4. Choose the **Form Wizard** option and then follow the instructions in the Form Wizard dialog boxes.

Note: If you select any of the AutoForm options, a form is automatically created and opened for you. The form shows the first record in the selected table.

<u>Use a Form to View Records</u>

Now you have a form that you can use to view, change, add, and delete records in the selected table. Examine the way Microsoft Access displays information on a form. The objects on the form are called *controls* which can be used to change the way you view your data.

Microsoft Access places three kinds of controls on a form. A form based on the Video table of the *StayHome* database created using the AutoForm (Columar) facility is shown in Figure P3-1.

Figure P3-1: Form based on Video table in Form view.

A *label* displays text such as a title, caption, or message (e.g. Video).

A *text box* provides an area where you can display or type text or numbers that are stored in your database. Fields such as catalogNo and title of the Video table are displayed in text boxes.

There are a variety of other controls you can add to Microsoft Access forms as well, including controls that display lists, contain pictures, or carry out actions.

Microsoft Access forms provide two views of your data: Form view and Datasheet view. Form view is often the best way to see all the fields in a single record at the same time, without scrolling. On the other hand, Datasheet view is a convenient way to view many records in your table at once. You can use the toolbar to switch between the two views.

To switch to Datasheet view

From the **View** menu, choose **Datasheet View** (or click the arrow to the right of the **View** button on the toolbar and select **Datasheet View**).

To switch to Form view

From the **View** menu, choose **Form View** (or click the **View** button on the toolbar and select **Form View**).

To move from record to record on a form

Use the navigation buttons in the lower-left corner of the form's window to go to the first, last, previous, or next record. You can also use the **Go To** command in the **Edit** menu to move to the first, last, or next record or to a new record.

Add and Save Records with a Form

To add a new record

1. From the **Edit** menu, choose **GoTo**, and then choose **New Record** (or click the **New** button at the bottom of the form and on the toolbar).

   Microsoft Access displays the blank form at the end of the records.

   You can also use the **Records** menu and select **Data Entry**. However, in this mode you can only add and then view the newly appended records.

2. Enter data using **TAB** to move between fields.

To save a record

When you have completed the data entries for a record, press **TAB** to move to the next record.

As soon as you leave the record, Microsoft Access saves it in the table. If you want to save a record without leaving it, choose the **Save Record** command from the **Records** menu.

To undo your most recent change in a field before you leave the field

From the **Edit** menu, choose **Undo Current Field/Record** (or click the **Undo Current Field/Record** button on the toolbar).

To delete a record

From the **Edit** menu, select **Delete Record** or by clicking the **Delete Record** button.

Carolyn Begg (2000)

Print, Save, and Close a Form

You can use Print Preview to see how your form will look in print before you print it.

To preview how a form and its data will look on a page

1. Choose **Print Preview** from the **File** menu (or choose the **Print Preview** button on the toolbar). Microsoft Access displays your form and its data as it will look in print.

2. To zoom in on the page, position the pointer over the page so that it turns into a picture of a magnifying glass, and then click (or click the **Zoom** button on the toolbar).

3. To return to a view of the entire page, click the form again (or click the **Zoom** button again).

You can print your form from Print Preview or Form view.

To print a form

1. From the **File** menu, choose **Print** (or click the **Print** button on the toolbar). Microsoft Access only displays the Print dialog box when you select to print using the menu options.

To save a form

1. From the **File** menu, choose **Save**. When a form is saved for the first time, Microsoft Access displays the **Save As** dialog box.

2. Enter the name of the form and then choose **OK**.

To save and rename a form, select the **File** menu and choose **Save As**.

To close a form

From the **File** menu, choose **Close** (or double-click the Control-menu box in the upper-left corner of the Form window).

Activity P3-3

First preview, and then print VideoForm1.

Customizing Your Form

In this section, you will learn how to place, move, and resize controls on forms and how to display values in a list. In addition, you will learn how to show a default value in a control so that the field has that value automatically for each new record.

Change a Form's Design

You change the appearance of a form in the form's **Design** view. You can open your form in Design view from the Database window.

To open a form in Design view

1. In the Database window, select the name of the form. (if necessary, click the **Forms** button to display the list of forms) and then click the **Design** button. Microsoft Access opens the form in Design view.

Microsoft Access divides a form into five sections in Design view. A form based on the Videos table of the *StayHome* database is shown in Figure P3-2.

The *form header* prints at the top of the first page (currently blank). When you are viewing data, the form header appears once at the top of the window.

The *page header* prints at the top of every page (currently blank). The page header only appears when printed or in print preview.

The *detail* section contains the fields from the table. When you are viewing data, the detail section is repeated for each record. When you print the form, the detail section shows as many records as will fit on a page.

The *page footer* prints at the bottom of every page (currently blank). The page footer only appears when printed or in print preview.
The *form footer* prints at the bottom of every page (currently blank). When you are viewing data, the footer appears once at the bottom of the window.
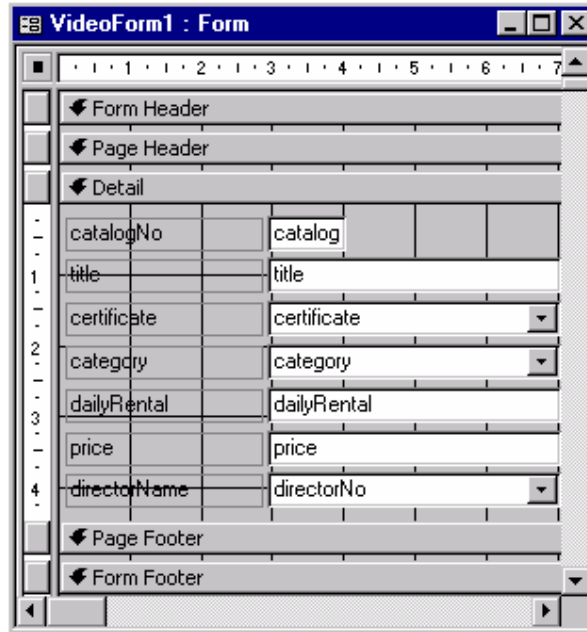
All forms have a detail section, but not all forms have a form/page header and footer. To add these sections to a form, choose the **Page Header/Footer** command or **Form Header/Footer** from the **View** menu.

Figure P3-2: Form based on Video table in Design View.

Select and Resize Controls

Controls are the objects on your form that display data from a field or words in a title. In Design view, you can select, resize, move, and otherwise manipulate the controls on a form.

To select a control

Click the field's text box. (Make sure to click the text box and not its attached label.)
When you select a control, Microsoft Access displays size and move handles around the control.

Drag the handles on the top and bottom to size the text box vertically.
Drag the handles on the left and right sides to size the text box horizontally.
Drag the handles in the corners to size the text box both vertically and horizontally.
In controls with attached labels, use the move handles to move each part separately.
The size of the text box should be appropriate to the maximum length of the values to be displayed in the field.

Carolyn Begg (2000)

To resize a control

1. Position the pointer on the part of the border of the text box that is to be resized.
2. Drag the border to shorten or lengthen the text box. When the box is the size you want, release the mouse button.

You can also select more than one control at a time. This is a convenient method for moving or aligning a group of controls.

To select more than one control

Position the pointer beside (not on) one of the controls you want to select, and then drag diagonally through all the controls you want to select. While you drag, Microsoft Access draws a rectangle around the controls. When you release the mouse button, all the controls in or touching the rectangle are selected. (You can also select a group of controls by holding down the SHIFT key while you click each control.)

Move Controls

All the text box controls on your form have attached labels. You can move a control and its attached label together, or you can move them separately.

To move a control

1. If a control is selected but is not the one you wish to select, click *outside* the control to cancel the selection.
2. Position the pointer anywhere on the selected control, and hold down the mouse button. The pointer changes to a hand symbol.
3. Drag the control so that it is next to its text box. Note that Microsoft Access moves the text box and its attached label together.
4. When the control is positioned where you want it, release the mouse button.

To lengthen a section

1. Position the pointer on the border between the detail section and the form footer.
2. Drag the border down to lengthen the section.

Move Controls and Attached Labels Separately

When you move a text box, its attached label moves with it. You can also move a control or its attached label separately. To do that, you use the move handles.

To move the attached label separately

1. Select the control.
2. Position the pointer over the label's move handle. When the pointer is over the handle, it changes to a pointing hand.
3. Drag the move handle to the required position.

4. When the label is where you want it, release the mouse button.

Add a Label and Edit Label Text

A *label* is a type of control you can place on your form to add information. A freestanding label is not bound to a field (like a text box) or attached to a control (like a text box's label). The first time you open a form in Design view, Microsoft Access displays the toolbox.

You use the toolbox to place new controls on your form. You can close or open the toolbox by choosing **Toolbox** from the **View** menu. You can also move the toolbox on your screen by dragging its title bar.

More information For details about each type of control, click the respective tool in the toolbox and press F1.

To draw a freestanding label

1. Click the **Label** tool in the toolbox.
2. Click where you want to place the label.
3. Type in your label. As you type, Microsoft Access sizes the label to fit your text.

To edit text in a label

1. Click the label attached to a text box. Microsoft Access selects the label.
2. Click the label again. Microsoft Access places an insertion point in the text of the label. Now you can edit the text.

Change the Appearance of Text

Visual style in text can add important functional impact or aesthetic appeal to your form.

To make text italic

1. Select the label. When you select a label or a control that includes text, the toolbar enables additional tools for changing the appearance of the text.

2. Click the **Italic** button on the toolbar.

2. From the **Format** menu, choose **Size**, and then choose **To Fit**. Microsoft Access resizes the label to fit the new text.

To change the visual style of a control

1. Select the label and use the various options available through the visual style buttons on the toolbar.

Fill/Back Color	Font/Fore Color	Line/Border Color	Special Effects: Flat	Line/Border Width

An example of a customized form is shown in Figure P3-3.

Figure P3-3: Customized Form based on Video table in Form View.

Activity P3-5

Customize your VideoForm1 form to look like the form shown in Figure P3-3. Once you have made the required alterations, save your form as VideoForm2.

Now continue to experiment with different fonts, sizes, colours, and alignments for the text. Use the buttons on the toolbar or the options in the palette to make your changes. If you want to save this version of your form, use the **File** menu and choose **Save As** to give this form another name, otherwise, close the form without saving.

Display Values using a Combo Box

The controls that you use to enter, update, and display data from a table or query are bound to fields in the table or query.

For some controls it is useful to use a **combo box** that shows appropriate values for the control and if necessary the values can be displayed with descriptive text that informs the user about the different values. The user simply makes a selection from a list of possible entries. This helps the user to enter the correct values for a given control. You can replace a control with a combo box by first deleting the control and then using the **Combo Box Wizard** to create the new combo box control.

To delete a control

1. Click on the text box to select it.

2. Press the **DEL** key. Microsoft Access deletes the text box and its label. Note that to delete a label without deleting the text box, select the label and press the DEL key.

When you add a bound control to a form, your first step is to select the tool from the toolbox for the type of control you want.

To add a combo box control to a form

1. Click the **Combo Box** tool in the toolbox.

2. Click the form where you want to draw the combo box. Microsoft Access displays the first Combo Box Wizard dialog box.

3. Follow the instructions in the Control Wizard dialog boxes.

4. Click the **Finish** button to create the combo box control.

Switch to Form view to see the combo box control.

If you selected to type in the values to be displayed by the combo box, you must now defined these values using the property sheet for the combo box, which is described in the following section.

Set Control, Section, or Form Properties

Each control on a form has a set of properties. Properties determine a control's appearance and behaviour. For example, when you give your freestanding label, italic lettering and a three-dimensional look, you were setting properties for the label. To see and set control properties, you open the **property sheet**. The property sheet shows the properties of the selected object. A form and each of the sections and controls it contains has its own set of properties.

To display the property sheet

From the **View** menu, choose **Properties** (or click the **Properties** [icon] button on the toolbar).

To see the properties of an object

With the property sheet open, click on a control. Microsoft Access displays the properties of the selected control in the property sheet. You can leave the property sheet open while you work on your form.

Display a Description in the Status Bar

In Form view, the status bar displays the descriptions you entered for each field when you originally create a table. Because the combo box is a new control, it does not have a description to display. You can define a description by setting the **Status Bar Text** property for the combo box. We noted earlier that, when the combo box is created, the Combo Box Wizard sets the properties of the new control.

The *Row Source Type* property tells Microsoft Access what type of source provides the values in the list: a table or query, a list of values you provide, or a list of fields.

The *Row Source* property identifies the source of the list. For example, if the Row Source Type property is set to Table/Query, you set the Row Source property to the name of the table or query that contains the values for the list.

The *Column Count* property determines how many columns are in the combo box.

The *Column Widths* property determines the width of the columns.

To set the Row Source property

1. While viewing the properties of the control, select the **Row Source** property box.
2. In the Row Source property box, type in the source of the values, e.g. table name, query name or enter a list of values, where each value is separated by a semi-colon.

To set the Status Bar Text property

1. While viewing the properties of the control, select the **Status Bar Text** property box.
2. In the Status Bar Text property box, type in the description.

Activity P3-6

Open the property sheet for your form and examine the properties for the different objects on your form.

Carolyn Begg (2000)

In Practical 2, you created a combo box control for the certification field of your Video table during the design of the table. In this practical, create a combo box control for the category field of your VideoForm1 form

The Row Source for the combo box for the category field should contain the following values: Action; Adults; Children; Comedy; Drama; Horror.

Now, save your form and look at it in Form view. Add a new record to your Video table using your form.

Make Your Form Work for You

When you create a form that you or someone else will use to add, change, or view records, think about how you might want that form to work for you. For example, to automatically enter new values for each new record, to display error messages, or to show the results of calculations in some controls.

Setting a Default Value

In some cases, one value might show up in a field more often than any other. For example, we may assume that 'PG' is the most common certification for videos in the shop. When you add a new video, you can have Microsoft Access automatically fill in the certificate field with 'PG'. We set the **Default Value** property for the control to 'PG'. You can also set the Default value of a field when you design your table. Then Microsoft Access will automatically apply that value to any control you create that is bound to the field.

Showing Calculations

A control that is bound to a field in a table or query displays data from the field. You can also use a control to display data that is not in your tables. For example, you might want to display the current date in a text box on the Video form. The text box would not be bound to any field; instead, it would display the result of this expression: **=Date()**. The **Date** function returns the current date as reported by the system clock in your computer. A control that displays the result of an expression is called a *calculated control.*

To create a calculated control, select the tool in the toolbox for the control you want, and then click your form where you want the control to appear. Microsoft Access creates the unbound control. Now type the expression that you want in the control, or set the control's **Control Source** property to the expression.

Creating Validation Rules

Validation rules help you ensure that information entered into a form is correct before Microsoft Access stores it in your tables. For example, the *StayHome* video shop opened on 1st

September 1985 and therefore the dateJoined field for the Member table cannot take a value that is before this date. If we attempt to enter a date that is wrong, we want Microsoft Access to stop errors like this and display a message that helps the user fix the problem. Just as you use expressions to show calculations on a form, you can also use expressions to set rules for validating data. To create the rule, set the **Validation Rule** property of the dateJoined control to the following expression: **>=#1/09/85#**.

Set the **Validation Text** property to a message that you want Microsoft Access to display if the date entered in the text box falls out with the defined range.

You can also set a validation rule for a field when you design your table. Then Microsoft Access will apply that validation rule automatically to any control you create that is bound to the field. If necessary, you can set a separate, more restrictive validation rule for that control on the form.

Activity P3-7

Set default values for the certificate and category controls of your VideosForm1 form. Assume that the majority of videos in the shop are of certificate (PG) and category (Action).

Add a control to this form to display today's date in the top-right hand corner.

Set a validation rule for the dailyRental control such that no value entered into this field can be less than 2.00. Also add appropriate validation text.

Now, save your form and look at it in View form. Add a new record to your Video table using your form.

Activity P3-8

Create customized forms for your Member, VideoForRent and RentalAgreement tables. Change the appearance of each form, add combo boxes, default values, calculated fields and validation rules, where appropriate.

Now, save your forms and look at them in View form. Add new records to your Member, VideoForRent and RentalAgreement tables using your forms.

Microsoft Access 2000

Practical 4

In this practical you will learn how to create a query that associates related data from different tables together in the same datasheet. You should first read the information given in this practical and then complete the activities listed throughout.

To undertake the activities in this practical you need to have all of the tables of the *StayHome* database built with records. If you do not have a complete *StayHome* database, please take a copy of this database from your class directory on the network.

Create a Query

To bring together the data that we need from the one or more tables, we need to create a **select query**. A select query retrieves a set of records that match the specified criteria. As with other types of objects in an Access database, there are numerous ways to create queries.

To create a select query

1. Start Microsoft Access, and open the required database.

2. In the Database window, click the **Queries** button.

3. Choose the **New** button. Microsoft Access displays the New Query dialog box as shown in Figure P4-1.
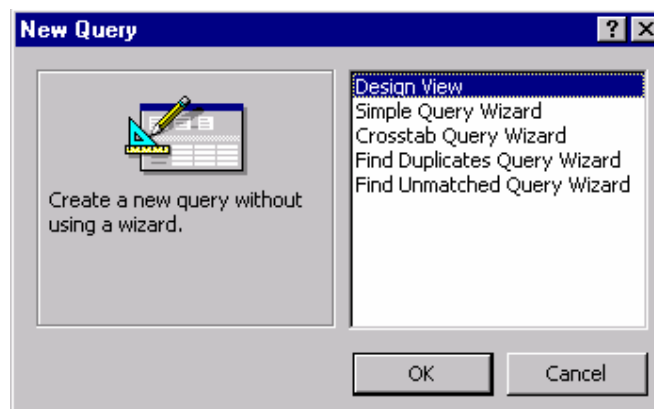
Figure P4-1 The New Query dialog box.

4. If you want to design the new query, select **Design View** and click **OK**. (If you want a wizard to help you build the query, select one of the other options).

5. Microsoft Access opens the **Select Query** window and displays the **Show Table** dialog box so that you can select the tables to use for your query as shown in Figure P4-2.
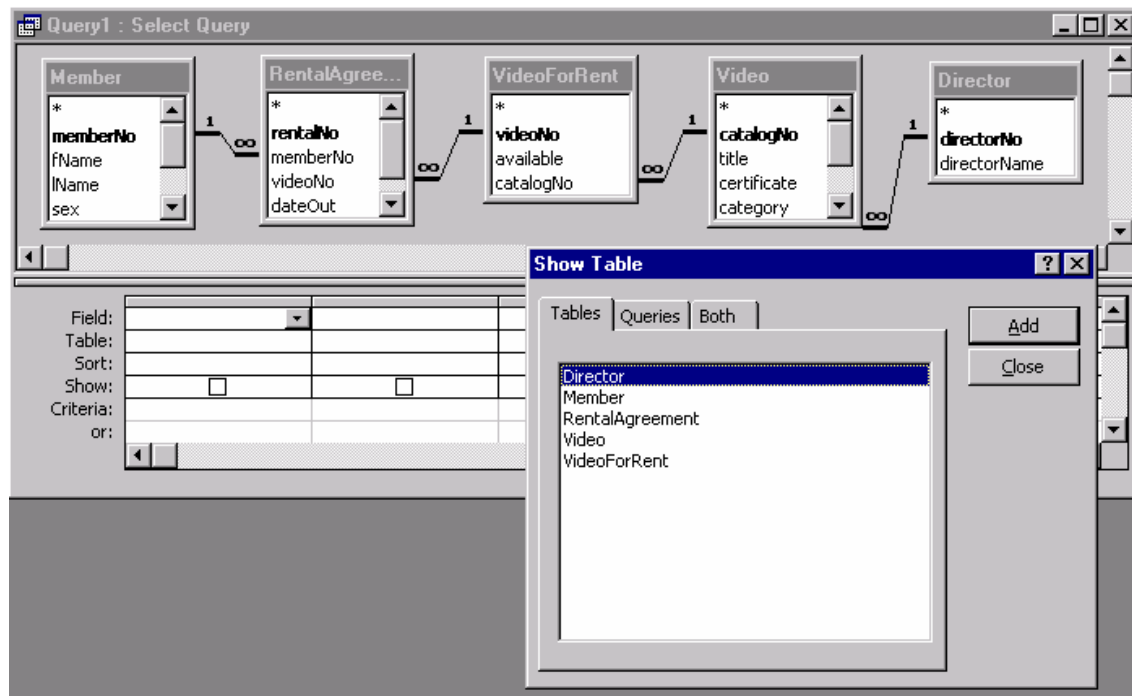
Figure P4-2: The Select Query window and Show Table dialog box.

6. Select the first table, and then choose the **Add** button. Microsoft Access adds the table to your query. Select the next table(s), followed by the **Add** button in each case. For example, in the Figure P4-2 all of the tables in the *StayHome* database have been selected for this query.

7. Choose the **Close** button.

The Select Query window

A query is a question you ask about the data in your database. To create a query, you specify the fields and records you want to see in the **Select Query** window. The Select Query window is a graphical query-by-example (QBE) tool. Because of its graphical features, you can use a mouse to select, drag, and otherwise manipulate objects in the window to define an example of the records you want to see. You specify the fields and records you want to include in the query in the OBE grid.

The **Select Query** window displaying the Member, RentalAgreement, VideoForRent, Video and Director tables is shown in Figure P4-2.

Join Tables

If Microsoft Access has not joined your tables automatically or if you have not created a relationship between the tables yourself, the tables will not be connected by join lines in the Select Query window. However, you can still use related data from the two tables, by joining the tables in the Select Query window when you create the query.

Before you can join two tables in a query, the related fields must be present in both tables. For the join to work, the two fields must contain matching data in related records.

To draw a join line

Select the field to be used in the join and then drag the field from its table to the same field in the table to be joined. When you draw a join line between two tables in the Query window, the join applies to that query only. If you use the same two tables in another query, you will need to join them again.

Note join lines have properties you can set and change. To see the properties of a join line, double-click the line (or click the line and choose **Join Properties** from the **View** menu).

To delete a join line

Click the join line to select it, and then press the **DEL** key.

Microsoft Access deletes the join. This does not change the data in your tables, but if you create a query now that includes fields from both tables, you might be surprised at the result. When it cannot determine how to associate the data, Microsoft Access creates a record for every possible combination of data between the tables.

 For more information about join properties, press F1 from the Join Properties dialog box.

Activity P4-1

Using the Select Query window, select your Member, RentalAgreement, VideoForRent, Video and Director tables (as shown in Figure P4-2). Practise joining and deleting the join lines between your tables. Examine the join properties of the join lines relating your tables.

Note that, in the Query window, Microsoft Access displays a table's primary key field or fields in bold. For example, the memberNo field in the Member table is in bold.

It is a good idea to create relationships between your tables, because in many case Microsoft Access can join the tables in a query automatically.

Creating Relationships between Tables

You relate tables or queries by specifying one or more fields that contain the same value in related records. These matching fields often have the same name in each table. In many cases, you will want to relate the primary key of one table to a matching field in another table. You create, view, and edit relationships in the **Relationships** window.

When you first create a table, it is not related to any other table. To create a relationship, you start by opening the Relationships window and add the tables or queries you want to relate and then you define the relationship(s).

To display the Relationships window

In the Database window, choose **Relationships** from the **Tools** menu (or click the **Relationships** button on the toolbar).

If you have viewed or edited relationships before, the Relationships window appears as you last saved it. If you are editing relationships for the first time in this database, the window is empty and Microsoft Access displays the Show Table dialog box.

To add tables or queries to the Relationships window

1. If the Show Table dialog box is not automatically displayed, choose **Show Table** from the **Relationships** menu (or click the **Show Table** button).

2. Select the table or query you want to create a relationship for, and then choose the **Add** button. To select more than one table or query at a time, hold down the **CTRL** key and click each you want to add. To select all or a block of tables and queries, click the first table or query, then hold down the **SHIFT** key and click the last one.

To create a relationship

1. Drag the field(s) that you want to relate from the field list of a table or query to the matching field in another table or query. The field you drag belongs to the **primary table**; the matching field where you drop it belongs to the **related table**.

2. Microsoft Access displays the Relationships dialog box. Check the field names displayed in the two columns and edit them if necessary. Choose **OK**.

Microsoft Access creates the relationship and displays a line between matching fields in the two tables. The relationship remains in your database until you delete it.

Create relationships between your Member, RentalAgreement, VideoForRent, Video and Director tables using the Relationship window.

Select Fields

Now that you have the table(s) you want for your query, you are ready to define the records you want. Start by selecting the fields from each table that you want to see in the answer.

To add fields to a query

1. Drag the field from the table field list to the first cell in the **Field** row of the QBE grid.

2. When the pointer is over the cell, release the mouse button.

3. Repeat for all of the required fields.

The check boxes in the **Show** cells for those fields are ticked, which shows that the data in the fields will be displayed in the query's datasheet.

The Query window displaying a query that retrieves the memberNo, fName, lName and DOB fields of the Member table is shown in Figure P4-3.
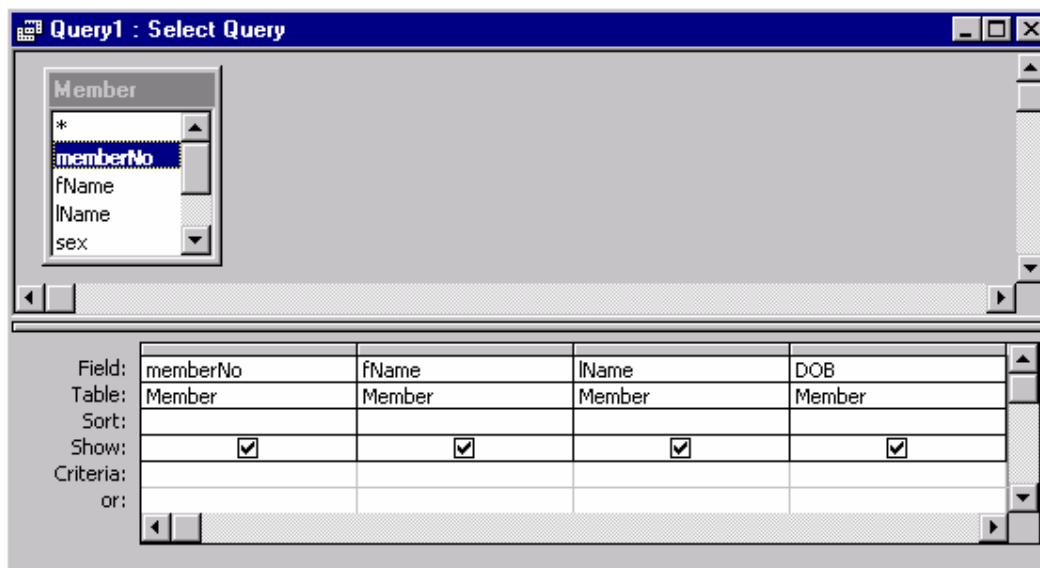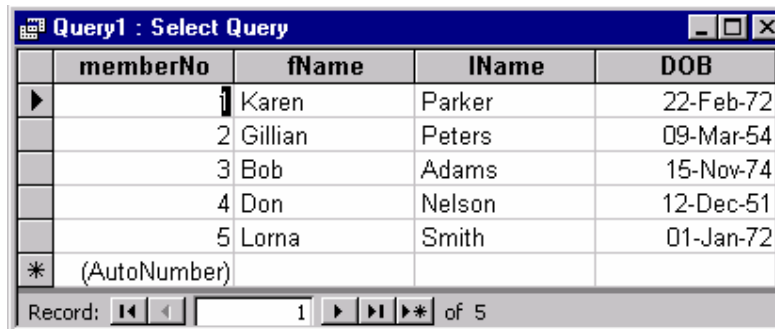

Figure P4-3: Creating a query on the Member table.

To see the results of a query

From the **View** menu, choose **Datasheet View** (or click the **View** button ▦▾ on the toolbar). You can also click the **Run** button. ❗

For example, running the query shown in Figure P4-3 produces the datasheet shown in Figure P4-4.

Figure P4-4: The datasheet produced when the query shown in Figure P4-3 is run.

When you attempt to close the window displaying the results of a new or changed query, you will be asked if you wish to save the query. If required, you may save and rename the query at this stage. Microsoft Access provides a default name for each new query created, for example Query1.

You may also save your query when you are creating it using the Select Query window.

Activity P4-3

In your Select Query window, create and run the following queries:

(a) From the Member table show only the memberNo, fName, lName and DOB fields (as shown in Figures P4-3 and P4-4).
(b) From the Member and RentalAgreement tables show only the fName, lName, rentalNo, dateOut and dateReturn fields.
(c) From the Member, RentalAgreement and VideoForRent tables show only the memberNo, fName, lName, rentalNo, videoNo, available and catalogNo fields.
(d) From the Member, RentalAgreement, VideoForRent and Video tables show only the memberNo, lName, videoNo, title and certificate fields.
(e) From the Video table show only the catalogNo, title, dailyRental and price fields.
(f) From the Video and Director tables show only the catalogNo, title, directorNo and directorName fields.

Create any other useful queries on your tables.

Specify Criteria

The answer to a query is an updateable set of records, which is called a **dynaset**. When you use a query to access data, its dynaset consists of the current data from the tables where the data is stored. If you change data in a dynaset, Microsoft Access updates the data in the underlying tables.

You can use queries and dynasets in the same way that you use tables to access data. For example, you can base a form or report on a query that displays data from two or more tables. Because the data in the dynaset is always current, you know that the data you are viewing on the form or report reflects the latest changes in your database. Any changes that you make to the data using the form are saved.

A dynaset may include all records in a table or you can specify the records you want to see using **criteria**. You use values in fields to indicate the records you want to see.

To specify criteria for a query

1. To return to **Design** view, choose **Design View** from the **View** menu or click the **View** button on the toolbar.

2. In the lower portion of the Design window, move to the **Criteria** cell(s) of the required table(s) and enter the required value(s).

3. To see your dynaset, choose **Datasheet View** from the **View** menu or click the **View** button on the toolbar.

Microsoft Access limits the dynaset to the records that match your criteria.

Specify Additional Criteria

By adding and combining criteria in the Query window, you can create powerful queries that meet a variety of precise conditions.

To add criteria to a query

1. Switch your query to **Design** view.

2. In the target column, enter the search criteria (phrase or expression) in the **Criteria** cell below the column heading, and then press **ENTER**.

Microsoft Access evaluates the expression and then looks in the field for values that match the result of the expression. Microsoft Access includes all the records with matching values in the field.

Common types of search criteria include:

- The value in a field is equal to the value you specify, e.g. to search for the video with the title Natural Born Killers. Enter **Independence Day** in the title field of the Video table.

- The value falls within a range of values, e.g. to search for all videos that have a daily rental rate less than £3.00. Enter **<4.00** in the dailyRental field of the Video table.

- The value begins with the value you set, e.g. to search for all members with a last name beginning with the letter M. Use the * wildcard and enter **M*** in the lName field of the Member table.

For more information about expressions in Microsoft Access, choose Search from the Help menu and search for 'expressions: examples.'

Activity P4-4

In your Query window, create and run the following queries:

(a) Locate a specific member given their first and last name. Show only the memberNo, fName, lName and address fields.
(b) For a specific member, given their first and last name, show the details of his or her video rentals.
(c) For a specific video, given the video title, show the first and last names and full addresses of those members who have rented this video.
(d) Locate the first and last names of female members who joined the video shop after the 1st September 1994.
(e) Locate the video number and title of videos in the Children category that have a daily rental rate of less than £4.00 and are available for rent.
(f) Locate videos that have 'the' in the title.
(g) Locate the number, first and last names and addresses of those members who have rented videos this year.
(h) Locate the videos directed by Sally Nichols.

Practise creating and running any other queries on your tables.

Sort Records

You have the set of records you want, but you may want to see them sorted in a different order. Just as you can sort records in a table or form, you can sort records in a query by one or more fields.

To sort records in ascending or descending order

1.   Switch to **Design** view.

2. Click the **Sort** cell for the field (or use the arrow keys to move to the Sort cell).

3. Select **Ascending, Descending** or **(not sorted)** from the Sort list.

4. Switch to **Datasheet** view to see the sorted records.

Modify a Query

The Query window is designed so that it can be easily modified.

To move a column in a query

1. In **Design** view, click the **field selector** (column heading) of the column you want to move.

2. Click the **field selector** again, hold down the mouse button, and drag the column to its new location.

To insert a column in a query

1. Select the column to the right of where you want the new column inserted.

2. From the **Insert** menu, choose **Columns**. Microsoft Access inserts a blank column.

To make a column wider or narrower

Drag the right border of the field selector.

To adjust a column's width for the best fit

Double-click the right border of the field selector. Microsoft Access adjusts the column width to accommodate the longest cell entry in the column.

You can also include a field in your query without having it appear in the datasheet. This is convenient if you want to use the field to specify criteria for the dynaset but don't want the field in your datasheet.

To exclude a field from the query's datasheet

Clear the field's **Show** box by clicking it.

Calculations

Often, the most interesting information is a total, average, or some other type of calculation based on a set of records. For example, the average age of all members of the video shop.

To perform calculations in your query

1. From the **View** menu, choose **Totals** or click the **Totals** button on the toolbar. $\boxed{\Sigma}$

Microsoft Access displays the **Total** row in the QBE grid. Note that Microsoft Access automatically fills in each box with '**Group By**'.

2. Select the **Totals** row and click on the arrow to choose the type of calculation you want performed on your records.

Carolyn Begg (2000)

Microsoft Access 2000

Practical 5

In this practical, you will learn how to find a specific value in a set of records. In addition, you will learn how to use filters to interactively refine the set of records you are viewing. You will also learn how to create a subform that shows the set of records associated with a single record on the main form. You will also learn how to combine data from different tables into a single form by basing the form on a query.

You should first <u>read</u> the information in this practical and <u>then</u> complete the activities listed throughout.

Find a value

When you are looking for a specific value such as 'Independence Day' in the title field of the Video table, the **Find** command on the **Edit** menu of a form or datasheet provides the quickest way to find the record you want.

You can tell Microsoft Access the exact value you want to find, or you can use these wildcard characters: the question mark (**?**), asterisk (*****), or number sign (**#**). For example, you can use L?s to find Los, Las, or L6s; you can use L*s to find Los or Louis; or you can use A#X to find A2X or A9X.

To find a value

1. Open your datasheet and move to the required column.

2. From the **Edit** menu, choose **Find** (or click the **Find** button on the toolbar).

    Microsoft Access displays the Find and Replace dialog box, as shown in Figure P5-1.
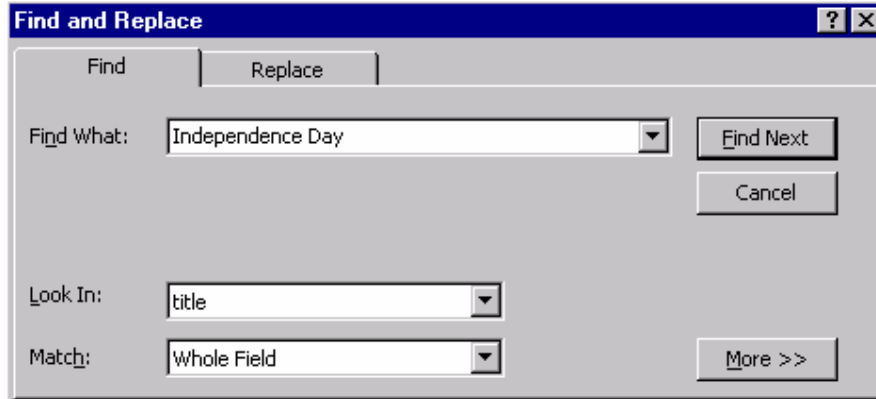
Figure P5-1: The Find and Replace dialog box.

3. Type the value you want to find in the **Find What** box.

4. Then select the other options as required by your search.

5. To find the first (and subsequent) occurrence of the value being searched for, choose the **Find Next** button.

6. When the search is completed, choose the **Close** button to close the Find and Replace dialog box.

Activity P5-1

Use the Find and Replace dialog box to locate specific records in your Member and Video tables. For example, find the following records:

(a) Find female members of the video shop.
(b) Find members who have a surname beginning with the letter 'P'.
(c) Find members who live in a certain area of Glasgow, e.g. G3.
(d) Find videos with the 'PG' certification.
(e) Find videos that are in the 'Action' category.
(f) Find videos that have 'The' in the title.

Undertake other searches to explore the options offered in the Find and Replace dialog box. Ensure that you understand how to use the wildcard characters.

Sort Records

To sort records

1. Open your datasheet and move to the required column.

2. Click the **Sort Ascending** button or the **Sort Descending** button on the toolbar. You can also sort records by selecting **Sort** from the **Records** menu and by choosing **Sort Ascending** or **Sort Descending**.

3. The records are displayed in ascending or descending order using the values in the selected column.

Activity P5-2

Sort your members and videos records into the following orders:

(a) Sort your members records according to their last name.
(b) Sort your members records according to the date they joined the video shop with the latest to join at the top of the list.
(c) Sort your members records according to their postal code.
(d) Sort your videos records according to the video title in descending order.
(e) Sort your video records into category order in descending order.

Create a Filter

When you create a filter, you give Microsoft Access a set of criteria that describe the records you want to see. Microsoft Access uses these criteria to select the records you want from the table or dynaset. There are four methods you can use to filter records: Filter by Form, Filter by Selection, Filter Excluding Selection and Advanced Filter/Sort. The method you pick depends on the criteria you want the records to meet and how you want the records sorted (if at all).

Filter by Form and Filter by Selection are the easiest way to filter records. If you can easily find and select an instance of the value you want the filtered records to contain use Filter by Selection; otherwise use Filter by Form. You can save these filters as queries. For more complex filters, use Advanced Filter/Sort.

To use Filter by Selection / Filter Excluding Selection

1. In a field on a form, subform or datasheet, find one instance of the value you want the records to contain.

---

2. Select the value, and then access the **Records** menu and choose **Filter** and then **Filter by Selection** or click the Filter by Selection button on the toolbar.

3. To further limit the set of records, select another value, and then click the Filter by Selection button again. Repeat steps 2 and 3 until you have the records you want.

You can use **Filter Excluding Selection** in exactly the same way that you apply Filter by Selection with the exception that you enter values that you do <u>not</u> want the records to contain.

To use Filter by Form

1. In Datasheet or Form view, select the **Records** menu and then **Filter** and choose **Filter by Form** to switch to the Filter by Form window or click the Filter by Form button on the toolbar.

2. Click the field in which you want to specify the criteria that records must meet to be included in the filtered set of records.

3. Enter your criteria by selecting the value you are searching for from the list in the field, or by typing the value into the field.

   Note that you can find records which contain a particular field that is empty or not empty by typing **Is Null** or **Is Not Null** into the field. You can also find records by typing a criteria expression into a field. For examples of criteria expressions – search the online help for **Filters** and then **Examples of criteria expressions for queries and filters**.

4. To specify alternative values that records can have to be included in the filters results, click the **Or** tab at the bottom of the window.

5. From the **Filter** menu and select **Apply Filter/ Sort** or click the Apply filter button on the toolbar.

6. To cancel the filter, from the **Records** menu, select **Remove Filter/Sort** or click on the Remove Filter button, which is a sunken version of the above button.

To use the Advanced Filter/Sort

1. In Datasheet or Form view, from the **Records** menu, choose **Filter** and then **Advanced Filter/Sort**.

Microsoft Access opens the Filter window as show in Figure P5-2, where you define the records you want to see.
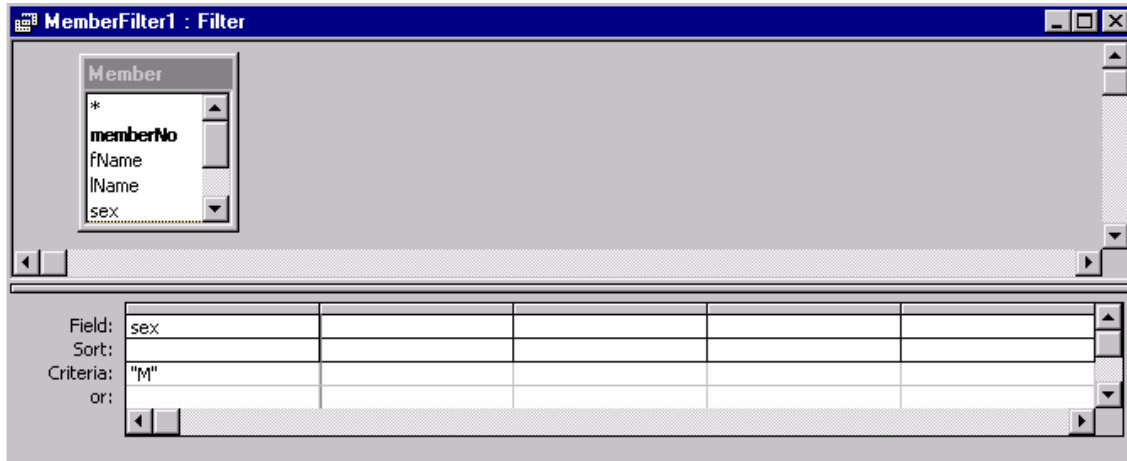
Figure P5-2: The Filter Window.

The **Filter** window looks a lot like a Query window. However, in the Filter window, you cannot add tables or compute values the way you can with a query, you can only specify criteria and sort order.

2. Add to the design grid the field or fields you will need to specify the values or other criteria the filter will use to find the records.

3. Type in the value in the **Criteria** cell for the appropriate field, and then press **ENTER**. Also, select the sort order in the **Sort** cell of the appropriate field(s), if required.

4. Apply the filter by accessing the **Filter** menu and selecting **Apply Filter/ Sort** or click the Apply filter button on the toolbar.

5. To cancel the filter, from the **Records** menu, select **Remove Filter/Sort** or click on the Remove Filter button.

Activity P5-3

Examine the four methods of creating a filter.

Apply filters to your members and videos records. For example, create the following filters to view:

(a) Only male members of the video shop (as shown in Figure P5-2).
(b) Only male members of the shop who joined the shop this year in order of last name and then first name.
(c) All members born in the 1960s.
(d) Only videos in the Children category with a daily rental rate of less than £4.00 and sorted according to video title.

(e) Only videos currently available for rent with a certification of 'PG' or 'U'.

(f) Only videos by a certain director.
(g) Only members of the video shop that have not supplied a date of birth.

Filters can also be used with queries. Create other useful filters on your queries.

Create a Form That Contains a Subform

We can create a form that is actually two forms in one. Such a form is made up of a **mainform** and **subform**. The mainform displays one record at a time (e.g. details of a member) and at the same time, the subform displays the many records associated with that record (e.g. all of the video rental details for a member). This type of data is said to have a 'one-to-many' relationship; one member has many video rentals.

A form with a subform has advantages over a query for viewing this type of data. Because a query displays its result in a datasheet, each field on the 'one' side of the relationship must be repeated for each record on the 'many' side. But a form with a subform can show the data on the 'one' side of the one-to-many relationship once at the top of the form and show all the records on the 'many' side of the relationship grouped below it.

To create a form that contains a subform

1. In the Database window, click the **Form** button.

2. Choose the **New** button.

3. Select the table on the 'one' side of the relationship from the list of tables and queries.

4. Select the **Form Wizards** option and click the **OK** button.

5. Select the fields for the main form.

6. In the Tables/Queries box, select the table on the 'many' side of the relationship as the source for the subform. Select the required fields and click the **Next** button.

7. Select the Form with subform(s) option and click the **Next** button.

8. Complete the instructions in the following Forms Wizard dialog boxes.

The Form Wizard creates your form and opens it for you as shown in Figure P5-3.

Figure P5-3: A main form called Member that contains a subform called RentalAgreement.

Activity P5-4

Create the following forms that contains a subform to display the following information:

(a) Member details including the memberNo, fName, lName and the details of videos rented for a member including the rentalNo, videoNo, dateOut and dateReturn fields (as shown in Figure P5-3).

(b) Video details including the catalogNo, title, certification and category fields and the details of copies for a video including the videoNo and available fields.

Create other forms with a subform to display a different selection of fields from your Member, RentalAgreement, VideoForRent, Video and Director tables. Attempt to improve the appearance of your forms.

Use a Query to Include Fields from More Than One Table

Suppose that you want to review your video rental details one by one. It is sometimes easier to use a form rather than a datasheet because a form has a more convenient layout for viewing individual records. Also, it would be convenient to have the member's number and name appear on the form along with the rental details. In this case, you don't need to group the data from either table. You just need to combine data from different tables in the same record on a

form. To do that, you create a query that includes the fields you want and then base the form on the query.

To create a query

1. From the Database window, create a new query.

2. Add the required tables to the query, and then close the **Show Table** dialog box.

3. From the tables, drag the required fields to the **Field** row of the **QBE** grid.

4. Save and name the query.

5. Close the query.

To base a form on a query

I . In the Database window, select to create a new form.

2. Select the multi-table query and then follow the same instruction as when you create a form base on table using the Form Wizard or AutoForm options.

Microsoft Access creates a form based on the query. Now you have a form that shows data from more than one table in the same record.

To Create a Form based on an Autolookup Query

We can design a multiple-table query to automatically fill in certain field values for a new record. When we enter a value in the join field in the query or in a form based on the query, Microsoft Access looks up and fills in existing information related to that value. For example, if we know the value in the join field between the RentalAgreement table and the Member table we could enter the memberNo and have Microsoft Access enter the rest of the information for that member. If no matching information is found, Microsoft Access will display an error message.

To create an autolookup query, we add two tables that have a one-to-many relationship and select fields for the query to the QBE grid. The join field must be selected from the 'many' side of the one-to-many relationship. For example, in a query that includes the RentalAgreement and Member tables, we drag to the design grid the memberNo field (foreign key) from the RentalAgreement table as shown in Figure P5-4.

The figure shows an "AutoLookup Form" window with the following fields:

- rentalNo: 7
- Video No: 178643
- Date Out: 14-Nov-99
- Date Return: 16-Nov-99
- Member No: 4 — When member number is selected.
- fName: Don
- lName: Nelson — The member's details are automatically filled in.
- address: 123 Suffolk Lane,Glasgow, G15
- Record: 11 of 11

Figure P5-4: Form based on a lookup query.

ActivityP5-5

Create the following autolookup forms:

(a) A form to accept video rental details including the rentalNo, videoNo, dateOut, dateReturn and memberNo. When the memberNo field is filled out, the corresponding member details in the fName, lName and address fields should be automatically filled in (as shown in figure P5-4).

(b) A form to accept video rental details including the rentalNo, memberNo, dateOut, dateReturn and videoNo. When the videoNo field is filled in, the corresponding video details including in the title, certificate, category and dailyRental fields should be automatically filled in.

Microsoft Access 2000

Practical 6

In this practical, you will learn how to create reports that groups data. You will also learn how to create a customized database application, which includes creating a startup form and automating repetitive tasks using macros and the Command Button Wizard. You should first <u>read</u> the information given in this practical and <u>then</u> complete the activities listed throughout.

How to Use Reports to Present Data

You can use a report to present your data in print. With a report, you have greater flexibility to present summary information than with a form. For instance, you can include totals across an entire set of records in a report.

To create a report with grouped data

1. In the Database window, click the **Reports** button.

2. Choose the **New** button. Microsoft Access displays the New Report dialog box.

3. Select the required table or query from the list for the report.

4. Select the **Report Wizard** button and click **OK**. Microsoft Access displays the first Report Wizard dialog box.

5. Make these choices as you go through the dialog boxes:

    (a) Select the required fields from the table or query for the report. Click the **Next** button.
    (b) Select the field(s) to be used to group the records by.
    (c) Click on the **Grouping Options** button and select the option 'Normal', which groups records together with the same value. Click **OK** and then the **Next** button.
    (d) If required, select the field(s) to sort records within a group of records.
    (e) If required, click the **Summary Options** button to set summaries (Sum, Avg, Min, Max) for your report. Click the **Next** button.

6. Complete the instructions for the final Report Wizard dialog boxes that set the style of the report.

Microsoft Access creates and displays the report in Design View or in Print Preview, as shown in Figure P6-1.

Figure P6-1: Report based on some fields of the Video table in Print Preview.

Preview, Print, and Save a Report

In Print Preview, Microsoft Access displays your report as it would appear in print.

To see a whole page of the report

1. In **Print Preview**, position the pointer over the report. The pointer changes to a magnifying glass.

2. Click the report. Microsoft Access displays a view of the whole page.

3. To zoom back in and view the data, click the report again. You can also use the **Zoom** button on the toolbar to zoom in or out of your report.

To close the Print Preview window

Click the **Close** button on the toolbar.

To print a report

1. From the **File** menu, choose **Print** or click the **Print** button on the toolbar.

2. Change the print settings if you need to, and then choose **OK**. Microsoft Access prints your report.

To save a report

1. From the **File** menu, choose **Save** or click the **Save** button on the toolbar.

2. Microsoft Access displays the **Save As** dialog box. Give the report a name and choose **OK**.

A Report in Design View

You use **Design** view to modify the design of your report.

To open a report in Design view

1. In the Database window, click the **Reports** button to display the list of reports.

2. Choose the **Design** button. Microsoft Access displays the report in Design view.

Microsoft Access divides a report into sections. In Design view, each section of the report appears once, as displayed in Figure P6-2.
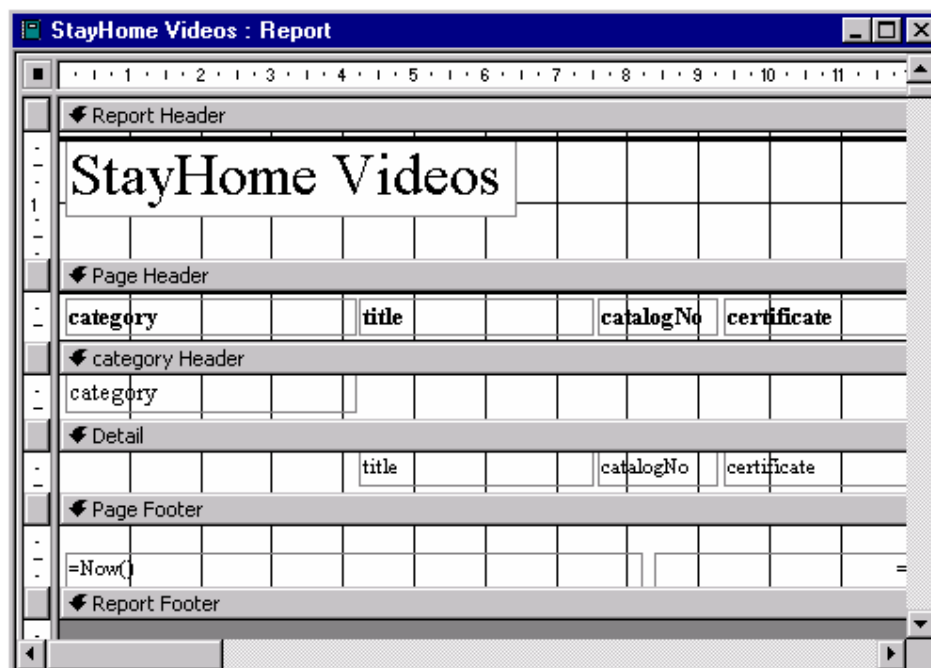
Figure P6-2: Report based on some fields of the Video table in Design View.

When you print the report, sections are repeated, as appropriate, until all the data in the report is printed. The controls in each section tell Microsoft Access what data to print in the section. The **Report Header** prints at the beginning of the report. The **Page Header and Footer** prints on every page. The **Category Header and Footer** prints for each category. The **Details** section prints for each record in the category.

Activity P6-1

(a) Create a report for your Video table containing the catalogNo, title, category and certificate fields. Group your records according to the values in the category field and then sort on the values in the title field. (Note that this report is shown in Print Preview in Figure P6-1 and in Design view in Figure P6-2.)

(b) Create a report for your Video table containing the category, dailyRental and price fields. Group your records according to the values in the category field and then sum the values in the dailyRental and price fields.

(c) Create a report based on a query that contains the following fields memberNo, fName, lName, videoNo, title, dateOut and dateReturn. Group your records according to memberNo and then order by videoNo.

Attempt to improve the appearance of your reports. Explore the other options available to you when creating a report and create more reports for use by *StayHome*.

Creating a Customized Database Application

A customized database application is a database created in a commercial package, such as Microsoft Access, using the tools that the commercial application provides to automate tasks and to replace the built-in interface elements with customized versions. A well-designed customized application is easy to learn and use because it presents, in clear, obvious, and intuitive ways only the instructions and commands needed to perform the specific tasks the database was designed to carry out.

The following sections described how to create customized interface elements.

Starting up your application

A startup form will appear whenever someone opens your database. A startup form looks like any other database form, and can include text to identify the database and welcome users.

To create a startup form

1. You first create the form that is to be displayed when the database application is started. From the **Insert** menu, select **Form**.

2. In the New Form dialog box, double-click **Design View**.

3. Add the text you want to appear on the form.

4. Select the form by clicking on the **form selector** located at the top left-hand-side of the form.

   When selected, the form selector appears with a black box in the center.

5. Click on the **Property** button and change the following properties to make the form look like a dialog box.

   Scroll Bar (Neither)   Record selectors (No)
   Navigation Buttons (No)   Auto Center (Yes)

6. Save and name your form. An example of a startup form is shown in Figure P6-3.

Figure P6-3: An example of a startup form for the *StayHome* database.

To open startup form automatically

1. From the **Tools** menu, select **Startup** to display the Startup dialog box. You can change the title and the image displayed in the title bar using the **Application Title** and **Application Icon** boxes, as shown in Figure P6-4. Note that icon files can be found in the C:\ Program Files\Microsoft Visual Studio\Common\Graphics\Icons folder.
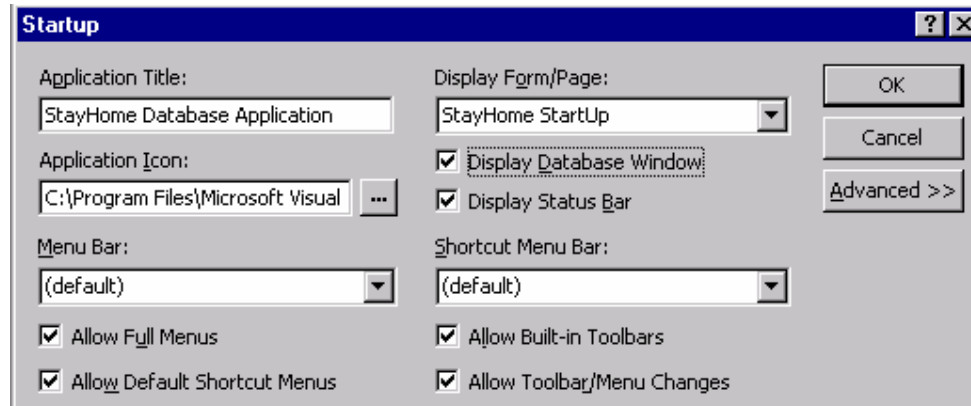
Figure P6-4: Startup dialog box.

To bypass the startup form

To bypass settings that determine how a database or application starts, hold down the **SHIFT** key when opening your database.

Activity P6-2

Create a startup form for the *StayHome* database called StayHome Startup (as shown in Figure P6-3). Ensure that this form is automatically displayed when you opened the database.

Automating Repetitive Tasks

When you set up a database, you will want it to be as easy to use as possible, especially when it comes to repetitive tasks. With Microsoft Access, it is easy to automate tasks like changing values in one field when the value in another changes or printing reports by creating macros or writing Visual Basic procedures.

Using Macros

A macro automatically carries out a task or a series of tasks for you. Each task that you want Microsoft Access to perform is called an action. Microsoft Access provides a list of actions for you to select from to create a macro. When you run the macro, Microsoft Access carries out the actions in the sequence they are listed, using the objects or data you have specified.

To create a macro

1. In the Database window, click the **Macros** button and click **New** or from the **Insert** menu, select **Macro**.

   Microsoft Access opens a new Macro window, where you select the actions you want in the macro, as shown in Figure P6-5.
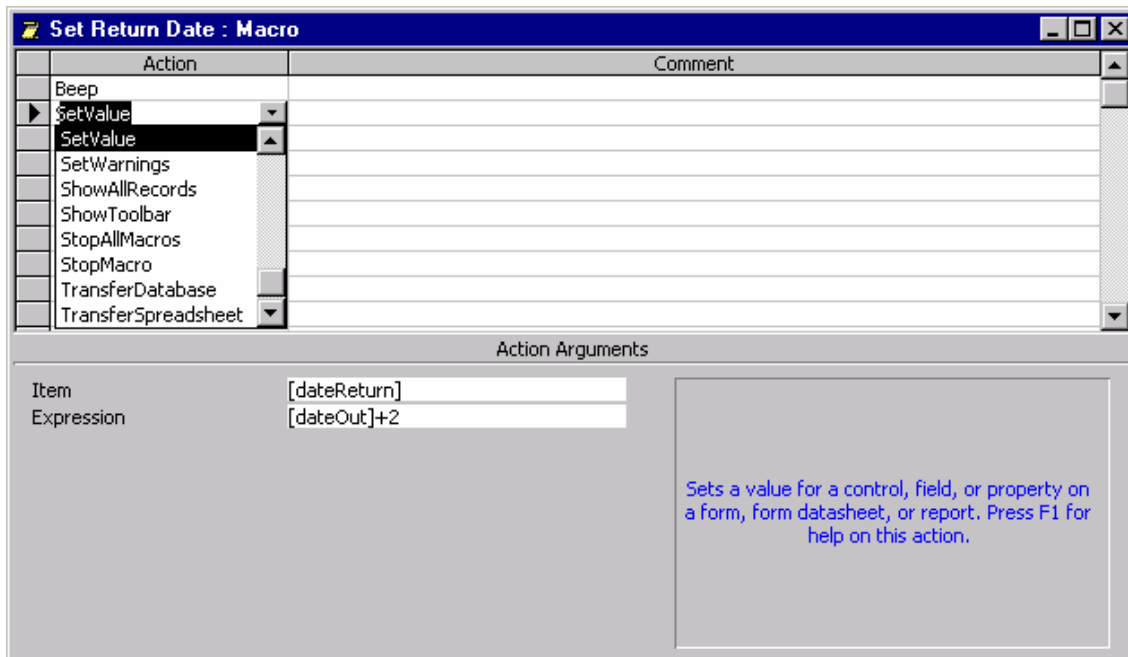
Figure P6-4: Creating a macro called Set Return Date in the Macro Window.

2. You use the upper portion of the Macro window to add actions. You can add comments to explain the reasoning behind each action. You use the lower portion of the Macro window to specify arguments for an action. Arguments give Microsoft Access additional information on how to carry out an action, such as which object or data to use.

There are two ways to add actions to a macro. You can select actions from the action list in the Macro window, or for common actions associated with objects in your database, you can drag the object from the Database window to the action cell in the Macro window. This drag-and-drop method adds the appropriate action and arguments.

To add an action to a macro

1. In the Macro window, click the first empty cell in the **Action** column.

2. Either select the action you want from the action list (click the arrow to see this list) or type the action directly in the cell.

3. Enter a comment (optional) for the action.

4. Specify the arguments for the action, if any are required.

To save a macro

You must save a macro before you can run it. When you save a macro, it becomes a database object that you can open or run from the Database window.

1. From the Macro window, choose **Save** from the **File** menu.

2. If you are saving a macro for the first time, type a name for the macro and choose **OK**.

Running a Macro

You can run a macro from the Macro window, from the Database window, from other windows in the database, or from another macro. You can also run a macro in response to an event that occurs in a form or report.

To run a macro from the Macro window

With the macro open in the Macro window, choose **Run** from the **Run** menu or click the **Run** button on the toolbar.

To run a macro from the Database window

In the Database window, click the **Macro** button and choose the **Run** button.

To run a macro from other windows in the database

1. From the **Tools** menu, choose **Macro** and then **Run Macro…**.

2. In the Run Macro box, type the name of the macro you want to run and click **OK**.

To run a macro from another macro

1. Add the **RunMacro** action to your macro.

2. Set the **Macro Name** argument to the name of the macro you want to run.

You can also run a macro in response to an event that occurs in a form or report, by setting the appropriate event property to the name of the macro. For example, you can run a macro automatically when you open a form, use the form to add a new record, press a command button on the form, or close the form.

Responding to Events on Forms

When you use a form, Microsoft Access recognizes certain things that happen on the form as events. For example, moving from one record to another on a form is an event; so is double-clicking a control. You can use a macro to respond to an event.

Each form and control event has a corresponding **event property**. You specify how a control or the form responds to an event by using a macro: You set the appropriate event property for the form or control to the name of the macro.

To create a response to an event, first you identify the form or control event you want the macro to respond to. Next, you write a macro that contains the actions that are to take place when the event occurs and set the event property to the name of the macro. You can use the Macro Builder to create a macro and set the event automatically. The Macro Builder is available for each event property.

Activity P6-3

(a) Create a macro called Set Return Date that automatically sets the value in the dateReturn field of the RentalAgreement table to two days after the value in the dateOut field. Open a form for the RentalAgreement table and associate the Set Return Date macro with the After Update event property of the dateOut field. Test the Set Return Date macro.

(b) Create a macro called Open Rental Agreement Form that opens up a form for the RentalAgreement table in data entry mode (Set Mode to Add). Save and close the macro. Open up a form for the Member table in Design View and ensure that you can also see the Database Window. Click on the Macros button on the Database Window and click and drag the Open Rental Agreement Form macro to the Member form. Drop the macro onto the form and note that a command button is created. Save the form and test the Open Rental Agreement Form macro.

(c) Explore the other types of tasks that can be automated using macros.

Use the Command Button Wizard to Create the Button

Using Microsoft Access, you can automate tasks by creating command buttons with the **Command Button Wizard**. A command button is a control on a form. Unlike most other controls, a command button does not display or accept data. Instead, when you press the button, it carries out an action such as printing reports or opening forms.

If you often use two forms together, you can create a command button on one form that opens the other automatically.

To create a button that closes a form

1. Open the form that is to contain the button in **Design** view.

2. Select the **Command Button** tool in the toolbox.

3. Click an empty area in the form. Microsoft Access displays the first Command Button Wizard dialog box.

4. A command button can be use to carry out many tasks such as navigating through records, performing operations on records and running other run applications.

   To create a button that opens a form, select **Form Operations** and **Open Form**. Click the **Next** button.

5. Complete the instructions in the following Command Button Wizard dialog boxes.

   Microsoft Access creates the command button and places it on the form.

Activity P6-4

(a) Add a button to your startup form that when clicked closes the form.

(b) Add a command button to your VideoForm2 (created in Practical 3) that print previews the report created for Activity P6-1(a) of this practical.

(c) Create a form for the Member table that allows the user to add, delete and save records or to close the form.

Explore the other types of tasks that can be automated using the Command Button Wizard.

Programming in Visual Basic

When the Command Button Wizard creates a button, it actually writes a Visual Basic event procedure to perform the action you want. You can see the event procedure for a button by opening the button's property sheet and examining the **On Click** property and clicking the **Build** button.

Using the Visual Basic programming language, you can edit or add to the instructions the Command Button Wizard creates, or you can write your own event driven procedures. For more information on event procedures search the online help.

Activity P6-5

Examine the Visual Basic code attached to the buttons that you created in Activity P6-4. Open the Microsoft Access sample database applications and examine the Visual Basic code associated with these applications.

Microsoft Access 2000

Practical 7

In this practical, we revisit some of the topics introduced in Practicals 1 to 6. You will learn more about field and table properties, and about indexes including when it is appropriate to create them. You will also learn more about relationships and in particular referential integrity. You should first <u>read</u> the information given in this practical and <u>then</u> complete the activities listed throughout.

<u>Setting Field Properties</u>

You can control the appearance of data, prevent incorrect entries, specify default values, and speed up searching and sorting by setting field properties in a table's Design view. For example, you can format numbers to make them easier to read, or you can set rules that data must meet to be entered in a field.

Microsoft Access uses **field property** settings when you view and edit data. The **Format**, **Input Mask**, and **Caption** properties you set appear in table and query datasheets, and controls on new forms and reports. You use other properties to set rules for data or to require data entry in your fields, which Microsoft Access enforces whenever you add or edit data in the table.

Listed below are the field properties and their uses.

<u>Field Property</u>	<u>Uses</u>
Field Size	Adjust the size of a Text field, or limit the range of allowable values in a Number field.
Format	Display dates and numbers in a certain display format, such as Long Date format or Currency format.
Decimal Places	Display a certain number of places after the decimal point when using a format for a Number or Currency field.
Input Mask	Display formatting characters in a field so that they don't have to be entered, and ensure that data entered fits in the mask.
Caption	Specify a label other than the default label (field name) for new forms and reports.
Default Value	Automatically fill in a certain value for a field in new records you add to the table.
Validation Rule	Limit data entered in a field to values that meet certain requirements. Microsoft Access checks to make sure the data follows this rule before it moves to the next field in the table.
ValidationText	Display a message when the field validation rule is violated.
Required	Require that data be entered in a field.
Allow Zero Length	Allow zero-length strings to be stored in a Text or Memo field.
Indexed	Speed up searches on fields that are searched frequently.

Unicode Compression   A character-encoding scheme to represent the data in a Text, Memo or Hyperlink field. In Unicode, each character is represented by two bytes instead a single byte.

You view and change field properties for one field at a time. When you open a table in Design view, Microsoft Access displays the property settings for the current field in the lower portion of the Table window. The particular field properties displayed for each field in your table will vary according to the field data type.

To set a field property for a table

1. Open the table in **Design** view.

2. In the upper portion of the Table window, click the field for which you want to set properties. Microsoft Access displays the properties for this field in the lower portion of the Table window.

3. In the lower portion of the window, click the box for the field property you want to set.

4. Type a setting for the property. Or, if an arrow appears at the right side of the property box, click the arrow to choose from a list of settings for the property.

If you want more space to enter or edit a property setting, press **SHIFT+F2** to display the zoom box. If you are entering an input mask or validation expression and would like help building it, click the **Build** button to the right of the property box to display the appropriate builder.

5. To save your changes to the table, choose **Save** from the **File** menu or click the **Save** button on the toolbar.

Activity P7-1

In Practicals 1 and 2, you set field properties for some of the fields in your Member, RentalAgreement, VideoForRent, Video and Director tables. Examine the other fields in these tables, and add appropriate field properties. (At this stage, do not set the index property for your tables as later in this practical, we examine indexes in more detail.)

Note that, you should use the builder, when entering an input mask or validation expression.

Setting Table Properties

In addition to field properties, you can set properties that apply to an entire table and to entire records. You set these properties in the table's property sheet. The list shown below gives the table properties and their uses.
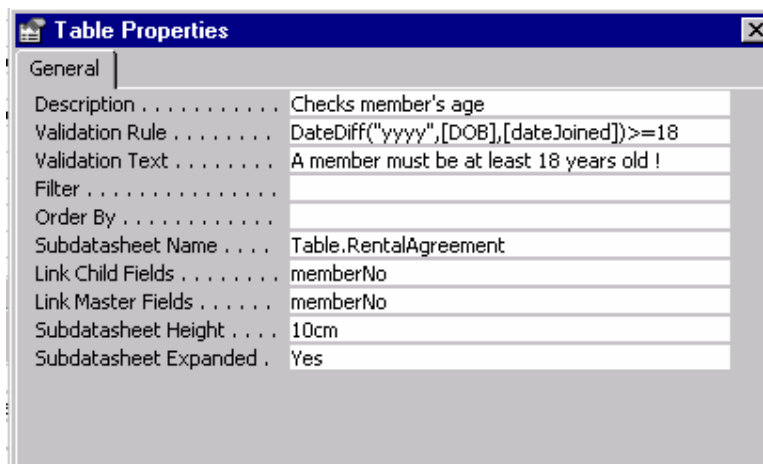
Table Property	**Uses**
Description	Store a description of a table's contents and purpose. For attached tables, Microsoft Access stores a description of the table's source.
Validation Rule	Limit data entered in a record to values that meet certain requirements. Microsoft Access checks to make sure the data follows this rule before it saves a record in the table.
Validation Text	Display a message when the record validation rule is violated.
Filter	Store a description of the filter for the table.
Order By	Store a description of the sort order for the records of the table.
Subdatasheet Name	Specify the table or query (subdatasheet) that is bound to the table. A subdatasheet is a datasheet that is nested within another datasheet that contains data related or joined to the first datasheet.
LinkChildFields / LinkMasterFields	Specify how Microsoft Access links records in the table to the subdatasheet. If set, Microsoft Access automatically updates the related record in subdatasheet when you change to a new record in a table.
Subdatasheet Height	Specify the display height of a subdatasheet when expanded.
Subdatasheet Expanded	Specify the saved state of all subdatasheets within a table.

To set a table property

1. Open the table in **Design** view.

2. From the **View** menu, choose **Properties** (or click the **Properties** button on the toolbar).

Microsoft Access displays the table's property sheet, as shown in Figure P7-1.

Figure P7-1: Table property sheet for the Member table.

3. Click the box for the property you want to set.

4. Type a setting for the property.

   If you want more space to enter or edit a property setting, press **SHIFT+F2** to display the Zoom box. If you are setting the **Validation Rule** property to an expression and would like help building it, click the **Build** button to the right of the Validation Rule property box to display the Expression Builder.

5. To save your changes to the table, choose **Save** from the **File** menu.

Using Validation Rules for Records

Although you will usually set validation rules for individual fields, you may also want to set a rule that applies to a record as a whole. When you set a validation rule for a table, Microsoft Access checks for valid data when you save or leave a record, rather than when you leave a field. Unlike field validation rules, table validation rules can contain references to one or more fields in the table. This makes them useful when you want to compare values in different fields. For example, you can use a table validation rule to ensure that one field's value is always greater than that of another in the same record.

You create a table validation rule by setting the table's Validation Rule property to an expression. Each time you save a record, Microsoft Access evaluates the expression to make sure it's true.

Activity P7-2

(a) Create a rule that all members must be at least 18 years old when they join the video shop. Set this rule as a table property for your Member table (as shown in the Figure P7-1). Please ensure that you understand how the validation expression works by accessing the online help.
(b) Create a subdatasheet for the Member table to display the video rentals associated with each member (as shown in Figure P7-1). Save your Member table and examine the table in datasheet view.

Creating Indexes

If you often search a table or sort its records by a particular field, you can speed up these operations by creating an index for the field.

To create an index

1. Open the table in **Design** view.

2. Select the field to be indexed and access the **Indexed** property for this field. This gives the following list of possible settings for the Indexed property.

Indexed Property Setting	**Meaning**
No	Don't create an index on this field (or delete existing index).
Yes (Duplicates OK)	Create an index on this field.
Yes (No Duplicates)	Create a unique index on this field.

If you create a unique index, Microsoft Access does not allow you to enter in a field a value that already exists in the same field for another record. Microsoft Access automatically creates a unique index for primary keys but you may want to prohibit duplicate values in other fields, as well.

For more information on unique indexes, search Help for 'Indexed'. Note that, Microsoft Access also automatically creates indexes for fields involved in relationships between tables.

Viewing and Editing Indexes

If you want to see or edit a table's indexes, you can open the Indexes window in the table's Design view.

To view and edit existing indexes

1. Open the table in **Design** view.

2. From the **View** menu, choose **Indexes** or click the **Indexes** button on the toolbar.

Microsoft Access displays the Indexes window. If the table has a primary key, the primary key index is displayed along with any other indexes you have added, as shown in Figure P7-2.
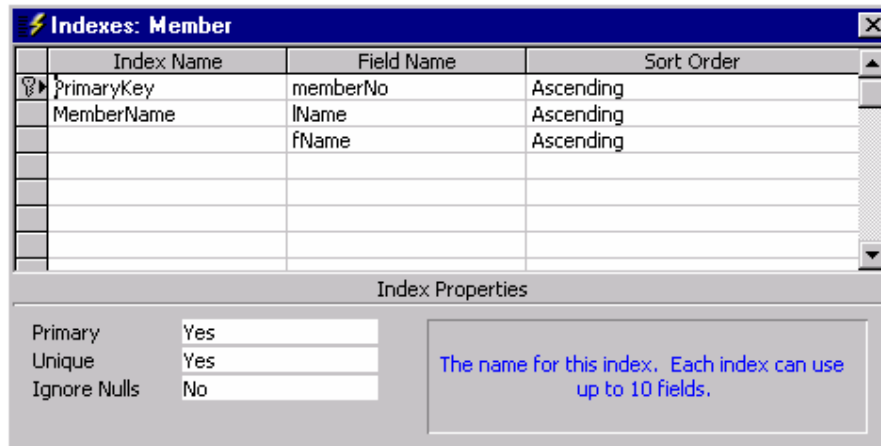
Figure P7-2: Indexes window for the Member table.

3. Change indexes or index properties as desired. To delete an index, delete its row in the Indexes window. This action removes only the index, not the field itself.

4. To save changes to the table, choose **Save** from the **File** menu.

Creating Multiple-Field Indexes

If you think you will often search or sort by two or more specific fields at a time, you can create an index on multiple fields. For example, if you often set criteria for lName and fName fields in the same query, it makes sense to create an index on both fields.

When you sort a table by a multiple-field index, Microsoft Access sorts first by the first field listed in the Indexes window. If there are records with duplicate values in the field, Microsoft Access sorts next by the second field listed, and so on.

To create a multi-table index

1. Open the table in **Design** view.

2. Open the **Indexes** window.

3. Move to the **Index Name** column and enter the names of the index. Only include the index name in the first row.

4. Move to the **Field Name** column and enter the names of the fields to be used in the index. Each field name is entered into a separate row.

Note that, Microsoft Access treats all rows as part of the same index until it comes to a row containing another index name.

Setting Relationships Between Tables

Because Microsoft Access is a relational database, you can use data from more than one table or query at a time. If your database contains tables with related data, you can define the relationship in the database. Microsoft Access uses relationships to:

Create joins in new queries

When you create a query and add related tables or queries for which you have specified a relationship, Microsoft Access automatically creates joins to relate the data in the query.

Display related records in a subform or subreport

A common use for a subform or subreport is to include records from a related table. When you drag and drop a form or report onto another form or report, Microsoft Access uses relationships to display the correct data in the subform or subreport.

Enforce referential integrity

This is to protect the relationship between tables when you add, change, or delete records.

Viewing and Editing Existing Relationships

When you add tables to a query or Relationship window, Microsoft Access automatically displays the relationships that have been defined between them.

To view existing relationships for a table or query

1. From the **Tools** menu, choose **Relationships.**

2. To view all the relationships defined in the database, choose the **Show All** from the **Relationship** menu or click on the **Show All Relationships** button on the toolbar.

The Relationship window for the tables of the *StayHome* database is shown in Figure P7-3.

Carolyn Begg (2000)
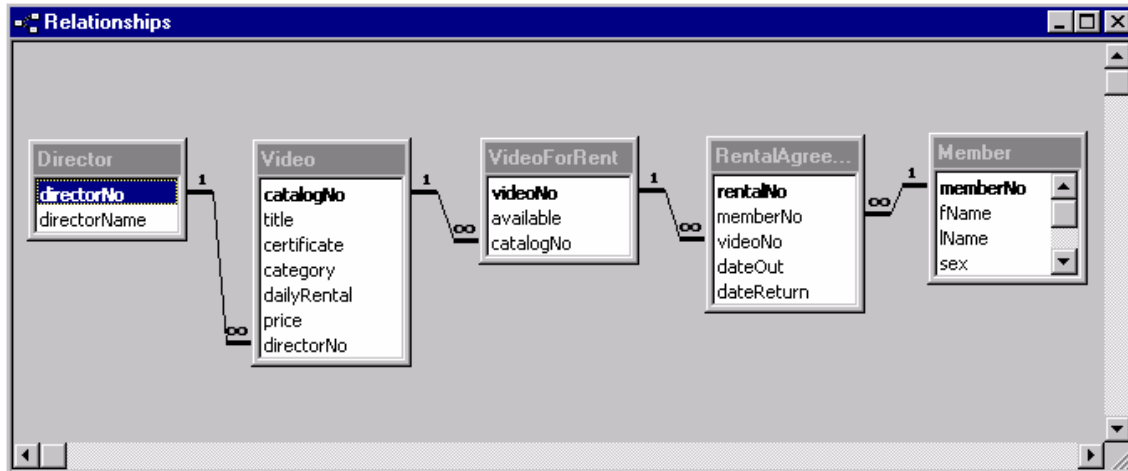
**Figure P7-3 The Relationship window for the tables of the *StayHome* database.**

To view all the relationships defined for a particular table, select the table and then choose **Show Direct** from the **Relationship** menu or click on the **Show Direct Relationships** button on the toolbar.

To edit an existing relationship

1. Click on the relationship line that you want to edit and from the **Relationships** menu, choose **Edit Relationship**. Alternatively, you can double-click on the relationship line that you want to edit.

   Microsoft Access displays the Edit Relationship dialog box as shown in Figure P7-4.
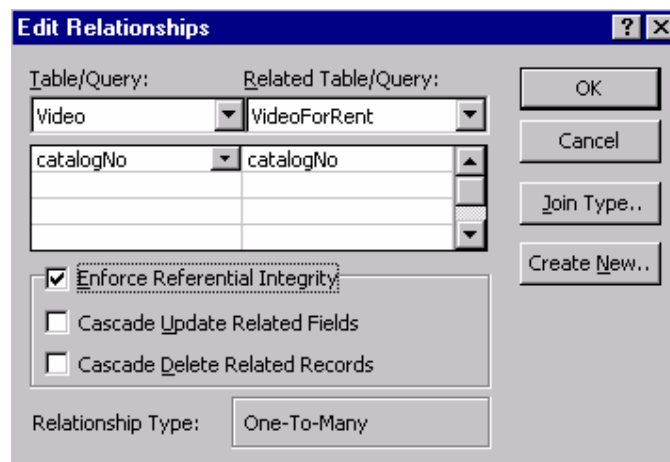
Figure P7-4: Edit Relationship dialog box for relationship between Video and VideoForRent tables.

2. Set the relationship options and then choose **OK**.

To delete a relationship or table

1. From the **Tools** menu, choose **Relationships**.

2. Click on the relationship line or table that you want to delete and then press the **DEL** key.

Referential Integrity

In some relationships, Microsoft Access can enforce referential integrity when you add or delete records in related tables. Referential integrity helps ensure that relationships between records are valid, and that you do not accidentally delete related data. Microsoft Access can enforce referential integrity when these conditions are met:

- The matching field from the primary table is a primary key or has a unique index.

- The related fields have the same data type.

- Both the tables belong to the same Microsoft Access database. If the tables are attached, they must belong to the same Microsoft Access database.

Referential integrity cannot be enforced for attached tables from databases in other formats.

When referential integrity is enforced, you must observe the following rules:

When you add a record to a related table and specify a value in the matching field(s), there must already be a record with this value in the primary table. For example, when you add rental details to the RentalAgreement table, the videoNo and memberNo that you specify must exist in the VideoForRent and Member tables, respectively. In other words, you must add a video or member record to the appropriate tables before entering rental details.

You cannot delete a record from a primary table if matching records exist in a related table. For example, you cannot delete a record from the Member table if there are rental details associated with that member in the RentalAgreement table. (This restriction does not apply if you set the **Cascade Delete** option for the relationship.)

If you want Microsoft Access to enforce these rules for a relationship, select **the Enforce Referential Integrity** option when you create the relationship. If referential integrity is enforced and you break one of the rules with the related tables, Microsoft Access displays a message and does not allow the change.

Relationship Types

For relationships in which referential integrity is enforced, you specify whether the two tables you are relating have a **one-to-many** or **one-to-one** type of relationship. In a one-to-many relationship, the most common type of relationship, each record in the primary table can be associated with many records in the related table (each primary key value can appear many times in the related table). For example, each video for rent or member can be associated with many rentals.

In a one-to-one relationship, each record in the primary table can be associated with only one record in the related table. To display a one-to-one relationship in the Relationship window, the matching fields on both sides of the relationship must be set as a primary key *or* have a unique index.

Cascading Delete and Update Operations

For relationships in which referential integrity is enforced, you can specify whether you want Microsoft Access to automatically 'cascade' delete and update operations for related records. If you select these options, delete and update operations that would normally break referential integrity rules are allowed. When you delete records or change primary key values in a table, Microsoft Access makes necessary in changes to related tables to preserve referential integrity.

If you select **Cascade Delete** for a relationship, any time you delete records in the primary table, Microsoft Access automatically deletes related records in the related table. For example, if you delete a record from the Member table, all the member's rental details are automatically deleted from the RentalAgreement table. When you delete records from a table with the Cascade Delete option set, Microsoft Access warns you that related records may also be deleted.

If you select **Cascade Update** for a relationship, any time you change the primary key of a record in the primary table, Microsoft Access automatically changes the primary key to the new value in all related records. For example, if you change a video's number in the Video table, the videoNo field in the RentalAgreement table is automatically updated for every one of that Video's rentals so that the relationship is not broken. Microsoft Access cascades updates without displaying any message.

Join Types

If you want to specify the type of join Microsoft Access should create in new queries, you can set the join type when you create the relationship. For example, if you always want Microsoft Access to create an outer join between two related tables, you can specify this type of join. For information on join types, search Help for 'joins'.

Activity P7-4

View the relationships between your Member, RentalAgreement, VideoForRent, Video and Director tables. Examine the properties on each relationship. In particular, explore the Enforce Referential Integrity option of the Edit Relationship dialog box including the Cascade Delete and Cascade Update options. Investigate how these options work by attempting to edit or delete your records.

Microsoft Access 2000

Practical 8

In this practical, you will learn how to create parameter queries. You will also learn how to create queries using the Structured Query Language (SQL), which is a language used in querying, updating, and managing relational databases. You should first <u>read</u> the information given in this practical and <u>then</u> complete the activities listed throughout this practical.

We start this practical by presenting an overview of the types of queries provided by Microsoft Access.

Microsoft Access Queries

As well as select queries, you can also create many other types of useful queries using Microsoft Access. Table P8-1 presents a summary of the types of queries provided by Access.

Query Type	Description
Select Query	Asks a question or defines a set of criteria about the data in one or more tables.
Parameter Query	Displays one or more predefined dialog boxes that prompts the user for the parameter value (criteria).
Find Matched Query	Finds duplicate records in a single table.
Find Unmatched Query	Finds distinct records in related tables.
Crosstab Query	Allows large amounts of data to be summarized and presented in a compact spreadsheet format with row and column headings.
Autolookup Query	Automatically fills in certain field values for a new record.
Action Query (including delete, append, update and make-table queries)	Makes changes to many records in just one operation. Such changes include the ability to delete, append, or make changes to records in a table and also to create a new table.
SQL Query (including union, pass-through, data-definition, subquery SQL)	Union SQL query combines matching fields from two or more tables. Pass-through SQL query sends commands to an SQL database. Data-definition SQL query creates, changes or deletes tables.

Table P8-1: Summary of Microsoft Access Query Types.

Creating Parameter Queries

If you frequently run the same select query but you change the criteria each time you run it,

you can save time by creating a **parameter query**. When you run a parameter query, you do not have to open the Query window and make changes to the QBE grid; instead, Microsoft Access prompts you for criteria in the Enter Parameter Value dialog box.

If you design a parameter query that prompts you for more than one criterion, Microsoft Access displays successive dialog boxes for each criterion. Note that you can enter values into the Enter Parameter Value dialog box, but you cannot enter expressions.
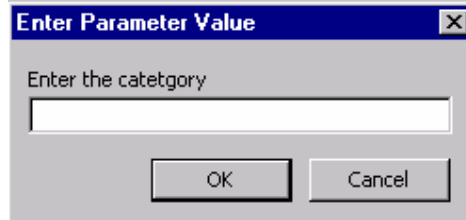
To create a parameter query

1. Create a query without using a Wizard, and add the tables you want.

2. Drag the fields for the query to the QBE grid.

3. In the **Criteria** cell under each field you want to use as a parameter, enter a prompt enclosed in square brackets. Microsoft Access displays this prompt when the query is run. The text of the prompt must be different from the field name, though it can include the field name. An example QBE grid for a parameter query is shown in Figure P8-1.
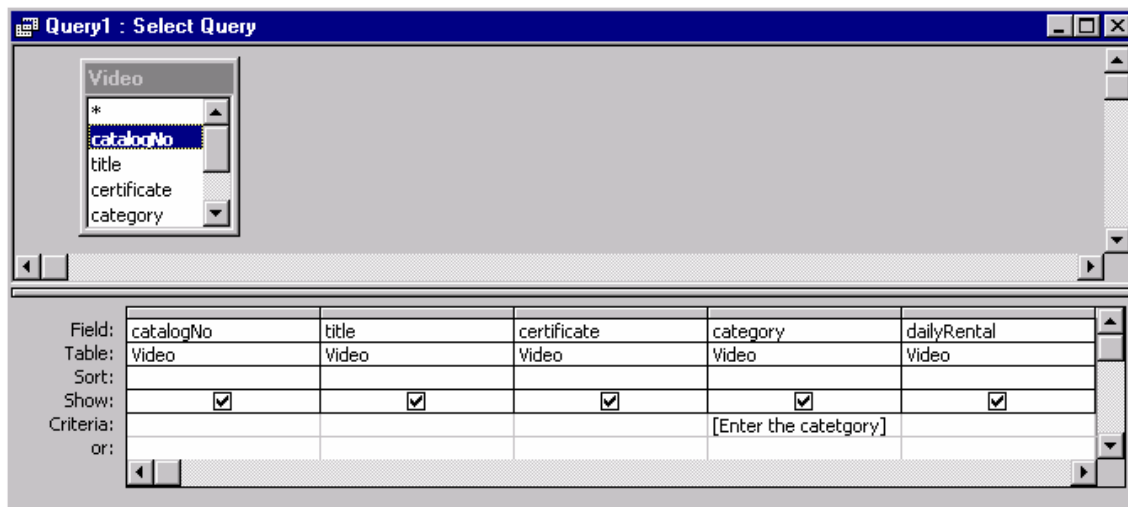
Figure P8-1: Creating a parameter query for the Video table.

4. Run the query by clicking the **View** button ⊞▾ or **Run** button ❗ button on the toolbar. Microsoft Access displays the Enter Parameter Value dialog box, as shown in Figure P8-2.

Figure P8-2: The Enter Parameter Value dialog box for the parameter query created in Figure P8-1.

5 . Enter a value, and then choose **OK**.

Microsoft Access retrieves the data and displays the dynaset. Or, if you have specified more than one parameter, Microsoft Access prompts you for the other parameters and then displays the dynaset.

Prompting for Several Parameters

You can also create queries that prompt you for several parameter values. You can specify parameters in each of several fields, or multiple parameters in a single field. For example, to display the details of videos with a daily rental rate between certain maximum and minimum rate, we create a query that prompts you with two successive dialog boxes. The QBE grid for this query is shown in Figure P8-3.
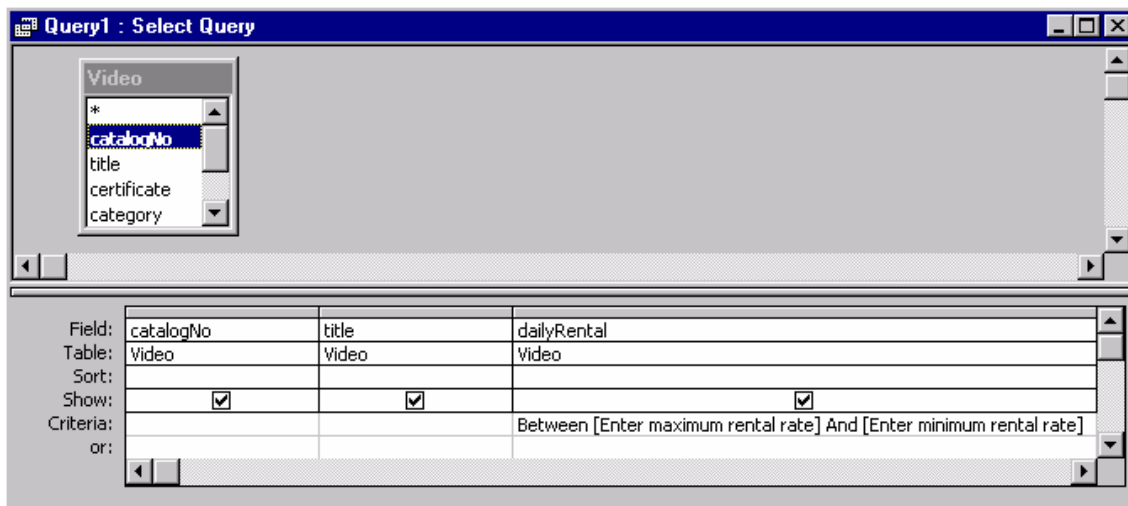
Figure P8-3: Creating a parameter query for the Video table using multiple parameters in the dailyRental field.

When the query is run, Microsoft prompts you with successive dialog boxes. By entering the maximum and minimum rental rates into each dialog box, you specify the range of rental rates you want.

Activity P8-1

Create and save the following parameter queries:

(a) To display the details of videos in a given category (as shown in Figure P8-1).
(b) To display the details of one or more members given the last name.
(c) To display the details of a member given the member's number.
(d) To display the details of one or more members given the first name and last name.
(e) To display the member number, full name, and address of members who had rented out a video, between certain dates.
(f) To display the details of videos with a daily rental rate between certain maximum and minimum limits (as shown in Figure P8-3).

Create any other useful single or multi-parameter queries.

Using SQL in Microsoft Access

Structured Query Language (SQL) is a language often used in querying, updating, and managing relational databases. Each query created in Microsoft Access has an associated SQL statement that defines the actions of that query. You can use SQL statements to:

View and modify queries you created using the QBE grid
For every query you create using the QBE grid in Design view, you can view and make changes to its SQL statement.

Set properties
You can use SQL statements when setting form and report properties, such as Record Source and Row Source.

Create SQL-specific queries
For some types of queries, you must use SQL statements. Union queries, pass-through queries, and data-definition queries cannot be designed using the QBE grid.

Create subqueries
To create a subquery, you use the QBE grid, but you enter an SQL SELECT statement for criteria.
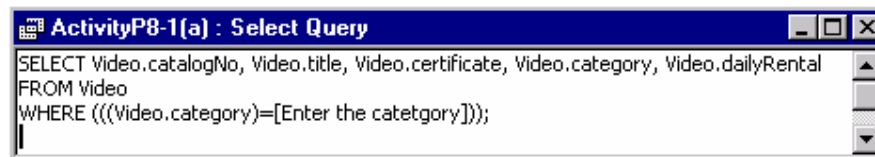
Using SQL to View and Modify Queries

When you create a query with the QBE grid, Microsoft Access constructs the equivalent SQL statement behind the scenes. You can view or modify the SQL statement, rather than use the QBE grid. After you make changes to the SQL statement, the changes are reflected in the QBE grid.

To view or modify an SQL statement

1. Create a query, or open an existing query in **Design** view.

2. From the **View** menu, choose **SQL View**.

Microsoft Access displays the query in SQL view. This view is of the SQL statement that is equivalent to what you created in Design view. The SQL statement for the query created in Figure P8-1 is shown Figure P8-4.


```
ActivityP8-1(a) : Select Query
SELECT Video.catalogNo, Video.title, Video.certificate, Video.category, Video.dailyRental
FROM Video
WHERE (((Video.category)=[Enter the catetgory]));
```

Figure P8-4: SQL View of parameter query created in Figure P8-1.

3. If you want to make changes, enter the changes into the SQL statement.

4. To return to the QBE grid select from the **View** menu, choose **Design View**.

The QBE grid reflects the changes you made.

Activity P8-2

Examine each of the queries you created for Activity P8-1 in SQL view. If you have saved any queries created in earlier practicals, also examine these queries in SQL view.

Now re-examine the queries for Activity P8-1(a) to (f) using the QBE grid. Convert your parameter queries into standard select queries by carrying out the following modifications (shown underlined) to these queries using the QBE grid and note the changes reflected in the corresponding SQL statement. Also, run the queries to ensure that they retrieve the correct information.

(a) To display the details of videos in category 'Comedy' or 'Children'.
(b) To display the details of one or more members with 'Smith' as the last name.

(c) To display the details of member number '4'.

(d) To display the details of one or more members with last name 'Smith' and first name 'Lorna'.

(e) To display the member number, full name, and address of members who have rented out video number '1'.

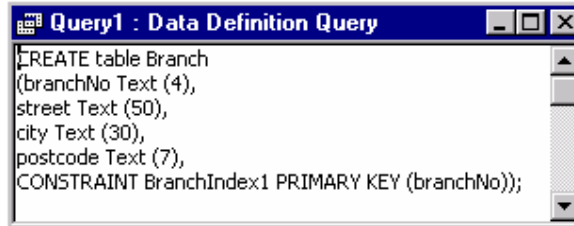(f) To display the details of videos with a daily rental rate that is less than 4.00.

Creating Tables with Access SQL

You can create tables in your database using the Access SQL.

- **CREATE TABLE** table_name (field_name data_type [(field size)][, field_name data_type...]) creates a new table with the fields specified by a comma-separated list. (For field names with spaces enclose entries with in square brackets). The field_size entry is only optional for Text fields.

- **CONSTRAINTS** index_name {**PRIMARY KEY** (field_name)|**UNIQUE** (field_name)| |**FOREIGN KEY** (field_name) **REFERENCES** foreign table [(foreign_field)]} creates an index on the field name that follows the expression. You can specify the index as a PRIMARYKEY or as an UNIQUE index. You can also establish a relationship between the field and the field of a foreign table with the REFERENCES foreign_table [foreign_field] entry.

- **ALTER TABLE** allows you to add new fields (**ADD COLUMN** field_name...) or delete existing fields (**DROP COLUMN** field_name...).

- **DROP INDEX** index_name **ON** table_name deletes the index from a table specified by table_name.

- **DROP TABLE** table_name deletes a table from the database.
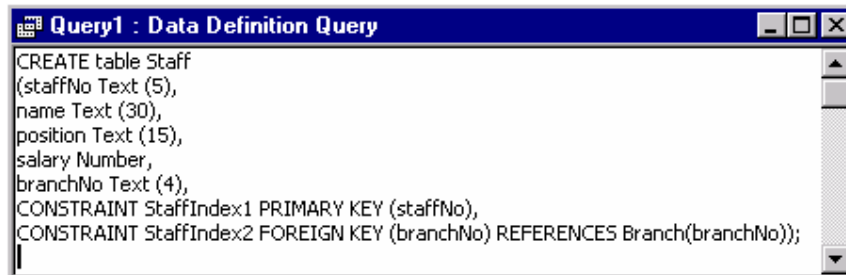
Note that, the Access SQL statement must terminated with a semi-colon (;).

The Access SQL statements to create tables called Branch and Staff are shown in Figures P8-5 and P8-6, respectively.

Figure P8-5: Creating the Branch table using Access SQL.

Figure P8-6: Creating the Staff table using Access SQL.

Activity P8-3

Open your *StayHome* database and create the Branch and Staff tables using Access SQL (as shown in Figures P8-5 and P8-6). Use the CONSTRAINT clause of the CREATE TABLE statement to create primary keys for the tables and to establish the relationship between these tables.
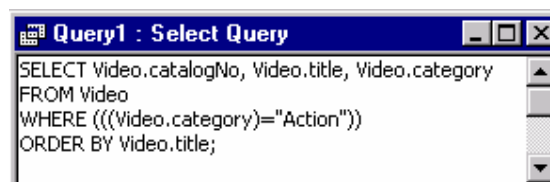
Writing Select Queries in SQL

When you create a select query using QBE, Access translates the QBE query into an Access SQL statement. Every select query begins with the SELECT statement. The syntax for the basic SQL SELECT statement is shown overleaf.

SELECT [**ALL|DISTINCT|DISTINCTROW**] select_list
      FROM table_names
      [**WHERE** search_criteria]
      [**ORDER BY** column_criteria [**ASC|DESC**]]

The following list describes the purpose of the elements in the basic select statement.

- **SELECT** is the basic command that specifies the query. The select_list parameter determines the fields (columns) that are to be included in the results table of the query. When you design an Access QBE query, the select_list parameter is determined by the fields you add to the Field row in the Query grid. Only those fields with the Show box ticked are included in the select_list. Multiple fields are separated by commas. The optional ALL, DISTINCT and DISTINCTROW qualifiers determine how rows are handled. ALL specifies that all rows are to be included, DISTINCT and DISTINCTROW have a similar function in eliminating duplicate rows.

- **FROM** table_name specifies the name or names of the table(s) that form the target of the query. The table_names parameter is created in Access QBE by the entries from the Show Table dialog box. Commas are used to separate multiple tables.

- **WHERE** search_criteria determines which records from the select list are displayed The search_criteria parameter is an expression with a text (string) operator such as LIKE for text fields or a numeric operator such as >= for numeric values. The WHERE clause is optional and if absent all rows are retrieved.

- **ORDER BY** column_criteria specifies the sorting order of the records in the results table. ORDER BY is optional.

An example of a simple SQL statement to query the Video table and the resulting datasheet are shown in Figures P8-7 and P8-8, respectively.
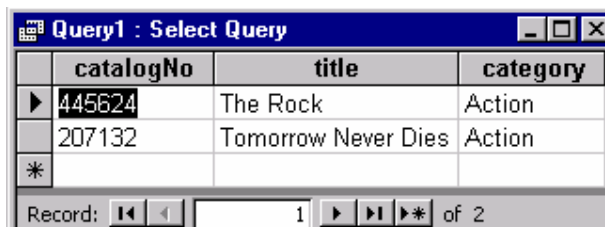
Figure P8-7: Creating a Select query on the Video table using Access SQL.

Figure P8-8: The datasheet created on running the Select query shown in Figure P8-7.

Using the SQL Aggregate Functions

If you want to use the aggregate functions to determine totals, averages or statistical data for groups of records with a common attribute value, you add the **GROUP BY** clause. You can further limit the result of the GROUP BY clause with the optional **HAVING** qualifier.

> **SELECT** [**ALL|DISTINCT|DISTINCTROW**]
> aggregate_function (field_name) **AS** alias [, select_list]
> **FROM** tables_names
> [**WHERE** search_criteria]
> [**GROUP BY** group_criteria]
>   [**HAVING** aggregate_criteria]
> [**ORDER BY** column_criteria]

The select_list includes the aggregate function with a field_name as its argument.

- **AS** alias assigns a caption to the column.

- **GROUP BY** group_criteria establishes the column on which the grouping is based.

- **HAVING** aggregate_criteria is one or more criteria applied to the column that contains the aggregate function. The aggregate_criteria of the HAVING is applied after the grouping is complete. **WHERE** search_criteria operates before the grouping occurs.

An example of a SQL statement using the aggregate functions (COUNT and SUM), and the GROUP BY and HAVING clauses to query the Videos table and the resulting table are shown in Figures P8-9 and P8-10, respectively.
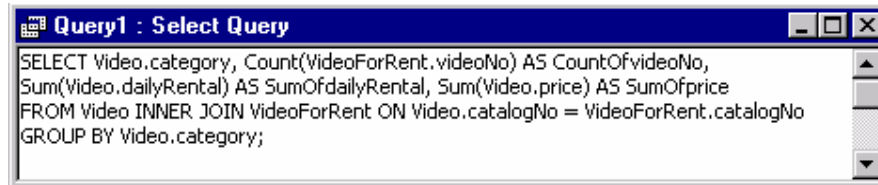
Figure P8-9: Creating an Aggregate query on the Video table using Access SQL.

Figure P8-10: The datasheet created on running the Aggregate query shown in Figure P8-9.

Activity P8-5

Using the Access SQL, create select queries on the tables of your *StayHome* database. For example, create and save the following queries on the Video table.

(a) For each video category, list the total number of videos, the total daily rental rate and total price of videos (as shown in Figures P8-9 and P8-10).
(b) List the total number of videos with a certification of 'PG' or '18'.
(c) List the maximum and minimum daily rental rate for videos in each category.

Carolyn Begg (2000)

Creating Joins with SQL

Joining two or more tables with Access QBE uses the **JOIN_ON** clause that specifies the tables to be joined and the relationship between the fields on which the join is based.

> **SELECT** [**ALL|DISTINCT|DISTINCTROW**]
> **FROM** tables_names
> {**INNER|LEFT|RIGHT**} table_name **JOIN** join_table **ON** join_criteria
> [{**INNER|LEFT|RIGHT**} table_name **JOIN** join_table **ON** join_criteria
> [**WHERE** search_criteria]
> [**ORDER BY** column_criteria]

- table_name **JOIN** join_table specifies the name of the table that is joined with other tables listed in table_names. Each of the tables participating in a join must be included in the table_names list.

  One of the three types of joins, **INNER**, **LEFT** or **RIGHT** must precede the join statement. INNER specifies an equi-join: LEFT specifies a left outer join and RIGHT specifies a right outer join.

- **ON** join_criteria specifies the two fields to be joined and the relationship between the two joined fields. The join_criteria expression contains an equal sign (=) comparison operator and returns a true or false value. If the value of the expression is True, the record in the joined table is included in the query result.

An example of an INNER JOIN (natural join) between the Member and RentalAgreement tables using Access SQL and the resulting datasheet are shown in Figures P8-11 and P8-12, respectively.


```
Query1 : Select Query
SELECT Member.memberNo, Member.fName, Member.lName, RentalAgreement.rentalNo,
RentalAgreement.dateOut, RentalAgreement.dateReturn
FROM Member INNER JOIN RentalAgreement ON Member.memberNo = RentalAgreement.memberNo;
```

Figure P8-11: Creating an INNER JOIN between the Member and RentalAgreement tables.

Figure P8-12: The datasheet created on running the Inner Join query shown in Figure P8-11.

Activity P8-6

(a) Using Access SQL, create an INNER (natural) join between the Member and RentalAgreement tables to display only the memberNo, fName, lName, rentalNo, dateOut and dateReturn fields (as shown in Figures P8-11 and P8-12).

Investigate the effect of changing the join type between the Member and RentalAgreement tables to a LEFT (outer) join and then to a RIGHT (outer) join.

(b) Create an INNER (natural) join between the VideoForRent, RentalAgreement and Member tables to display only the catalogNo, videoNo, dateOut, dateReturn, memberNo, fName and lName fields.

Creating Subqueries

A subquery is an SQL SELECT statement inside another select query. You can create a subquery that defines a field, or you can use a subquery to define criteria for a field.

In many cases, SQL statements that include subqueries can be formulated either as a join or as one query based on another. For example, say you wanted to find all videos with a daily rental rate the same as the rental rate of a video called 'Independence Day'. You can create
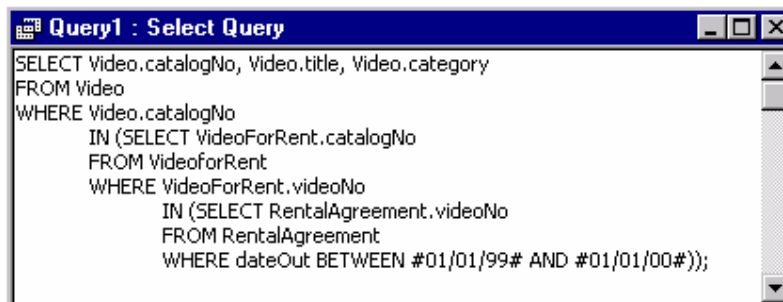
one query that finds the daily rental rate of 'Independence Day'. Then you can create another query based on the first query. The second query finds all videos with the same rental rate as that found in the first query. Or you can create a subquery that performs everything in one operation.

You can write a SELECT query that uses another SELECT query to supply the criteria for the WHERE clause. The general syntax of a subquery is as follows.
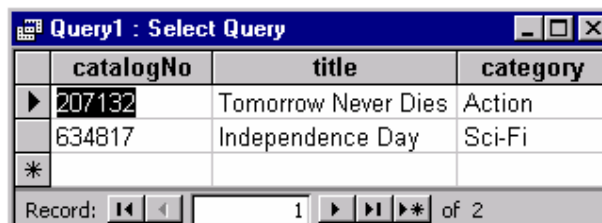
SELECT field_list
      FROM tables_list
      [**WHERE** [table.name.]field_name
           IN SELECT select statement
      [**GROUP BY** group_criteria]
           [**HAVING** aggregate_criteria]
      [**ORDER BY** column_criteria]

An example of a subquery and the resulting datasheet is shown in Figures P8-13 and P8-14.

Figure P8-13: An example of a Subquery (nested query) on the Video, VideoForRent and RentalAgreement tables.

Figure P8-14: The datasheet created on running the Subquery shown in Figure P8-12.

For more information on the syntax for subqueries and useful examples of subqueries, search Help for 'SQL: subqueries'.

Activity P8-7

Using the Access SQL, create select subqueries on the tables of your *StayHome* database. For example, create and save the following queries.

(a) List the catalogNo, title and category fields of the Video table for those videos that were rented out between the 1st January 99 and the 1st January 00 (as shown in Figures P8-13 and P8-14).
(b) List the details of the videos with a certification of 'PG' or '18' that were rented out to member number '3'.
(c) List the videoNo, dateOut and dateReturn fields of the RentalAgreement table for videos with a certification 'U'.

Activity P8-8

Return to Table P8-1 of this practical and examine the range of queries provided by Microsoft Access. Ensure that you understand the purpose of each type of query and attempt to create and run some of the queries not covered in detail in this practical.