ACCESS

Laboratory Manual

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Department of Computer Engineering

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TABLE OF CONTENTS **Page**

INTRODUCTION TO MICROSOFT ACCESS

A **database** is a collection of related information and has several **objects** such as a *table, query, form* or *report.*

A **table** is a grouping of related data organized in fields (columns) and records (rows) on a datasheet. Many tables can be stored in a single database.

A **field** is a column on a datasheet and defines a data type for a set of values in a table. For a mailing list a table might include fields for first name, last name, address, city, state, zip code, and telephone number.

A **record** in a row on a datasheet and is a set of values defined by fields. In a mailing list table, each record would contain the data for one person as specified by the intersecting fields. Every record in a given table has the same fields in the same order

The **Database Window** displays the various objects in an Access database. The default tables listing provides links for creating tables and will list all of the tables in the database when they have been added.
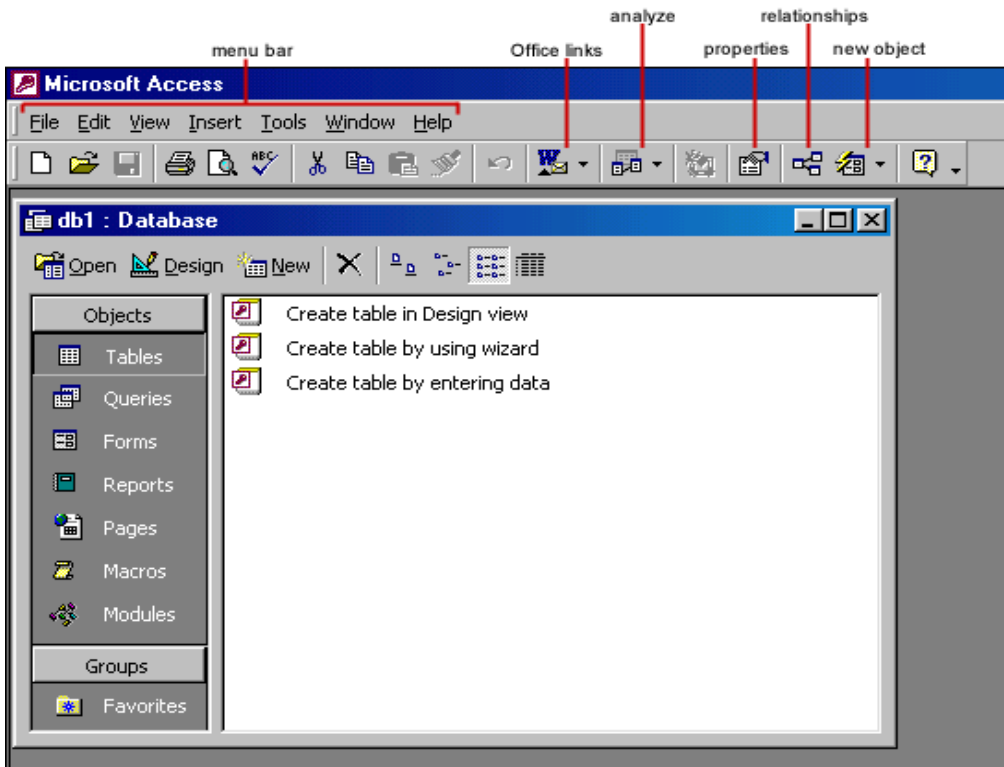
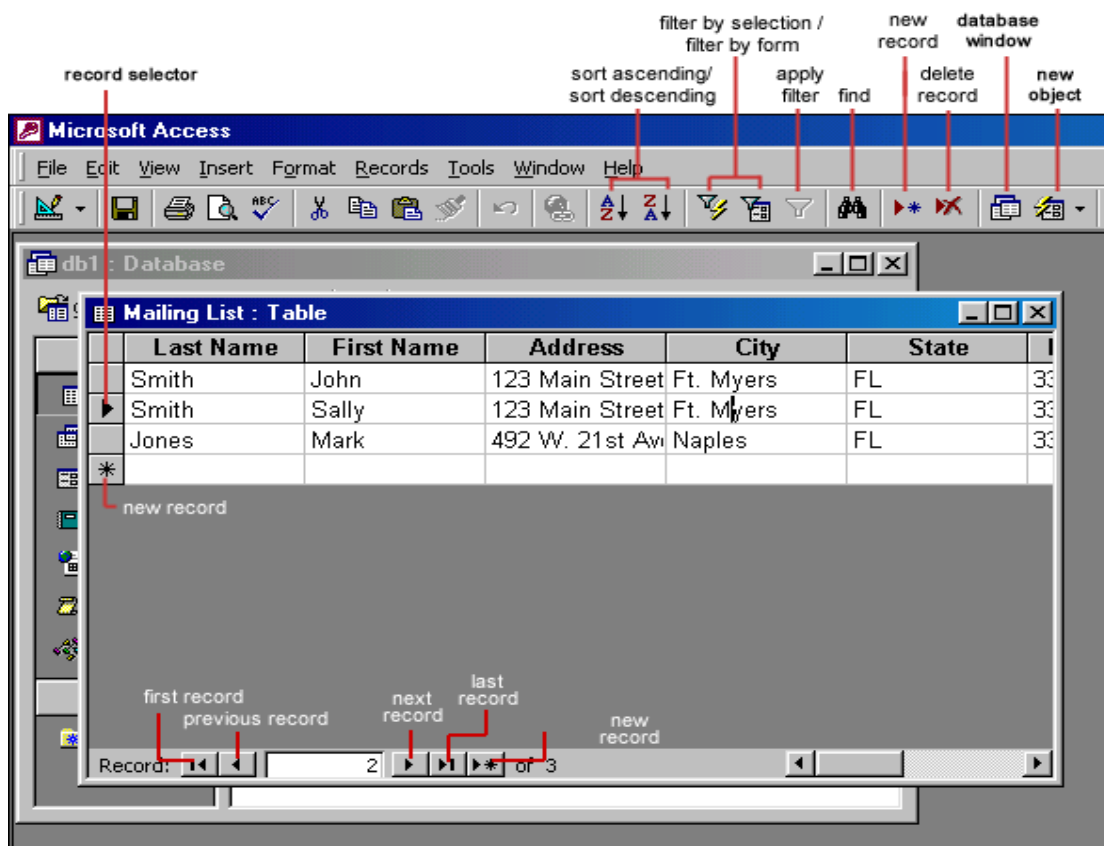A table is displayed in multiple views. **Design View** is used to define the table initially and to specify the fields it will contain so that the data can be entered.
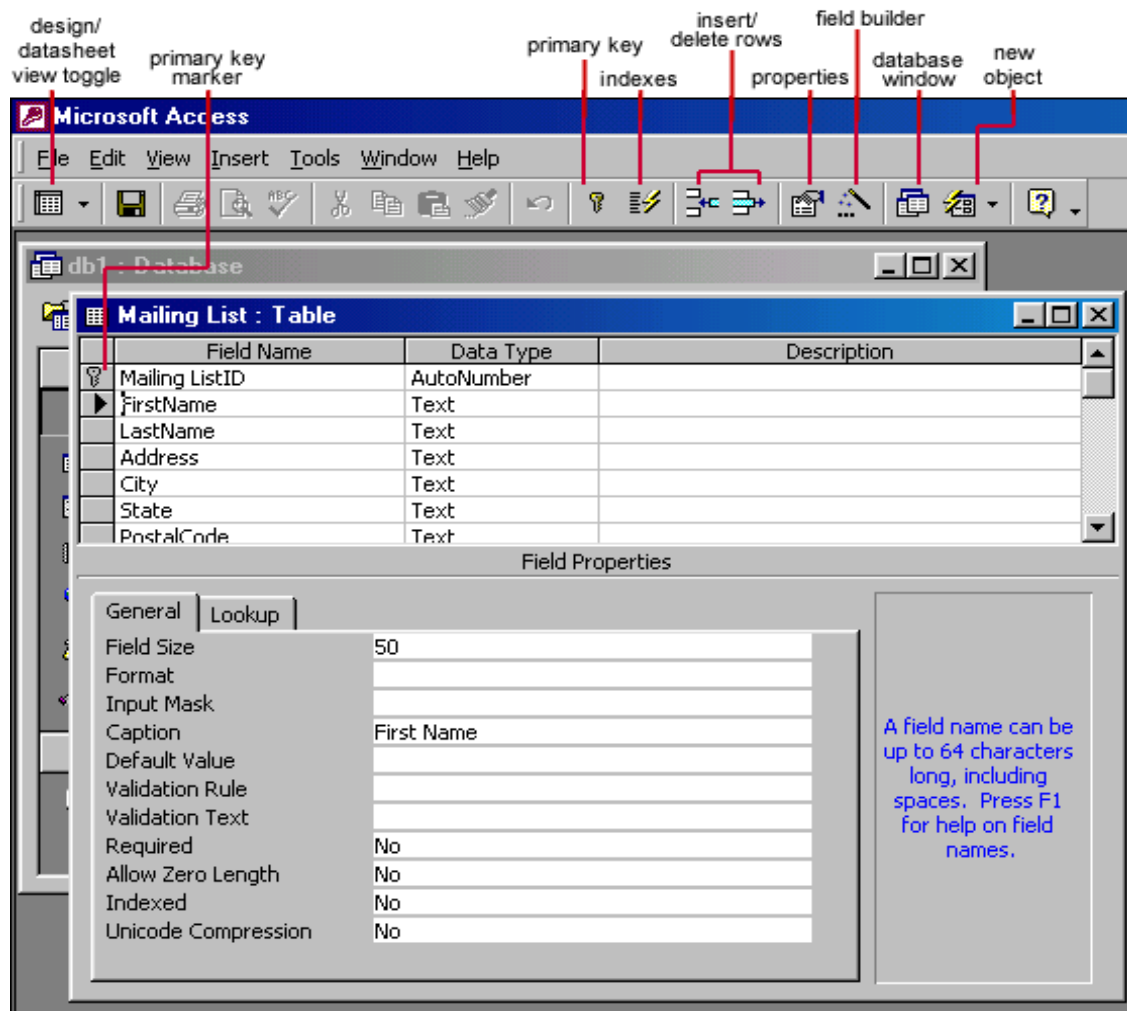
Datasheet View allows you to update, edit, and delete records.

Adding Records
Add new records to the table in datasheet view by typing in the record beside the asterisk (*) that marks the new record. You can also click the new record button at the bottom of the datasheet to skip to the last empty record.

Editing records
To edit records, simply place the cursor in the record that is to be edited and make the necessary changes. Use the arrow keys to move through the record grid. The previous, next, first, and last record buttons at the bottom of the datasheet are helpful in maneuvering through the datasheet.

Deleting Records
Delete a record on a datasheet by placing the cursor in any field of the record row and select **Edit|Delete Record** from the menu bar or click the **Delete Record** button on the datasheet toolbar.

Adding and Deleting Columns
Although it is best to add new fields (displayed as columns in the datasheet) in design view because more options are available, they can also be quickly added in datasheet view. Highlight the column that the new column should appear to the left of by clicking its label at the top of the datasheet and select **Insert|Column** from the menu bar.

Resizing Rows and Columns
The height of rows on a datasheet can be changed by dragging the gray sizing line between row labels up and down with the mouse. By changing the height on one row, the height of all rows in the datasheet will be changed to the new value.

Column width can be changed in a similar way by dragging the sizing line between columns. Double click on the line to have the column automatically fit to the longest value of the column. Unlike rows, columns on a datasheet can be different widths. More exact values can be assigned by selecting **Format|Row Height** or **Format|Column Width** from the menu bar.
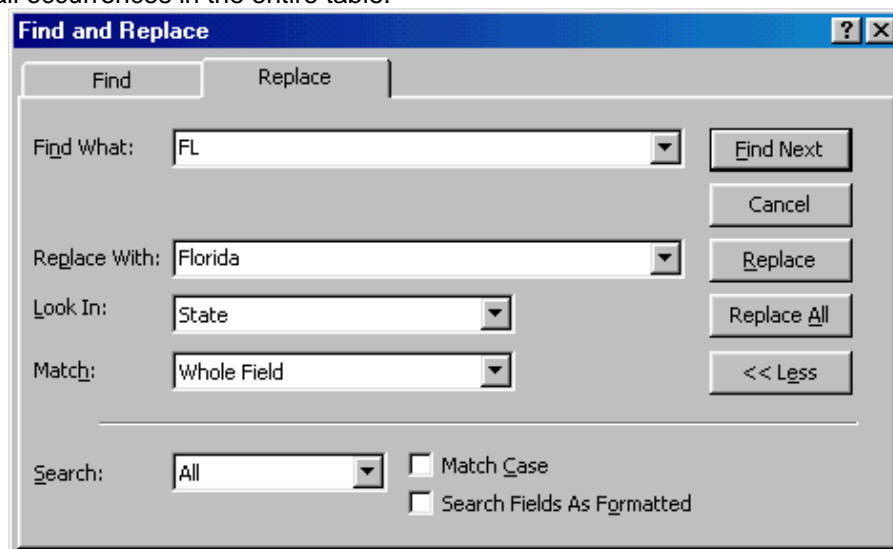
Finding Data in a Table
Data in a datasheet can be quickly located by using the **Find** command.
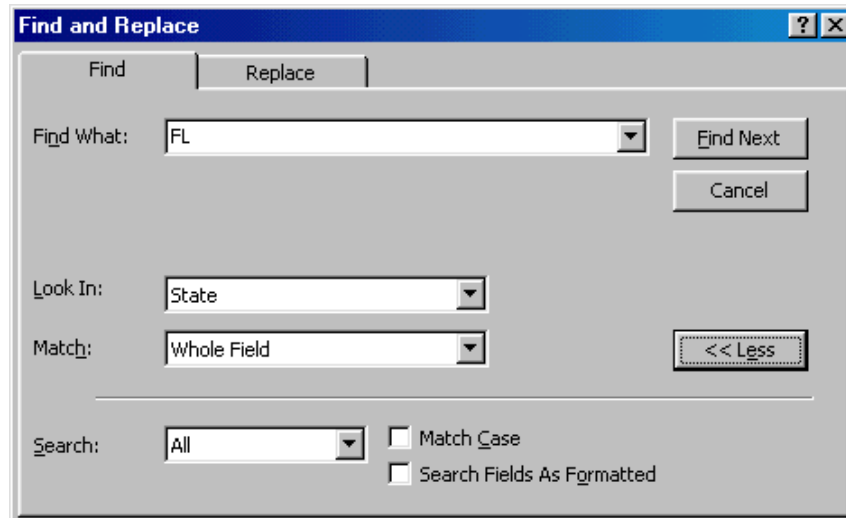
Replace
The replace function allows you to quickly replace a single occurrence of data with a new value or to replace all occurrences in the entire table.

Check Spelling and AutoCorrect
The spell checker can be used to flag spelling errors in text and menu fields in a datasheet. Select **Tools|Spelling** from the menu bar to activate the spell checker and make corrections just as you would using Word or Excel. The AutoCorrect feature can automatically correct common spelling errors such as two INitial CApitals, capitalizing the first letter of the first word of a sentence, and anything you define. Select **Tools|AutoCorrect** to set these features.

Print a Datasheet
Datasheets can be printed by clicking the Print button on the toolbar or select File|Print to set more printing options.

Sorting and filtering

Sorting and filtering allow you to view records in a table in a different way either by reordering all of the records in the table or view only those records in a table that meet certain criteria that you specify.

Sorting

You may want to view the records in a table in a different order than they appear such as sorting by a date or in alphabetical order, for example. Follow these steps to execute a simple sort of records in a table based on the values of one field:

1. In table view, place the cursor in the column that you want to sort by.
2. Select **Records|Sort|Sort Ascending** or **Records|Sort|Sort Descending** from the menu bar or click the **Sort Ascending** or **Sort Descending** buttons on the toolbar.

To sort by more than one column (such as sorting by date and then sorting records with the same date alphabetically), highlight the columns by clicking and dragging the mouse over the field labels and select one of the sort methods stated above.

Filter by Selection

This feature will filter records that contain identical data values in a given field such as filtering out all of the records that have the value "Smith" in a name field. To Filter by Selection, place the cursor in the field that you want to filter the other records by and click the **Filter by Selection** button on the toolbar or select **Records|Filter|Filter By Selection** from the menu bar. In the example below, the cursor is placed in the City field of the second record that displays the value "Ft. Myers" so the filtered table will show only the records where the city is Ft. Myers.
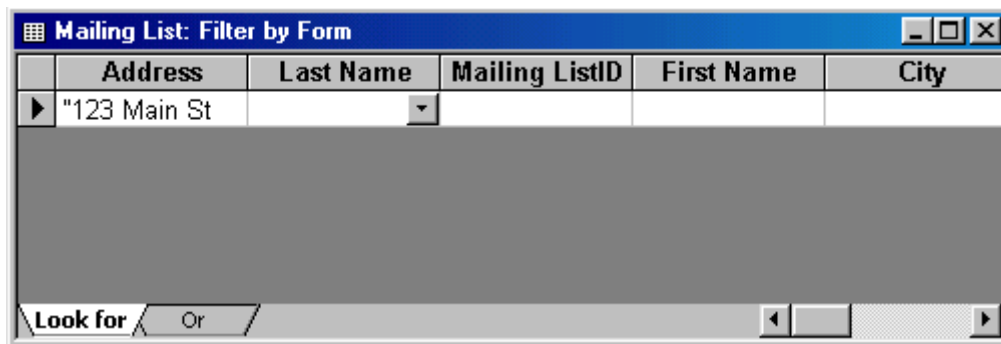

Filter by Form

If the table is large, it may be difficult to find the record that contains the value you would like to filter by so using Filter by Form may be advantageous instead. This method creates a blank version of the table with drop-down menus for each field that each contains the values found in the records of that field. Under the default **Look for** tab of the Filter by Form window, click in the field to enter the filter criteria. To specify an alternate criteria if records may contain one of two specified values, click the **Or** tab at the bottom of the window and select another criteria from the drop-down menu. More **Or** tabs will appear after one criteria is set to allow you to add more alternate criteria for the filter.

After you have selected all of the criteria you want to filter, click the **Apply Filter** button on the toolbar.

The following methods can be used to select records based on the record selected by that do not have exactly the same value. Type these formats into the field where the drop-down menu appears instead of selecting an absolute value.

Filter by Form	
Format	**Explanation**
Like "*Street"	Selects all records that end with "Street"
<="G"	Selects all records that begin with the letters A through G
>1/1/00	Selects all dates since 1/1/00
<> 0	Selects all records not equal to zero

Saving A Filter
The filtered contents of a table can be saved as a query by selecting **File|Save As Query** from the menu bar. Enter a name for the query and click **OK**. The query is now saved within the database.
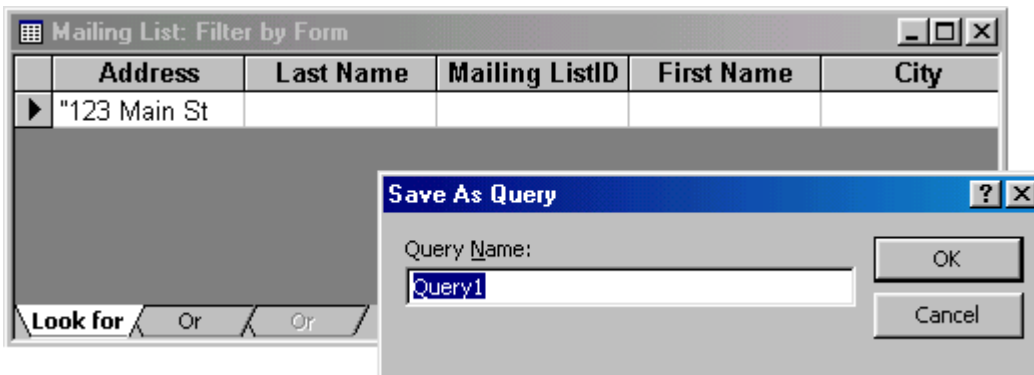

 Remove a filter

To view all records in a table again, click the depressed **Apply Filter** toggle button on the toolbar.
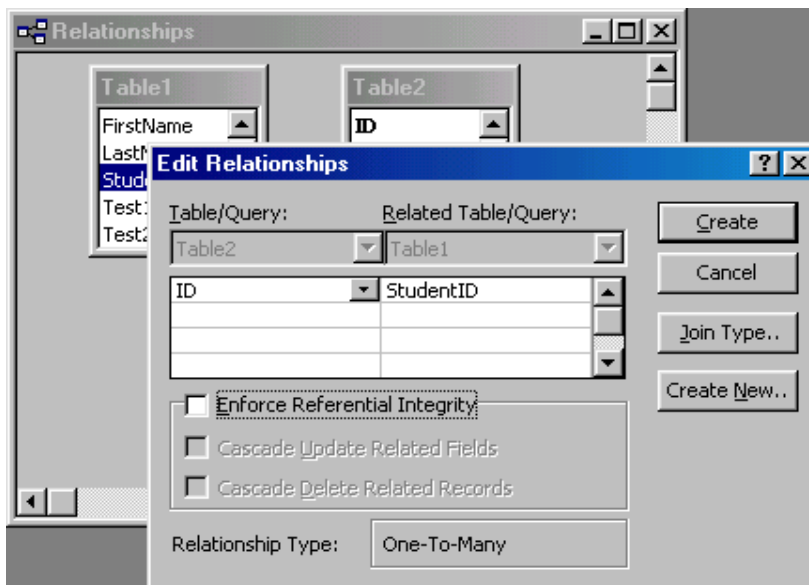
Table Relationships
To prevent the duplication of information in a database by repeating fields in more than one table, table relationships can be established to link fields of tables together. Follow the steps below to set up a relational database:

1. Click the **Relationships** button on the toolbar.
2. From the **Show Table** window (click the **Show Table** button on the toolbar to make it appear), double click on the names of the tables you would like to include in the relationships. When you have finished adding tables, click **Close**.
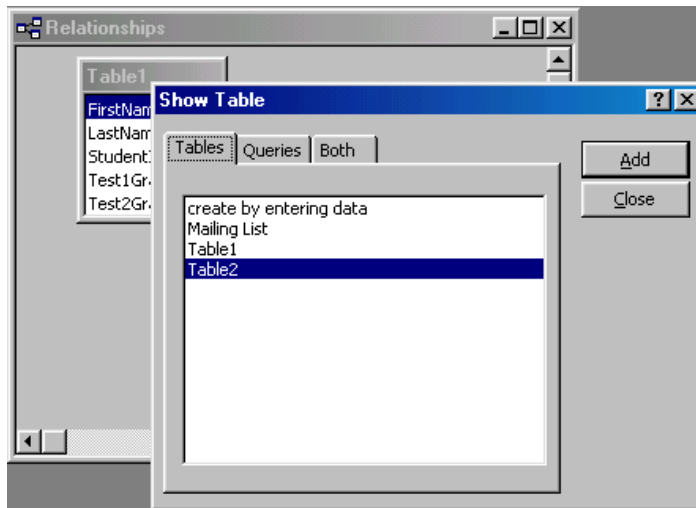
3. To link fields in two different tables, click and drag a field from one table to the corresponding field on the other table and release the mouse button. The **Edit Relationships** window will appear. From this window, select different fields if necessary and select an option from Enforce Referential Integrity if necessary. These options give Access permission to automatically make changes to referential tables if key records in one of the tales is deleted. Check the **Enforce Referential Integrity** box to ensure that the relationships are valid and that the data is not accidentally deleted when data is added, edited, or deleted. Click **Create** to create the link.

4. A line now connects the two fields in the Relationships window.
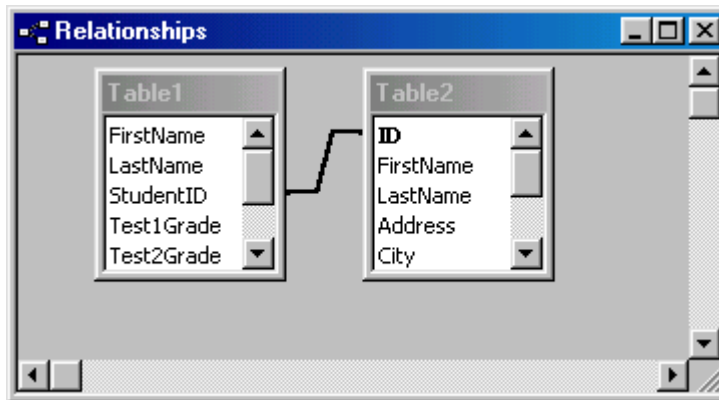
5. The datasheet of a relational table will provide expand and collapse indicators to view subdatasheets containing matching information from the other table. In the example below, the student address database and student grade database were related and the two can be shown simultaneously using the expand feature. To expand or collapse all subdatasheets at once, select **Format|Subdatasheet|Expand All** or **Collapse All** from the toolbar.

Laboratory Work: INTRODUCTION TO MICROSOFT ACCESS: WHAT IS A DATABASE?

Objectives

- Define the terms field, record, table, and database.
- Start Microsoft Access; describe the Database window and the objects in an Access database.
- Add, edit, and delete records within a table; use the Find command to locate a specific record.
- Describe the record selector; explain when changes are saved to a database.
- Explain the importance of data validation in table maintenance.
- Apply a filter (by form or by selection) to a table; sort a table on one or more fields.

EXERCISE 1

Open the **Employee** Database. Be sure to remove any filters that are in effect, and then implement the following transitions:

1. **Delete** the record for **Kelly Marder**.
2. **Change** Pamela Milgrom's salary to **$59,500**.
3. Use the **Replace** command to change all occurrences of **"Manager"** to **"Supervisor"**.
4. **Open** the **Employee Census Report** as shown in the following figure after making the changes in parts (1) through (3).

Seascapes Unlimited Employee Roster

27-Eyl-05

LastName	FirstName	Social Security Number	Title	Salary
Adams	Jennifer	000-02-2222	Trainee	$19500
Adamson	David	776-67-6666	Supervisor	$52000
Brown	Marietta	333-66-1234	Trainee	$18500
Charles	Kenneth	555-56-5555	Account Rep	$40000
Coulter	Tracey	123-45-6789	Supervisor	$100000
Frank	Vernon	444-45-4444	Account Rep	$75000
Johnson	James	111-12-1111	Account Rep	$47500
Manin	Ann	333-34-3333	Account Rep	$49500
Marlin	Billy	222-23-2222	Supervisor	$125000
Milgrom	Pamela	000-01-0000	Supervisor	$59500
Rubin	Patricia	555-22-3333	Account Rep	$45000
Smith	Frank	333-43-4444	Account Rep	$65000
Smith	Mary	222-52-5555	Account Rep	$42500

EXERCISE 2

Open the **Bookstore** database and modify the database to accommodate the following:

- **Add** the book *Exploring Microsoft Office 2000 Vol II* (ISBN: 013-011100-7) by Grauer/Barber, published in 1999 by Prentice Hall, selling for $45.00.
- **Change** the price of *Memory Management for All of Us* to **$29.95**.
- **Delete** *The Presentation Design Book.*
- **Open** the *All Books Report* as shown in the following figure after these changes have been made.

University of Miami Book Store
27-Eyl-05

	ISBN Number	Title	Author	List Price
Boyd & Fraser				
	0-87835-669-X	A Guide to SQL	Pratt	$24,95
Macmillan Publishing				
	1-56686-127-6	The Hardware Bible	Rosch	$35,00
McGraw Hill				
	43543543	Internet Literacy	Hofstetter	$45,00
	0-07-070318-3	The Cybernetics Reader	Willard	$15,75
Prentice Hall				
	0-13-754227-5	Exploring Access 97	Grauer/Barber	$30,95
	0-13-011108-2	Exploring Excel 2000	Grauer/Barber	$28,95
	0-13-011816-8	Exploring PowerPoint 2000	Grauer/Barber	$28,95
	0-13-020476-5	Exploring Access 2000	Grauer/Barber	$28,95
	0-13-020489-7	Exploring Word 2000	Grauer/Barber	$28,95
	0-13-504077-9	Exploring Windows 95	Grauer/Barber	$27,95
	0-13-754193-7	Exploring Windows 98	Grauer/Barber	$28,95
	0-13-754219-1	Exploring Excel 97	Grauer/Barber	$30,95
	013-011100-7	Exploring Microsoft Office 2000 Vol II	Grauer/Barber	$45,00
	0-13-754235-6	Exploring PowerPoint 97	Grauer/Barber	$30,95
	0-13-754201-1	Exploring Word 97	Grauer/Barber	$30,95
Prentice-Hall				
	0-13-065541-4	Exploring Windows 3.1	Grauer/Barber	$24,95
	0-13-790817-2	COBOL: From Micro to Mainframe/3e	Grauer/Villar/Buss	$52,95
Que Corporation				
	0-88022-761-3	Speed Up Your Computer Book	Reed/Nance	$29,95

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EXERCISE 3

Open the **Super Bowl** database.

1. On the **Objects** bar, double-click the **Super Bowl** table to open it in the Datasheet view.

Year	AFCTeam	AFCScore	NFCTeam	NFCScore	Winner
1999	Denver	34	Atlanta	19	AFC
1998	Denver	31	Green Bay	24	AFC
1997	New England	21	Green Bay	35	NFC
1996	Pittsburgh	17	Dallas	27	NFC
1995	San Diego	26	San Francisco	49	NFC
1994	Buffalo	13	Dallas	30	NFC
1993	Buffalo	17	Dallas	52	NFC
1992	Buffalo	24	Washington	37	NFC
1991	Buffalo	19	Giants	20	NFC
1990	Denver	10	San Francisco	55	NFC
1989	Cincinnati	16	San Francisco	20	NFC
1988	Denver	10	Washington	42	NFC
1987	Denver	20	Giants	39	NFC
1986	New England	10	Chicago	46	NFC
1985	Miami	16	San Francisco	38	NFC
1984	Los Angeles Raiders	38	Washington	9	AFC
1983	Miami	17	Washington	27	NFC
1982	Cincinnati	21	San Francisco	26	NFC
1981	Oakland	27	Philadelphia	10	AFC
1980	Pittsburgh	31	Los Angeles	19	AFC
1979	Pittsburgh	35	Dallas	31	AFC
1978	Denver	10	Dallas	27	NFC
1977	Oakland	32	Minnesota	14	AFC
1976	Pittsburgh	21	Dallas	17	AFC
1975	Pittsburgh	16	Minnesota	6	AFC
1974	Miami	24	Minnesota	7	AFC

Record: 1 of 33

2. The data has to be **Sorted**. Click anywhere in the **Year** field, then click the **Descending Sort** button to display the most recent Super Bowl first.

3. Select the **Winner** in any year that the **AFC** won. Click the **Filter by Selection** button to display only those records (the years in which the AFC won the game).

4. Click the **Remove Filter** button. Select any year in which the **NFC** won, then click the **Filter by Selection** button to display the years in which the NFC won. Remove the filter.

5. Create one additional filter (for example, the years in which your favorite team won the big game).

TABLES

A table stores information in a row-column format a database similar to the way an Excel worksheet stores information in a workbook. Access provides three ways to create a table for which there are icons in the Database Window. Double-click on the icons to create a table.
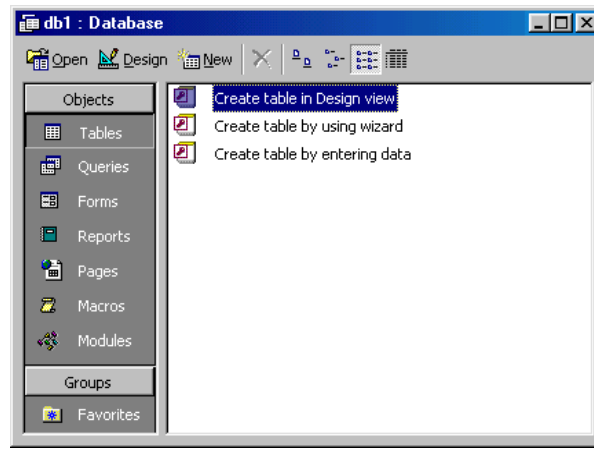
The Database Window

- **Create table in Design view** will allow you to create the fields of the table. This is the most common way of creating a table and is explained in detail below.

- **Create table using wizard** will step you through the creation of a table.

- **Create table by entering data** will give you a blank datasheet with unlabelled columns that looks much like an Excel worksheet. Enter data into the cells and click the **Save** button. You will be prompted to add a **primary key** field. After the table is saved, the empty cells of the datasheet are trimmed. To rename the fields with more descriptive titles that reflect the content of the fields, select **Format |Rename Column** from the menu bar or highlight the column, right-click on it with the mouse, and select **Rename Column** from the shortcut menu.

Create a Table in Design View
Design View will allow you to define the fields in the table before adding any data to the datasheet. The window is divided into two parts: a top pane for entering the field name, data type, and an option description of the field, and a bottom pane for specifying field properties.

- **Field Name** - This is the name of the field and should represent the contents of the field such as "Name", "Address", "Final Grade", etc. The name can not exceed 64 characters in length and may include spaces.

- **Data Type** is the type of value that will be entered into the fields.

  - *Text* - The default type, text type allows any combination of letters and numbers up to a maximum of 255 characters per field record.

  - *Memo* - A text type that stores up to 64,000 characters.

  - *Number* - Any number can be stored.

  - *Date/Time* - A date, time, or combination of both.

  - *Currency* - Monetary values that can be set up to automatically include a dollar sign ($) and correct decimal and comma positions.

- o ***AutoNumber*** - When a new record is created, Access will automatically assign a unique integer to the record in this field. From the General options, select Increment if the numbers should be assigned in order or random if any random number should be chosen. Since every record in a datasheet must include at least one field that distinguishes it from all others, this is a useful data type to use if the existing data will not produce such values.

- o ***Yes/No*** - Use this option for True/False, Yes/No, On/Off, or other values that must be only one of two.

- o ***OLE Object*** - An OLE (Object Linking and Embedding) object is a sound, picture, or other object such as a Word document or Excel spreadsheet that is created in another program. Use this data type to embed an OLE object or link to the object in the database.

- o ***Hyperlink*** - A hyperlink will link to an Internet or Intranet site, or another location in the database. The data consists of up to four parts each separated by the pound sign (#): DisplayText#Address#SubAddress#ScreenTip. The Address is the only required part of the string. Examples:

  Internet hyperlink example: Cankaya Univ. Home Page   #http://www.cankaya.edu.tr#

- **Description** (optional) - Enter a brief description of what the contents of the field are.

- **Field Properties** - Select any pertinent properties for the field from the bottom pane.

Field Properties
Properties for each field are set from the bottom pane of the Design View window.

- **Field Size** is used to set the number of characters needed in a text or number field. The default field size for the text type is 50 characters. If the records in the field will only have two or three characters, you can change the size of the field to save disk space or prevent entry errors by limiting the number of characters allowed. Likewise, if the field will require more than 50 characters, enter a number up to 255. The field size is set in exact characters for Text type, but options are give for numbers:

  - o Byte - Positive integers between 1 and 255

  - o Integer - Positive and negative integers between -32,768 and 32,768

  - o Long Integer (default) - Larger positive and negative integers between -2 billion and 2 billion.

  - o Single - Single-precision floating-point number

  - o Double - Double-precision floating-point number

  - o Decimal - Allows for Precision and Scale property control

- **Format** conforms the data in the field to the same format when it is entered into the datasheet. For text and memo fields, this property has two parts that are separated by a semicolon. The first part of the property is used to apply to the field and the second applies to empty fields.

Text and memo format.

Text Format			
Format	**Datasheet Entry**	**Display**	**Explanation**
@@@-@@@@	1234567	123-4567	@ indicates a required character or space
@@@-@@@&	123456	123-456	& indicates an optional character or space
<	HELLO	hello	< converts characters to lowercase
>	hello	HELLO	> converts characters to uppercase
@\!	Hello	Hello!	\ adds characters to the end
@;"No Data Entered"	Hello	Hello	
@;"No Data Entered"	(blank)	No Data Entered	

Number format. Select one of the preset options from the drop down menu or construct a custom format using symbols explained below:

Number Format			
Format	**Datasheet Entry**	**Display**	**Explanation**
###,##0.00	123456.78	123,456.78	0 is a placeholder that displays a digit or 0 if there is none.
$###,##0.00	0	$0.00	# is a placeholder that displays a digit or nothing if there is none.
###.00%	.123	12.3%	% multiplies the number by 100 and added a percent sign

Currency format. This formatting consists of four parts separated by semicolons:
format for positive numbers; format for negative numbers; format for zero values; format for Null values.

Currency Format	
Format	**Explanation**
$##0.00;($##0.00)[Red];$0.00;"none"	Positive values will be normal currency format, negative numbers will be red in parentheses, zero is entered for zero values, and "none" will be written for Null values.

Date format. In the table below, the value "1/1/01" is entered into the datasheet, and the following values are displayed as a result of the different assigned formats.

Date Format		
Format	**Display**	**Explanation**
dddd","mmmm d","yyyy	Monday, January 1, 2001	dddd, mmmm, and yyyy print the full day name, month name, and year
ddd","mmm ". " d", '"yy	Mon, Jan. 1, '01	ddd, mmm, and yy print the first three day letters, first three month letters, and last two year digits
"Today is " dddd	Today is Monday	
h:n:s: AM/PM	12:00:00 AM	"n" is used for minutes to avoid confusion with months

Yes/No fields are displayed as check boxes by default on the datasheet. To change the formatting of these fields, first click the Lookup tab and change the Display Control to a text box. Go back to the General tab choices to make formatting changes. The formatting is designated in three sections separated by semicolons. The first section does not contain anything but the semicolon must be included. The second section specifies formatting for Yes values and the third for No values.

Yes/No Format	
Format	**Explanation**
;"Yes"[green];"No"[red]	Prints "Yes" in green or "No" in red

Default Value - There may be cases where the value of a field will usually be the same for all records. In this case, a changeable default value can be set to prevent typing the same thing numerous times. Set the Default Value property.

Primary Key
Every record in a table must have a primary key that differentiates it from every other record in the table. In some cases, it is only necessary to designate an existing field as the primary key if you are certain that every record in the table will have a different value for that particular field. A social security number is an example of a record whose values will only appear once in a database table. Designate the primary key field by right-clicking on the record and selection **Primary Key** from the shortcut menu or select **Edit|Primary Key** from the menu bar. The primary key field will be noted with a key image to the left. To remove a primary key, repeat one of these steps.
If none of the existing fields in the table will produce unique values for every record, a separate field must be added. Access will prompt you to create this type of field at the beginning of the table the first time you save the table and a primary key field has not been assigned. The field is named "ID" and the data type is "autonumber". Since this extra field serves no purpose to you as the user, the autonumber type automatically updates whenever a record is added so there is no extra work on your part. You may also choose to hide this column in the datasheet as explained on a later page in this tutorial.

Indexes
Creating indexes allows Access to query and sort records faster. To set an indexed field, select a field that is commonly searched and change the Indexed property to **Yes (Duplicates OK)** if multiple entries of the same data value are allowed or **Yes (No Duplicates)** to prevent duplicates.

Field Validation Rules
Validation Rules specify requirements (change word) for the data entered in the worksheet. A customized message can be displayed to the user when data that violates the rule setting is entered. Click the expression builder ("**...**") button at the end of the Validation Rule box to write the validation rule. Examples of field validation rules include **<> 0** to not allow zero values in the record, and **???** to only all data strings three characters in length.

Input Masks
An input mask controls the value of a record and sets it in a specific format. They are similar to the Format property, but instead display the format on the datasheet before the data is entered. For example, a telephone number field can be formatted with an input mask to accept ten digits that are automatically formatted as "(999) 888-7777". The blank field would look like (___) ___-____. An an input mask to a field by following these steps:

1. In design view, place the cursor in the field that the input mask will be applied to.
2. Click in the white space following **Input Mask** under the **General** tab.
3. Click the "**...**" button to use the wizard or enter the mask, (@@@) @@@-@@@@, into the field provided. The following symbols can be used to create an input mask from scratch:

Input Mask Symbols	
Symbol	**Explanation**
A	Letter or digit
0	A digit 0 through 9 without a + or - sign and with blanks displayed as zeros
9	Same as 0 with blanks displayed as spaces
#	Same as 9 with +/- signs
?	Letter
L	Letter A through Z
C or &	Character or space
<	Convert letters to lower case
>	Convert letters to upper case

Laboratory work: CREATING A TABLE

Objectives

- To use the Table Wizard to create a table
- To add and delete fields in an existing table
- To establish an input mask and validation rule for fields within a table
- To switch between the Design and Datasheet views of a table

EXERCISE 4

STEP 1 : Create a New Database

➤ Click the **Start button** to display the Start menu. Click the **Programs menu**, then click **Microsoft Access** to start the program.
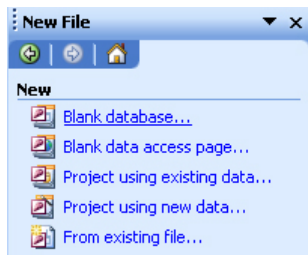

➤ You should see the Microsoft Access dialog box as shown on the left side. Click the option button to create a new database using a **Blank Access Database**. Click **OK**.

➤ Click the **drop-down arrow** on the **Save in:** list box. Click the appropriate drive (drive C or drive A), depending on the location of your data. Double click the **Exploring Access folder** to make it the active folder.

➤ Click in the **File Name text box** and drag to select **db1**. Type **My First Database** as the name of the database you will create. Click the **Create button**.
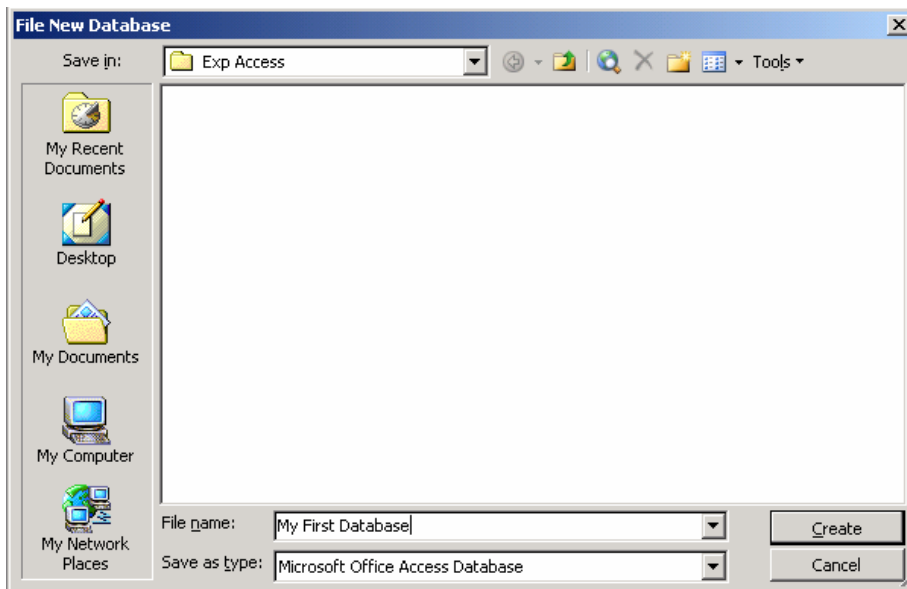
STEP 2 : Create the Table

➤ The database window for **My First Database** should appear on your monitor. The **Tables button** is selected by default.
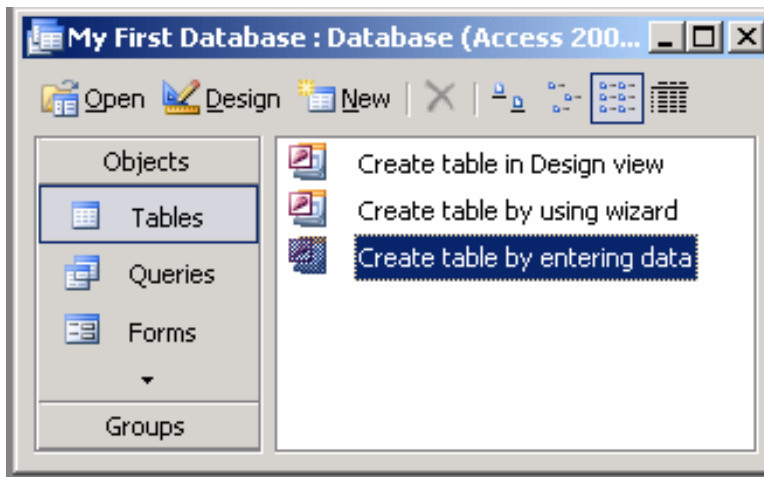
- ➢ Click and drag an edge or border of the Database window to change its size. Click and drag the title bar of the Database window to change its position on the desktop.

- ➢ Click the **New button** to display the New Table dialog box. Click (select) **Table Wizard** in the New Table dialog box, then click OK to start the Table Wizard.
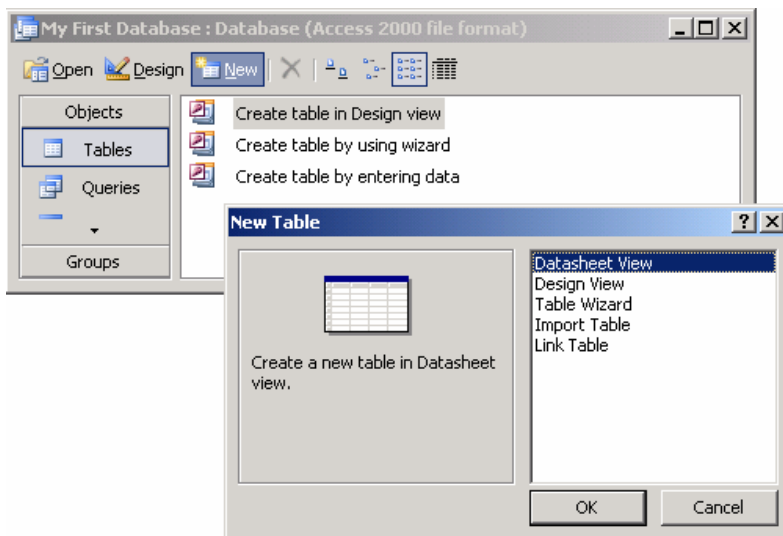
STEP 3: The Table Wizard

- ➢ If necessary, click the **Business Option button**. Click the **down arrow** on the **Sample Tables list box** to scroll through the available business tables. Click (select) **Students** within the list of sample tables. The tables are not in alphabetical order, and the Students table is found near the very bottom of the list.

- ➢ The **StudentID field** is already selected in the Sample Fields list box. Click the **> button** to enter this field in the list of fields for the new table.

- ➢ Enter the additional fields for the new table by selecting the field and clicking the **> button**. The fields to enter are: **FirstName, LastName, Address, City**, and **StateOrProvince**.

- ➢ Click the **Rename Field command button** after the adding the StateOrProvince field to display the Rename Field dialog box. Enter **State** to shorten the name of this field. Click **OK**.

- ➢ Add **PostalCode** and **PhoneNumber** as the last two fields in the table. Click the Next command button when you have entered all the fields.
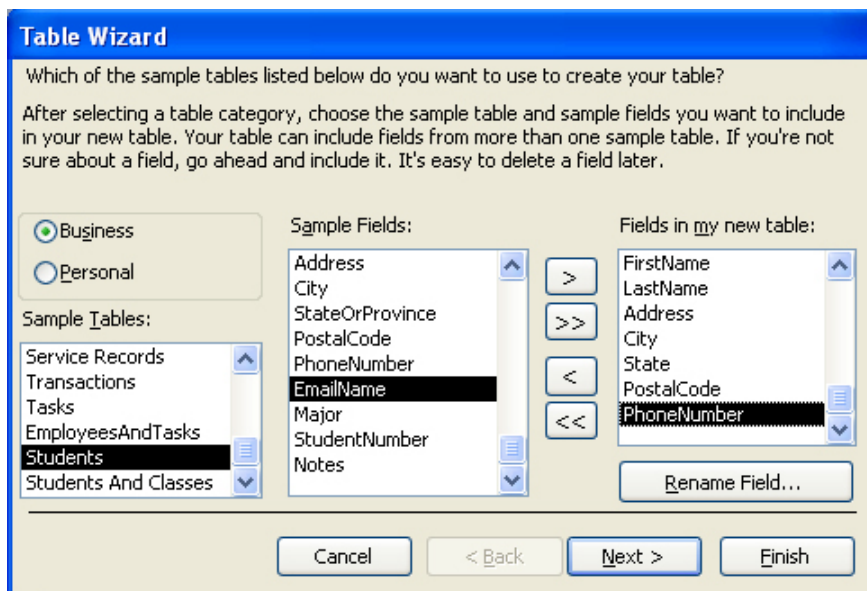
STEP 4 :

➢ The next screen in the Table Wizard asks you to name the table and determine the primary key.

➢ Accept the Wizard's suggestion of **Students** as the name of the table.

➢ Make sure that the option button **Yes, set a primary key for me** is selected.

➢ Click the **Next command button** to accept both of these options.
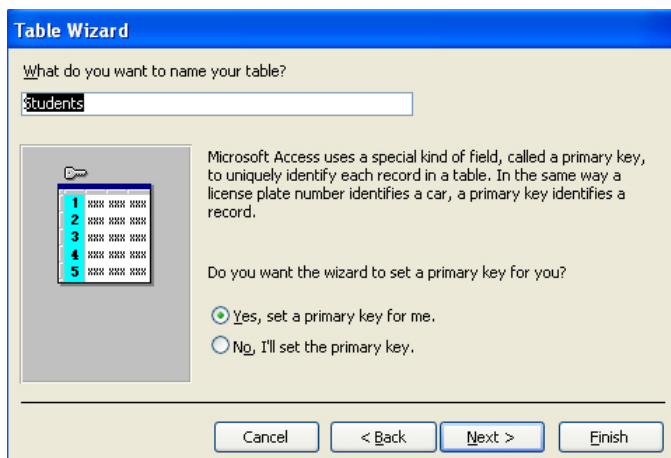
➢ The final screen in the Table Wizard asks you what to do next.

➢ Click the option button to **Modify the table design**.
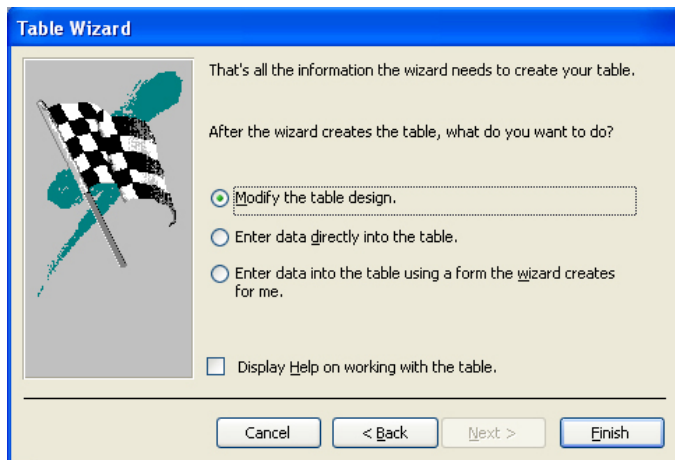
> Click the **Finish command button**. The Students table should appear on your monitor. Pull down the **File menu** and click Save to save the table.
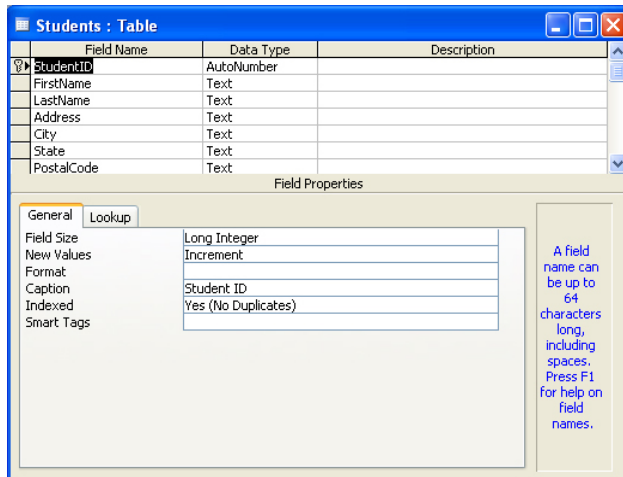
STEP 5 : Add the Additional Fields

> Click the cell immediately below the last field in the table (PhoneNumber). Type **BirthDate**.

> Press the **Tab key** to move to the Data Type column. Click the **down arrow** on the drop-down list box. Click **Date/Time**.

> Add the remaining fields to the Students table. Add **Gender** as a text field. Add **Credits** as a Number field. Add **Points** as a Number field.
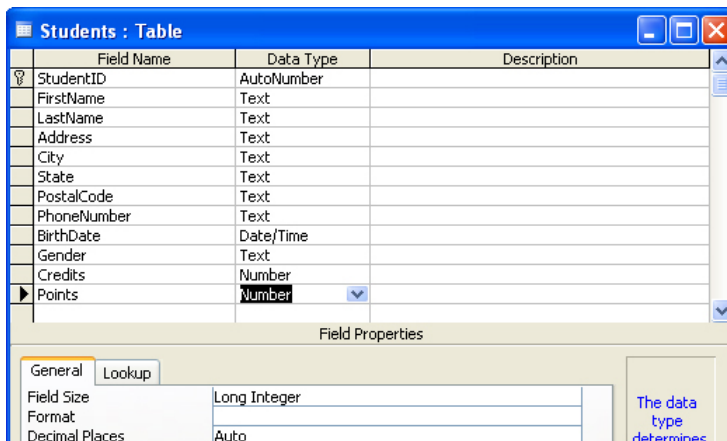
STEP 6 : Change the Primary Key

➢ Point to the first field in the table and click the **right mouse button** to display the shortcut menu. Click **Insert Rows**.

➢ Click the **Field Name column** in the newly inserted row. Type **SSN** (for social security number) as the name of the new field. Press **enter**. The data type will be set to Text by default.

➢ Click the **Required box** in the Properties area. Click the drop-down arrow and select **Yes**.

➢ Click in the Field Name column for **SSN**, then click the **Primary Key button** on the Table Design toolbar to change the primary key to social security number. The primary key symbol has moved to SSN.

➢ Point to the **StudentID field** in the second row. Click the **right mouse button** to display the shortcut menu. Click **Delete Rows** to remove this field from the table definition. Save the table.
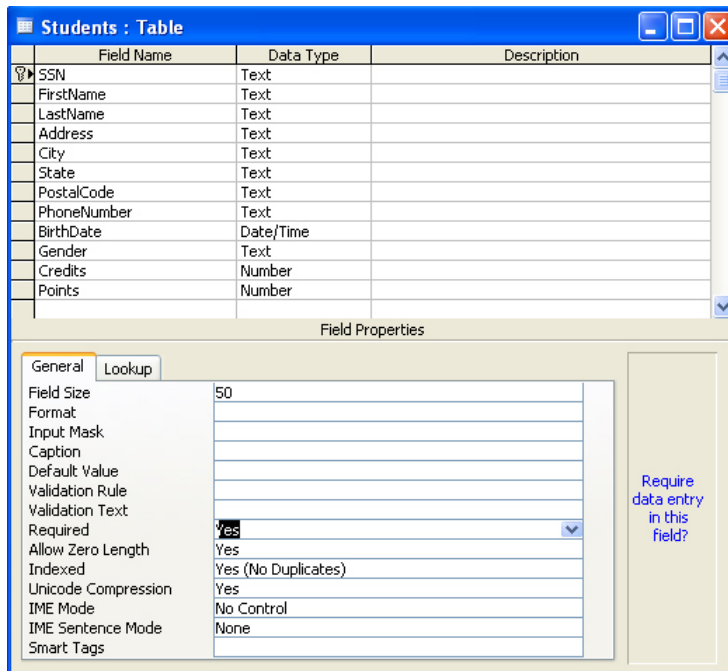
STEP 7 : Add an Input Mask

➢ Click the Field selector column for **SSN**. Click the **Input Mask box** in the Properties area.

➢ Click the **Build button** to display the Input Mask Wizard. Click **Yes** if asked whether to save the table. Click **Social Security Number** in the Input Mask Wizard dialog box.

➢ Click the **Try It** text box and enter a social secyrity number to see how the mask works. If necessary, press the **left arrow key** until you are at the beginning of the text box, then enter a social security number (digits only). Click the **Finish command button** to accept the input mask.
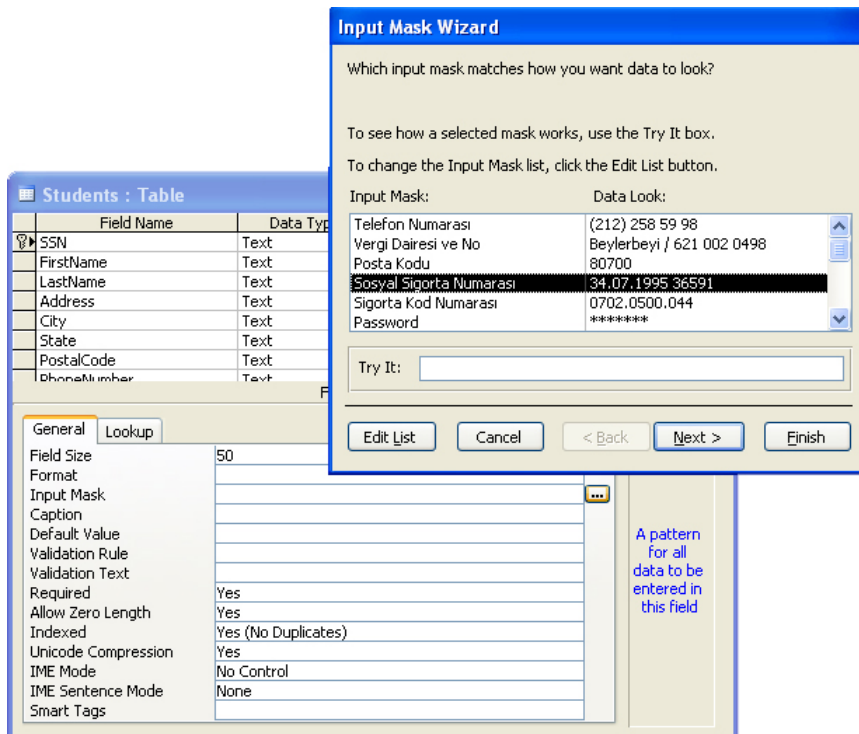
- ➢ Click the field selector column for **BirthDate**, then follow the steps detailed above to add an input mask. (Choose the **Short Date** format.) Click **Yes** if asked whether to save the table. Save the table.

STEP 8 : Change the Field Properties

- ➢ Click the field selector column for the **FirstName** field:
  - Click the **Field Size box** in the Properties area and change the field size to **25**.
  - Click the **Required** box in the Properties area. Click the **drop-down arrow** and select **Yes**.
- ➢ Click the field selector column for the **LastName** field:
  - Click the **Field Size** box in the Properties area and change the field size to **25**.
  - Click the **Required box** in the Properties area. Click the **drop-down arrow** and select **Yes**.
- ➢ Click the field selector column for the **State** field:
  - Click the **Field Size** box in the Properties area and change the field size to **2**.
  - Click the **Format box** in the Properties area. Type a **> sign** to display the data in uppercase.
- ➢ Click the field selector column for the **Credits** field:
  - Click the **Field Size box** in the Properties area, click the **drop-down arrow** to display the available field sizes, then click **Integer**.
  - Click the **Default Value box** in the Properties area. Delete the **0**.
- ➢ Click the field selector column for the **Points** field:
  - Click the **Field Size box** in the Properties area, click the **drop-down arrow** to display the available field sizes, then click **Integer**.
  - Click the **Default Value box** in the Properties area. Delete the **0**. Save the table.

STEP 9 : Add a Validation Rule

➢ Click the field selector column for the Gender field. Click the **Field Size   box** and change the field size to **1**.

➢ Click the **Format box** in the Properties area. Type a **> sign** to display the data entered in uppercase.

➢ Click the **Validation Rule box**. Type **"M" or "F"** to accept only these values on data entry.

➢ Click the **Validation Text box**. Type **You must specify M or F**. Save the table.
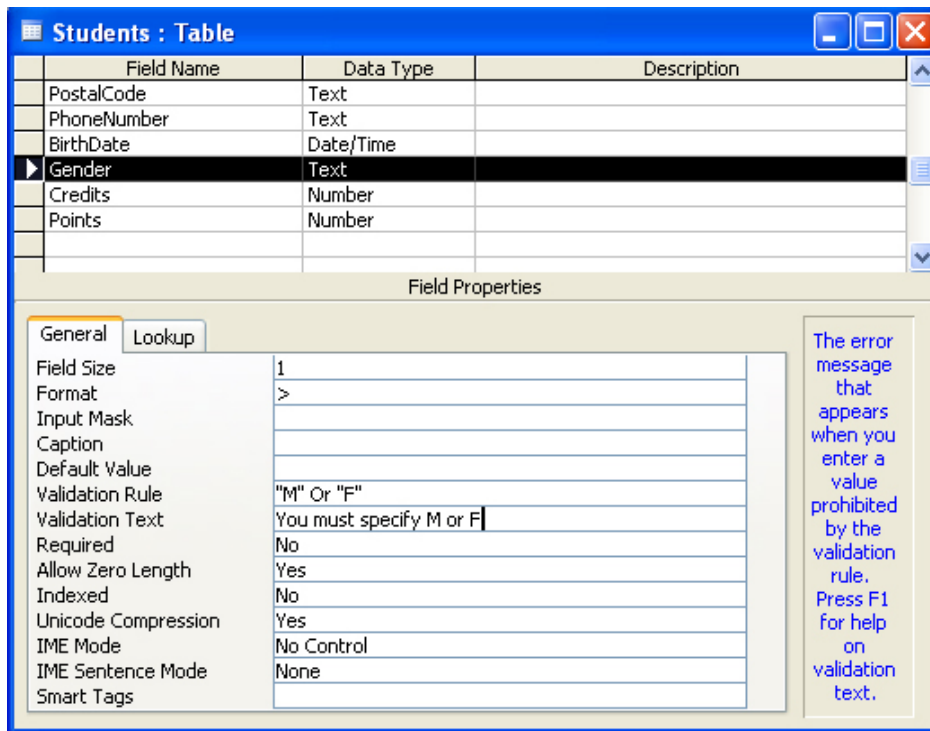
STEP 10 : The Datasheet View

➢ Pull down the **View menu** and click **Datasheet View** to change to the Datasheet view.

➢ The insertion point is automatically set to the first field of the first record.

➢ Type **111111111** to enter the social security number for the first record. (The input mask will appear as soon as you enter the first digit.)

➢ Press the **Tab key**, the **right arrow key**, or the **enter key** to move to the FirstName field. Enter the data for Brad Pitt and make up data for other fields.

➢ Scrolling takes place automatically as you move within the record.

➢ Enter data for the two other students, but enter deliberately invalid data to experiment with the validation capabilities built into Access. Save the table.
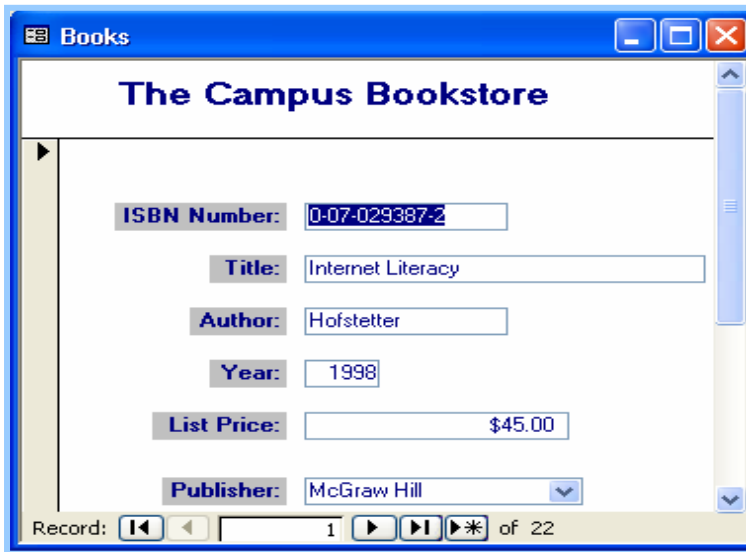
FORMS

A form provides a user-friendly way to enter and display the data stored in a table. AutoForms and the Form Wizard are easy ways to create a form. One advantage of using a form (as opposed to entering records in the Datasheet view) is that you can see all of the fields in a single record without scrolling. A second advantage is that a form can be designed to resemble a paper form.

A form has two views; The **Form view** displays the completed form and is used to enter or modify the data in the underlying table.
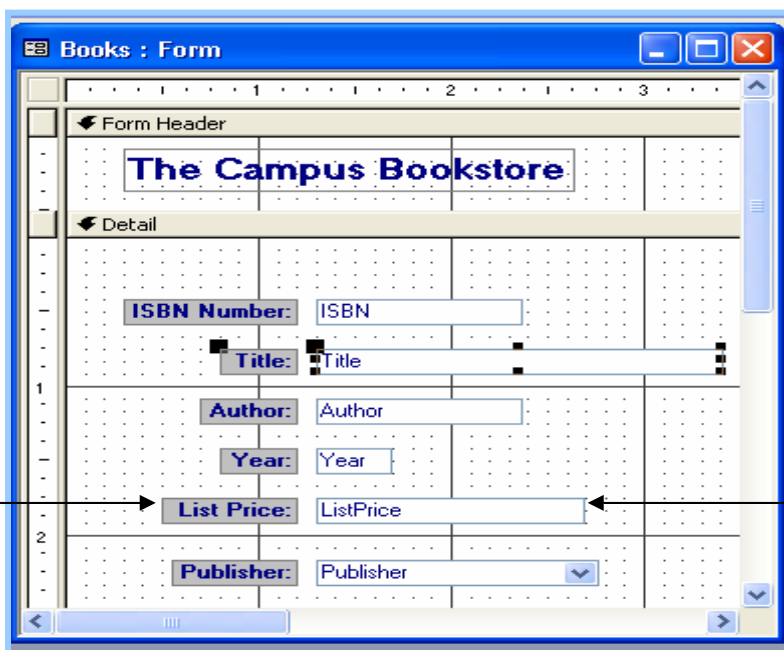
The Form view

The **Design view** ids used to create or modify the form.

Unbound control

Bound control

The Design view

All forms contain objects that called **controls** that accept and display data, perform a specific action, decorate a form, or add descriptive information. There are three types of controls: bound, unbound and calculated.

A **bound control** (such as the text boxes in the design view above) has a data source (a field in the underlying table) and is used to enter or modify the data in that table.

An **unbound control** has no data source. Unbound controls are used to display titles, labels, lines, graphics, or pictures. Every bound control is associated with an unbound control (or label to identify the control).

A **calculated control** has its data source an expression rather than a field. An expression is a combination of operators (+, -, * and /) field names, constants, and/or functions.

Properties

A property is a characteristic of an object that determines how the object looks and behaves. Each control in a form has its own set of properties, just as every field in a table has its own set of properties. The properties for a control are displayed in a property sheet.

**AutoForms and the Form Wizard**

The easiest way to create a form is by selecting one of several predefined **AutoForms**. Double click the Columnar AutoForms, for example, and you are presented with a form that contains all of the fields in the underlying table or query.

The **Form Wizard** gives you greater flexibility because you can select the fields you want and/or choose a different style from the default style provided by the AutoForm. The Wizard asks you a series of questions, then build the form according to your answers.
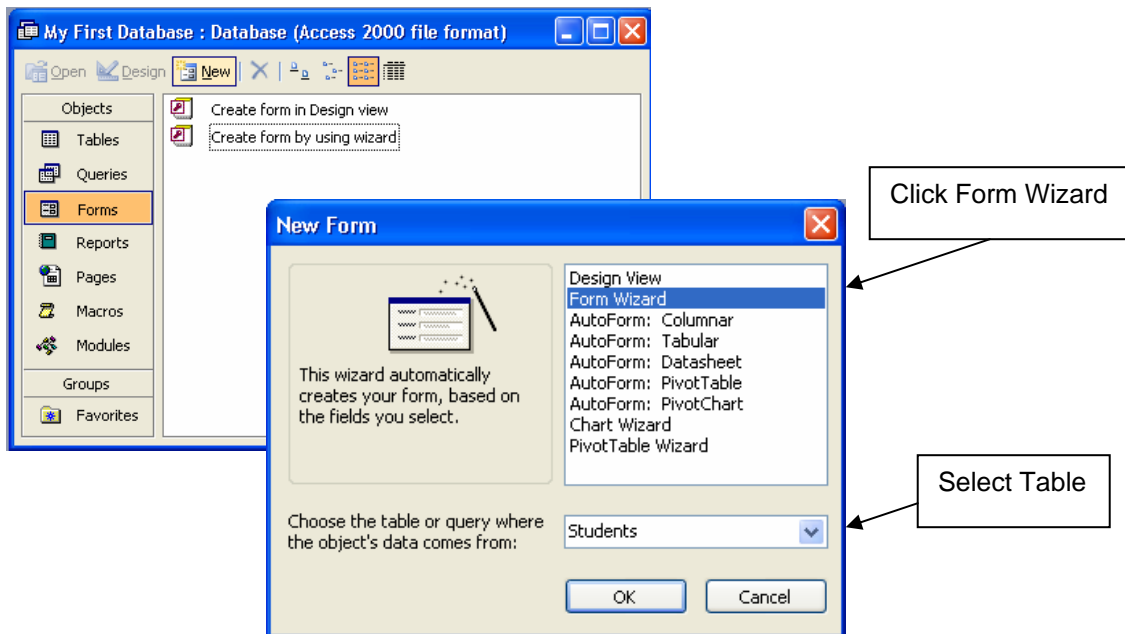
Modifying a Form

You can customize the form, by adding other controls, such as adding a calculated field, and/or modify the controls that were created by the Wizard.

Click >> to select all fields

Click Next
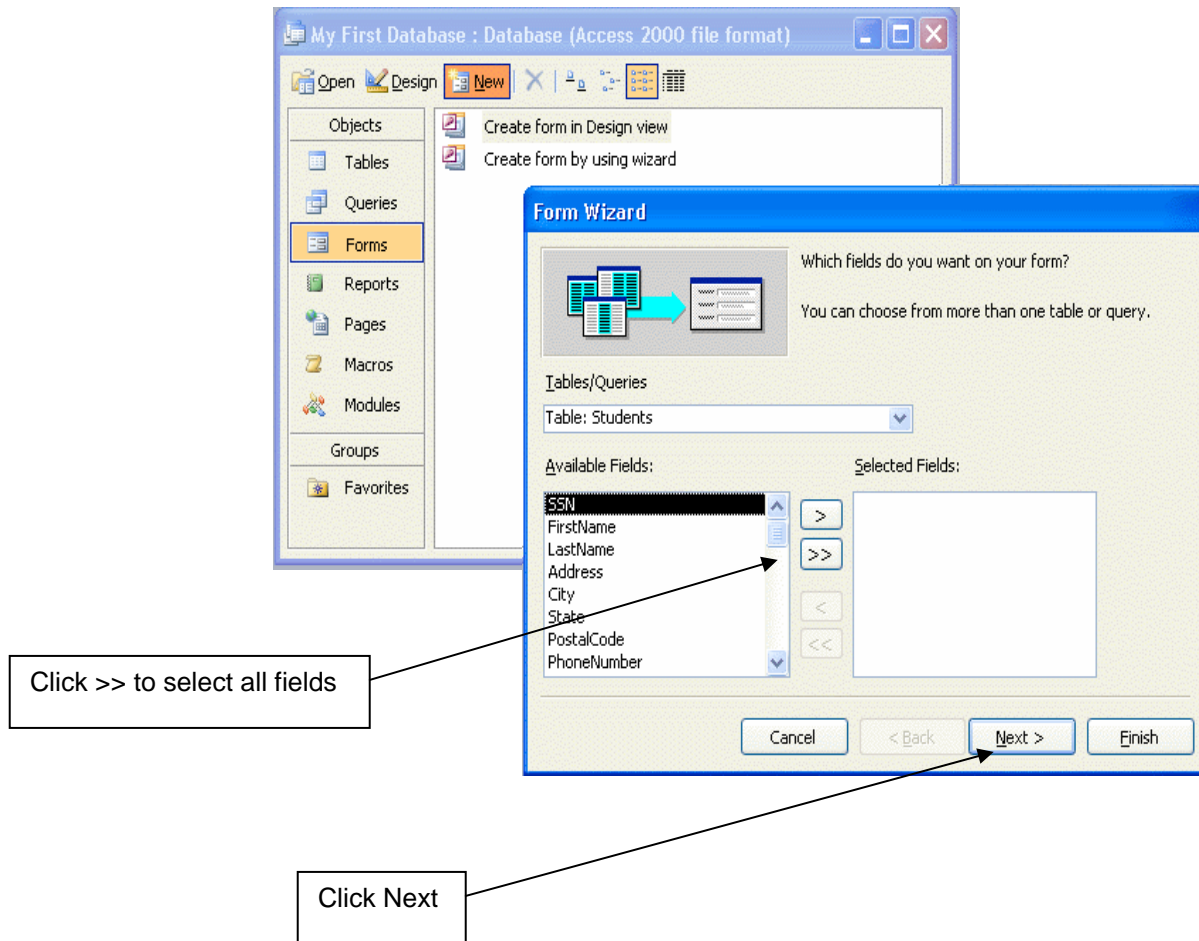
Each control can be moved or sized by selecting the control, then clicking and dragging to resize the control or position it elsewhere on the form. You can also change the properties of the control through buttons on the various toolbars or by displaying the property sheet for the control and changing the appropriate property.

Laboratory work: CREATING A FORM

Objectives

- To use the Form Wizard to create a form
- To move and size controls within a form
- To use the completed form to enter data into the associated table

EXERCISE 5

STEP 1 : Open the Existing Database & The Form Wizard

➢ Start **Access**. Select **My First Database** from the list of recently opened databases, then click **OK**.

➢ Click the **Forms** button in the Database window. Click the **New** command button to display the New Form dialog box.

➢ Click **Form Wizard** in the list box. Click the drop-down arrow to display the available tables and queries in the database on which the form can be based.

➢ You should see the dialog box which displays all of the fields in the **Students** table. Click the **>>** button to enter all of the fields in the table on the form. Click the **Next** command button.
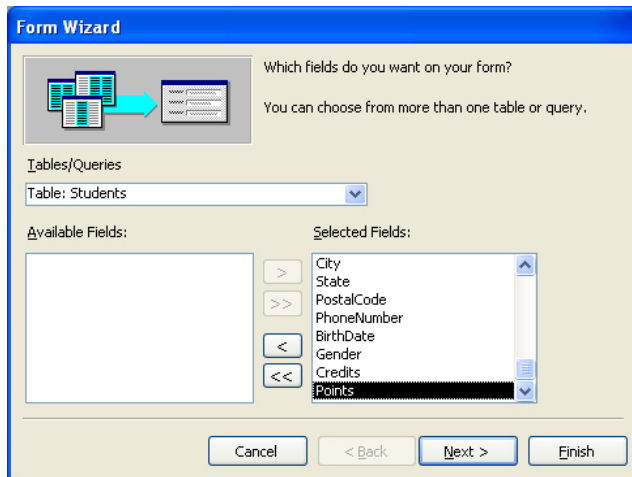

➢ The Columnar layout is already selected. Click the **Next** command button.

➢ Click Industrial as the style for your form. Click the **Next** command button.

➢ The Form Wizard asks you for the title of the form and what you want to do next.

- The Form Wizard suggests **Students** as the title of the form. Keep this entry.

- Click the option button to **Modify the form's design**.

➢ Click the **Finish** command button to display the form in Design view.
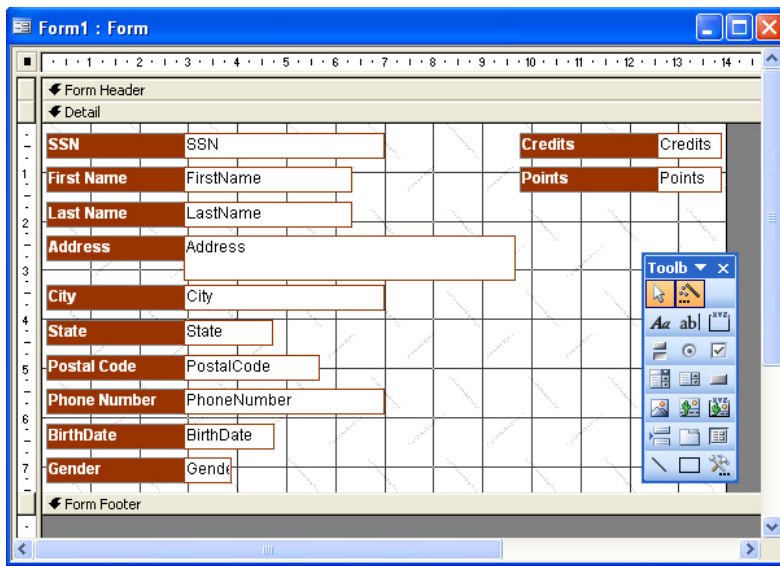
STEP 3 : Move the Controls

➢ If necessary, click the **Maximize** button so that the form takes the entire screen. The Form Wizard has arranged the controls in columnar format, but you need to rearrange the controls.

➢ Click the **LastName** control to select the control and display the sizing handles. (Be sure to select the text box and not the attached label.) Click and drag the border of the control (the pointer changes to a hand) so that the LastName control is on the same line as the FirstName control. Use the grid to space and align the controls.

➢ Click and drag the **Address** control under the **FirstName** control. Click and drag the border of the form to 18 cm. so that the **City**, **State**, and **PostalCode** controls will fit on the same line.

➢ Click and drag the **State** control so that it is next to the City control, then click and drag the PostalCode control so that it is on the same line as the other two. Press and hold the Shift key as you click the City, State, and PostalCode controls to select all three, then click and drag the selected controls under the Address control.

➢ Place the controls for **PhoneNumber**, **BirthDate**, and **Gender** on the same line. Move the controls under City, State, and PostalCode. Place the controls for **Credits** and **Points** on the same line. Move the controls under **PhoneNumber**.

➢ Fine-tune the form as necessary to make it more attractive. Move LastName to align it with State. Also you may make the SSN and PostalCode controls smaller. Pull down the File menu and click **Save** to save the form.
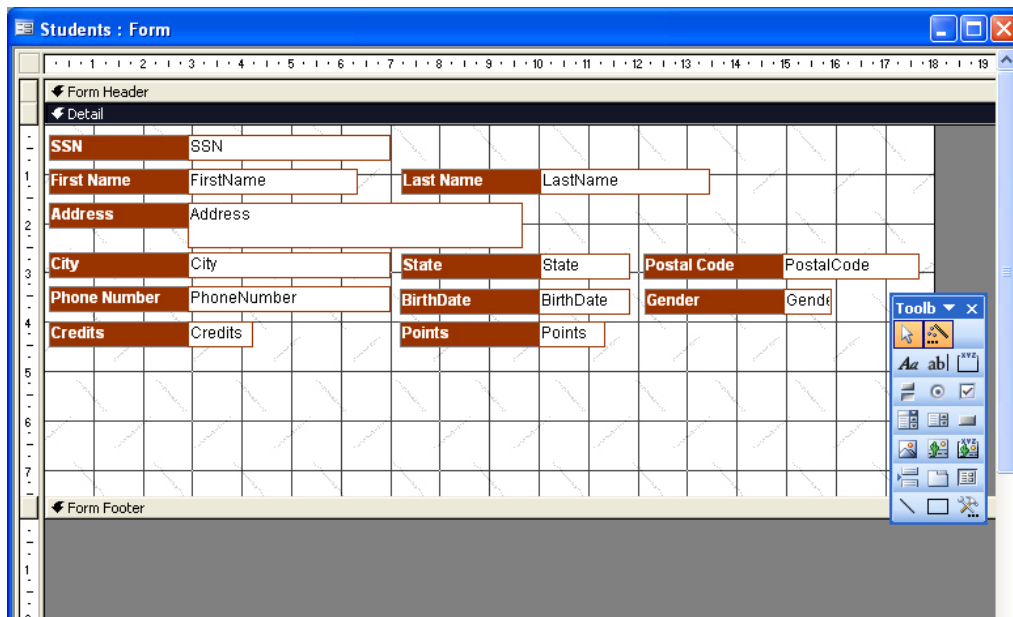
STEP 4 : Add a Calculated Control (GPA)

➢ Click the Text box tool in the Toolbox. The mouse pointer changes to a tiny crosshair with a text box attached.

➢ Click and drag in the form where you want the text box (the GPA control) to go. Release the mouse. You will see an Unbound control and an attached label containing a field number (for ex. Text24).

➢ Click in the text box of the control. The word Unbound will disappear, and you can enter an expression **= [Points]/[Credits]** to calculate a student's GPA. Do not be concerned if you cannot see the entire entry as scrolling will take place as necessary. You must enter the field names exactly as they were defined in the table.

➢ Select the attached label (Text24), then click and drag to select the text in the attached label. Type GPA as the label for this control and press enter. Size the text box appropriately for GPA. Size the bound control as well. Move either control as necessary. Click the Save button.

STEP 5 : Modify the Property Sheet

➢ Point to the GPA control and click the right mouse button to display a shortcut menu. Click Properties to display the Properties dialog box.

➢ If necessary, click the All tab. The Control Source text box contains the entry = [Points]/[Credits] from the preceding step.

➢ Click the **Name** text box. Replace the original name (Text24) with GPA. Click the **Format** box. Click the drop-down arrow, then scroll until you can select Fixed. Click the box for the **Decimal Places**. Click the drop-down arrow and select **2** as the number of decimal places.

➢ Close the Properties dialog box to accept these settings and return to the form.

29
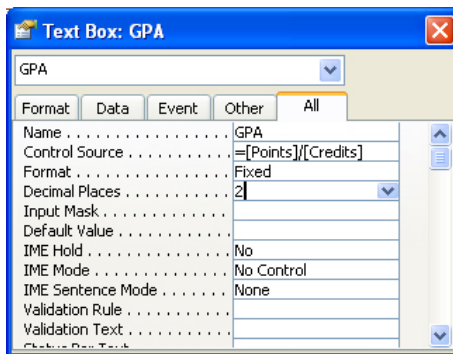
STEP 6 : Create the Form Header

➢ Click and drag the line separating the border of the **Form Header** and **Detail** to provide space for a header.

➢ Click the **Label** tool on the **Toolbox** toolbar (the mouse pointer changes to a cross hair combined with the letter A). Click and drag the mouse pointer to create a label within the header. The insertion point is automatically positioned within the label.

➢ Type **Student Information Form**. Do not be concerned about the size or alignment of the text at this time. Click outside the label when you have completed the entry, then click the control to select it.

➢ Click the drop-down arrow on the **Font Size** list box on the Formatting toolbar. Click **18**. The size of the text changes to the larger point size.

➢ Click the drop-down arrow next to the **Special Effect** button on the Formatting toolbar to display the available effects. Click the **Raised** button to highlight the label. Click outside the label to deselect it. Click the Save button to save the form.
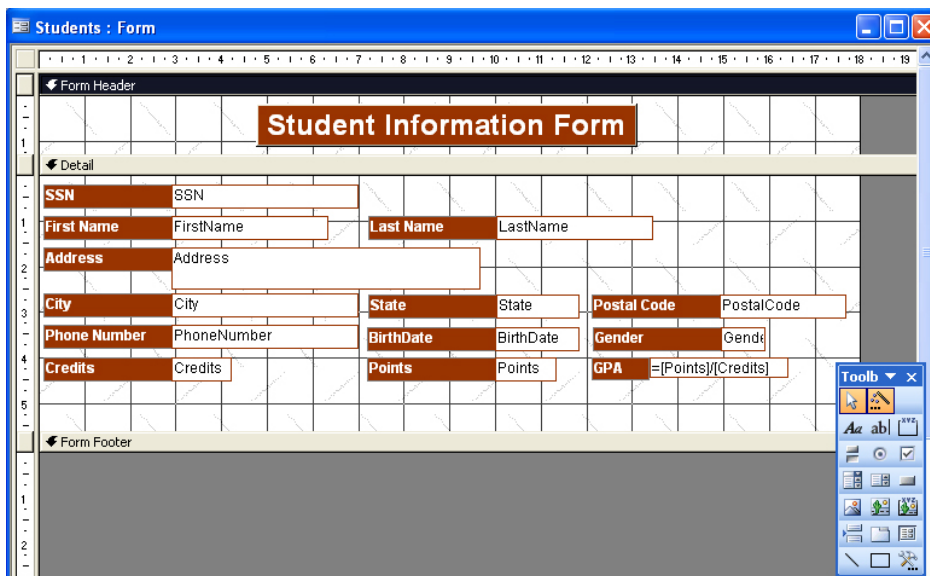

STEP 7 : Add the Date

➢ Click the Textbox tool on the Toolbox toolbar. The mouse pointer changes to a tiny crosshair with a text box attached. Click and drag in the form where you want the text box for the date, then release the mouse.

➢ You will see an Unbound control and the attached label containing a number (Text27). Click in the text box, and the word Unbound will disappear. Type **=Date( )**. Click the attached label. Press the **Del** key to delete the label.
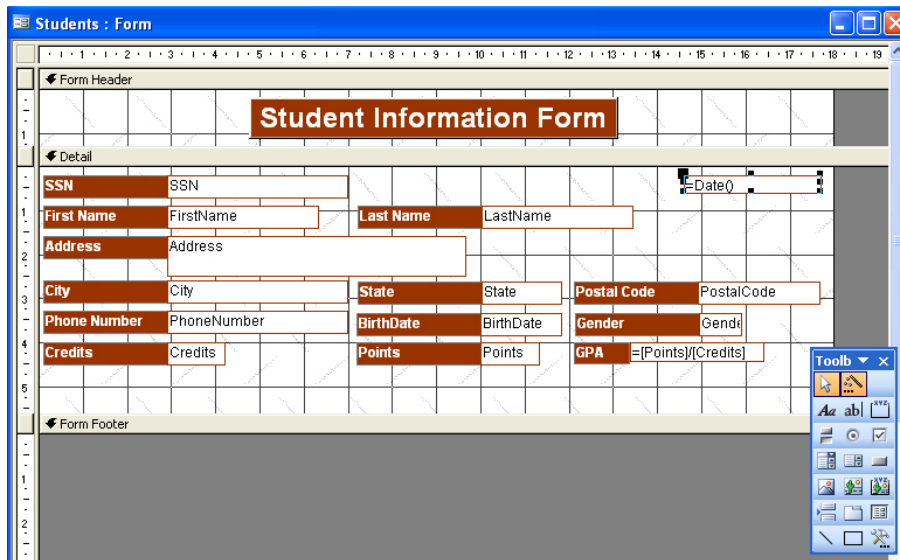
STEP 9 : The Form View

➢ Click the **View** button to switch to the Form view. You will see the first record in the table that was created in the previous exercise.

➢ Click the **New Record** button to move to the end of the table to enter a new record. Enter data for yourself. The record selector symbol changes to a pencil as you begin to enter data.

➢ Press the **Tab** key to move from one field to the next within the form. All properties (masks and validation) have been inherited from the Students table created in the first exercise.

➢ Pull down the **File** menu and **Close** the form. Click Yes if asked to save the changes to the form. Pull down the **File** menu and **Close** the database.
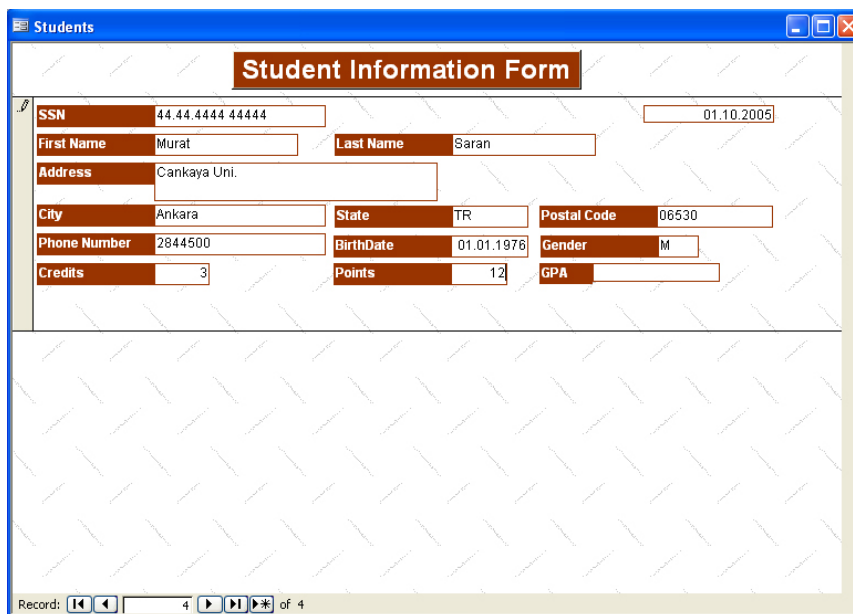
Laboratory work: CREATING A MORE SOPHISTICATEDFORM

Objectives

- To add fields to an existing table
- To use the Lookup Wizard to create a combo box
- To add controls to an existing form to demonstrate inheritance
- To add command buttons to a form

EXERCISE 6

STEP 1 : Modify the Table

➢ Open **My First Database** that we have been using throughout the previous works. If necessary, click the **Tables button** in the Database window. The **Students table** is already selected since that is the only table in the database.

➢ Click the **Design command button** to open the table in Design view. Maximize the window.

➢ Click the **Field Name box** under Quality Points. Enter **FinancialAid** as the name of the new field. Press the **tab**, or **right arrow key** to move to the **Data Type** column. Specify the Type as a **Yes/No** field.

➢ Click the **Field Name box** on the next row. Type **Campus** (There is no need to specify the Data Type since Text is the default).

➢ Press the **down arrow key** to move to the Field Name box on the next row. Enter **Major**. Press the **tab**, or **right arrow** key to move to the Data Type column. Click the **drop-down arrow** to display the list of data types. Click **Lookup Wizard**.
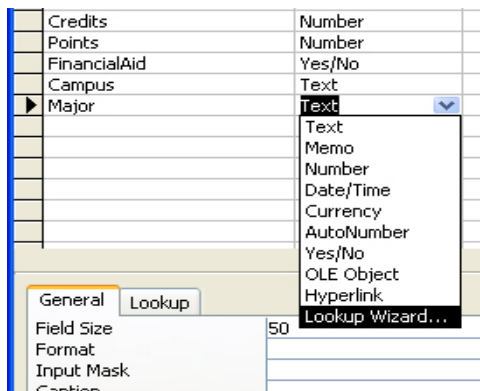

STEP 2 : The Lookup Wizard

➢ The first screen in the Lookup Wizard asks how you want to look up the data. Click the option button that indicates **I will type in the values that I want**. Click **Next**.
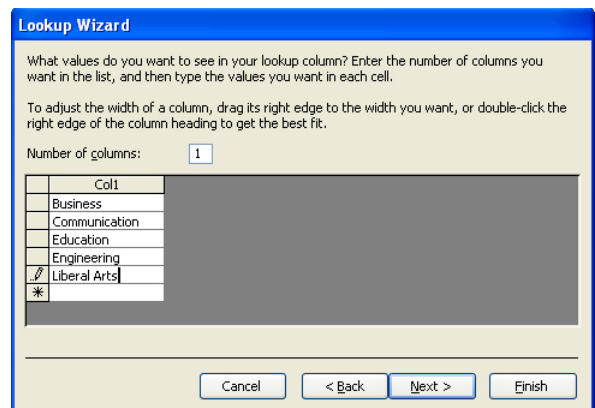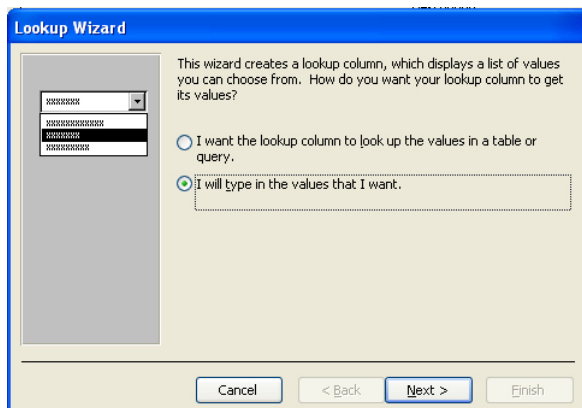
➢ The Number of columns is already entered as one. Click the **text box** to enter the first major. Type **Business**. Press **Tab** or **down arrow key** (do not press the enter key) to enter the next major.

➢ Complete the entries as **Communication, Education, Engineering, Liberal Arts**. Click **Next**. The Wizard asks for a label to identify the column (Major is already entered). Click **Finish** to exit the Wizard and return to the Design View. Click the **Save button** to save the table. **Close** the table.

STEP 3 : Add the New Controls

➢ Click the **Forms button** in the Database window. If nexessary, click the Students form to select it.

➢ Click the **Design command button** to open the form from the previous exercise. If necessary, Click the **Maximize button** so that the form takes the entire window.

➢ Pull down the **View menu**. Click **Field List** to display the field list for the table on which the form is based. You can move and size the field list just like any other Windows object.

➢ Fields can be added to the form from the field list in any order. Click and drag the **Major field** from the field list to the form. The Major control is created as a combo box because of the lookup list in the underlying table.

➢ Click and drag the **FinancialAid** field from the list to the form. The FinancialAid control is created as a check box because FinancialAid is a Yes/No field in the underlying table. Save the form.
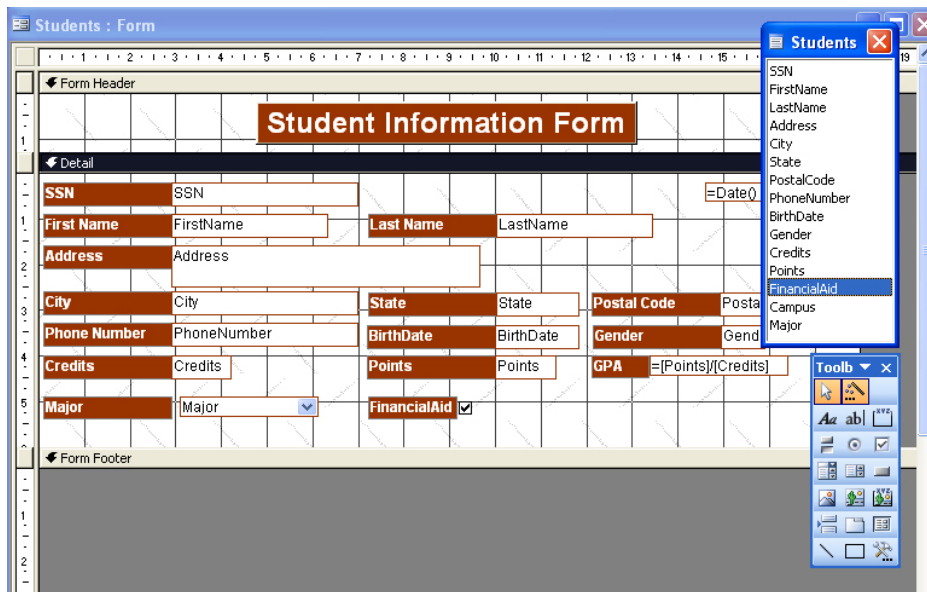

STEP 4 : Create an Option Group

➢ Click the **Option Group button** on the Toolbox toolbar. The mouse pointer changes to a tiny crosshair attached to an option group icon when you point anywhere in the form. **Click and drag** in the form **where you want the option group to place**, then release the mouse.

➢ You should see the **Option Group Wizard**. Enter **Main** as the label for the first option, then press the **Tab key** to move to the next line. Type **North** and press **Tab** to move to the next line. Enter **South** as the third and last option. Click **Next**.

➢ The option button to select Main (the first label that was entered) as the default is selected. Click **Next**. Main, North, and South will be assigned the values 1, 2, and 3, respectively (Numeric entries are required for an option group). Click **Next**.

➢ Click the drop-down arrow to select the field in which to store the value selected through the option group, scroll until you can select **Campus**. Click **Next**. Make sure the option button is selected as the type of control.


➢ Click the Option button for the **Sunken style** to match the other controls on the form. Click **Next**.

➢ Enter **Campus** as the caption for the group. Click the **Finish command button** to create the option group on the form. Click and drag the option group to position it on the form under the **GPA** control.

➢ Point to the border of the option group on the form, click the right mouse button to display a short cut menu, and click Properties. Click the All tab. Change the name to Campus.Close the dialog box. Close the field list. Save the form.
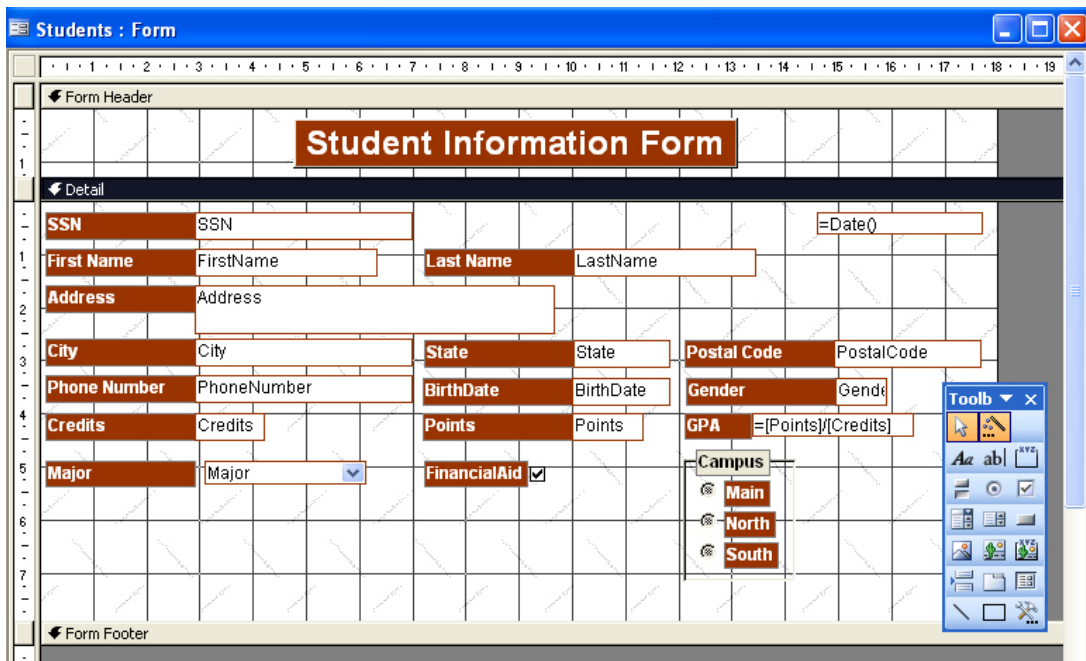
STEP 5 : Add a Command Button

➢ Click the **Command button tool**. The mouse pointer changes to a tiny crosshair attached to a command button when you point anywhere in the form.

➢ **Click and drag** in the form **where you want the button to go**, then release the mouse. This draws a button and simultaneously opens the **Command Button Wizard**.

➢ Click the **Record Operations** in the categories list box. Choose **Add New Record** as the operation. Click **Next**.

➢ Click the **Text option button** in the next screen. Click **Next**. Type **Add Record** as the name of the button, then click the **Finish command button.** The completed command button should appear on your form. **Save** the form.
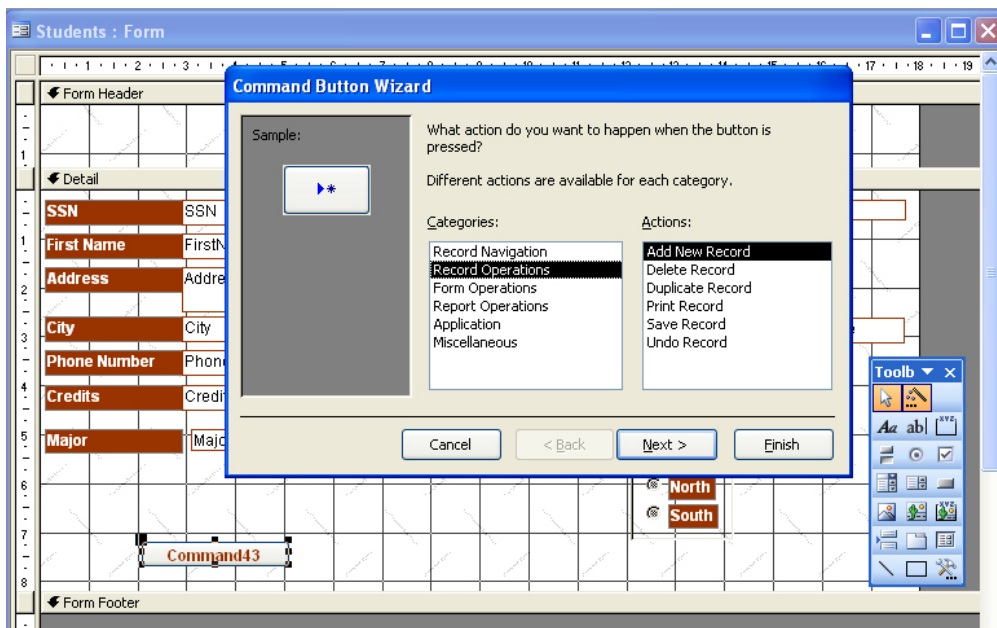
STEP 6 : Create the Additional Command Buttons

➢ Click the **Command button tool**. Click and drag in the form where you want the second button to go.

➢ Click **Record Navigation** in the categories list box. Choose **Find Record** as the operation. Click **Next command button**. Click the **Text option button** in the next screen. Click **Next command button**.

➢ Type **Find Record** as the name of the button, then click the **Finish command button.** The completed command button should appear on your form.

➢ Repeat these steps to add the command buttons to **delete record** (Record Operations) and **close the form** (Form Operations). Save the form.

STEP 7 : Reset the Tab Order

➢ Click anywhere in the **Detail section**. Pull down the **View menu**. Click **Tab Order** to display the **Tab Order dialog box**. Click the **AutoOrder command button** so that the Tab key will move to fields in left-to-right, top-to-bottom order as you enter data in the form. Click **OK** to close the Tab Order dialog box. **Save** the form.

STEP 8 : The Page Setup Command

➢ Point to any blank area in the Detail section of the form. Click the **right mouse button** to display a shortcut menu, then click **Properties** to display the Properties dialog box for the Detail section. Click the **Format tab.** Click the text box for **Height**. Enter **9** to change the height of the Detail section to 9 cm. **Close** the Properties dialog box.
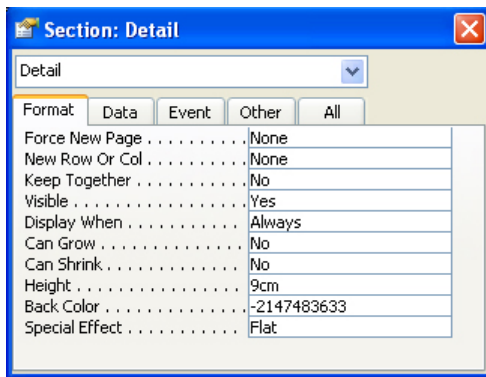
- ➢ If necessary, click and drag the **right border** of the form so that all controls are fully visible. <u>Do not</u> exceed a width of 20 cm. for the entire form.

- ➢ Pull down the **File menu**. Click **Page Setup** to display the Page Setup dialog box. If necessary, click the **Margins** tab. Change the left and right margins to **25 mm**. Click **OK** to accept the settings and close the Page Setup dialog box.

STEP 10 : The Completed Form

- ➢ Click the **View button** to switch to the Form view and display the first record in the table.

- ➢ Complete the record by adding appropriate data for the Major, FinancialAid, and Campus fields that were added to the form in this exercise.

- ➢ Click the **Add Record command button** to create a new record. Click the text box for **Social Security Number**. Complete the data, The record selector changes to a pencil as soon as you begin to enter data to indicate the record has not been saved.

- ➢ Press the **Tab key** or the **enter key** to move from field to field within the record. Click the **arrow** on the drop-down list box to display the list of majors, then click the desired major.

- ➢ Complete all of the information on the form. Press **enter** to move to the next record. Click the **Close Form command button** on the form. Click **Yes** if you see a message asking to save changes to the form design.

REPORTS

A **report** is a printed document that displays information from a database. Reports are created through the Report Wizard, then modified as necessary in the Design view.

The **columnar (vertical) report** is the simplest type of report. It lists every field for every record in a single column (one record per page). The records in this report are displayed in the same sequence as the records in the table on which the report is based.

The Tabular report displays fields in a row rather than in a column. Each record in the underlying table is printed on its own row. Only selected fields are displayed, so the tabular report is more concise than the columnar report.

Columnar Report   Tabular Report

A report is divided into sections. These are:

- o Report header & footer
- o Page header & footer
- o Group header & footer
- o Detail section

The report header appears once, at the beginning of a report. It typically contains its title and the date the report was printed. The **report footer** appear once, at the end of the report and displays summary information for the report as a whole.
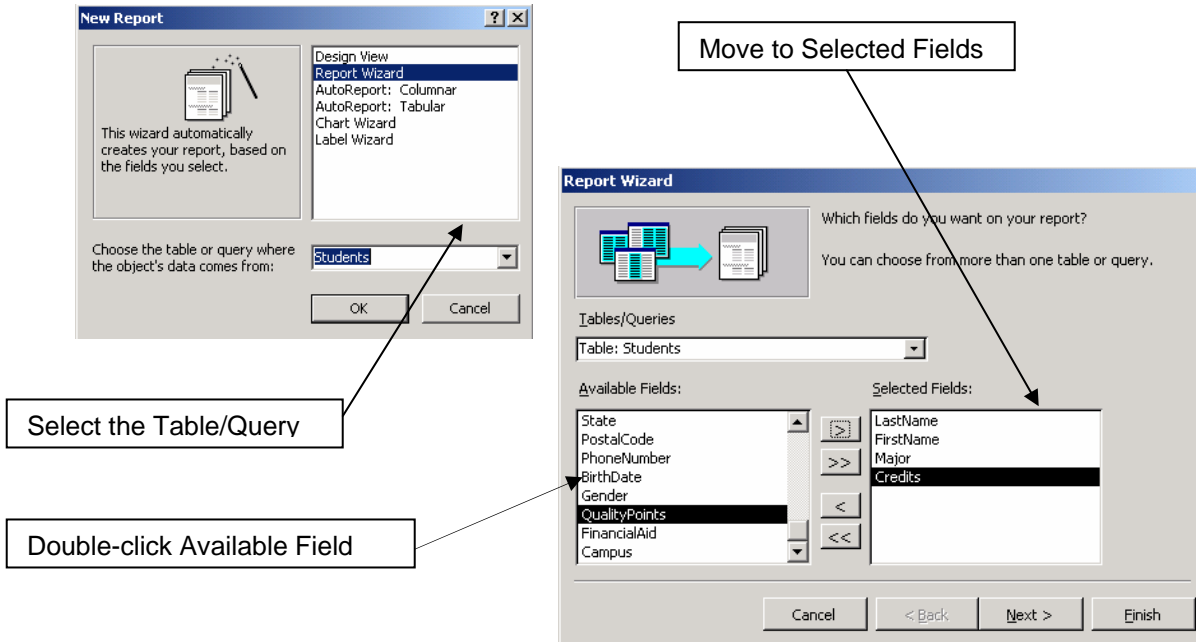
The **page header** appears at the top of every page in a report and can be used to display column headings, and other descriptive information. The **page footer** appears at the bottom of every page and may contain page numbers or other descriptive information.

A **group header** appears at the beginning of a group of records to identify the group. A **group footer** appears after the last record in a group and contains summary information about the group. Group headers and footers are used only when the records in a report are sorted (grouped) according to a common value in a specific field.
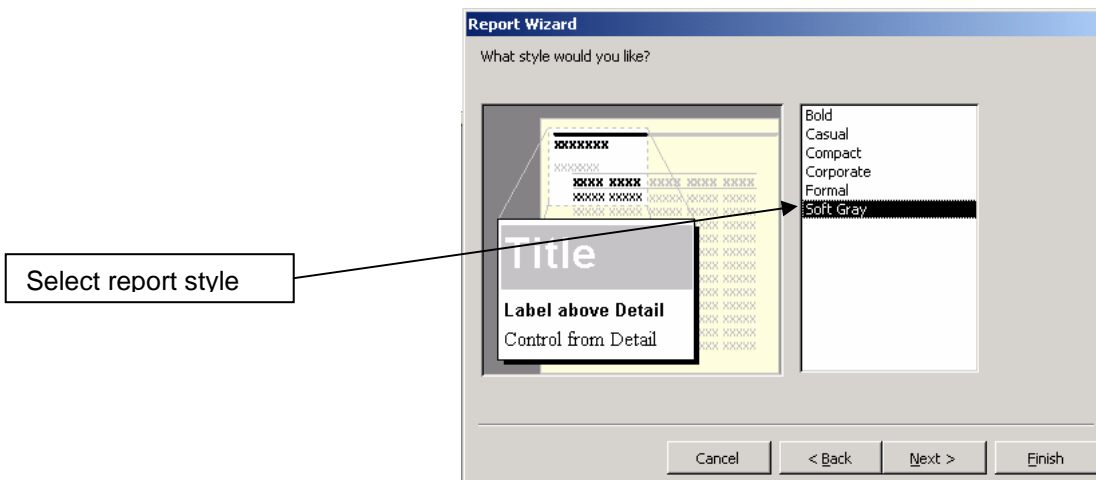
The **detail section** appears in the main body of a report and is printed once for every record in the underlying table or query. It displays one or more fields for each record in a columnar or tabular fashion, according to the design of the report.
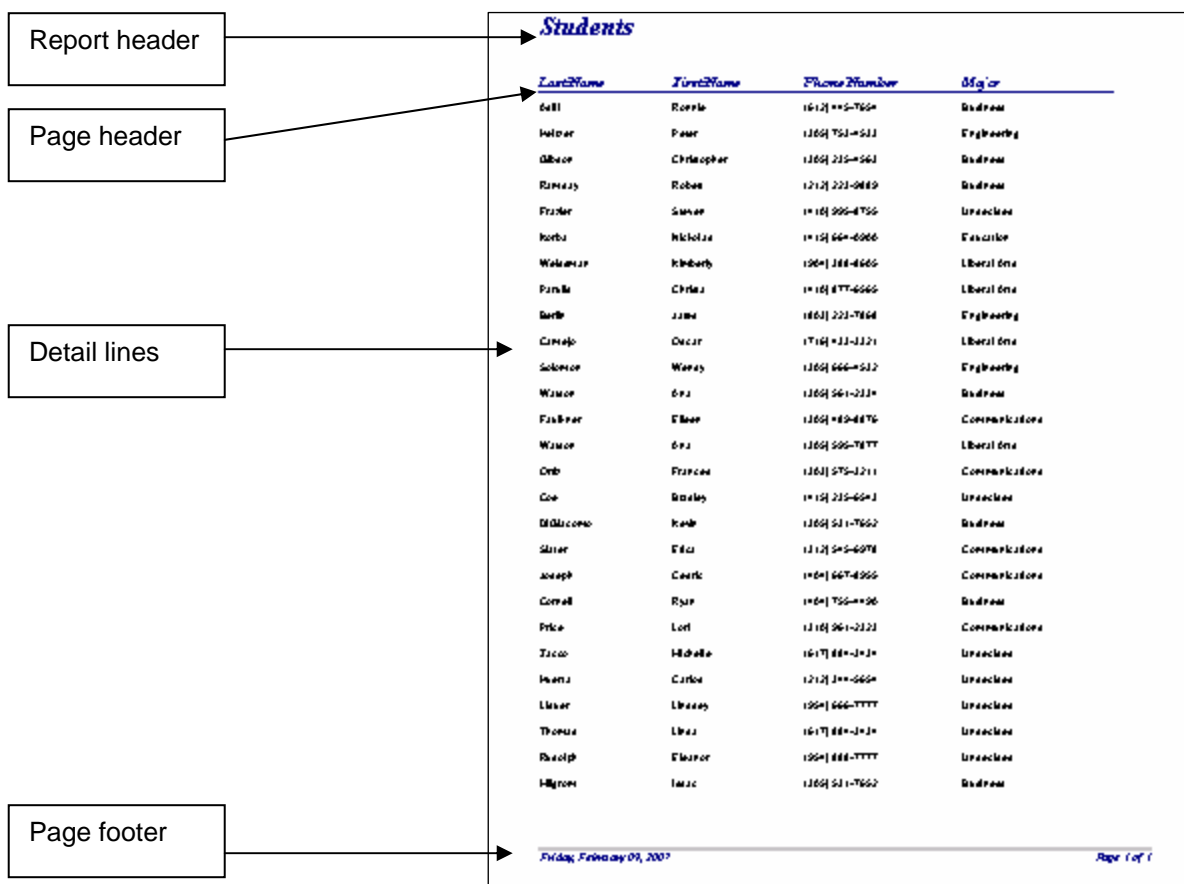
The **Report Wizard** is the easiest way to create a report. It asks you questions about the report you want, then builds the report for you. You can modify the report as you want in the Design view. In the New Report dialog box, you can select the table or query on which the report will be based

New Report

Design View
Report Wizard
AutoReport: Columnar
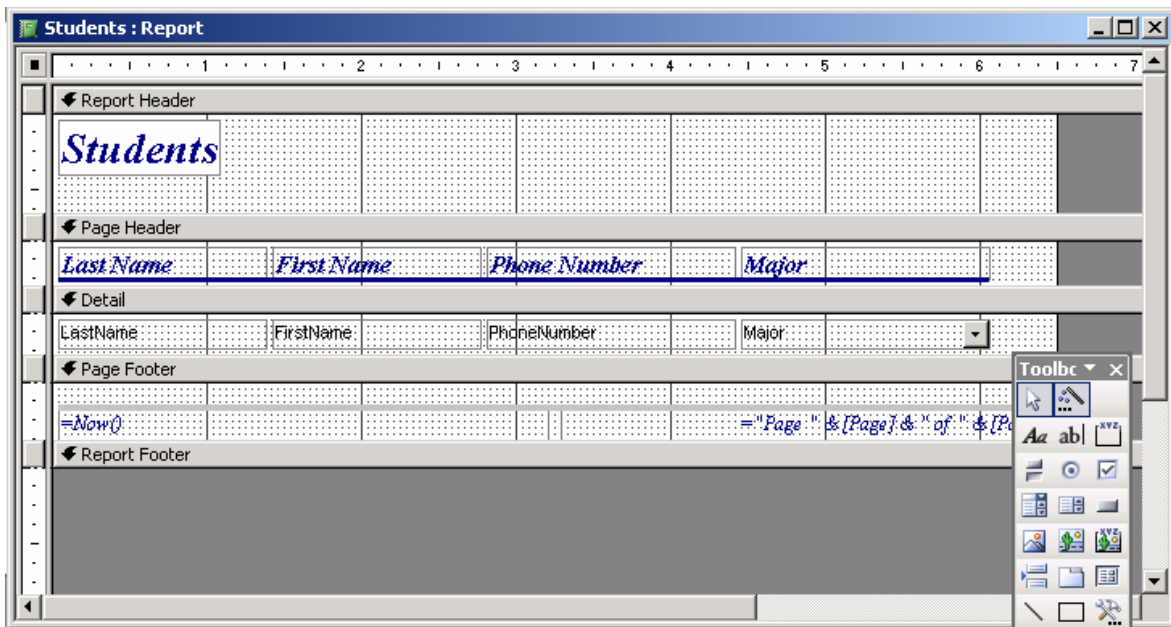AutoReport: Tabular
Chart Wizard
Label Wizard

This wizard automatically creates your report, based on the fields you select.

Choose the table or query where the object's data comes from: Students

OK   Cancel

Move to Selected Fields

Select the Table/Query

Double-click Available Field

Report Wizard

Which fields do you want on your report?

You can choose from more than one table or query.

Tables/Queries

Table: Students

Available Fields:

State
PostalCode
PhoneNumber
BirthDate
Gender
QualityPoints
FinancialAid
Campus

Selected Fields:

LastName
FirstName
Major
Credits

Cancel   < Back   Next >   Finish

After you select the underlying table, you select one or more fields from that table. Report Wizard then asks you to select a layout and a style and then the report is created.

Report Wizard

How would you like to lay out your report?

XXXXXXXX

Layout
○ Columnar
● Tabular
○ Justified

Orientation
● Portrait
○ Landscape

A

☑ Adjust the field width so all fields fit on a page.

Cancel   < Back   Next >   Finish

Select page orientation

Select Layout type

Report Wizard

What style would you like?

XXXXXXX

Title

Label above Detail

Control from Detail

Bold
Casual
Compact
Corporate
Formal
Soft Gray

Cancel   < Back   Next >   Finish

Select report style

40

Design View

After the report is created, you can modify the report, just as you can modify a form. Each section is composed of controls. A **bound control** has a data source such as a field in the underlying table. An **unbound control** has no data source. A **calculated control** contains an expression.

Laboratory work: CREATING A REPORT

Objectives

- To use the report wizard to create a new report;
- To modify an existing report by adding, deleting, and/or modifying its controls.

EXERCISE 7

STEP 1: The Report Wizard

➢ Start Access. Open **Our Students** database.

➢ Click the **Reports** button in the Database Window, then click the **Create report by using wizard** command button to create the report.

➢ You should see the dialog box, which displays all of the fields in the **Students** table. Click the **LastName** field in the Available Fields list box, then click the **>** button to enter this field in the Selected Fields.

➢ Enter the remaining fields (**FirstName, PhoneNumber**, and **Major**) one at a time, by selecting the field name, then clicking the **>** button. Click the **Next** Command button when you have entered the four fields.
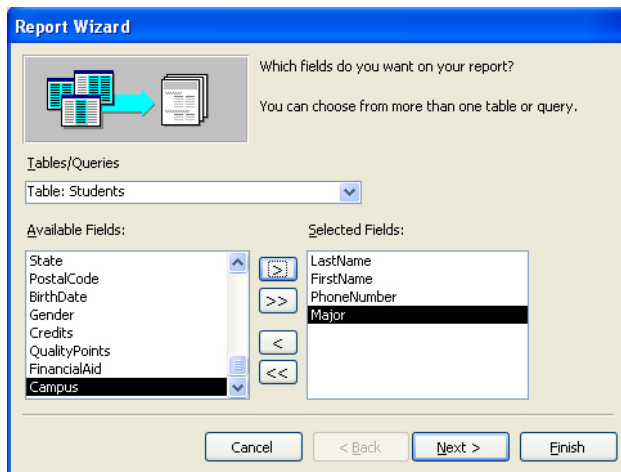
➢ The first screen asks whether you want to choose any grouping levels. Click **Next** without specifying a grouping level.

➢ The next screen asks whether you want to sort the records. Click the drop-down arrow to display the available fields, then select the **LastName**. Click **Next**.

➢ The **tabular layout** is selected, as is **Portrait** orientation. Be sure the box is checked **to Adjust field width so all fields fit on a page**. Click **Next**.

➢ Choose **Corporate** as the style. Click **Next**.

➢ Enter **Student Master List** as the title for your report. The option button to **Preview the Report** is already selected. Click the **Finish** command button to exit the Report Wizard and view the report.

STEP 2: Preview the Report

➢ Click the **maximize** button so the report takes the entire window.

➢ Click the drop-down arrow on the **Zoom Control** boz so that you can view the report at **75%.** Click the scroll arrows on the vertical scroll bar to view the names of additional students.

➢ Click the Close button to close the **Print Preview** window and change to the Report Design view.

STEP 3: Modify an Existing Control

➢ Click and drag the border of control containing the **Now function** from the report footer to the report header.

➢ Size the control as necessary, then check that the control is still selected and click the **Align Right** button on the Formatting toolbar.

➢ Point to the control, then click the **right mouse button** to display a shortcut menu and click Properties to display the **Properties** sheet.

➢ Click the **Format** tab in the Properties sheet , Click the **Format property**, then click the **drop-down arrow** to display the available formats. Click **Short Date**, then close the Properties sheet.

➢ Pull down the **File menu** and **Save** to save the modified design.

STEP 4: Add an Unbound Control

➢ Click the **Label tool** on the Toolbox toolbar, then click and drag in the report footer where you want the label to go and release the mouse. You should see a flashing insertion point inside the label control (If you see the word *Unbound* instead of the insertion point, it means you selected the Text box tool rather than the Label tool; delete the Text box and begin again).

➢ Type **Prepared by** followed by your name. Press **enter** to complete the entry and also select the control. Point to the control, click the **right mouse button** to display the shortcut menu, then click **Properties** to display the Properties dialog box.

➢ Click the **down arrow** on the scrool bar, then scroll until you see the Font Size property. Click in the **Font Size box**, click the **drop-down arrow,** then scroll until you can change the font size to **9.** Close the Property sheet.

STEP 5: Change the Sort Order

➢ Pull down the **View menu.** Click **Sorting and Grouping** to display the Sorting and Grouping dialog box. The students are currently sorted by last name.

➢ Click the **drop-down arrow** in the Field Expression box. Click **Major** (The ascending sequence is selected automatically).

➢ Click on the next line in the Field Expression box, click the **drop-down arrow** to display the available fields, then click **LastName** to sort the students alphabetically within major.

➢ Close the Sorting and Grouping dialog box. Save the report.

➢ **Close** the database. **Exit** Access if you do not wish to continue with the next exercise at this time.

| *Students*			
Last Name	*First Name*	*Phone Number*	*Major*
Adili	Ronnie	(512) 445-7654	Business
Heltzer	Peter	(305) 753-4533	Engineering
Gibson	Christopher	(305) 235-4563	Business
Ramsay	Robert	(212) 223-9889	Business
Frazier	Steven	(410) 995-8755	Undecided
Koiba	Nickolas	(415) 664-0900	Education
Weissman	Kimberly	(906) 388-8605	Liberal Arts
Parrilli	Christa	(410) 877-6565	Liberal Arts
Berlin	Jared	(803) 223-7868	Engineering
Camejo	Oscar	(716) 433-3321	Liberal Arts

QUERIES

Queries select records from one or more tables in a database so they can be viewed, analyzed, and sorted on a common datasheet. The resulting collection of records, called a **dynaset** (short for dynamic subset), is saved as a database object and can therefore be easily used in the future. The query will be updated whenever the original tables are updated. Types of queries are *select queries* that extract data from tables based on specified values, *find duplicate* queries that display records with duplicate values for one or more of the specified fields, and *find unmatched* queries display records from one table that do not have corresponding values in a second table.

Create a Query in Design View
Follow these steps to create a new query in Design View:

1. From the Queries page on the Database Window, click the **New** button.
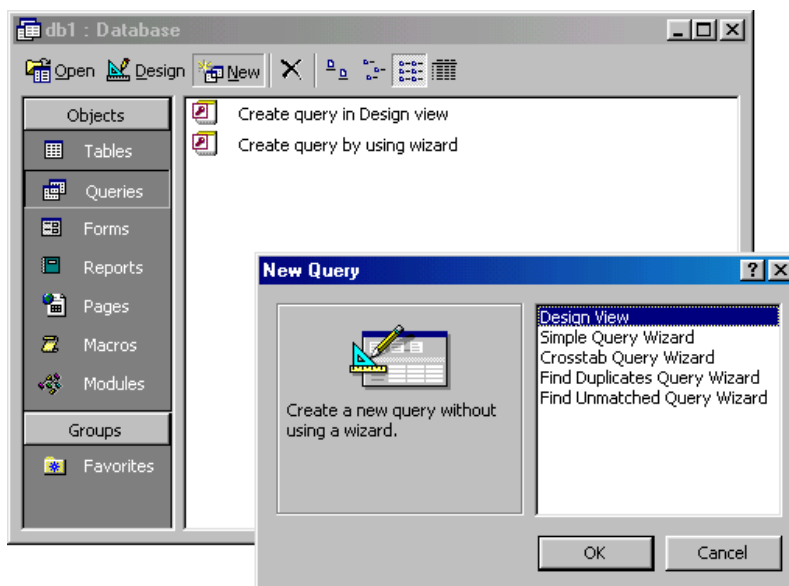
2. Select Design View and click **OK**.
3. Select tables and existing queries from the **Tables** and **Queries** tabs and click the **Add** button to add each one to the new query.
4. Click **Close** when all of the tables and queries have been selected.
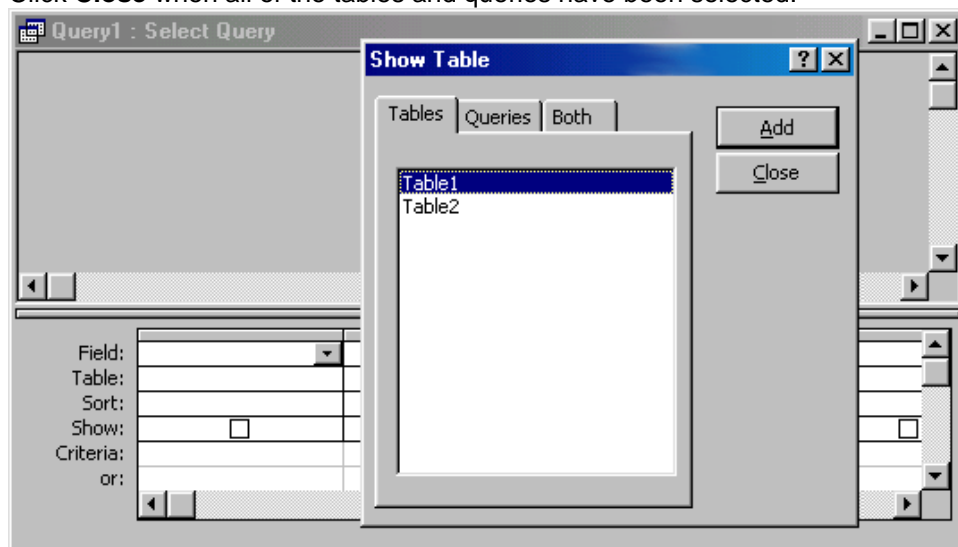
5. Add fields from the tables to the new query by double-clicking the field name in the table boxes or selecting the field from the **Field:** and **Table:** drop-down menus on the query form. Specify sort orders if necessary.
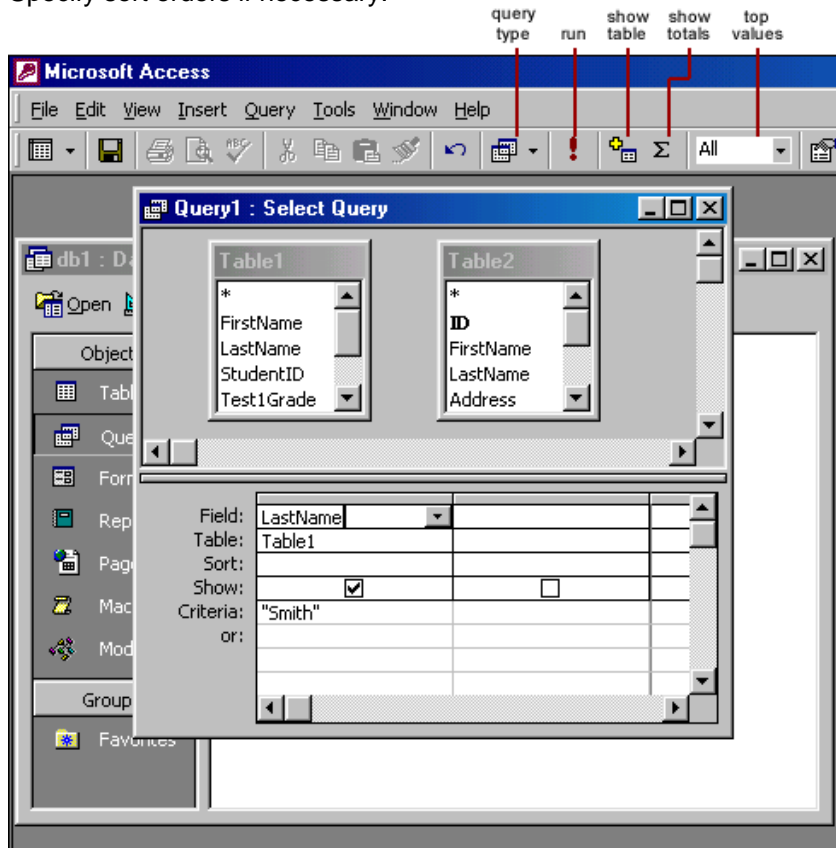
6. Enter the criteria for the query in the **Criteria:** field. The following table provides examples for some of the wildcard symbols and arithmetic operators that may be used. The **Expression Builder** can also be used to assist in writing the expressions.

Query Wildcards and Expression Operators	
Wildcard / Operator	**Explanation**
? Street	The question mark is a wildcard that takes the place of a single letter.
43th *	The asterisk is the wildcard that represents a number of characters.
<100	Value less than 100
>=1	Value greater than or equal to 1
<>"FL"	Not equal to (all states besides Florida)
Between 1 and 10	Numbers between 1 and 10
Is Null **Is Not Null**	Finds records with no value or all records that have a value
Like "a*"	All words beginning with "a"
>0 And <=10	All numbers greater than 0 and less than 10
"Bob" Or "Jane"	Values are Bob or Jane

7. After you have selected all of the fields and tables, click the **Run** button on the toolbar.
8. Save the query by clicking the **Save** button.

Query Wizard
Access' Query Wizard will easily assist you to begin creating a select query.

1. Click the **Create query by using wizard** icon in the database window to have Access step you through the process of creating a query.
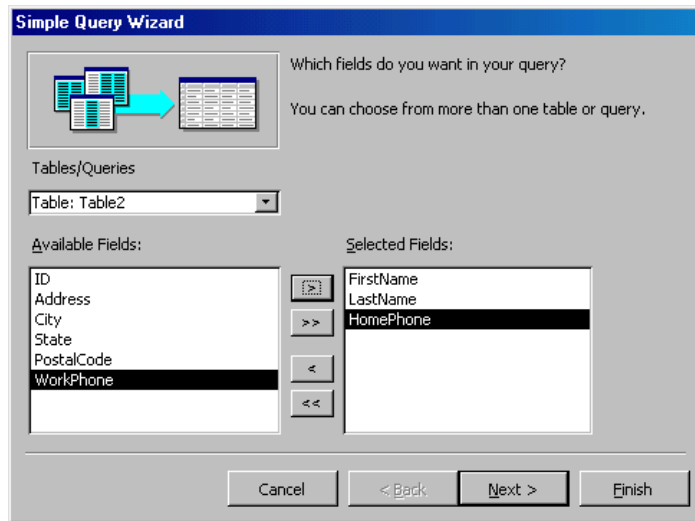
2. From the first window, select fields that will be included in the query by first selecting the table from the drop-down **Tables/Queries** menu. Select the fields by clicking the **>** button to move the field from the Available Fields list to Selected Fields. Click the double arrow button **>>** to move all of the fields to Selected Fields. Select another table or query to choose from more fields and repeat the process of moving them to the Selected Fields box. Click **Next >** when all of the fields have been selected.
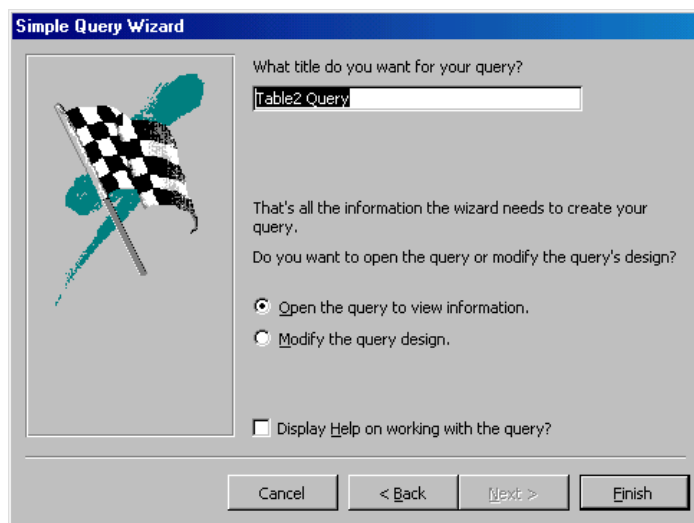
3. On the next window, enter the name for the query and click **Finish**.
4. Refer to steps 5-8 of the previous tutorial to add more parameters to the query.

**Laboratory work: CREATING A QUERY – GROUPING RECORDS**

Objectives

- To create a query containing a calculated control
- Then, create report based on that query
- To use the Sorting and Grouping command to add a group header and group footer to a report

EXERCISE 8

STEP 1 : Create the Query

➤ Start Access and open the **Our Students** database.

➤ Click the **Queries** button in the Database window. Double click **Create Query in Design view** to display the Query Design Window.

➤ The **Show table dialog box** appears; the **Tables** tab is already selected as is the **Students** table. Click the **Add** button to add the table to the query (the field list should appear).

➤ Click **Close** to close the Show Table dialog box.
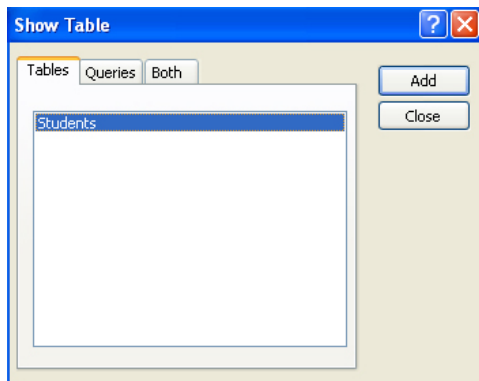
➤ Click the **Maximize button**. Make the field list larger, to display more fields at one time.

➤ Click and drag the **Major field** from the field list to the query. Click and drag the **LastName, Gender, FinancialAid, QualityPoints,** and **Credits fields** (in that order) in similar fashion.

➤ Click the **Sort row** for the Major field. Click the down arrow to open the drop-down list box. Click **Ascending**.

➤ Click the **Sort row** for the LastName field. Click the down arrow to open the drop-down list box. Click **Ascending**.

Field:	Major	LastName	Gender	FinancialAid	QualityPoints	Credits	
Table:	Students	Students	Students	Students	Students	Students	
Sort:	Ascending	Ascending					
Show:	☑	☑	☑	☑	☑	☑	
Criteria:							
or:							

**STEP 2 : Add a Calculated Control**

➤ Click in the first blank column in the field row. Enter the expression   **=[QualityPoints]/[Credits]**
   .

➤ Press **Enter**. Access has substituted Expr1: for the equal sign you typed initially. Drag the
   column selector boundary so that the entire expression is visible.

QualityPoints	Credits	Expr1: [QualityPoints]/[Credits]	
Students	Students		
✔	✔	✔	

➤ Pull down the **File menu** and click **Save** to display the dialog box. Enter **GPA By Major** for the
   Query Name. Click **OK**.

STEP 3 : Run the Query

➤ Pull down the **Query menu** and click **Run** (or click the **Run button** on the Query Design
   toolbar). You will see the dynaset.
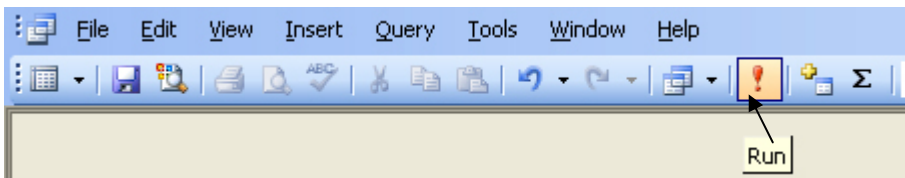
* Students are listed by major and alphabetically by last name within major.
* The GPA is calculated to several places and appears in the Expr! Field.

| Major	Last Name	Gender	FinancialAid	QualityPoints	Credits	Expr1
Business	Adili	F	☐	155	60	2,5833333333
Business	DiGiacomo	M	✔	375	105	3,5714285714
Business	Gibson	M	✔	60	35	1,7142857143
Business	Ramsay	M	✔	162	50	3,24
Business	Watson	F	☐	75	30	2,5
Communicatic	Faulkner	F	☐	80	30	2,6666666667
Communicatic	Joseph	M	✔	170	45	3,7777777778
Communicatic	Ortiz	F	✔	60	28	2,1428571429
Communicatic	Price	F	✔	42	24	1,75
Communicatic	Slater	F	✔	390	105	3,7142857143
Education	Korba	M	☐	166	100	1,66
Education	Zimmerman	F	☐	395	120	3,2916666667
Engineering	Berlin	M	✔	250	100	2,5
Engineering	Heltzer	M	☐	100	25	4
Engineering	Solomon	F	☐	175	50	3,5
Liberal Arts	Camejo	M	✔	280	100	2,8
Liberal Arts	Parulis	F	☐	90	50	1,8
Liberal Arts	Watson	F	✔	195	70	2,7857142857
Liberal Arts	Weissman	F	✔	166	63	2,6349206349
Undecided	Coe	M	☐	143	52	2,75
Undecided	Cornell	M	☐	80	45	1,7777777778
Undecided	Frazier	M	☐	45	35	1,2857142857
Undecided	Huerta	M	☐	40	15	2,6666666667
Undecided	Zacco	F	☐	68	21	3,2380952381
*			☐			

STEP 4 : Modify the Query

➢ Click the **View** button in order to modify the query.

➢ Click and drag to select **Expr1** in the Field row for the calculated field (Do not select the column). Type **GPA** to substitute a more meaningful field name.

➢ Point to the column and click the **right mouse button** to display a shortcut menu. Click **Properties** to display the Field Properties dialog box. Click the **General tab** if necessary.

- Click the **Description text box**. Enter **GPA**.
- Click the **Format text box**. Click the **drop-down arrow** to display the available formats. Click **Fixed**. Set Decimal places to **2**.
- Close the Field Properties dialog box.

➢ Click **Save button** to save the modified query.

STEP 5 : Rerun the Query

➢ Click the **Run button** to run the modified query. You will see a new dynaset corresponding to the modified query.

- Students are listed by major and alphabetically within the major.
- The Gpa is calculated to two decimal places and appears under GPA field.

➢ Click the **QualityPoints field** for Chistopher Gibson. Replace 60 with 70. press enter. The GPA changes automatically to 2.

➢ Pull down the **Edit menu** and click **Undo Current Field/Record** (or click the **Undo button** on the Query toolbar). The GPA returns to its previous value.

➢ Tab to the **GPA field** for Chistopher Gibson. Type **2**. Access will beep and prevent you from changing the GPA because it is a calculated field as indicated on the status bar.

➢ Click the **Close button** to close the query and return to the Database window. Click **Yes** if asked whether to save the changes.

STEP 6 : The Report Wizard

➢ You should see the Database window. Click the **Reports button**, then double click **Create Report by using Wizard** to start the Report wizard.

➢ Select **GPA By Major** from the Tables/Queries drop-down list. The available fields list displays all of the fields in the GPA By Major query.

- Click the **Major field** in the Available fields list box. Click the **> button.**
- Add the **LastName, Gender, FinancialAid,** and **GPA fields** one at a time.
- Do not include the QualityPoints or Credits fields. Click **Next**.
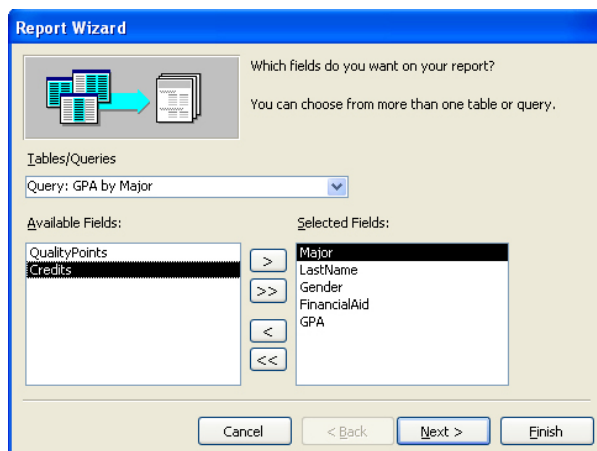
➤ You should see the screen asking whether you want to group the fields. Click (select) the **Major field**, then click the **>** button. The Major field appears above the other fields to indicate that the records will be grouped according to the value of the Major field. Click **Next**.

➤ The next screen asks you to specify the **order** for the detail records. Click the **drop-down arrow** on the list box for the first field. Click **LastName** to **sort** the records alphabetically by the last name within each major. Click **Next**.

➤ The **Stepped Option button** is already selected for the report layout, as is **Portrait Orientation**. Be sure the box is checked to **Adjust field width so all fields fit on a page**. Click **Next**.

➤ Choose **Compact** as the style. Click **Next**.

➤ **GPA By Major** (which corresponds to the name of the underlying query) is already entered as the name of the report. Click the Option button to **Modify the report's design**. Click **Finish** to exit the Report Wizard.

STEP 7 : Sorting and Grouping

➤ You should display the Report Design view. Maximize the report window.

➤ Move, size and align the column headings.

➤ Pull down the **View menu**. Click **Sorting and Grouping** to display the Sorting and Grouping dialog box.

➤ The **Major field** should already be selected. Click the **Group Footer** property, click **the drop-down arrow**, then click **Yes** to create a group footer for the Major field.
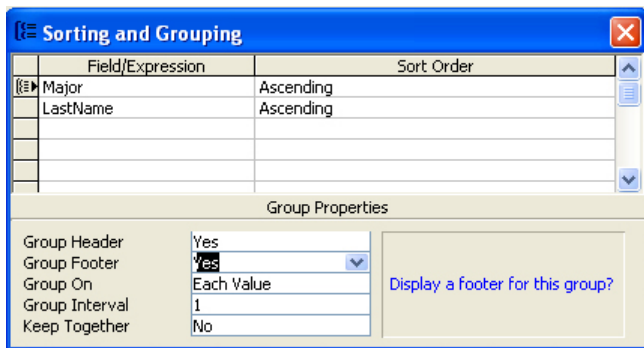
➤ Close the dialog box. The Major footer has been added to the report. Click the **Save** button to save the modified report.

STEP 8 : Create the Group Footer

➤ Click the **Text Box button** on the Toolbox toolbar. The mouse pointer changes to a tiny crosshair with a text box attached.

➤ Click and drag in the group footer where you want the text box (which will contain the average GPA) to go. Release the mouse.

➤ You will see an Unbound control and an attached label containing a field number(such as Text 19).

➤ Click in the **text box** of the control (Unbound will disappear). Enter **=Avg(GPA)** to calculate the average of the GPA for all students in this group.

➤ Click in the attached Unbound control, click and drag to select the text (Text 19), then type **Average GPA for Major** as the label for this control. Size, move and align the label.

➤ Point to the **Average GPA control**, click the **right mouse button** to display a shortcut menu, then click **Properties** to display the Properties dialog box. If necessary, click the **All tab**, then scroll to the top of the list to view and/or modify the existing properties:

• The Control Source text box contains the entry =Avg([GPA]) from the preceding step.

• Click the Name text box. Replace the original name (Text 19) with Average GPA for Major.

• Click the Format box. Click the drop-down arrow and select Fixed.

- Click the box for the Decimal places. Click the drop-down arrow and select (click) 2.
➢ Close the Properties dialog box to accept these settings and return to the report. Click the Save button on the toolbar.

STEP 9 : Create the Report Footer

➢ The report footer is created in similar fashion to the group footer. Click and drag the bottom of the report footer to extend the size of the footer.

➢ Click the Text Box button on the Toolbox toolbar, then click and drag in the report footer where you want the text box to go. Release the mouse. You will see an Unbound control and an attached label containing a field number (such as Text21).

➢ Click in the **text box** of the control (Unbound will disappear). Enter **=Avg(GPA)** to calculate the average of the grade point averages for all students in the report.

➢ Click in the attached label, click and drag to select the text (Text21) , then type Average GPA for All Students as the label for this control. Move, size and align the label appropriately.

➢ Size the text box, then format the control:
- Point to the control, click the **right mouse button** to display a shortcut menu, then click **Properties** to display the Properties dialog box. Change the properties to Fixed Format, with 2 decimal places. Change the name to Average GPA for All Students.

➢ Close the Properties dialog box to accept these settings and return to the report. Click the Save button on the toolbar.

STEP 10 : View the Report

➢ Click the **Print Preview button** to view the completed report. The status bar shows you are on page 1 of the report.

➢ Click the **Zoom button** to see the entire page. Click the **Zoom button** a second time to return to the higher magnification, which lets you read the report.

➢ Pull down the **File menu** and click **Print** to display the Print dialog box. The **All option button** is already selected under Print Range. Click **OK** to print the report.

➢ Pull down the **File menu** and click **Close** to close the GPA By Major report. Click **Yes** if asked to save design changes to the report.

➢ Close **Our Students database**.

GPA by Major

| Major	Last Name	Gender	FinancialAid	GPA
Business				
	Adili	F	☐	2.58
	DiGiacomo	M	☑	3.57
	Gibson	M	☑	1.71
	Ramsay	M	☑	3.24
	Watson	F	☐	2.50
Average GPA for Major 2.72				
Communications				
	Faulkner	F	☐	2.67
	Joseph	M	☑	3.78
	Ortiz	F	☑	2.14
	Price	F	☑	1.75
	Slater	F	☑	3.71
Average GPA for Major 2.81				
Education				
	Korba	M	☐	1.66
	Zimmerman	F	☐	3.29
Average GPA for Major 2.48				

Action Queries

Select queries are used to determine which records and fields are displayed and their sort order, but they do not change the contents of the fields in the table. Access also lets you create *Action queries*, *which change existing* *data or add new data to tables*. You can use the following types of Action queries:

- An **Update** query changes the data in the table in ways that you specify.
- The **Make Table** query creates a new table that holds the data that is the result of   the query.
- An **Append** query adds the data in records in the current table to another table
- The **Delete** query deletes records that you specify.

Warning: All of these Action queries work quickly and their results are not reversible. To avoid errors, you should always back up a table before performing an Action query on it. Action queries do not create a list like select queries.

In addition, to avoid losing data, it is always best to run an Action query as a select query first. After you are sure that it isolates the records you want, convert it to an Action query and run it.

An action query still is a query. So you start by creating a query, using the table or tables that contain the records that you want to manipulate. Then click the Query menu as shown below, the last four of which are action queries.
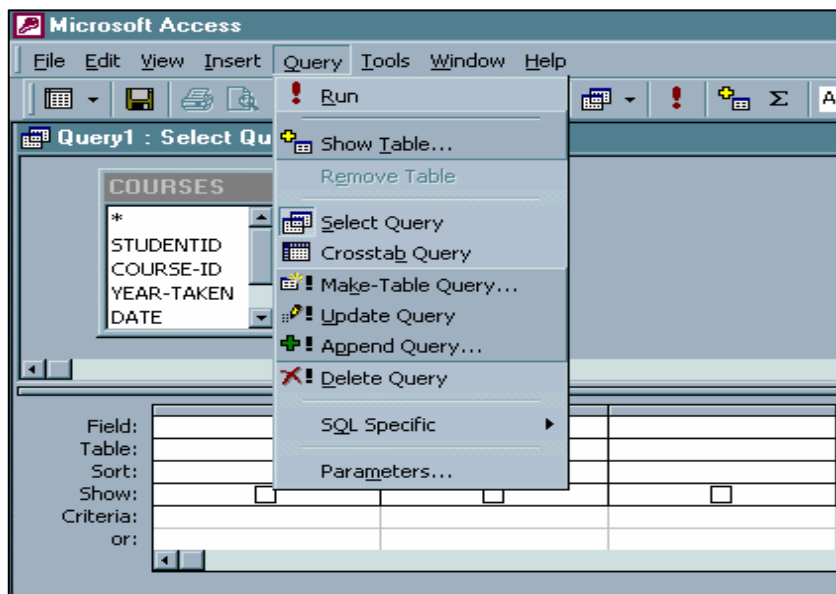
An update query changes multiple records within a table. You can also use criteria in the update query. For example, suppose you want to change the values in YEAR-TAKEN field of MAN256 course that was taken by the students who live in Ankara to 1997.

- First, create a select query which satisfies the conditions as shown below.
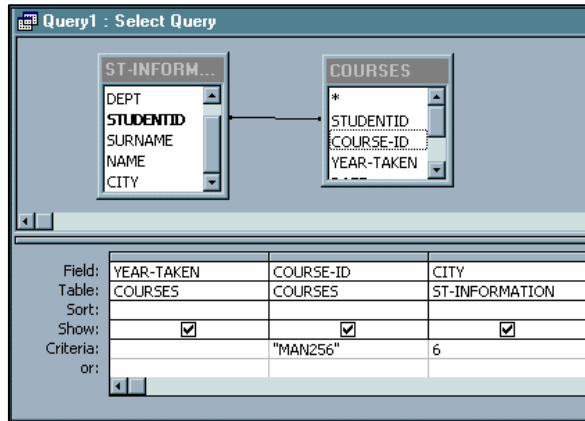
- Then, From Query Menu select update query command, and write 1997 to cell of Update To row of YEAR-TAKEN field.
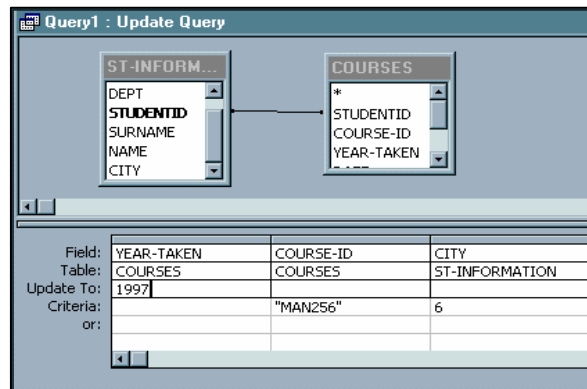
- Run the query. You will see a warning dialog box as shown below. Read the message and Press Yes button.
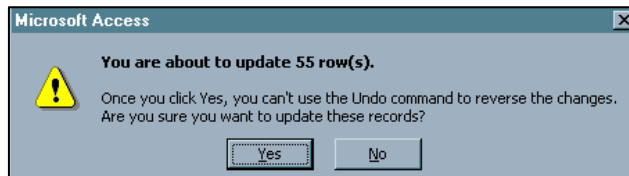
- It will update selected records

A make-table query creates a new table from records in an existing table. This type of query is especially useful prior to running a delete query in that you can back up (archive) the records you are about to delete

Make table queries have a couple of advantages. First, you can use a criteria. Thus you can better define the records to be ncluded in the new table. Second, a report based on a query includes up-to-date values from the underlying table.

When you choose Make Table from Query menu, Access displays the Make Table dialog box, shown below, which you use to specify the table, the data will be stored in.
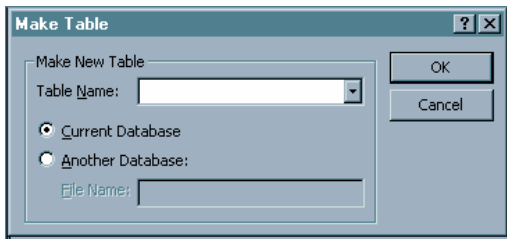
The current database button is selected by default. If you want to store the data in a table in the current database, simply enter its name in the Table Name text box. If you enter the name of a new table, Access creates that table and stores the result of the query in it. If you enter the name of an exsisting table or use the drop-down list to select it, Access replaces the data in that table with the result of the query.

If you want to store the data in a table in another database, select the Another Database button, and enter the full path name of the ….MDB file in the File Name dialog box. Then enter the table name.

When you finish with the Make Table dialog box, use the Query window exactly as you do for select query to specify the records, fields, sort order of the new table.

If you want to change the table the results are stored in, you can do so by choosing Make Table from the Query menu at any time while you are designing the query to display the Make Table dialog box again.

For example, suppose you want to create a new table in REAL Super Market database with name CRTBL01. The query is shown below:
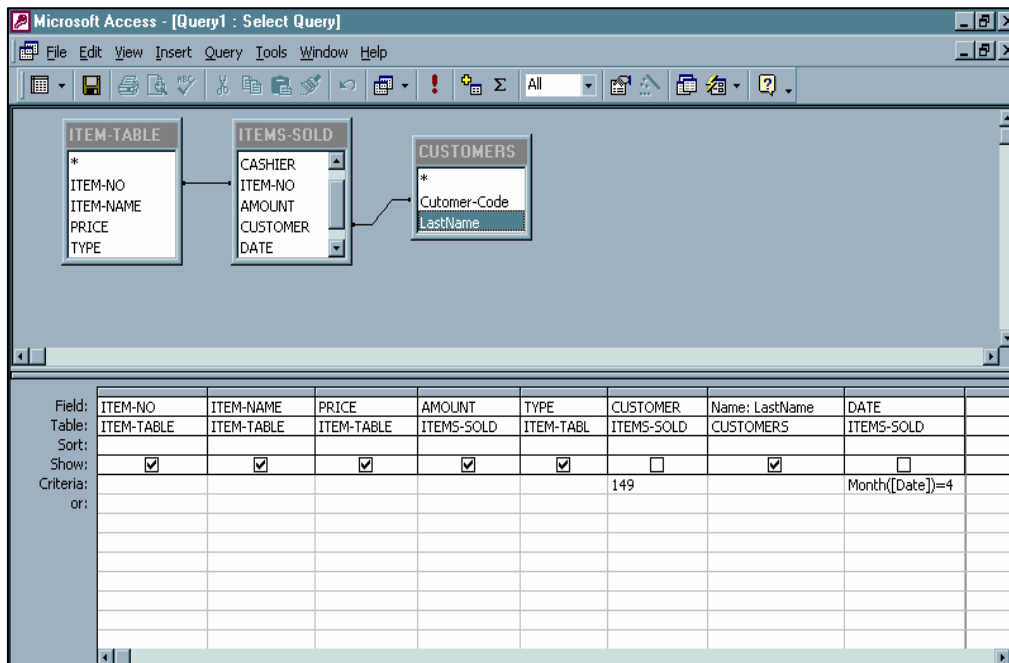
- Select Query menu and click Make Table query and write table name CRTBL01 in Table Name box. Press OK button.
- Run the query.
- You will see a dialog box similar to the one given below.
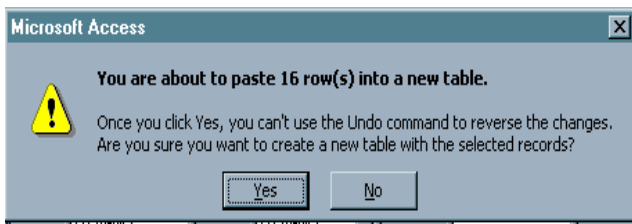
Press Yes button. It will create CRTBL01 table. Now, click Tables tab. You should see a table with this name. The content of the table is shown below.


You should reorganize the column widths.

If you want, you can click design view and modify the design.

An **append query** adds records from one table to the end of another table. An append query can include criteria, so that it adds only selected records. Append queries are similar to Make Table queries except that the data is appended to an existing table, without affecting the data already in that table.

When you choose **Append** from Query menu, Access displays the Append dialog box, which is identical to Make Table dialog box. This box lets you specify the table that the data will be appended (added) to. Notice that the Design grid does not have the *show row* that it does in select queries as shown below. . Instead, it has an Append To row, which you may use to select fields in the table you are appending the data to, in order to indicate which fields in the current table they correspond to. Click a cell in the Append To row to display a drop-down list that lets you choose among fields in the table you are appending to.

For example, suppose you want to add records of customer with Customer Code 55 to CRTBL01 the Design view is as follows.
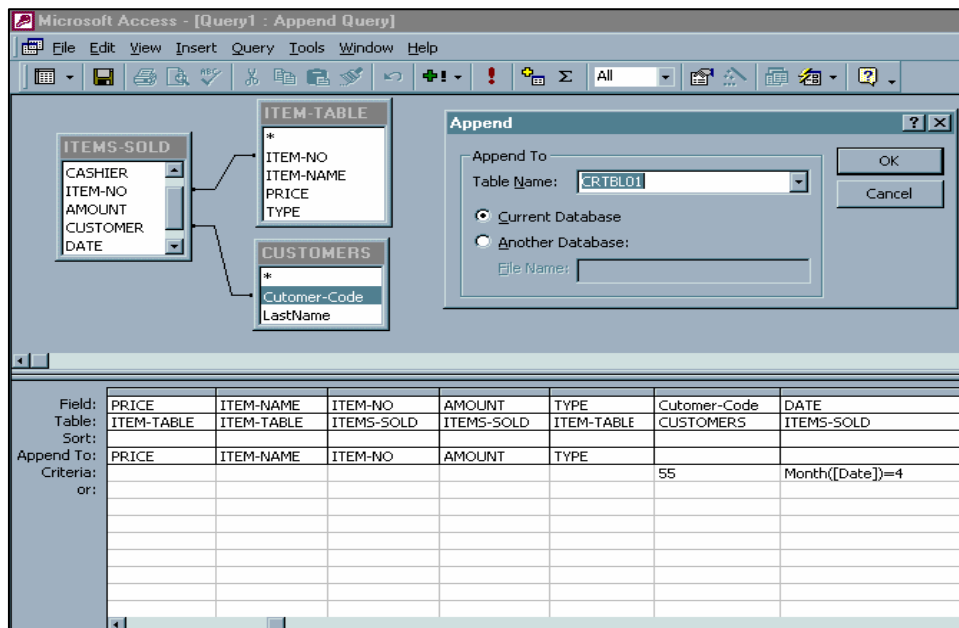
A delete query deletes one or more records from a table according to the designated criteria.
It is easy to select individual records in a table and press Delete to delete them, and it is easy to choose Select All from the Edit menu and then press Delete to delete all the records in a table. If you have to delete records that meet some criterion, though, it is obviously easier to use a Delete query than to select the records individually.

For example, suppose you want to delete all records from Item sold in April from ITEMS-SOLD table.
When you select Delete from Query menu, Access displays the query window as shown below. It does not include the Sort or Show rows. Instead it includes a Delete row.
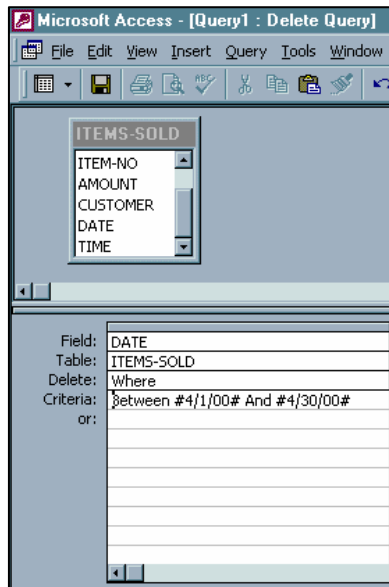
A warning message is shown, when you run the query.
Press yes button if you want to delete 5834 records.

Compacting and Repairing a Database

If you delete data or objects from a database, the database can become fragmented and use disk space inefficiently. Compacting rearranges how the database is stored on disk and optimizes the performance of the database. Access combines compacting and repairing into one process.

- Open a database.
- Choose **Database Utilities** on the **Tools** menu.
- Click **Compact and Repair Database**.
- When finished, close database.

Laboratory work: CROSS TAB AND ACTION QUERIES

Objectives

- To use action queries to modify a database
- To create a crosstab query to display summarized values from a table

EXERCISE 9

STEP 1: Create the Make-Table Query

➢ Open **Our Students** database. Click the **Queries button** in the Database Window, then double click **Create query in Design view**.

➢ The Show Table dialog box appears automatically with the Tables tab already selected. If necessary, select the **Students Table,** then click the **Add button** to add the table to the query. Close the Show Table dialog box. Maximize the query window.

➢ Click the **SSN** (the first field) in the Students table. Press and hold the **Shift key,** then scroll (if nesessary) until you can click **Major** in the table. Click and drag the selected fields form the field list to the design grid.

➢ Scroll in the design grid until you can see the Credits field. Click in the **Criteria** row for the Credits field and enter **>=120.**

➢ Click the **drop-down arrow** next to the **Query Type button** on the toolbar and select (click) the **make-table query.** Enter **Graduating Seniors** as the name of the table you will create.

➢ Verify that the option button for Current Database is selected then click **OK.**

STEP 2: Run the Make-Table Query

➢ Click **Run button** to run the make-table query. Click Yes in response to the message indicating that you are about to paste one record (for the graduating seniors) into a new table.

➢ Do not be concerned if you do not see the Graduating Seniors table at this time; i.e., unlike a select query, you remain in the Design view after executing the make-table query. Save the query as **Archive Graduating Seniors.**

➢ Click the Tables button in the Database window, then open the Graduating Seniors table you just created. The table should contain one record (for Kim Zimmerman) with 120 or more credits. Close the table.

STEP 3: Create the Delete Query

➢ Click the **Queries button** in the Database window, then click the **Archive Graduating Seniors** query to select the query. Pull down the **Edit menu.** Click **Copy** to copy the query to the clipboard.

➢ Pull down the **Edit menu** a second time, then click the **Paste command** to display the Paste As dialog box. Type **Purge Graduating Seniors** as the name of the query, then click **OK**.

➢ The Database window contains the original query (Archive Graduating Seniors) as well as the copied version (Purge Graduating Seniors) you just created.

STEP 4: Complete and Run the Delete Query

➢ Open the newly created query in the Design view. Maximize the window. Click the drop-down arrow next to the Query Type button on the toolbar and select (click) the **Delete Query**.

➢ Click and drag the box on the horizontal scroll bar until you can see the Credits field. The criteria, >=120, is already entered because the Delete query was copied originally from Make Table query and the criteria are identical.

➢ Click the Run button to execute the query. Click Yes when warned that you are about the delete one record from the specified table. Once again, you remain in the design view after the query has benn executed. Close the query window. Click Yes if asked to save the changes.

➢ Open the Students table. The record for Kim Zimmerman is no longer there. Close the sutdents table.

STEP 5: Create the Append Query

➢ Click the Queries button then double click Create query in design view. The Show Tables dialog box opens and contains the following tables:

- o The **Students** table that you have used throughout the lab sessions.
- o The **Graduating Seniors** table you just created.
- o The **Transfer Students** table that will be appended to the Students table.

➢ Select the **Transfer Students** table then click the **Add** button add this table to the query. Close the **Show Table** dialog box. Maximize the window. Click and drag asterisk from the field list to the query design grid.

➢ Click the drop-down arrow next to the Query type button on the toolbar and select (click) **Append Query** to display the Append dialog box. Click the drop-down arrow on the Append to Table name list box and select the Students table.

➢ Click the **Run button**. Click Yes when warned that you are about to add 4 rows (from the Transfer Students table to the Students table).

➢ Save the query as **Append Transfer Students**. Close the query window.

➢ Open the Students table. Four records have been added (Liquer, Thomas, Rudolph, Milgrom). Close the table.

STEP 6: Create an Update Query

➢ Click the the **Query** button in the Database window. Select (click) the **GPA by Major Query**, press Ctrl+C to copy the Query, then press Ctrl+V to display the paste as the dialog box. Enter **Update Financial Aid**. Click OK.

➢ Open the newly created query in the design view. Click the drop-down arrow next to the Query Type button on the toolbar and select (click) **Update Query**. The Query grid changes to include an *Update To:* row and the *Sort* row disappears.

➢ Click in the **Criteria** row for the GPA field and enter **>=3**. Click in the Update to Row for the FinancialAid field and enter **Yes**. The combination of these entries will change the value of the Financial Aid field to "yes" for all students with a GPA of 3.00 or higher.

➢ Click the **Run** button to execute the query. Click **Yes** when warned that you are about to update nine records. Close the query window. Click **Yes** if asked whether to save the changes.

STEP 7: Check Your Progress

➢ Click the Tables button in the Database window. Open (double click) the Students, Graduating Seniors, and Transfer Students tables one after another. You have to return to the Database window each time you open a table.

➢ Pull down the Window menu and click the Tile Vertically coommand to display the tables. The arregment of your tables may be different from ours.

➢ Check your progress by comparing the tables to one other:

- o Check the first record in the Transfer Students table, Lindsey Liquer, and note that it has been added to the Stıdents table via the Append Transfer Students query .

- o Check the record in the Graduating Senior table, Kim Zimmerman, and note that it has been removed from the Students table via the Purge Graduating Seniors query.
  - o The Students table reflects the table reflects the current student database. The other two tables function as back up.
- ➢ Close the Students, Transfer Students, and Graduating Seniors tables.

STEP 8: Create a Crosstab Query

- ➢ Click the Queries button in the Database window, click New, click the Crosstab Query Wizard in the New Query dialog box and click OK to start the wizard.
- ➢ Click the Queries option button and select the GPA by Major query. Click Next.
  - o Click Major in the avaiablel field list, then click > to place it in the selected fields list. Click Next.
  - o Click Gender as the field for column headings. Click Next.
  - o Click GPA as the field to calculate and select the Avg.function. Clear the check box to include to row sums. Click Next.
  - o The name of the query is suggested for you, as is the option button to view the query. Click Finish.
- ➢ The results of the crosstab query are shown. The query lists the average GPA for each combination of major and gender. The display is awkward, however, in that the GPA is calculated to an unnecessary number of decimal places.
- ➢ Click the View Button to display the Design view for this query. Right click in the GPA column to display a context-sensitive menu, click Properties to display the Field Properties dialog box, click in the Format row, and select Fixed. Set the number of decimals to two.
- ➢ Click the Run button to re-execute the query, This time the GPA is displayed to two decimal places. Save the query. Close the Query window.
- ➢ Close the Our Students database. Exit Access.

RELATIONAL DATABASES, SUBFORMS, EXTERNAL DATA AND THE SWITCHBOARD

A relational database contains multiple tables. Each table stores data about a specific entity in the physical system, such as customers and loans in an investment system. The tables are related to one another through a one-to-many relationship; for example, one customer may have many loans.

The relationship is created in the Relationship window by dragging the join field from the one table to the related table. This one-to-many relationship is implemented in the database by including a common field, CustomerID, in both tables. The CustomerID is **the primary key** in the Customers table. It also appears as a **foreign key** (the primary key of another table) in the Loans table in order to relate the two tables to one another

The data from both tables can be combined through this relationship to provide complete information about any customer and his/her loan, or about any loan and its customer.
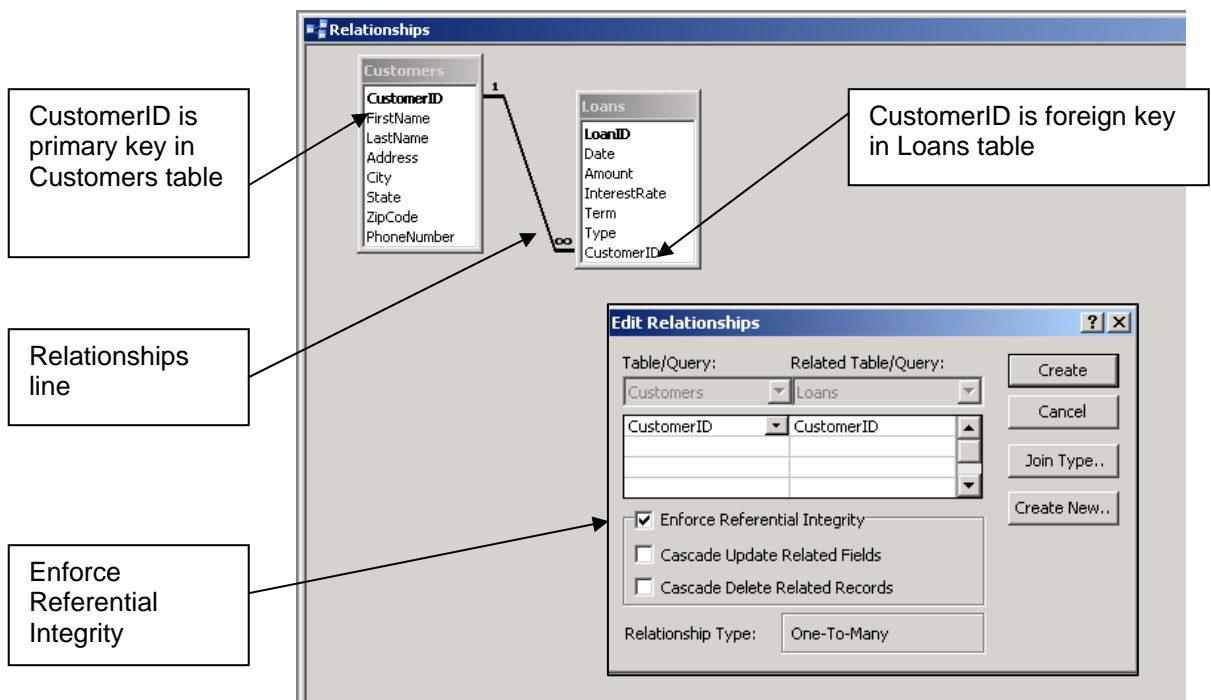
Relationship Window

The design of the database, with separate tables for customers and loans, makes it easy to add, edit, or delete information about a customer or loan. To add a new customer or loan, you should just go to the respected table and add the record. Similarly, to change the data for an existing customer or loan, you go to the appropriate table, locate the record, and make the change.

The advantage of the relational database is that, when you change the customer information in one place; for example, change the phone number of a customer and the change will be automatically reflected for every loan associated with this customer.

The tables in the database must be consistent with one another, a concept is known as **referential integrity**. For example, you can always delete a record from the Loans table (the "many" table in this example). But you cannot delete a record from the Customers table (the "one" table) when there are loans assigned to that customer, because these loans would then be assigned to a customer who did not exist. Access controls the relationships that are in effect and prevents you from making changes that do not make sense. It will enforce referential integrity automatically.

Delete Record button

Click + sign to display related records

Cannot delete Customer without first deleting related Loan

Referential Integrity

Laboratory work: CREATING A RELATIONAL DATABASE

Objectives

- To open a database with multiple tables;

- To identify the one-to-many relationships within the database and to produce reports based on those relationships.

EXERCISE 10

STEP 1: Open the Relationships Window

➢ Start Access. Open the **Look Ahead database**.

➢ The Tables button should be selected. The database contains Employees, Locations, and Titles tables.

➢ Pull down the **Tools menu** and click the **Relationships command** to open the Relationships window. (The tables are not yet visible in this window.)

➢ Pull down the **Relationships menu** and click the **Show Table command** to display the Show Table dialog box. Click the **Locations table** then click the **Add button** to add this table to the Relationships window.

➢ Double click the **Titles** and **Employees tables** to add these tables to the Relationships window.

➢ Close the Show Table dialog box.

STEP 2: Create the Relationships

➢ Maximize the Relationships windows so that you have more room in which to work. Click and drag the title bar of each table so that the positions of the tables match. Click and drag the bottom (and/or right) border of each table so that you see all of the fields in each table.

➢ Click and drag the **LocationID field** in the Locations table field list to the **LocationID field** in the Employees field list. You will see the Edit Relationships dialog box. Chech the box to **Enforce Referential Integrity**. Click the **Create button** to create the relationship.

➢ Click and drag the **TitleID field** in the Titles table field list to the **TitleID field** in the Employees field list. You will see the Edit Relationships dialog box. Chech the box to **Enforce Referential Integrity**. Click the **Create button** to create the relationship.

➢ Click the Save button on the Relationship toolbar to save the Relationships window, then close the Relationships window.

STEP 3: Enter Your Own Record

➢ Double click the **Employees table** to open the table. Maximize the window. Pull down the **Insert** menu and click the **New Record** command on the Table Datasheet toolbar.

➢ Enter data for yourself, using your own social security number, and your first and last name. Enter an invalid LocationID (e.g., **L44**) then complete the record.

➢ Press the **enter key** when you have completed the data entry, then click **OK** when you see the error message. Access prevents you from entering a location that does not exist.

➢ Click in the **LocationID field** and enter **L04**, LocationID for Miami. Press the **down arrow key** to move to the next record, which automatically saves the current record. Close the Employees table.

STEP 4: Simplified Data Entry

➢ Click the **Forms button** in the Database window, then double click the **Employees form** to open this form. Click the **Add Record button** then click the text box for the Social Security Number.

➢ Enter the data for **Bob Grauer** one field at a time, pressing the **Tab key** to move from one field to the next. Click the **down arrow** when you come to the location field to display the available locations, then select **Miami**.

➢ Press the **Tab key** to move to the Title field and choose **Account Rep**. Complete the data for Bob's record by entering **$150,000, M,** and **Excellent** in the Salary, Gender, and Performance fields, respectively.

➢ Click the **Close Form button** when you have finished entering the data.

STEP 5: View the Employee Master List

➢ Click the **Reports button** in the Database window. Double click the **Employee Master List** report to open the report.

➢ This report lists selected fields for all employees in the database. Note that the two new employees, you and Bob Grauer, in alphabetical order. Both employees are in the Miami Office.

➢ Close the Report window.

STEP 6 : Change the Locations Table

➢ Click the **Tables button** in the Database window, then double click the **Locations table** to open this table. Maximize the window.

➢ Click the **plus sign** next to location L04 (Miami) to view the employees in this office. The plus sign changes to a minus sign as the employee records for this location are shown. Your name appears in this list as does Bob Grauer's. Click the **minus sign** and the list of related records disappears.

➢ Click and drag to select **Miami** (the current value in the Location field). Type **Orlando** and press the **Tab key**. Enter the corresponding values for the other field: **1000 Kirkman Road, FL, 32801** and **(407) 555-55555** for the address, state, zip code, and office phone, respectively.

➢ Close the **Locations table**. You have moved the Miami Office to Orlando.

STEP 7 : View the Employees by title Report

➢ Click the **Reports button** in the Database window, then double click the **Employees by Title** report to open the report.

➢ This report lists employees by title, rather than alphabetically. Note that you and Bob Grauer are both listed as Account Reps in the Orlando office; i.e., the location of the office was changed in the Locations table and that change is automatically reflected for all employees assigned to that office.

➢ Close the report window. Close the Database window. Exit Access. Welcome to the world of relational databases☺

Subforms

Subform is a form within a form. A main form can have multiple subforms. Main table can have multiple levels of subforms. Subform is useful for displaying a one-to-many relationship within a one-to-many relationship.

Customer C01

Loans for Customer C01

Status bar for Loans form

Status bar for Customers form

The easiest way to create a subform is by using the **Subform Wizard**.

1. First select the table and the fields from that table.

Select the Customers table

Select >> to add all fields to the form

2. Select the second table and the fields from this table.

Select the Loans table for the submenu

Select >> to add all fields to the form

3. Choose how you want to view the records.

Choose to view the records by customer

4. Choose a layout.

5. Choose a style.
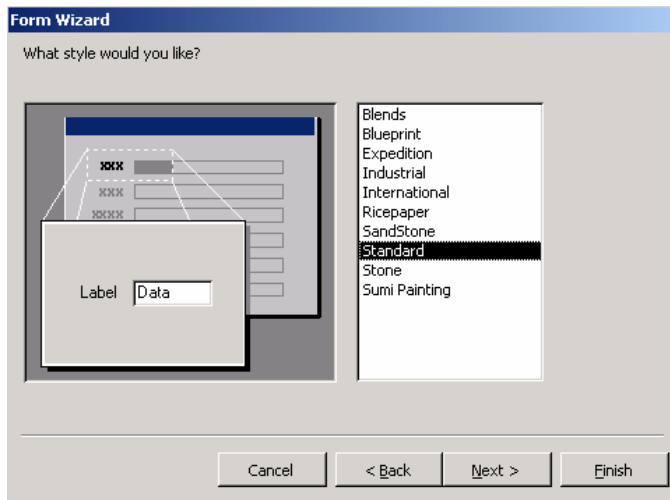
6. Save your form and subform as separate objects.
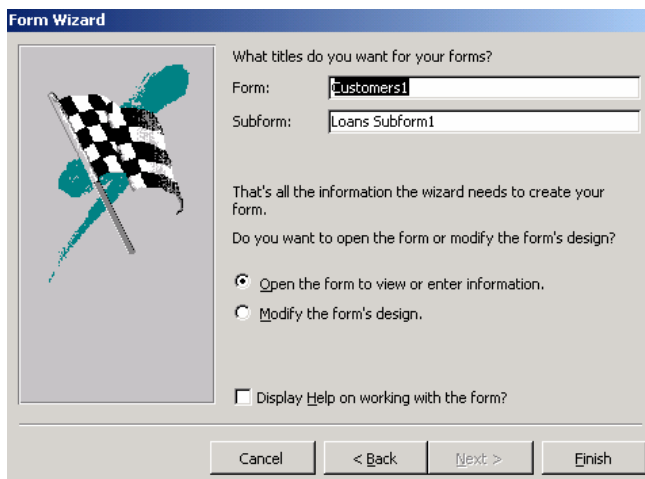
Laboratory work: ADDING A SUBFORM TO A FORM

Objectives

- To define the relationship between two tables;
- To add a subform to a form

EXERCISE 11

STEP 1: Open the **GardenCorparation** database.

STEP 1: On the Access toolbar, click the **Relationships** button to open the Relationships window.

STEP 3: If the **Show Table** dialog box isn't displayed, click the **Show Table** button on the toolbar, and then double-click Categories and Products in the list displayed.

STEP 4: Close the **Show Table** dialog box to view the Relationships window, which looks like this:
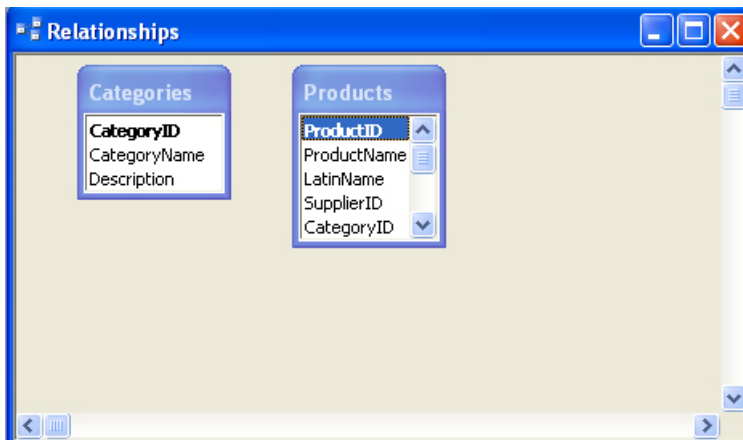
STEP 5: Point to the **CategoryID** in one table, and drag it on top of **CategoryID** in the other table.

Access displays the **Edit Relationships** dialog box, which lists the fields you have chosen to relate and offers several options, as shown here:
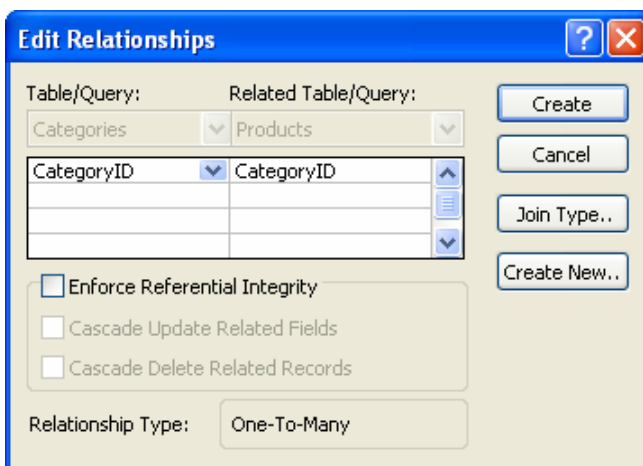
STEP 6: Click the **Enforce Referential Integrity** check box, click the other two check boxes, and then click **Create**.

Access draws a line representing the one-to-many relationship between the **CategoryID** fields in each of the tables.

Tip: When the **Cascade Update Related Fields** check box is selected, changing a primary key value in the primary table automatically updates the matching value in all related records. When the **Cascade Delete Related Records** check box is selected, deleting a record in the primary table deletes any related records in the related table. You can edit or delete a relationship by right-clicking the line and clicking the appropriate command on the shortcut menu.

STEP 7: Close the Relationships window, clicking **Yes** when prompted to save its layout.

STEP 8: Open the **Categories** form in Design view.

STEP 9: Maximize the Form window, and drag the **Form Footer** section selector down about 2.5 cm to give yourself some room to work.

STEP 10: If the toolbox isn't displayed, click the **Toolbox** button.

STEP 11: Make sure the **Control Wizards** button in the toolbox is active (has a border around it).
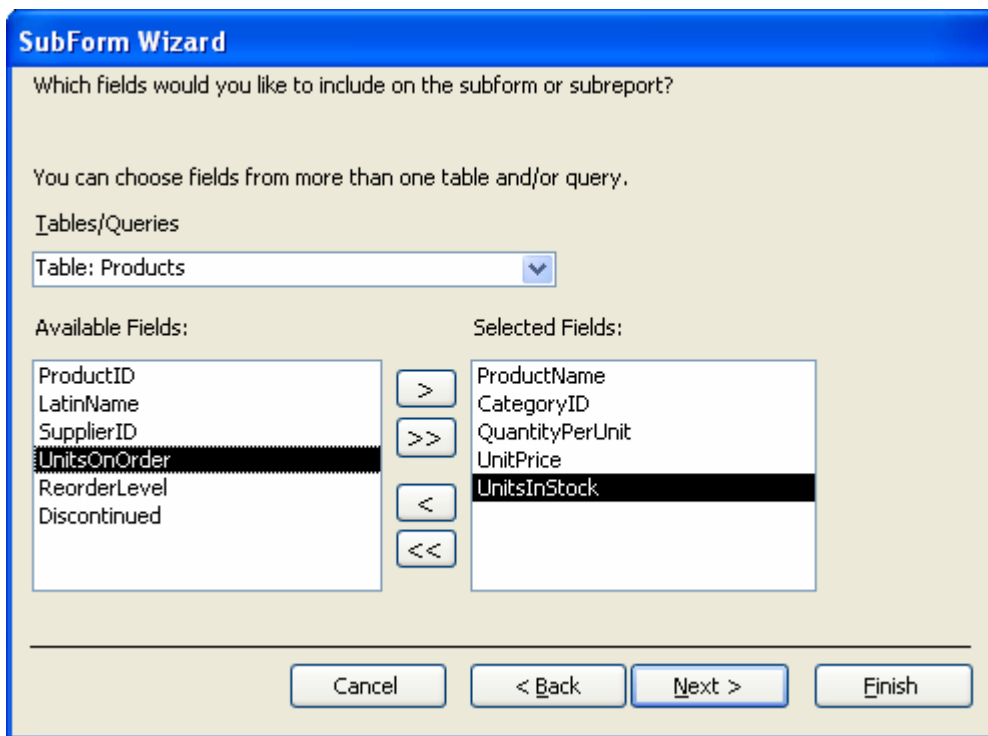
STEP 12: Click the **Subform/Subreport** button, and drag a rectangle in the lower portion of the Details section.

A white object appears on the form, and the first page of the **Subform Wizard** opens.

STEP 13: Leave **Use existing Tables and Queries** selected, and click **Next**.

STEP 14: In the **Tables/Queries** list, click **Table:Products**.

STEP 15: Add the **ProductName**, **CategoryID**, **QuantityPerUnit**, **UnitPrice**, and **UnitsInStock** fields to the **Selected Fields** list by clicking each one and then clicking **>** button.

Step 16: Then click **Next** to display this third page of the wizard. Because a field in the subform is related to a field in the main form (CategoryID), the wizard selects Show Products for each record in Categories using CategoryID as the Choose from a list option.

Tip: If the wizard can't figure out which fileds are related, it selects the Define my own option and displays list boxes in which you can specify the fields to be related.

STEP 17: Click **Next** to accept the default selection, and then click **Finish** to accept the default name for the subform and complete the process.

Access displays the Categories form in Design view, with an embedded Products subform. The size and location of the subform is determined by the original rectangle you dragged on the form.

STEP 18: Adjust the size and location of the objects on your form so that it resembles the one as follows.
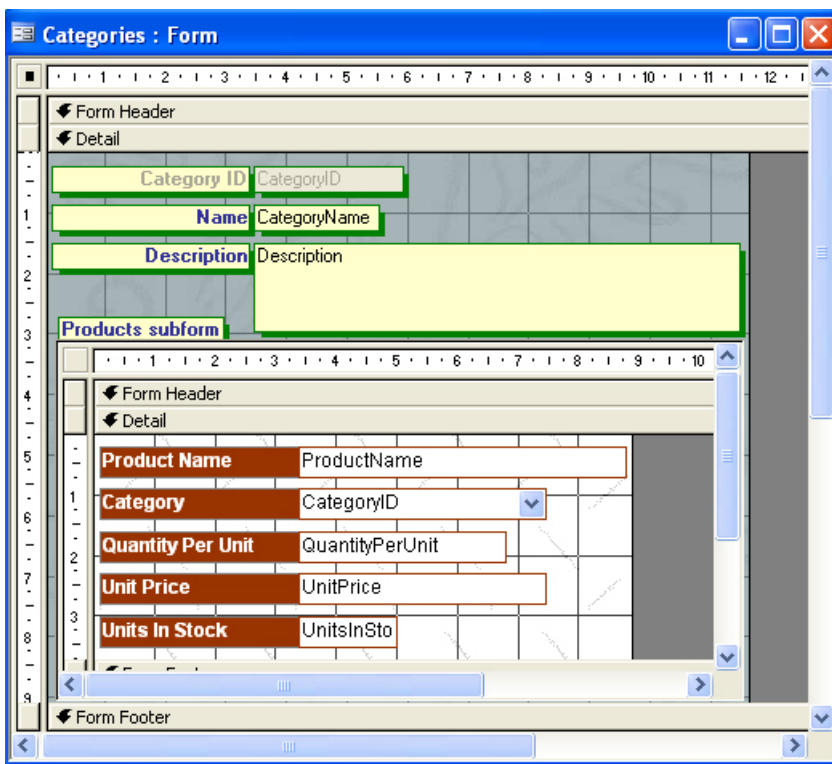
STEP 19: Notice the layout of the subform, and then click **View** to switch to Form view, where the form looks like this:
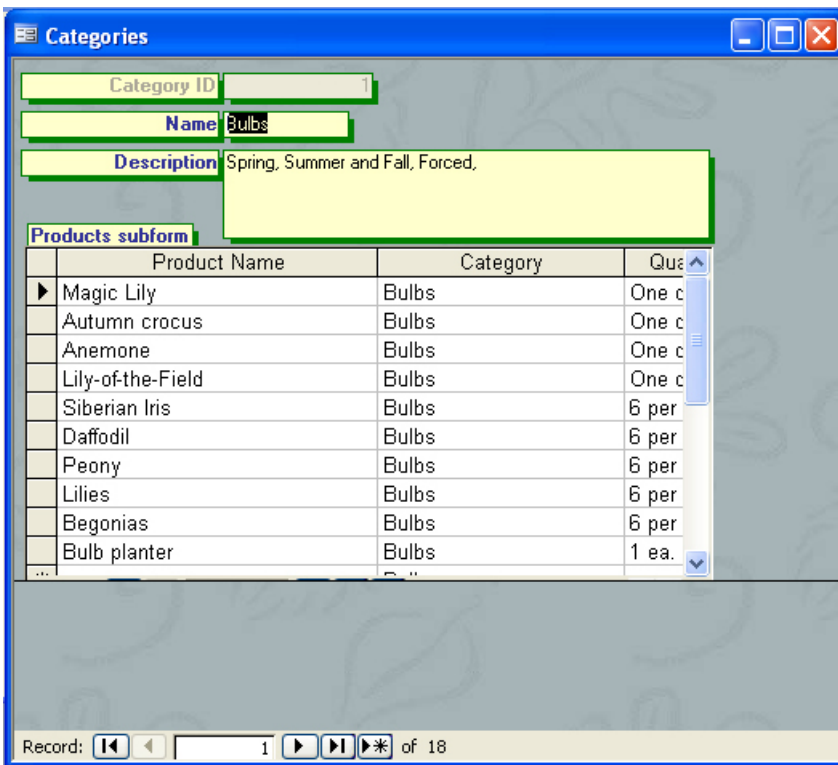
The format of the subform has totally changed. In Design view, it looks like a simple form, but in Form view, it looks like a datasheet.

STEP 20: Switch back to Design view, make any necessary size adjustments, and if necessary, open the **Properties** dialog box.

STEP 21: Click the <u>**Form** selector</u> in the upper left corner of the subform **twice**.
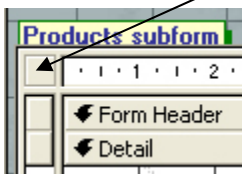

The first click selects the Products subform control, and the second click selects the form. A small black square appears in the button.

STEP 22: On the **Format** tab of the Properties dialog box, change both **Record Selectors** and **Navigation Buttons** to **No**.

While on this tab, notice the **Default View** property, which is set to Datasheet. You might want to return to this property and try the other options after finishing this exercise.
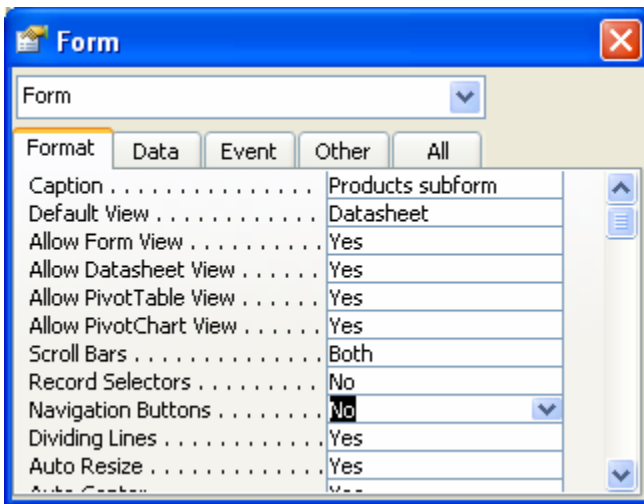
STEP 23: Switch back to Form view, and drag the dividers between column headers until you can see all the fields (You can quickly adjust the width of columns to fit their data by double-clicking the double arrow between column headings). Here are the results:
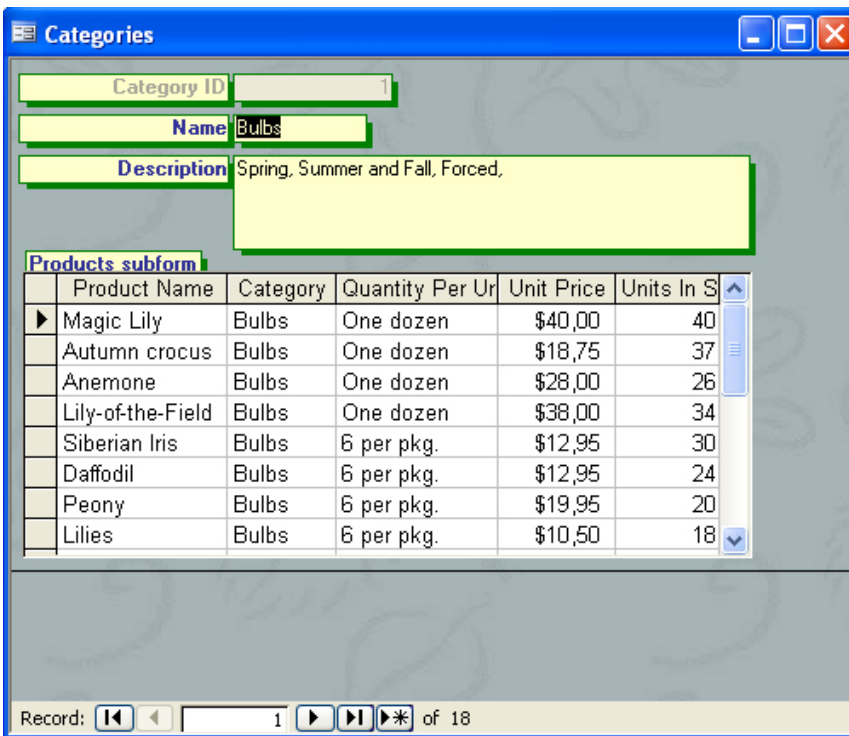
STEP 24: Click the navigation buttons to scroll through several categories. When you are through, click the **First Record** button to return to the first category (**Bulbs**).

As each category is displayed at the top of the form, the products in that category are listed in the datasheet in the subform.

STEP 25: Click the category name to the right of the first product.

The arrow at the right end of the box indicates that this is a combo box.

STEP 26: Click the arrow to display the list of categories, and change the category to **Cacti**.

STEP 27: Click the **Next Record** navigation button to move to the next category (Cacti).

You can see that the first product is now included in this category.

STEP 28: Display the list of categories, and restore the first product to the **Bulbs** category.

STEP 29: You don't want people to be able to change a product's category, so return to design view. Then in the subform, click the **CategoryID** combo box control, and press **Delete** key.

Important: You included the **CategoryID** field when the wizard created this subform because it is the field that relates the Categories and Products tables. The underlying Products table uses a combo box to display the name of the category instead of its ID number, so that combo box also appears on the subform.

STEP 30: Save the form, then switch back to Form view, and adjust the width of the subform columns and the size of the Form window until your form looks like this:

STEP 31: Close the **Categories** form, saving your changes to both the form and the subform. Close the database.

Multiple table queries

A select query can contain fields from multiple tables. The one-to-many relationship between those tables is shown graphically in the query design view. The tables are related through The **Tables** row displays the name of the table that contains each field in the query.

Relationship between tables

Each field & table to display
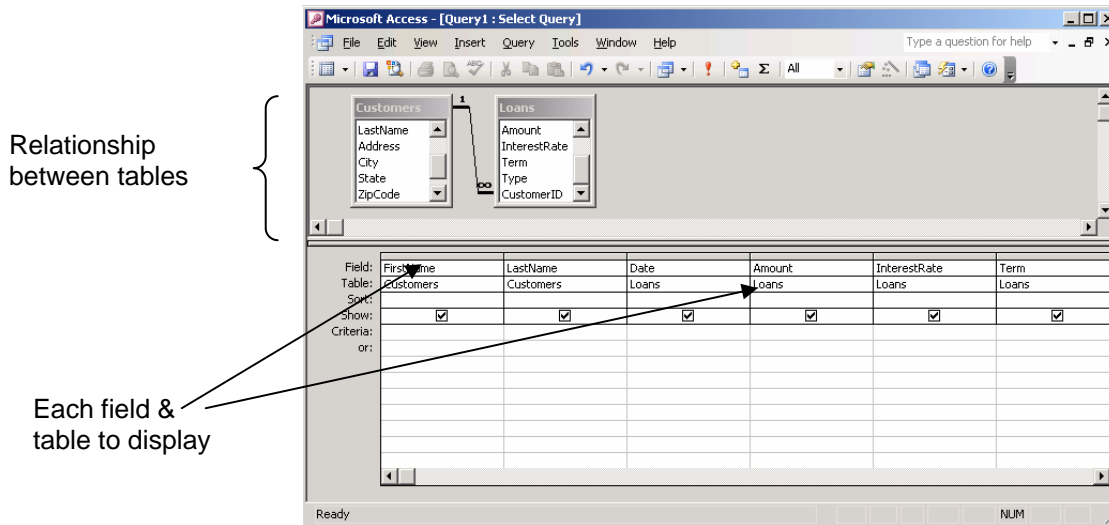
External data

Access provides an easy way to use external data. The **Get External Data** command starts a Wizard that will import (or link) data from an external source such as an Excel workbook into an Access database. The data may come from an Excel workbook, or from a text file that was created by an application outside of Microsoft Office. The **Export** command does the reverse and copies an Access database object to an external destination.

The **Import Spreadsheet Wizard** asks you a series of questions, then it imports the Excel worksheet into the Access table. You select the worksheet, designate the Excel column headings and Access field names, and specify the primary key. You can then view and/or modify the resulting table.

The Excel Workbook

Designate Column Headings

Choose Primary Key

The Clients Table

Laboratory Work: IMPORTING AND EXPORTING ACCESS OBJECTS

Objectives

- To import an Access table from an Excel workbook.
- To create a one-to-many relationship between tables in a database.
- To create a multiple-table query.

EXERCISE 12

STEP 1: Import the Excel worksheet

➢ Start Access. Click the link to **More Files** in the task pane or pull down the **File menu** and click the **Open command**.

➢ Open the **Investment database** in the Exploring Access folder.

➢ The database does not contain any tables yet. The tables will be imported from Excel.

➢ Pull down the **File menu**, click the **Get External Data command**, then click Import to display the **Import** dialog box.

➢ Click the **down arrow** on the Look in list box and change to **Exploring Access folder.**

➢ Click the **down arrow** on the Files of type list box and select **Microsoft Excel**. Select the **Investment Data workbook**. Click the **Import button** to start the Import Spreadsheet Wizard.
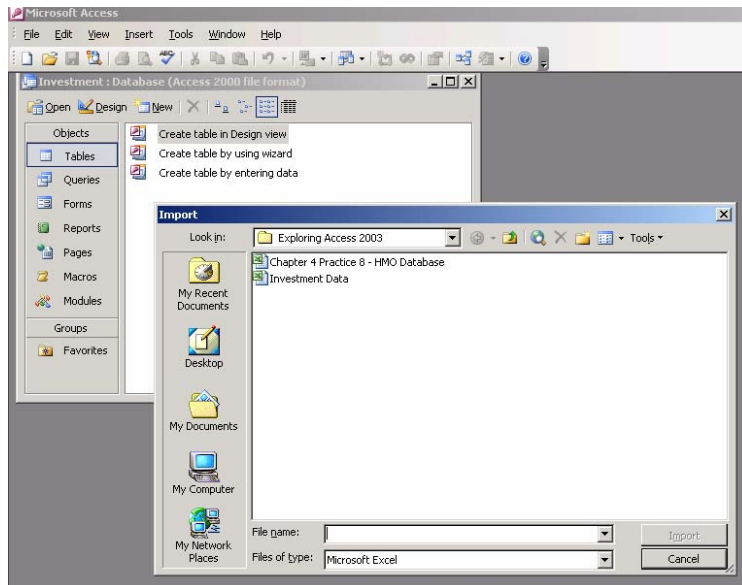
STEP 2: The Import Spreadsheet Wizard

➢ In the first step of the Import Spreadsheet Wizard, the option button to **Show Worksheet** is selected. The Clients worksheet is also selected. Click **Next**.

➢ Access will use the column headings in the Excel workbook as field names in the access table, provided you check the box indicating that the first row contains column headings. Click **Next**.

➢ Select the option button to store the data in a new table. Click **Next**.

➢ You do not need information about the individual fields. Click **Next**.

➢ Select the option to choose your own primary key. Click the **drop-down arrow** on the list box, and select **SSN**. Click **Next**.

➢ Access indicates that it will import the data to a Clients table. Click The **Finish button**, then click **OK**. The Clients table appears within the Database window.

➢ Repeat the steps to import the Consultants table into the Investment database from the Investment Data workbook. Use the **ConsultantID** field as the primary key for this table.
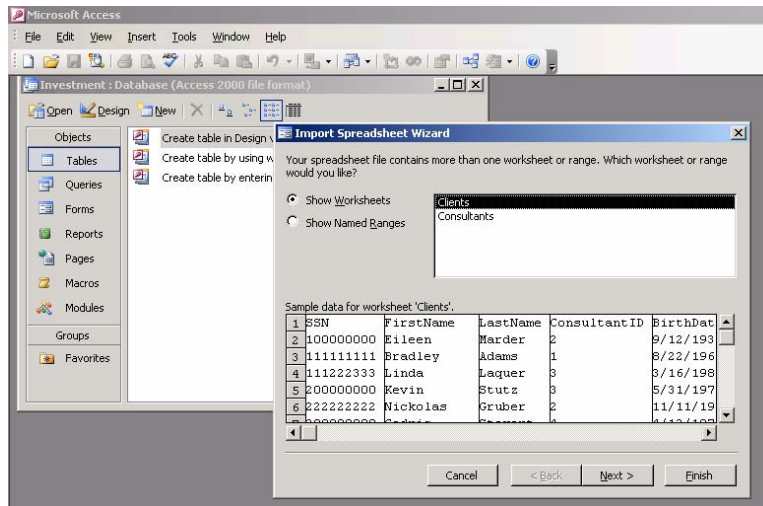
STEP 3: Create the Relationship

➢ Pull down the **Tools menu** and click the **Relationship command**.

➢ Pull down the **Relationship menu** and click the **Show Table command**. Click (select) the **Clients table**, then click the **Add button**.

➢ Double click the **Consultants table** to add this table to the Relationship window. Close the Show Table dialog box. Click and drag the title bar of each table.

➢ Click and drag the bottom border of each table so that you see all of the fields in each table.

➢ Click and drag the **ConsultantID field** in the Consultants table field list to the **ConsultantID field** in the Clients field list. You will see the Edit Relationships dialog box.

➢ Check the box to **Enforce Referential Integrity**. Click the **Create button** to create the relationship.

➢ Click the **Save** button.

STEP 4: Create the Multiple Table Query

➢ Click the **Queries button** in the Database window. Double click the icon to **Create query in design view** to open the Design window. The Show Table dialog box appears automatically.

➢ Press and hold down the **Ctrl key** to select the Clients and Consultants tables, then click the **Add button** to add these tables to query. Close the Show Table dialog box.

➢ Click the **Maximize button**. Click and drag the title bars of each table to arrange the tables, click and drag the bottom of each field list until you can see all of the fields in the table.
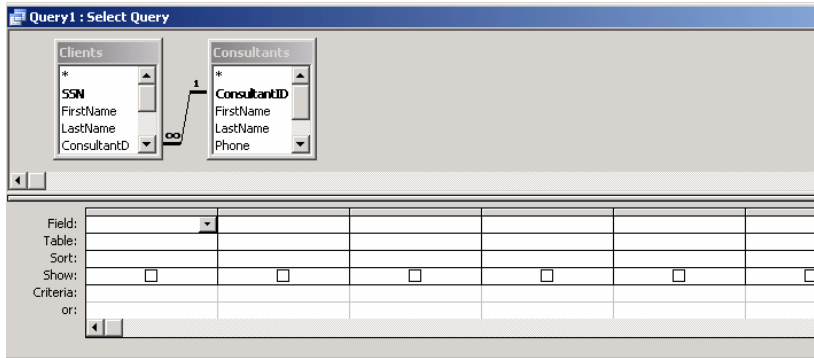
STEP 5: Complete the Multiple-Table Query

➢ The Table row should be visible within the design grid. If not, pull down the View menu and click Table Names to display the Table row.

➢ Double click the LastName and Status fields from the Consultants table to add these fields to the design grid. Double click the LastName, Assets, and Account Type fields from the Clients table to add these fields as well.

➢ Click the Sort row under the LastName field from the Consultants table, then click the down arrow to open the drop-down list box. Click Ascending.

➢ Click the Save button on the Query Design toolbar. Save the query as Assets Under Management. Click **OK**.

➢ Click the **Run button** to run the query.
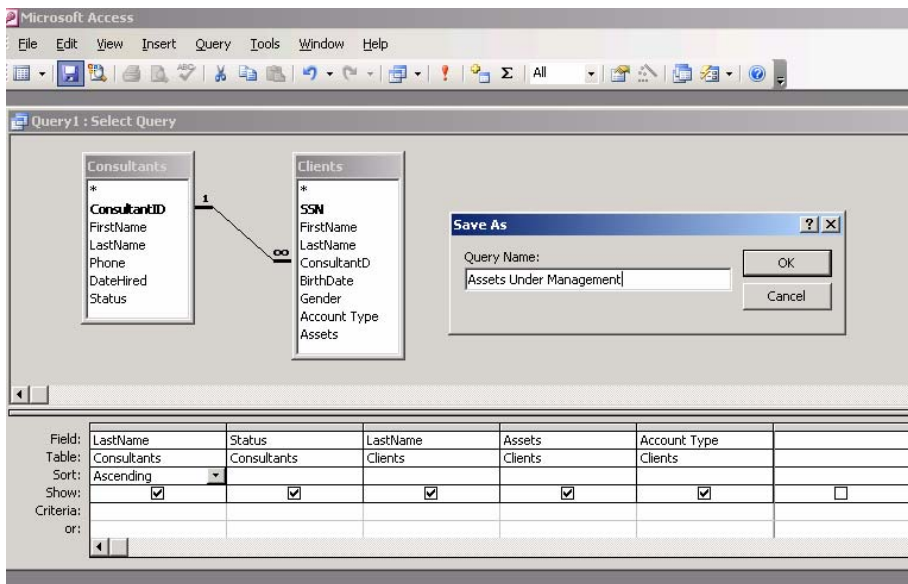
STEP 6: Export the Query

➢ You should see the dynaset created by the query as shown below. The query lists all of the client records grouped by the last name of the financial consultant.

➢ Pull down the **File menu**, click (or point to) **Export command** to display the Export Query dialog box. Click the **down arrow** in the Save as type list box to select **Microsoft Excel 97-2003**.

➢ Select the **Investment Data workbook** and click the **Export All button** to save the query as a worksheet in the Investment Data workbook. Click **Yes** if asked whether to replace the file. Close the Query window.

➢ Click the **Tables button**. Select the **Clients table**. Pull down the **File menu**, Click the **Export command**, and change the file type to **Microsoft Excel 97-2003**. Select (click) the **Investment Data workbook**. Click **Export**. Click **Yes** if asked whether to replace the file.

➢ Export the Consultants table in similar fashion. Exit Access.
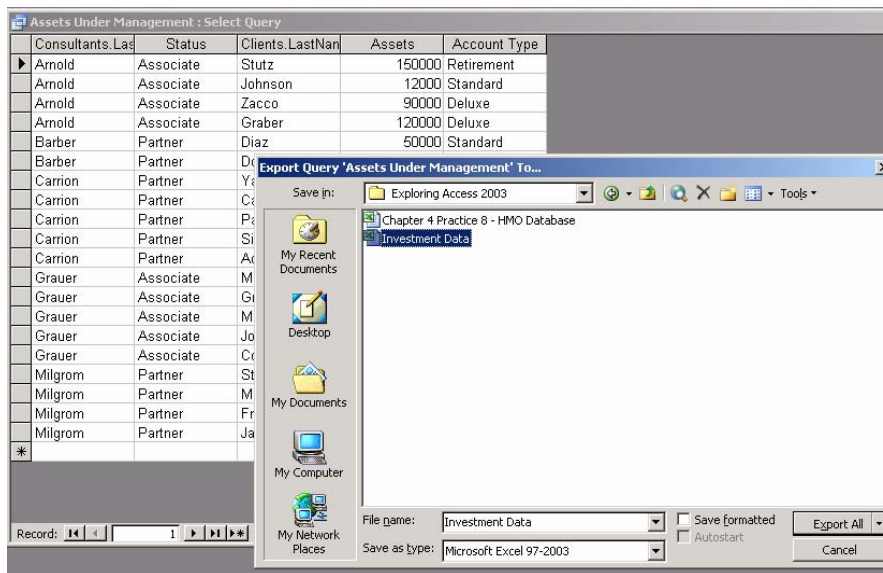
STEP 7: View the Excel Workbook

➢ Click the **Start button**, click (or point to) the **Programs command**, then select **Microsoft Excel**. Click the **Open button**, change to the Exploring Access folder, then open the **Investment Data workbook**.

➢ Click the **Assets_Under_Management tab** to see the worksheet. Format the worksheet to improve its appearance.

➢ There are two client worksheets, Clients and Clients1, corresponding to the original and modified client data. Click the **Clients1 tab**.

➢ There are also two consultant worksheets, Consultants and Consultants1. Click the **Consultants1 tab**.

➢ Press and hold down the **Ctrl key** as you click the tab for each worksheet to select all five worksheets. Pull down the **File menu**, click the **Page Setup command**. Click the **Sheet tab.** Check the boxes to print **Gridlines** and **Row and Column headings**. Click **OK**.

➢ Click the **Print button** to print the workbook. Save the workbook. Exit Excel.

The Switchboard Manager

A switchboard is a user interface that enables a nontechnical person to open the objects in an Access database by selecting commands from a menu. The switchboard itself is stored as a form within the database, but it is quite different from the forms you have learned in the previous sections, it is not used for data entry, but rather as a menu for the user.
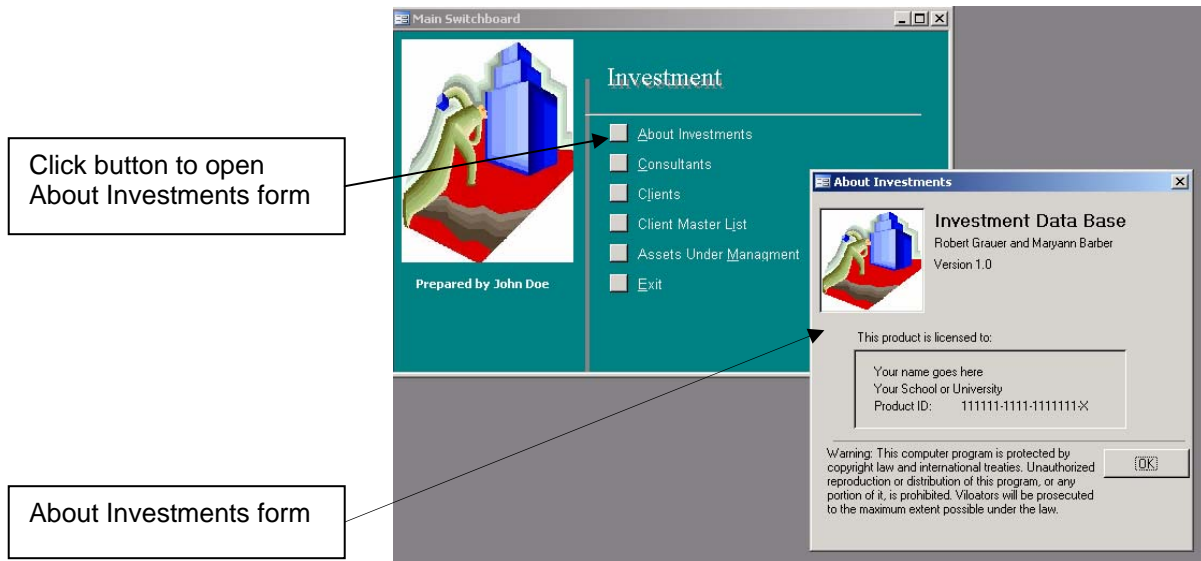
The switchboard is created through the **Switchboard Manager**, a tool that prompts you for the information about each menu item. You supply the text of the item, as it is to appear on the switchboard, together with the underlying command. Access does the rest. It creates the switchboard form and an associated **Switchboard Items table** that is the basis for the switchboard.
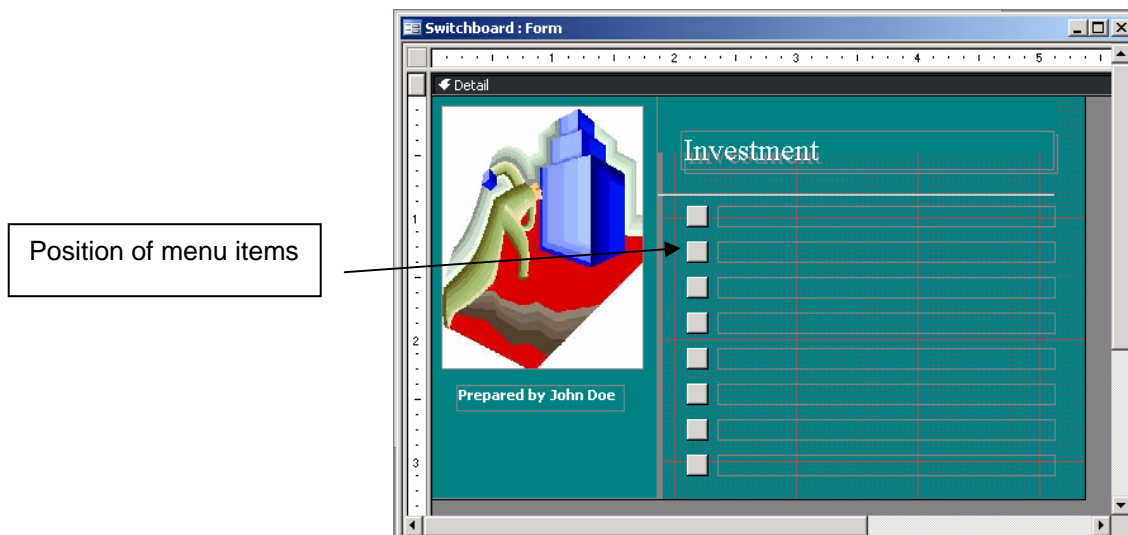
Design View

The Form view and Design view do not appear to correspond to one another; text appears next to each button in the Form view, but it is absent in the Design view. This is the nature of a switchboard, because the text for each button is taken from the Switchboard Items table which is the record source for the form. Each record in the Switchboard Items table has a corresponding menu item in the switchboard form.

The Switchboard Items Table

Switchboard Items table is created automatically. The SwitchboardID field identifies the number of the switchboard, which becomes important in applications with more than one switchboard.

The ItemNumber and ItemText fields identify the position and text of the item, respectively, as it appears on the switchboard form. (The & that appears within the ItemText field will appear as an underlined letter on the switchboard to enable a keyboard shortcut; for example, Consultants is displayed as <u>C</u>onsultants). The Command and Argument fields determine the action that will be taken when the corresponding button is clicked. Command number 3, for example, opens a form.

Compact and Repair Database

The Compact and Repair Database command in the Tools menu serves two functions. The compacting process eliminates the fragmentation and wasted disk space that occurs during development as you add, edit, and delete the various objects in a database. The Repair function takes place automatically if Access is unable to read a database when the database is opened initially.

Laboratory Work: THE SWITHCHBOARD MANAGER

Objectives

- To create a switchboard;
- To use the Link Tables command to associate tables in one database with the objects in a different database.

EXERCISE 13

STEP 1:   The Sports Objects Database

➢ Start Access. Change to the **Exploring Access folder** as you have been doing throughout the text.

➢ Open the **Sports Objects database**, and then click the various buttons in the Database window to view the contents of this database. This database contains the various objects (forms, queries, and reports) in the soccer application, but not the tables.

- Click the **Tables button.** There are currently no tables in the database.

- Click the **Queries button.** There is one query in the database.

- Click the **Forms button.** There are six forms in the database.

- Click the **Reports button.** There is one report in the database.

➢ Pull down the **File menu,** click **Database Properties,** then click the **Contents tab** to see the contents of the database. The Database Properties command enables you to see all of the objects on one screen.

➢ Click **OK** to close the dialog box.
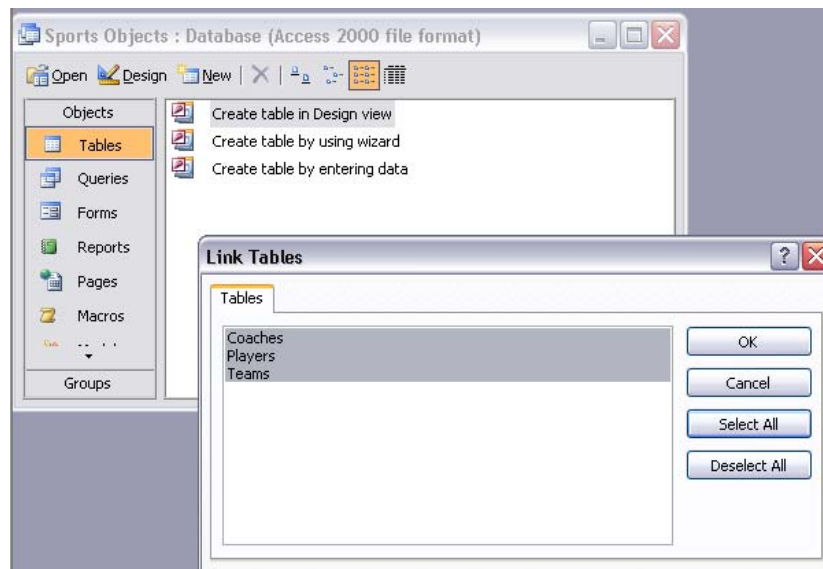
STEP 2:   The Link Tables Command

➢ Pull down the **File menu.** Click **Get External Data,** then click **Link Tables** from the cascaded menu. You should see the Link dialog box (which is similar in appearance to the Open dialog box).

➢ Select the **Exploring Access folder,** the folder you have been using throughout the text. Scroll (if necessary) until you can select the **Sports Tables database,** and then click the **Link command button.**

➢ You should see the Link Tables dialog box in Figure. Click the **Select All command button** to select all three tables, then click OK.

- ➢ The system (briefly) displays a message indicating that it is linking the tables, after which the tables should appear in the Database window.

- ➢ Click the **Tables button** in the Database window. The arrow next to each table indicates that the table physically resides in another database. (You may have to relink the tables if you move the database to another computer.)

STEP 3:   Import the About Sports Form

- ➢ Pull down the **File menu,** click the **Get External Data command,** and then click **Import** to display the Import dialog box. Select the **Exploring Access folder,** the folder you have been using throughout the text.

- ➢ Scroll (if necessary) until you can select the **About Sports database,** then click the **Import button** to display the Import Objects dialog box in Figure. Click the **Forms button,** select the **About Sports** form, and click OK. The system pauses as the About Sports form is brought into this database.

- ➢ Once the importing is complete, the Database window changes to display the forms in this database, which now includes the About Sports form. Open the form in the Design view, then modify its contents to include your name and school. Save your changes, then close the form.
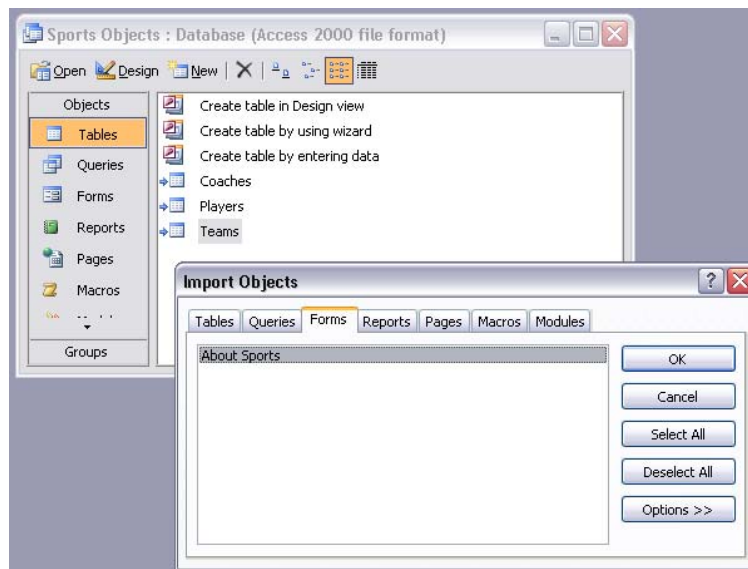
STEP 4:   Start the Switchboard Manager

- ➢ Minimize the Database window. Pull down the **Tools menu,** click the **Database Utilities command,** and choose **Switchboard Manager.**

- ➢ Click **Yes** if you see a message indicating that there is no valid switchboard. You should see the Switchboard Manager dialog box in Figure.

- ➢ Click the **Edit command button** to display the Edit Switchboard Page dialog box. Click the **New command button** to add an item to this page, which in turn displays the Edit Switchboard Item dialog box.

- ➢ Click in the Text list box and type **&About Sports,** which is the name of the command as it will appear in the switchboard.

- ➢ Click the **drop-down arrow** on the Command list box. Choose the command to open the form in either Add or Edit mode (it doesn't matter for this form).

- ➢ Click the **drop-down arrow** in the Form list box and choose **About Sports.**

- ➢ Click OK to create the switchboard item. The Edit Switchboard Item dialog box closes and the About Sports item appears in the Main Switchboard.
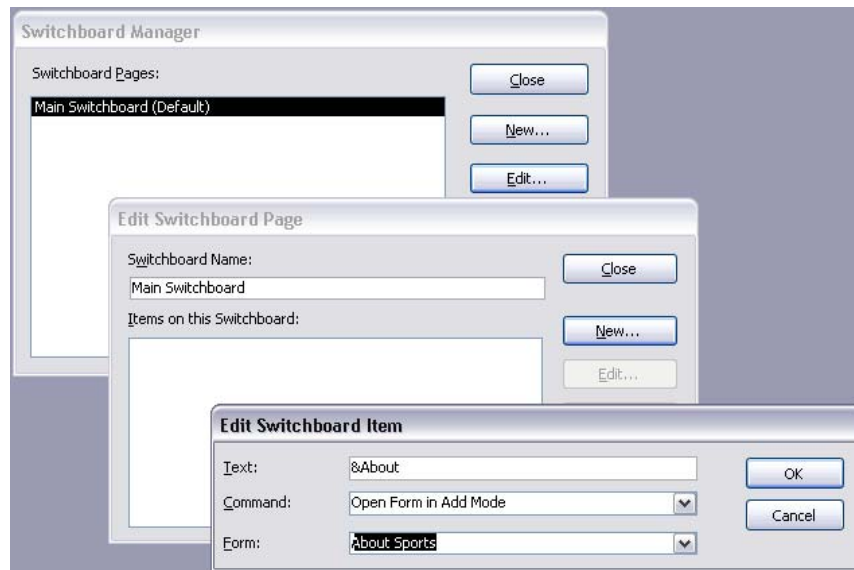
STEP 5:   Complete the Switchboard

➢ Click the **New command button** in the Edit Switchboard Page dialog box to add a second item to the switchboard. Once again, you see the Edit Switchboard dialog box.

➢ Click in the **Text** list box and type **&Players.** Click the **drop-down arrow** on the Command list box and choose **Open Form in Edit Mode.** Click the **drop-down arrow** in the Form list box and choose **Players.**

➢ Click OK to close the Edit Switchboard Item dialog box. The &Players command appears as an item on the switchboard.

➢ Create two additional switchboard items for **&Coaches** and **&Teams** in similar fashion. Your switchboard should contain four items as shown in Figure. Click **Close** to close the Edit Switchboard Page dialog box. Click **Close** to close the Switchboard Manager dialog box.
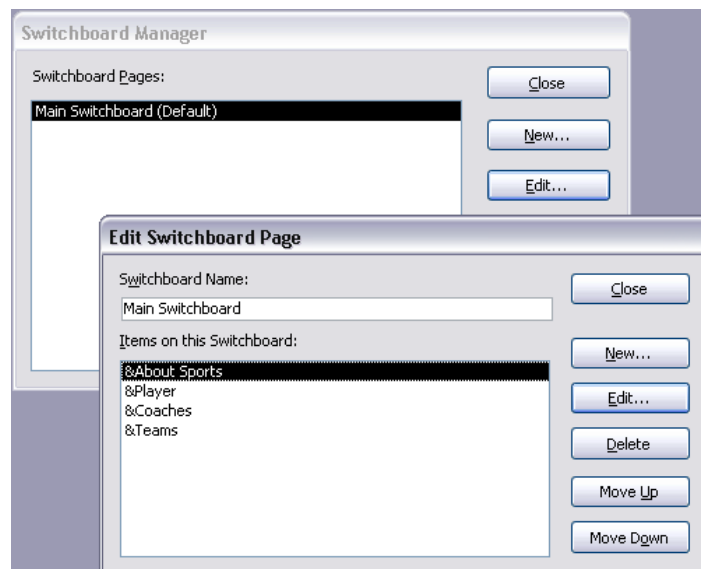
STEP 6:   Test the Switchboard

➢ Click the **Restore button** in the Database window to view the objects in the database, then click the **Forms tab.** The Switchboard form has been created automatically by the Switchboard Manager.

➢ Double click the **Switchboard form** to open the Main Switchboard. Do not be concerned about the design of the switchboard at this time, as your immediate objective is to make sure that the buttons work. (We modify the design of the switchboard at the end of the exercise.) Maximize the window.

➢ Click the **About Sports button** (or use the **Alt+A** shortcut) to display the About Sports form as shown in Figure. Click the **OK button** to close the form.

➢ Click the **Players button** (or use the **Alt+P** shortcut) to open the Players form.

Click the **Maximize button** so that the Players form takes the entire window.

STEP 7:   Add Your Record

➢ Click the **Add Player button** on the bottom of the form (or use the **Alt+A** shortcut) to display a blank record where you will enter data for yourself as shown in Figure.

➢ Click the **text box** to enter your first name. (The PlayerID is an AutoNumber field that is updated automatically.) Enter your name, then press the **Tab key** to move to the next field.

➢ Continue to enter the appropriate data for yourself, but please assign yourself to the **Comets team.** The team is entered via a drop-down list. Type C (the first letter in Comets) and Comets is entered automatically from the drop-down list for teams.

➢ The player rating is a required field (all players are evaluated for ability in order to balance the teams) and must be A, B, C, or D.

➢ Click the **Close Form button** to return to the switchboard.

STEP 8: Complete the Data Entry

➢ You should once again see the switchboard. Click the **Coaches button** (or use the **Alt+C** shortcut) to open the Coaches form.

➢ Click the **Add Coach button** at the bottom of the form. Click the **text box** to enter the coach's first name. (The CoachID is entered automatically.)

➢ Enter data for your instructor as the coach. Click the appropriate **option button** to make your instructor a **Head Coach.** Assign your instructor to the Comets. Click the **Close Form button** to return to switchboard.

➢ Click the **Teams command button** on the switchboard to open the Teams form and move to Team T02 (the Comets). You should see your instructor as the head coach and yourself as a player as shown in Figure.

- ➢ Pull down the **Edit menu** and click **Select Record** (or click the selection area), then click the **Print button** to print the roster for your team.
- ➢ Click the **Close Form button** to return to the switchboard.

STEP 9:   Insert the Clip Art

- ➢ Change to the Design view. **Right click** in the Picture area of the form to display a context-sensitive menu, and then click the **Properties command** to display the Property sheet. Click the **All tab.**
- ➢ The Picture property is currently set to "none" because the default switchboard does not contain a picture. Click in the **Picture box,** and then click the **Build button** to display the Insert Picture dialog box.
- ➢ Click the **down arrow** in the Look In box to change to the **Exploring Access folder,** then select the **SoccerBall**. Click OK.
- ➢ Size the picture as appropriate. The dimensions of the soccer ball should be changed to a square—for example, 1.7 inches X 1.7 inches. Close the property sheet.
- ➢ Right click below the picture in the Detail area of the form. Point to the **Fill/Back Color command** from the context-sensitive menu to display a color palette. Choose the same shade as appears on the rest of the form. (It is the fifth square from the left in the second row.)
- ➢ Click the **Undo button** if the color does not match. Save the form.

STEP 10:   Complete the Design

- ➢ Delete the label that contains the title of the switchboard, "Sports Objects". (You will have to delete two labels, because the switchboard manager automatically creates a shadow.)
- ➢ Click and drag the Label tool to create a new unbound control for the title of the switchboard. Enter **Any Sports League** as the title. Use 18-point Arial bold, in white for the formatting.
- ➢ Click the **Label** tool, then click and drag to create a text box under the picture. Enter your name in an appropriate font, point size, and color. Move and/or size the label containing your name as appropriate.
- ➢ Press and hold the **Shift key** as you click each text box in succession. The boxes appear to be empty, but the text will be drawn from the Switchboard Items table.
- ➢ Be sure that you selected all text boxes. Click the **drop-down arrow** on the Font/Fore Color button and change the color to white. Change the font and point size to **Arial** and **10pt,** respectively. Save the form.
- ➢ Change to the Form view to see the result of your changes. Exit Access if you do not want to continue with the next exercise at this time.

Introduction to Macros

A macro automates a command sequence. Instead of using the mouse and keyboard to execute a series of commands, you store the commands (actions) in a macro and execute the macro. You can create a macro to open a table, query, form, or report. You can create a macro to display an informational message. You can create a macro to move or size a window, or to minimize, maximize, or restore a window. In short, you can create a macro to execute any command (or combination of commands) in any Access menu to make an application easier to use.

A **macro** is created in the **Macro window**. The macro window is divided into two sections. The **actions** (commands) that comprise the macro are entered at the top. The **arguments**, or information for those actions, are entered in the lower section. Macros are stored as separate objects in a database.
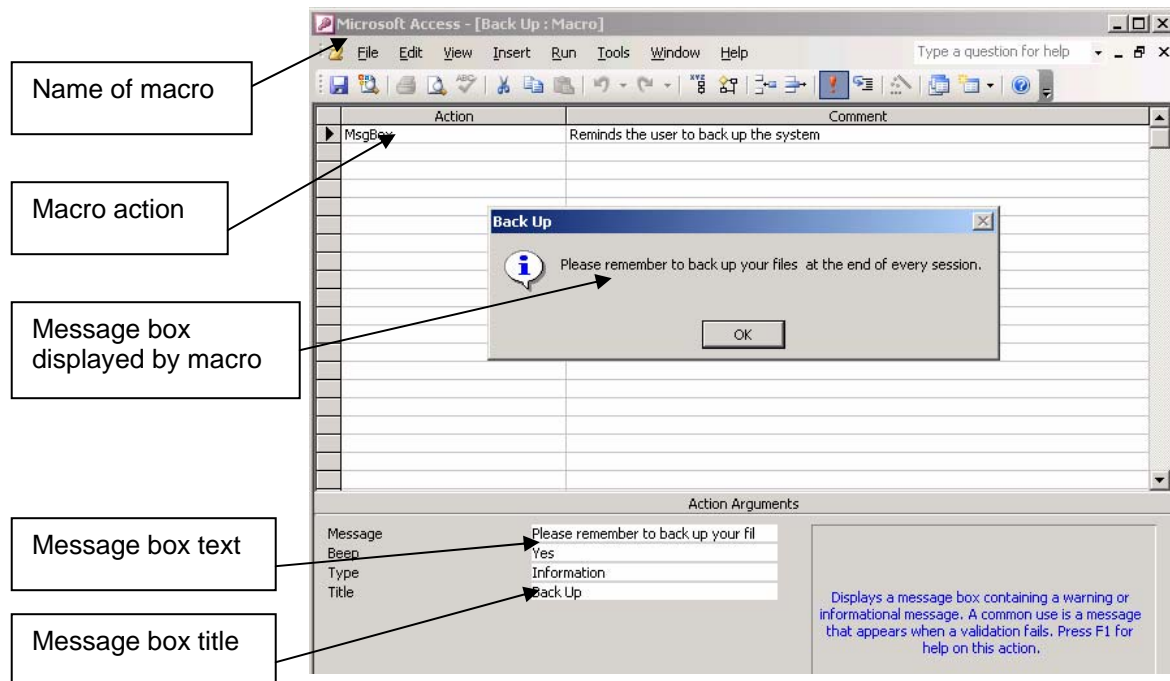
The Macro Window

To create a macro, select the Macros button in the database window, then click the New button to display the macro window. You add actions to a macro by clicking in the Action area then choosing the action from a drop-down list, or by typing the name of the action. The arguments of an action are entered by choosing from a drop-down list, or by typing the argument directly.

After the macro is created, you can execute it whenever the application is open. Execution of the macro will display a dialog box. The contents of the dialog box are determined by the value of the arguments. The value of the **Type** argument determines the icon that is displayed within the dialog box. The **Title** argument contains the text that appears in the title bar of the dialog box.

AutoExec Macro

The **AutoExec** macro is unique that is executed automatically whenever the database in which it is stored is opened. The macro is used to automate a system for the end user. It typically contains an OpenForm action to open the form containing the main switchboard. It may also perform other basic tasks, such as maximizing the current window.

Laboratory Work: MACROS AND PROTOTYPING

Objectives
- To create an AutoExec and a Close Database macro;

EXERCISE 14

STEP 1:   Create the AutoExec Macro

➢ Start Access. Open the **Sports Objects database** from the previous exercise. Click the **Macros button** in the Database window.

➢ Click the **New button** to create a new macro. If necessary, click the **Maximize button** so that the Macro window takes the entire screen.

➢ Click the **drop-down arrow** to display the available macro actions. Scroll until you can select **Maximize.** (There are no arguments for this action.)

➢ Click the **Action box** on the second line, click the **drop-down arrow** to display the macro actions, then scroll until you can click the **OpenForm action.** Click the text box for the **Form Name** argument in the lower section of the Macro window.

➢ Click the **drop-down arrow** to display the list of existing forms and select **Switchboard** (the form you created in the previous exercise).

➢ Click the **Save button** to display the Save As dialog box in Figure 1. Type **AutoExec** as the macro name and click OK. Click the **Run button** to run the macro and open the switchboard.

➢ Close the switchboard. Close the AutoExec macro.
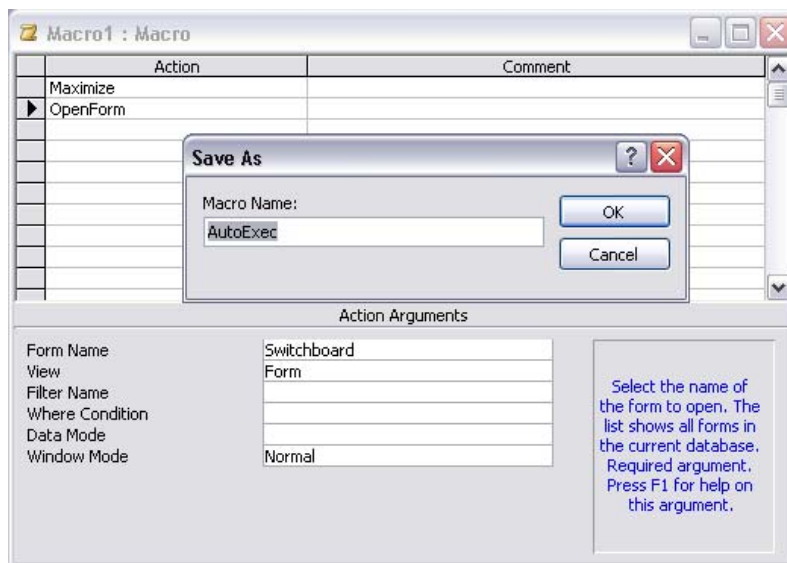
Figure 1

STEP 2:   Create the Prototype Macro

➢ You should be back in the Database window, which should display the name of the AutoExec macro. Click the **New button** to create a second macro.

➢ Type Ms (the first two letters in the MsgBox action), then press **enter** to accept this action. Enter the comment shown in Figure 2.

➢ Click the text box for the **Message** argument, then press **Shift+F2** to display the zoom box so that you can see the contents of your entire message. Enter the message "***The object will be implemented in the next version. In the meantime, you can gain an***

> *appreciation for the "look an feel" of the system by stepping through the various commands on the switchboard*' in Figure 2. Click **OK**.

➢ Click the text box for the **Type** argument, click the **drop-down arrow** to display the list of message types, and select **Information.**

➢ Click in the text box for the **Title** argument, and enter **"Under Development".**

➢ Click the **Run button** to test the macro. You will see a message indicating that you have to save the macro. Click Yes to save the macro, type **Prototype** as the name of the macro, and click OK.

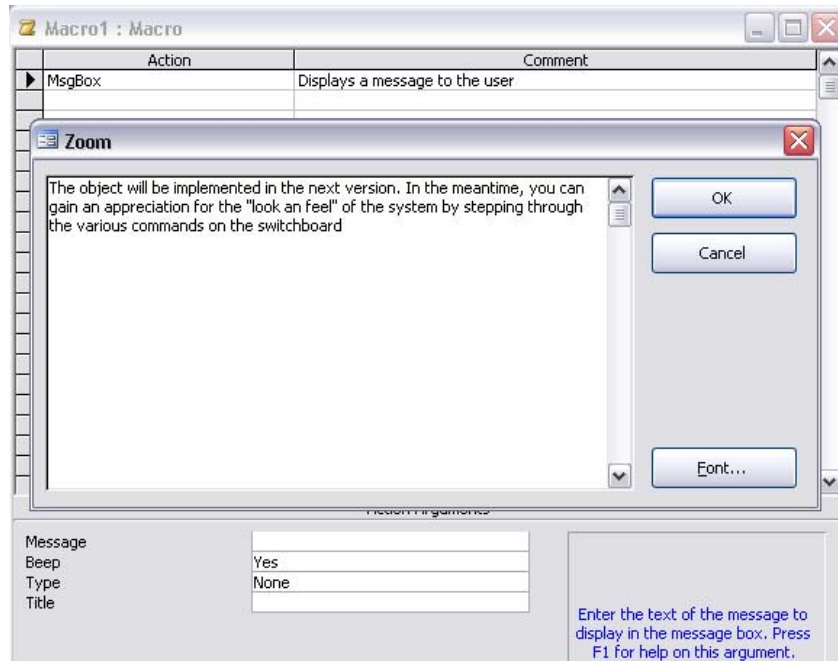➢ You will see a dialog box containing the message you just created. Click **OK**. Close the macro.

Figure 2

STEP 3:   Create the Close Database Macro

➢ Click the **New button** once again to create the third (and last) macro for this exercise. Specify the MsgBox action as the first command in the macro. Enter the comment shown in Figure 3, and enter the Message *"It is not a question of it will happen, but when. Hard disks fail, files are lost, and viruses can infect a system. Thus, you are urgent to back up your database at the end of every session."*

➢ Enter an appropriate message that stresses the importance of backup. Select Warning as the message type. Enter an appropriate title for the message box.

➢ Click the **Action box** on the second line. Type **Cl** (the first two letters in Close) and press **enter.** Enter the indicated comment as shown in Figure 3.

➢ Click the text box for the **Object Type** argument. Click the **drop-down arrow** and choose **Form** as the Object type. Click the **Object Name** argument, click the **drop-down arrow,** and choose **Switchboard** as the Object (form) name.

➢ Click the **Action box** on the third line. Type **Cl** (the first two letters in Close) and press **enter.** Click the **comments line** for this macro action and enter the comment shown in the figure. No arguments are necessary.

➢ Save the macro as **Close Database,** then close the macro. If necessary, press the **FII** key to return to the Database window, where you should see three macros: AutoExec, Close Database, and Prototype.
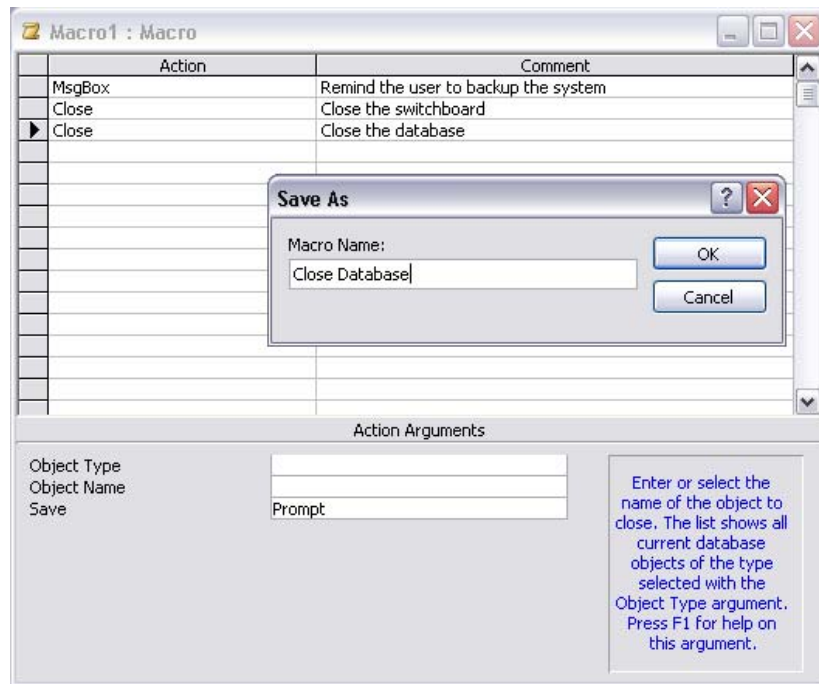
Figure 3

STEP 4:   Create the Report Switchboard

➢ Minimize the Database window to give yourself more room in which to work. Pull down the **Tools menu,** click the **Database Utilities command,** and choose **Switchboard Manager** to display the Switchboard Manager dialog box.

➢ Click **New.** Enter **Report Switchboard** as the name of the switchboard page. Click OK. The Create New dialog box closes and the Report Switchboard page appears in the Switchboard Manager dialog box.

➢ Select the **Report Switchboard,** click **Edit** to open the Edit Switchboard Page dialog box. Click **New** to open the Edit Switchboard Item dialog box.

➢ Add the first switchboard item. Click in the **Text** list box and type **Report 1** as shown in Figure 4.

➢ Press the **Tab key** to move to the Command list box and type the **Run M** (the first several letters in Run Macro). Press **Tab** to move to the Macro list box and type **P** (the first letter in the macro name, "Prototype").

➢ Click OK to create the switchboard item. The Edit Switchboard Item dialog box closes and Report 1appears on the Report Switchboard page.

➢ Add **Report 2** as the next switchboard item. Specify the **Run macro command** and choose **AutoExec** as the macro.

➢ Add an additional item that will return the user to the main switchboard. Click **New** to open the Edit Switchboard Item dialog box. Click in the **Text** list box and type "**&Return to Main Menu**..."

➢ Press the **Tab key** to move to the Command list box, where the Go to Switchboard command is entered by default. Press the **Tab key** to move to the Switchboard list box, and type **M** (the first letter in the "Main Switchboard"). Click **OK** to create the switchboard item. Close the Edit Switchboard Page.
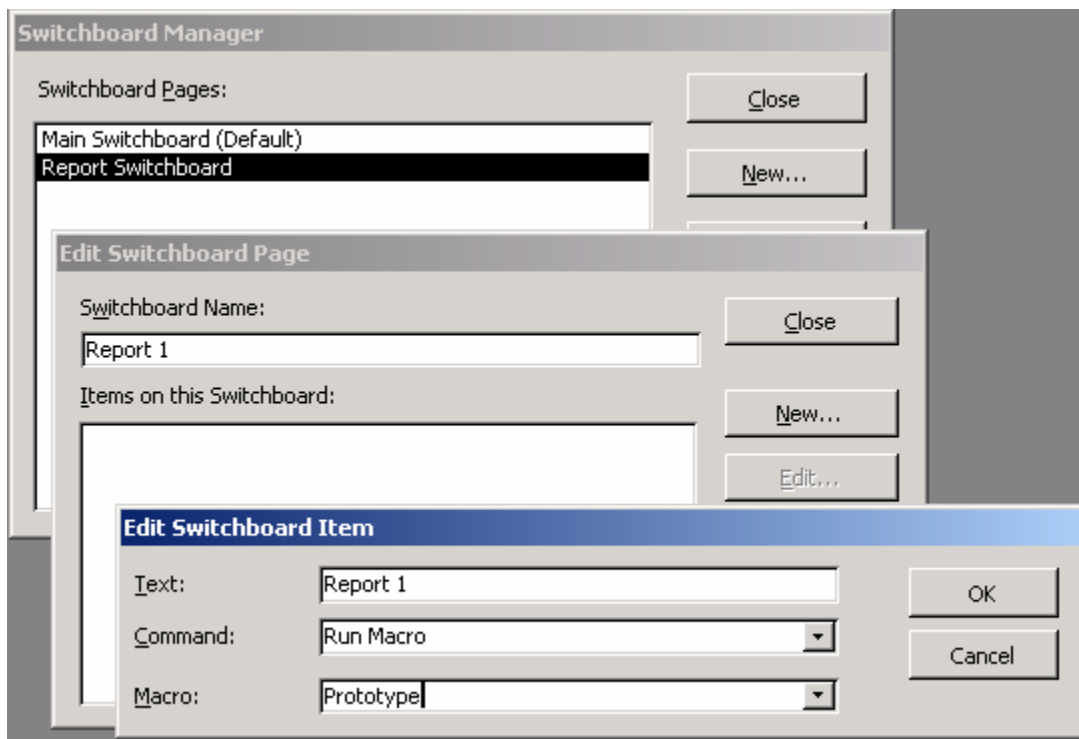
Figure 4

STEP 5:   Modify the Main Switchboard

➢ Select the **Main Switchboard** in the Switchboard Manager dialog box, click the **Edit button** to open the Edit Switchboard Page dialog box, then click **New** to open the Edit Switchboard Item dialog box as shown in Figure 5.

➢ Add a new switchboard item to open the Report Switchboard. Click in the **Text** list box and type **"&Report Menu** ...", the name of the command as it will appear in the switchboard.

➢ Press the **Tab key** to move to the Command list box, where "Go to Switchboard" is already entered, then press the **Tab key** a second time to move to the Switchboard list box. Type **R** (the first letter in the "Report Switchboard"). Click OK to create the switchboard item.

➢ The Edit Switchboard Item dialog box closes and "&Report Menu" appears on the main switchboard.

➢ The main switchboard needs one last command to close the database. Thus, click **New** to open the Edit Switchboard Item dialog box. Type **&Exit** as the name of the command.

➢ Press the **Tab key** to move to the Command list box and type **R** (the first letter in "Run Macro"). Press the **Tab key** a second time to move to the Macro list box, and type **C** (the first letter in the "Close Database" macro). Click OK to create the switchboard item.

➢ The main switchboard should contain six items— &About Sports, &Players, &Coaches, and &Teams from the first exercise, and &Report Menu and &Exit from this exercise.

➢ Close the Edit Switchboard Page dialog box. Close the Switchboard Manager.
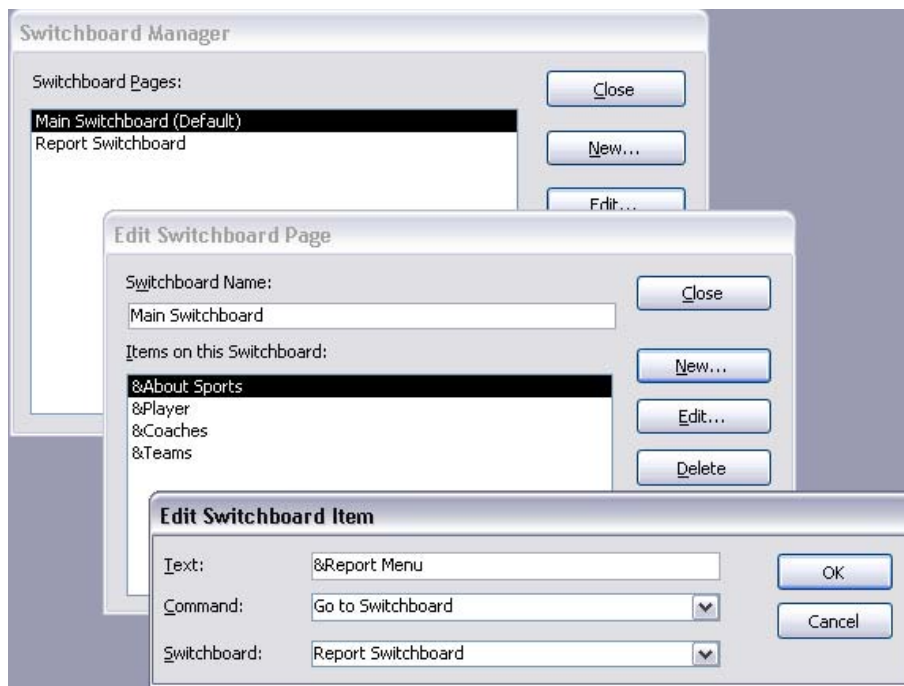
Figure 5

STEP 6: Test the Main Switchboard

➢ Click the **Restore button** in the Database window to view the objects in the database, click the **Forms button,** then double click the **Switchboard form** to open (Figure 6).

➢ Click the **Exit button** (or use the **Alt+E** shortcut).

➢ You should see an informational message similar to the one shown in the figure. (The message is displayed by the MsgBox action in the Close Database macro.)

➢ Click **OK** to accept the message. The Close Database macro then closes the database.

➢ Pull down the **File menu,** then click **Sports Objects** from the list of recently opened databases. The AutoExec macro executes automatically, maximizes the current window, and displays the main switchboard.

Figure 6

STEP 7:   Test the Report Switchboard

➤ Click the **Report Menu button** (or use the **Alt+R** keyboard shortcut) on the main switchboard to display the Report switchboard in Figure 7.

➤ Click the buttons for **Report 1**, **Report 2**.

➤ Click the **Return to Main Menu** button to exit the Report Menu and return to the main switchboard.

➤ To continue working, click the **Close button** on the title bar (or pull down the **File menu** and click the **Close command)** to close the form and continue working on this database. (You should not click the Exit command button as that would close the database.) You should be back in the Database window, where you can continue with the next hands-on exercise.

➤ To close the database, click the **Exit button** (or use the **Alt+E** shortcut).

➤ Either way, you have demonstrated the "look and feel" of the system to the extent that you can step through the various menus. Good work.

Figure 7