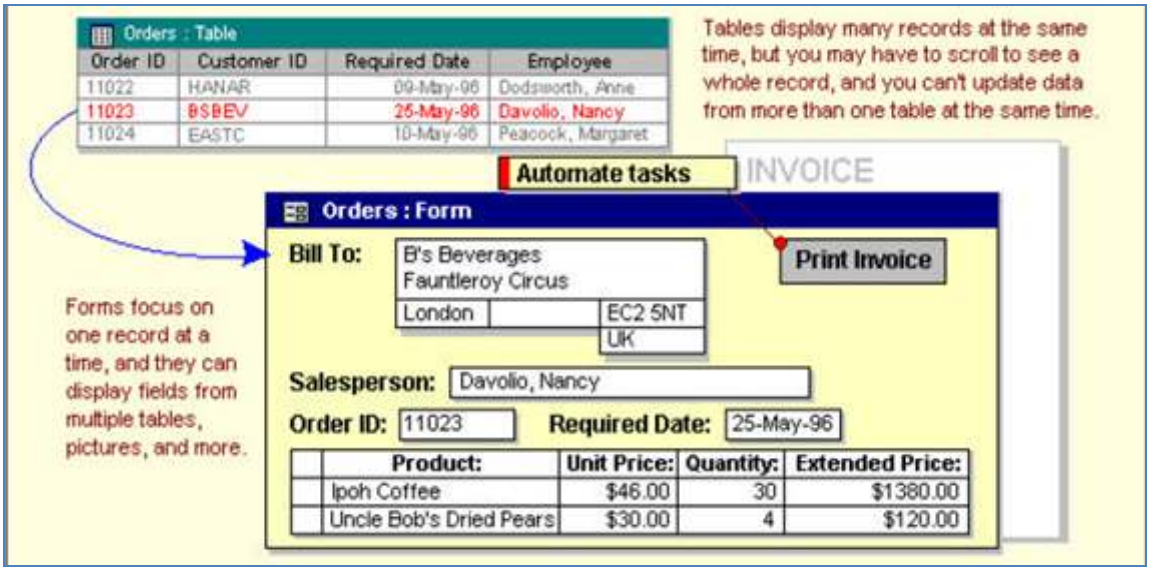
A. Form

1. Introduction

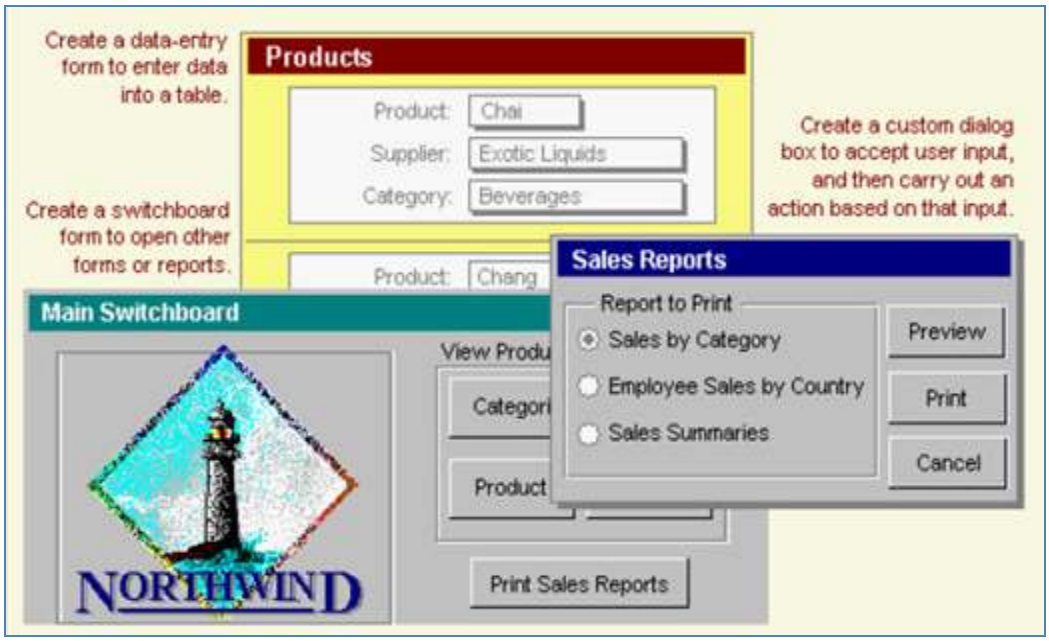
To easily view, enter, and change data directly in a table, create a form. When you open a form, Microsoft Access retrieves the data from one or more tables and displays it on screen using the layout your chose in the Form Wizard or using a layout that your created from scratch.



2. Kinds and Purposes

- **Data entry form**: To enter data into a table
- **Custom dialog box**: To accept user input and then carry out an action based on that input
- **Switchboard**: To open other forms or reports

You can use forms for a variety of purposes.

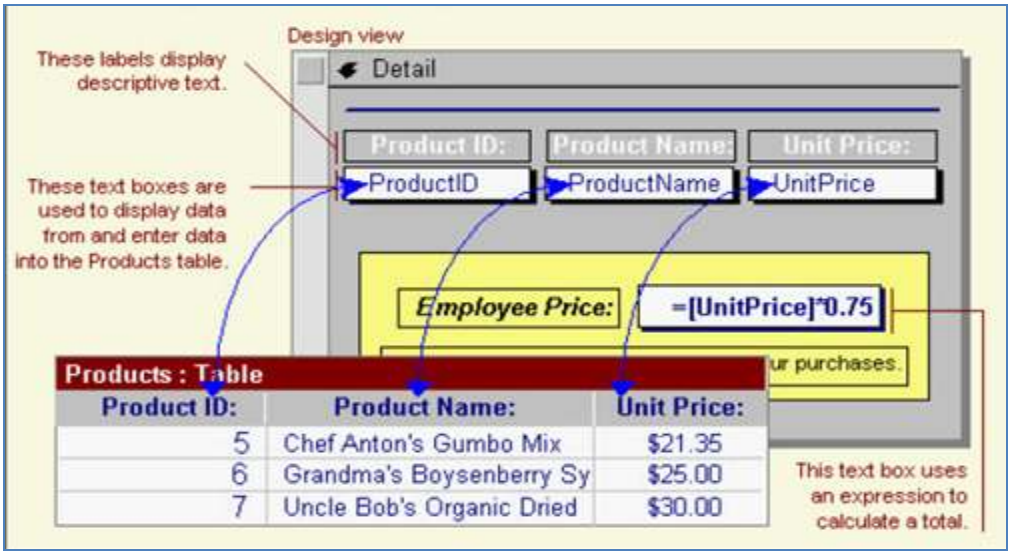


3. Information in a Form

Most of the information in a form comes from an underlying record source. Other information in the form is stored in the form's design.

4. Link between a form and its record

You create the link between a form and its record source by using graphical objects called controls. The most common type of control used to display and enter data is a text box.



5. Creating a form

You can create a form on your own or you can have Microsoft Access create your form for you using a **Form Wizard**. A Form Wizard speeds up the process of creating a form because it does all the basic work for you. When you use a Form Wizard, Microsoft Access prompts you for information and creates a form based on your answers. Even if you've created many forms, you may want to use a Form Wizard to quickly lay out all the controls on your form. Then you can switch to Design view to customize your form.

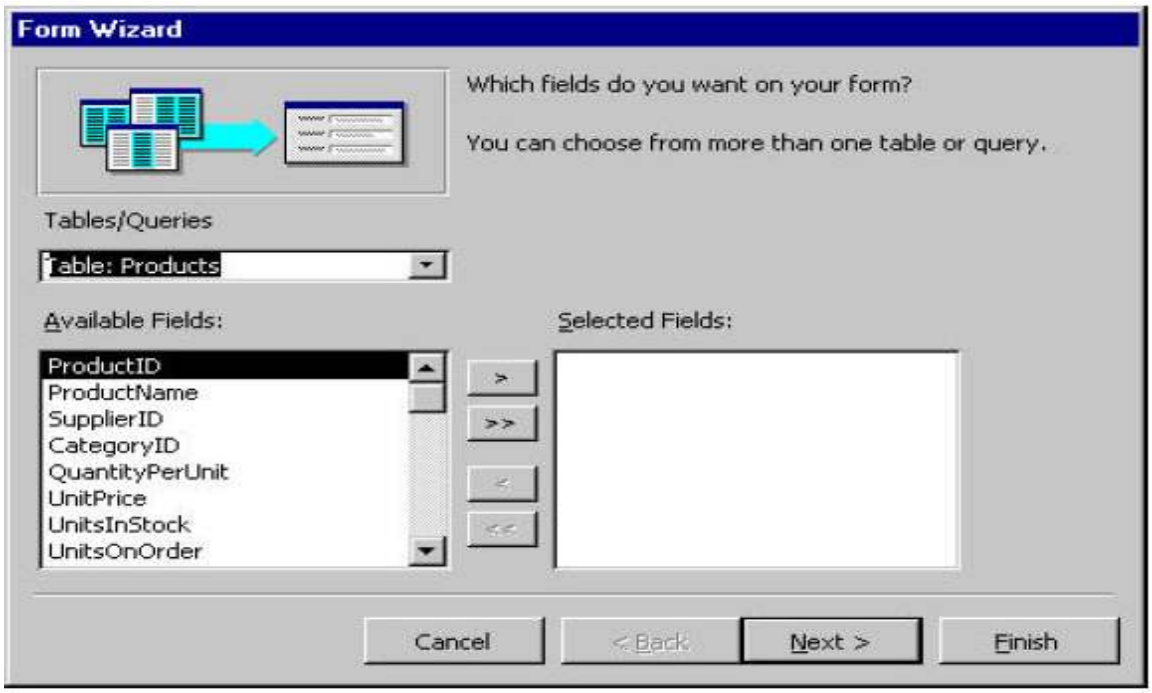


Fig. 1: Window in Form Wizard (Option 1)

Creating a form with a wizard

Option 1:

1. Choose **Forms ➔ Create form by using wizard** in database window, you will see **Fig. 1**.
2. Click on the name of the **Table** or **Query** that includes the data you want to base your form on (in the left column)
3. Then choose the Layout that you want your forms to follow. You can experiment with **Columnar**, **Tabular, Datasheet** and **Justified** to find the most suitable layout for you.
4. Next, choose the Style that you would like for your Form.
5. Give a title to your Form. You can now either go and open your form or modify the design in **Design view**.
6. Click on **Finish.**

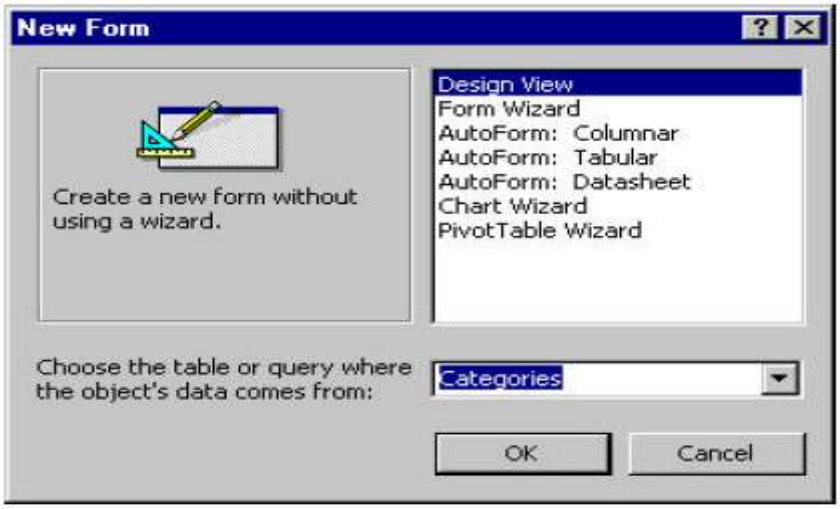


Fig. 2: New Form Dialog Box (Option 2)

Option 2:

1. Click menu **Insert** → **Form**
2. A **New Form** dialog box will pop up(**Fig. 2**) and then choose **Form Wizard**
3. Click on the name of the **Table** or **Query** that includes the data you want to base your form on (click on the list at the bottom of the dialog box)
4. Follow steps 4-6 in Option 1

Note:

1. In the dialog box shown in **Fig. 2**, if you clicked any of the three Autoform options, Microsoft Access automatically creates your form and uses the autoformat you last specified either in the Form Wizard or by using the AutoFormat command on the Format menu in Design view.
2. If the resulting form doesn't look the way you want, you can ALWAYS change it in **Design view.**

Creating a form without a wizard

1. Click menu **Insert** → **Form**, then choose Design View in **Fig. 2**.
2. Click the name of the table or query that includes the data you want to base your form on. If the form won't contain data (for example, if you want to create a form to use as a switchboard to open other forms or reports, or if you want to create a custom dialog box), don't select anything from this list. Then click **OK**.

   Note: If you want to create a form that uses data from more than one table, base your form on a query that includes the tables you want to include.

3. With this option you can TOTALLY customize and control everything you would like to have and see in your forms. Please refer to **Fig. 3**.

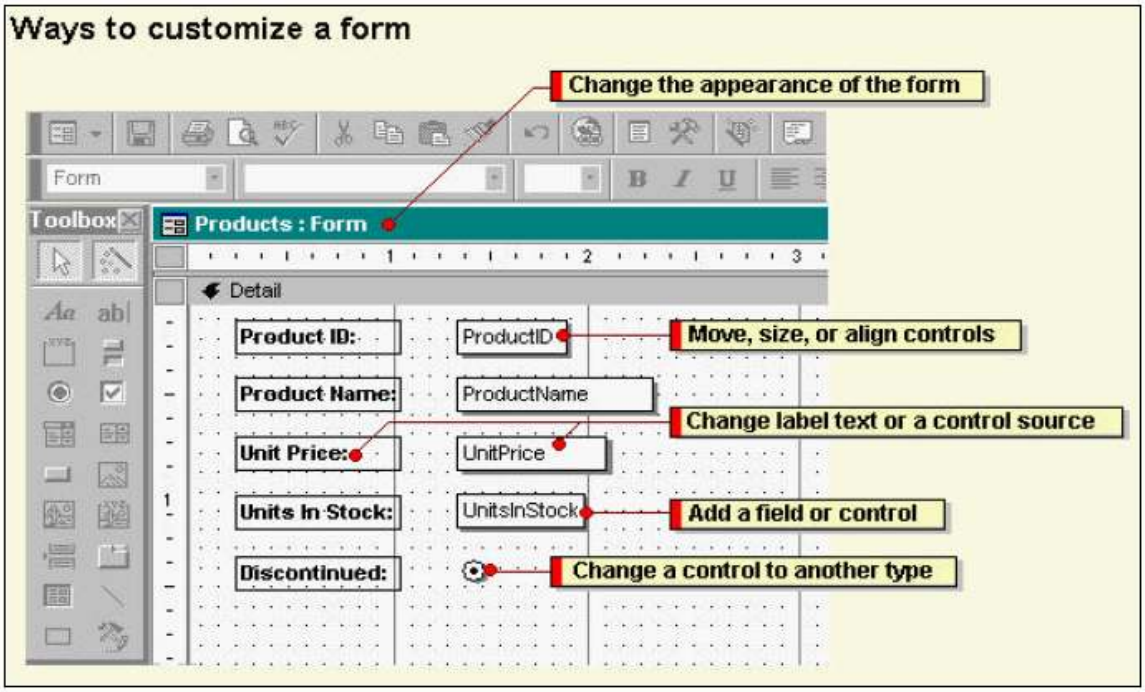


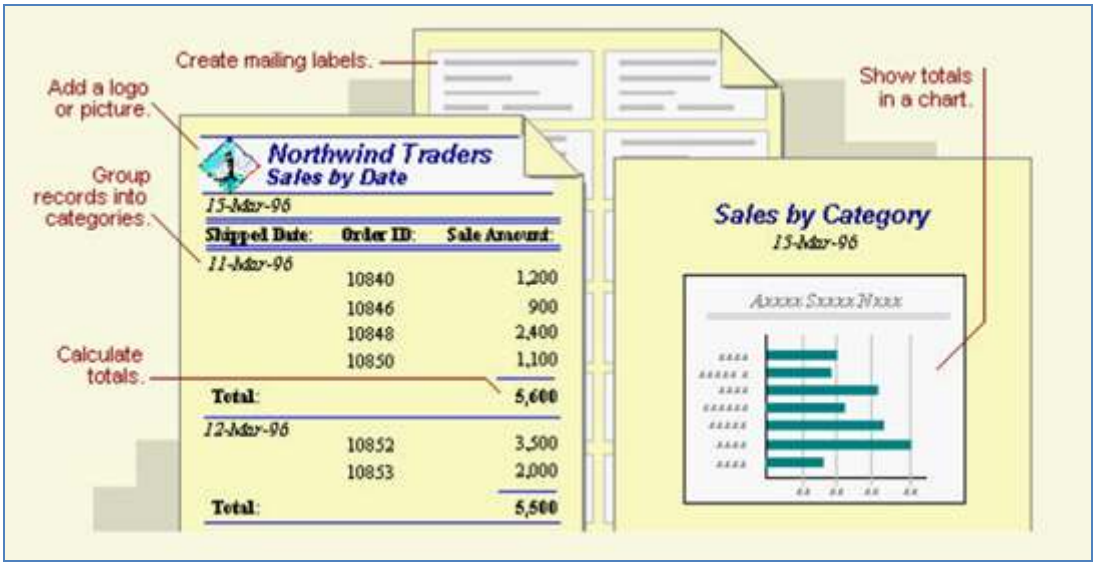
Fig. 3 Ways to Customize a Form

6. Examples: Various kinds of Forms in Northwind.mdb

B. Report

1. Introduction

A report is an effective way to present your data in a printed format. Because you have control over the size and appearance of everything on a report, you can display the information the way you want to see it.

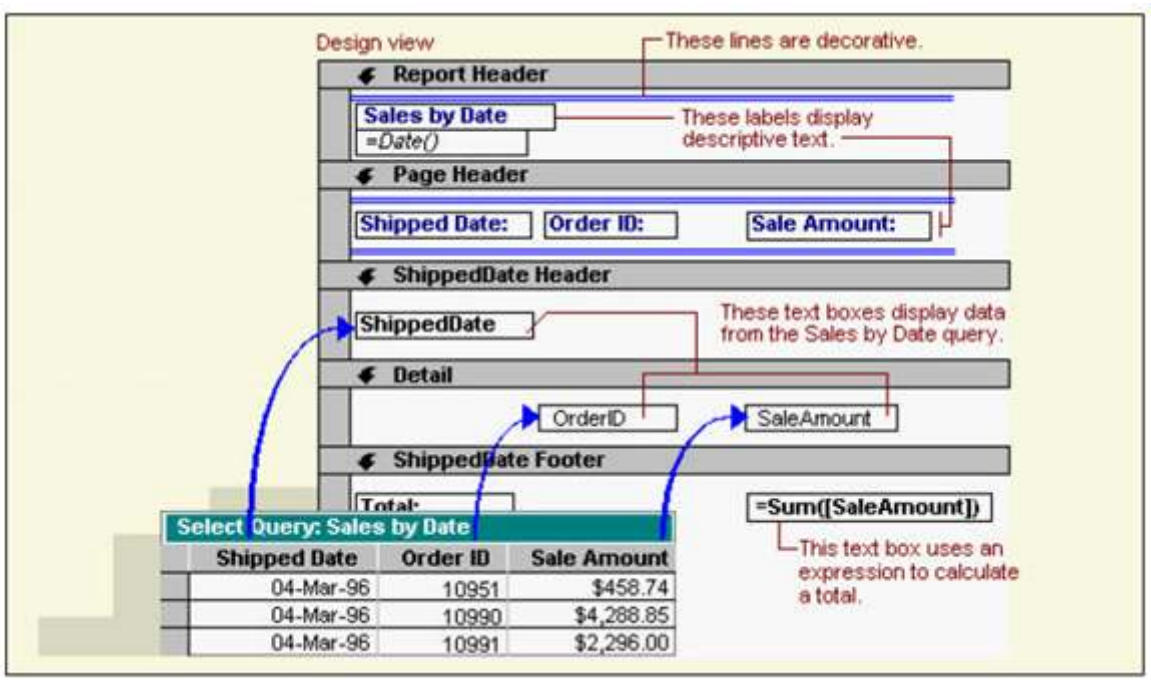


2. Information in a report

Most of the information in a report comes from an underlying table, query, or SQL statement, which is the source of the report's data. Other information in the report is stored in the report's design.

3. Link between a report and its record source

You create the link between a report and its record source by using graphical objects called controls. Controls can be text boxes that display names and numbers, labels that display titles, and decorative lines that graphically organize the data and make the report more attractive.



4. Creating a report

You can create a report on your own or you can have Microsoft Access create a report for you using a Report Wizard. A Report Wizard speeds up the process of creating a report because it does all the basic work for you. When you use a Report Wizard, it prompts you for information and creates a report based on your answers. Even if you've created many reports, you may want to use a Report Wizard to quickly lay out your report. Then you can switch to Design view to customize it.

Creating a report using AutoReport

AutoReport creates a report that displays **ALL** fields and records in the underlying table or query.

1. Click menu **Insert ➔ Report ➔ AutoReport**. You can choose columnar or tabular. Refer to **Fig. 3**.
   - AutoReport: Columnar. Each field appears on a separate line with a label to its left.
   - AutoReport: Tabular. The fields in each record appear on one line, and the labels print once at the top of each page.
2. Click the **Table** or **Query** that contains the data you want to base your report on. Click **OK** then.

Note: Microsoft Access applies the last autoformat you used to the report. If you haven't created a report with a wizard before or haven't used the AutoFormat command on the Format menu, it uses the Standard autoformat.

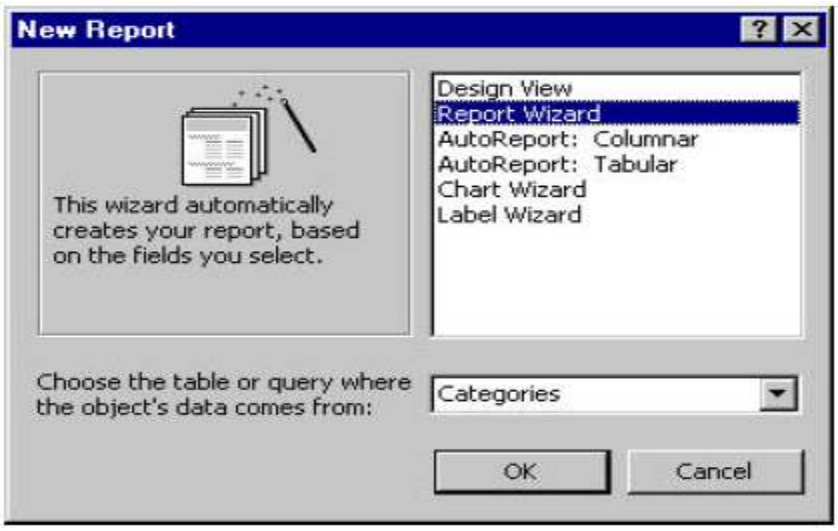


Fig. 3: New Report Dialog Box

Create a report with a wizard

1. Click menu **Insert** → **Report** → **Report Wizard** or just choose **Form** → **Create Report by Using Wizard** in database window.
2. Click the table or query that contains the data you want to base your report on. Click **OK** then.

   Note Microsoft Access uses this table or query as the default record source for the report. However, you can change the record source in the wizard and select fields from other tables and queries.

3. Follow the instructions on the screen to format and output the report the way you want it

Note: If the resulting report doesn't look the way you want, you can customize it in **Design view** as shown in **Fig. 4**.

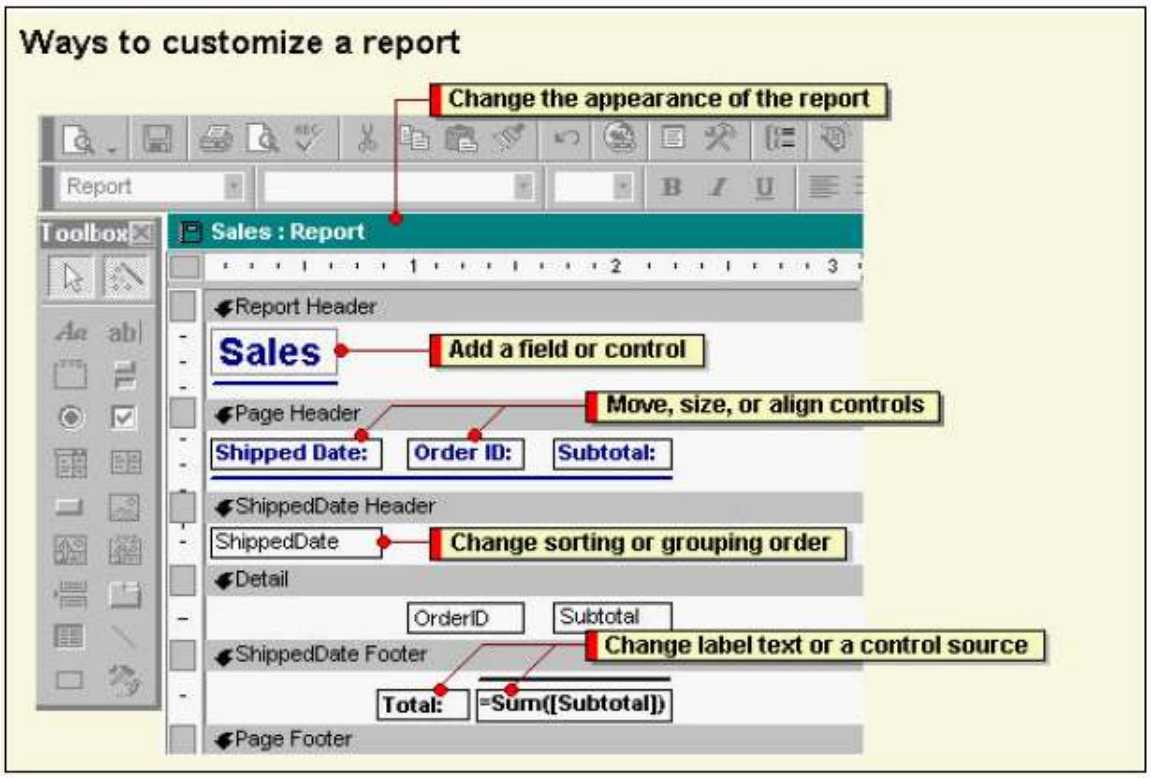


Fig. 4 Ways to Customize a Report

5. Example: Sales by Category Report in Northwind.mdb

C. Working with MS Access Forms

1. Relationship View of Northwind.mdb

As in the other sessions, we will use Northwind sample database. Reviewing **relationship view** of northwind.mdb will help you understand topics covered in this lab session.

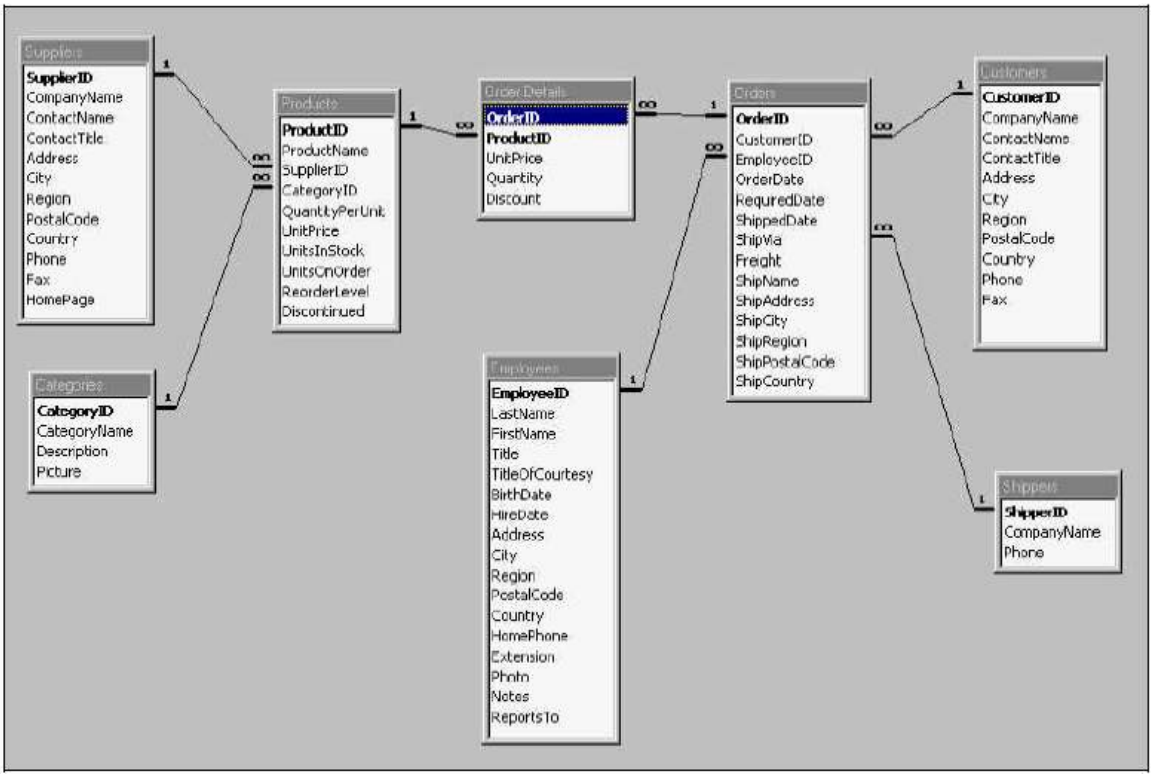


Fig. 1 Relationship View of Northwind.mdb

2. Creating Multiple-Table or Linked Forms

Using a **Form Wizard** is the simplest and fastest way to create a form that brings data together from more than one table. A **Form Wizard** speeds up the process of creating a form because it does all the basic work for you. In the first screen of a **Form Wizard**, you can pick the fields you want to include in your form. These fields can be from one table or from multiple tables.

You can use a Form Wizard to create a form that displays data from multiple tables as a "**flat form**" or as a "**hierarchical form**." An example of a flat form is a form that shows products and product suppliers (See **Fig. 2**). A **hierarchical form** is a form with one or more **subforms**. **Subforms** are useful if you want to show data from tables that have a one-to-many relationship. For example, you could have a "**Categories**" form that includes data from a "**Categories**" table and a "**Products**" table (See **Fig. 3**). You may want to present your data hierarchically without using a **subform**. For example, if you have a form with lots of controls, you may not have room for a **subform**. In this case, you can use a **Form Wizard** to create **synchronized forms** (See **Fig. 4)**. When you click a command button on one form, it opens another form that's synchronized with the record on the first form.

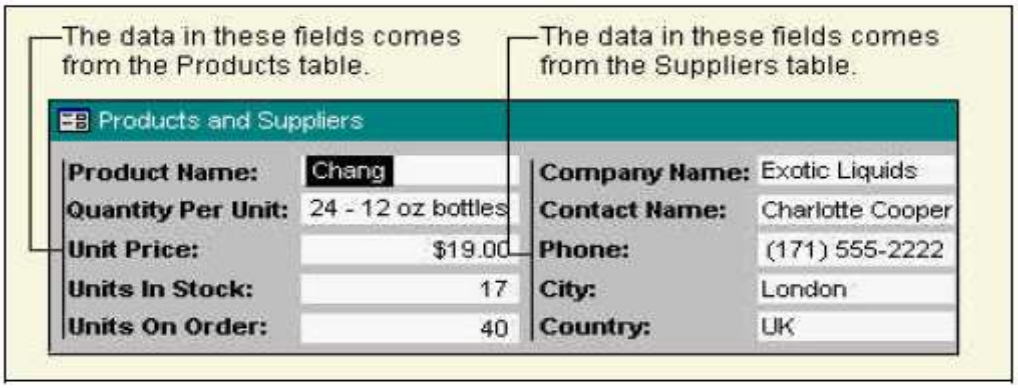


Fig. 2 Example of a multiple-table flat form

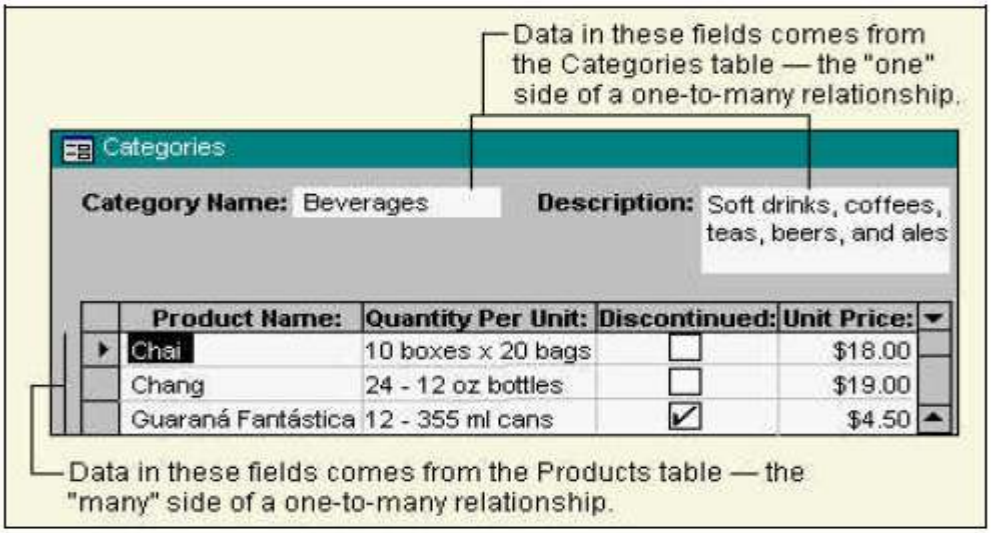


Fig. 3 Example of a multiple-table hierarchical form

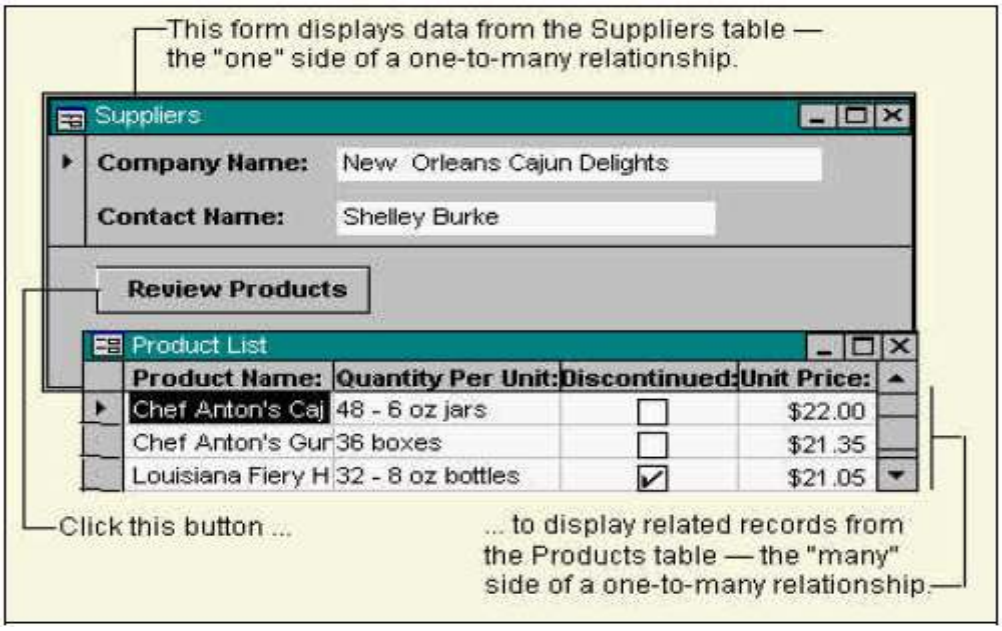


Fig. 4 Example of synchronized forms

3. Subforms

A **subform** is a form within a form. The primary form is called the **main form**, and the form within the form is called the **subform**. A **form/subform** combination is often referred to as a **hierarchical form**, a **master/detail** form, or a **parent/child** form.

Subforms are especially effective when you want to show data from tables or queries with a ***one-to-many*** relationship. For example in **Fig. 5**, you could create a form with a subform to show data from a Categories table and a "**Products**" table. The data in the "**Categories**" table is the "one" side of the relationship. The data in the "**Products**" table is the "many" side of the relationship-each category can have more than one product.

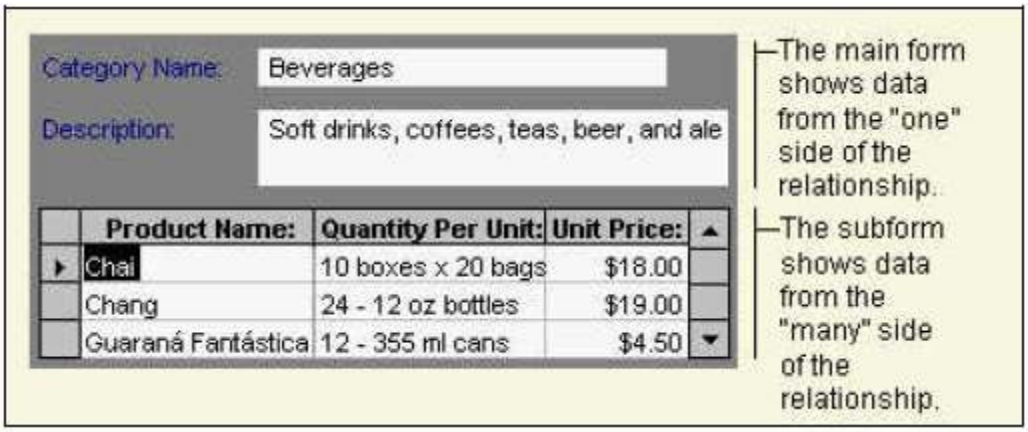


Fig. 5 Example of Form with a Subform

The main **form** and **subform** in this type of form are linked so that the **subform** displays only records that are related to the current record in the main form. For example, when the main form displays the "**Beverages**" category, the **subform** displays only the "**Products**" in the "**Beverages**" category. When you use a **form** with a **subform** to enter new records, Microsoft Access saves the current record in the main **form** when you enter the **subform**. This ensures that the records in the "many" table will have a record in the "one" table to relate to. It also automatically saves each record as you add it to the **subform**.

4. Creating a Form with a Subform

Before using this procedure, make sure you've set up your table relationships correctly.

1. In any Microsoft Access main menu, click on **Insert→Form**  .
2. In the **New Form** dialog box as shown in **Fig. 6**, double-click **Form Wizard** in the list.

Fig. 6 New Form dialog box

3. In the first wizard dialog box, select a table or query from the list. For example, to create a "**Categories"** form that displays "**Products**" for each category in a **subform**, select the "**Categories**" table (the "one" side of the one-to-many relationship).
4. Double-click the fields you want to include from this table or query.
5. In the same wizard dialog box, select another table or query from the list. Using the same example, select the "**Products**" table (the "many" side of the one-to-many relationship in the Categories form example).

   Note It doesn't matter which table or query you choose first.

6. Double-click the fields you want to include from this table or query.
7. When you click **Next**, if you set up the relationships correctly before starting the wizard, the wizard asks which table or query you want to view by. Using the same example, to create the "**Categories**" form, click **By Categories**.
8. In the same wizard dialog box, select the **Form With Subform**(s) option.
9. Follow the directions in the remaining wizard dialog boxes. When you click Finish, Microsoft Access creates two forms, one for the **main form** and **subform** control, and one for the **subform**.

5. Example of a Form with Subform : "Orders"

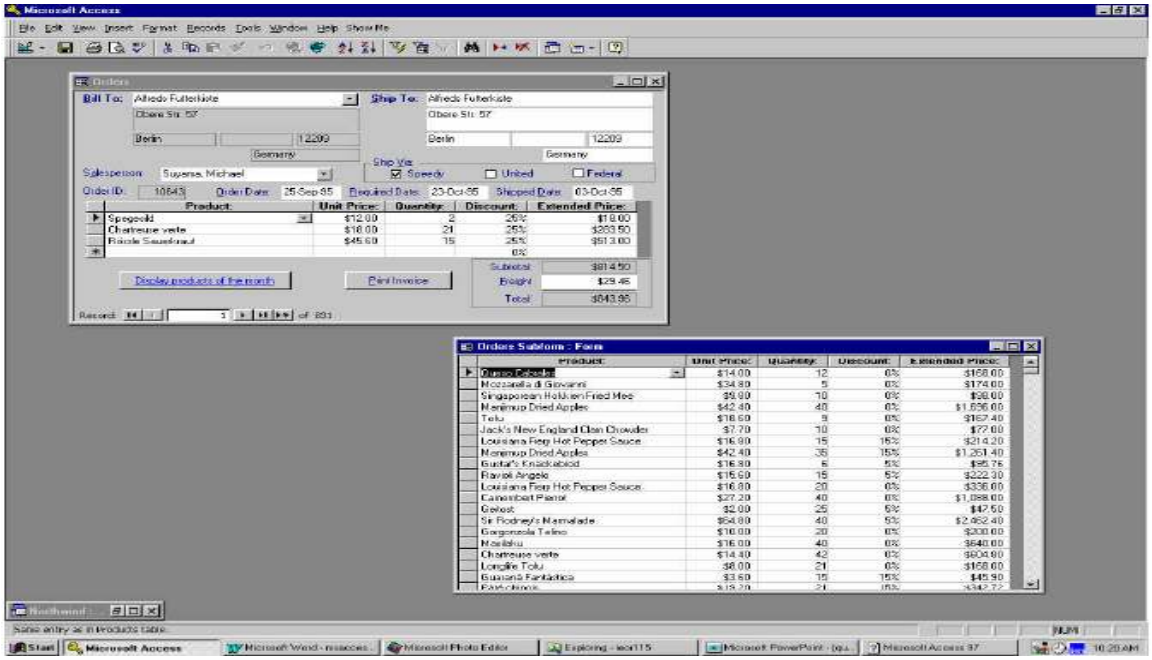


Fig. 7 "Orders" Form and Subform in Northwind Database

5.1 Overview of "Orders" Example

The "**Orders"** form is a **main form** with one **subform**. The **main form**, "**Orders**", displays order information, which you can add, edit, or delete. It is bound to "**Orders Qry**" query, a hidden query. The "**Orders**" subform displays information about the products ordered, which you can also add, edit, or delete. It is bound to the "**Order Details Extended**" query.

5.2 Orders form

The "Orders" form uses expressions in the following controls:

- The **Subtotal** text box uses an expression in the **ControlSource** property to refer to the value of the **OrderSubtotal** text box on the **Orders** subform.
- The **Total** text box uses an expression to calculate the total for the order.
- The **OrderDate** text box uses **Date** function in the **DefaultValue** property to automatically fill in today's date.

The form uses the following settings in form and control properties:

- The form's **Cycle** property is set to **Current Record** so that the focus stays on the current record in the form rather than automatically advancing to the next record. You can use the navigation buttons to switch to a different record.
- The **HyperlinkAddress** property of the **DisplayProducts** command button is set to **Products.doc**, a Microsoft Word document. The document opens in Word when you click the command button.
- The **ControlTipText** property the **CustomerID** combo box specifies a tip that is displayed for the control in Form view when the mouse pointer rests on the combo box.

The form uses event procedures in the following properties:

- The **event procedure** in the **BeforeUpdate** property of the **CustomerID** combo box displays a message if you leave the combo box without adding a value.
- The **event procedure** in the **AfterUpdate** property of the **CustomerID** combo box sets the values of the controls in the **Ship To** area of the form to the values of their corresponding controls in the **Bill To** area of the form.
- The **event procedure** in the **OnClick** property of the **PrintInvoice** command button prints the "**Invoice**" report for the current record. (specify the select query as the filtername argument of the **OpenReport** method.)

5.3 Orders Subform

- The **OrderSubtotal** text box uses the **Sum** function in an **expression** to calculate the subtotal for the order.

The form uses event procedures in the following properties:

- The **event procedure** in the **OnError** property of the form displays a message and undoes any records entered in the subform if the **BillTo** combo box on the **Orders** form doesn't have a value.
- The **event procedure** in the **AfterUpdate** property of the **ProductID** combo box fills in the **UnitPrice** value for the selected product.
- **Event procedures** in the **BeforeDelConfirm** and **BeforeUpdate** properties of the form and in the **BeforeUpdate** property of the **ProductID** combo box display a message and undo

changes if you open the subform as a standalone form and attempt to add, change, or delete records.

6. Calculating Totals and Using Expressions:

Please follow the procedure as below:

1. Open a form in **Design view** (or a report in **Design view**).
2. Click the tool in the **toolbox** for the type of **control**[1] you want to use as the **calculated control**. For further information on toolbox, please refer to **Fig. 8**.

   Note: A text box is the most common type of control to use to display a calculated value, but you can use any control that has a **ControlSource** property.

3. On the form, click where you want to place the control.

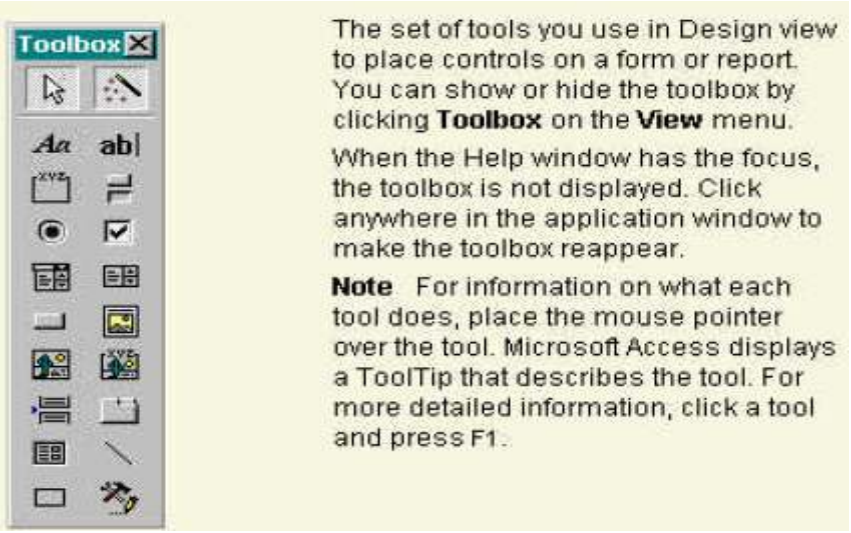
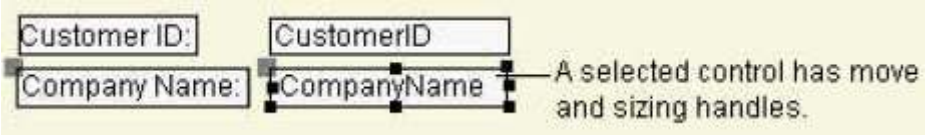


Fig. 8 Toolbox

4. Do one of the following:
   - If the control is a text box, you can type the expression directly in the control.

[1] Control is a graphical object, such as a text box ab| , a check box ☑ , a command button ▭ , or a rectangle ▭ , that you place on a form or report in Design view to display data, perform an action, or make the form or report easier to read.

- If the control isn't a text box, or if the control is a text box but you want to use the **Expression Builder** to create the expression, make sure the control is selected. To select a control, click it.



Then click **Properties** on the toolbar to open the control's property sheet, and then type the expression in the **ControlSource** property box or click the **Build** button to open the Expression Builder.

Table 1 shows some examples of performing arithmetic operations in forms and reports.

If you use this expression	Microsoft Access displays
=[Subtotal]+[Freight]	The sum of the values of the Subtotal and Freight controls.
=[RequiredDate]-[ShippedDate]	The difference between the values of the RequiredDate and ShippedDate controls.
=[Price]*1.06	The product of the value of the Price control and 1.06 (adds 6 percent to the Price value).
=[Quantity]*[Price]	The product of the values of the Quantity and Price controls.
=[EmployeeTotal]/[CountryTotal]	The quotient of the values of the EmployeeTotal and CountryTotal controls.

Table 1 Example of Expressions

7. Creating a pop-up form or custom dialog box

You can create a pop-up form to display information to a user or to prompt a user for data. A pop-up form stays on top of other open forms, even when another form is active. A pop-up form can be modeless or modal. When a pop-up form is modeless, you can access other objects and menu commands while the form is open. For example, on an "**Orders**" form, you could add a command button that displays a "**Products**" pop-up form. The pop-up form displays information about a product in the "**Orders**" form. Go back to **Fig. 4** for the example of pop-up form.

Create a pop-up form

1. Create the form. The form can include any combination of controls.
2. In form **Design view**, double-click the ***form selector*** to open the property sheet for the form.

   The form selector as shown in **Fig. 9** is the box where the rulers meet in form Design view. Click this box to select the form. Double-click this box to open the form's property sheet.

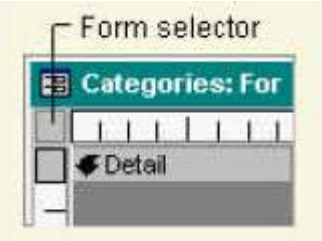


Fig. 9 Form Selector

3. In the **PopUp** property box (under **Other** tab or **All** tab), click **Yes**.
4. In the **BorderStyle** property box (under **Format** tab or **All** tab), click **Thin** if you don't want the form to be sizable; otherwise, skip to the next step. If you select the **Thin** setting, you can move the pop-up form, but you can't size it.
5. Create a **macro**[2] or **event procedure**[3] that opens the form.

   Note: To see an example of an event procedure that displays a modeless pop-up form, go to the form **Suppliers** in Northwind database, open the **properties** of the command button **Review Products**, and then click the **Build** button  next to the **OnClick** property box. Refer to **Fig. 10**.

6. Attach the macro or event procedure to a form or report by specifying the macro name or event procedure as the setting for the appropriate event property. For example, type the name of the macro or event procedure in the **OnClick** property box of a command button.

8. Switch Board Forms

When you use the Database Wizard to create a database, Microsoft Access automatically creates a switchboard that helps you to navigate around the database. This switchboard has buttons that you can click to open forms and reports (or open other switchboards that open additional forms and reports), quit Microsoft Access, or customize the switchboard. See **Fig. 11** for an example. You can create a switchboard similar to the one that the Database Wizard creates by using the Switchboard Manager.

Create a switchboard form by using the Switchboard Manager

When you use the Database Wizard to create a database, the wizard creates a switchboard that makes it easy to navigate between the forms and reports in your database. If you want to build the same type of switchboard for a database you created yourself, you can use the Switchboard Manager.

1. On the **Tools** menu, point to **Add-ins**, and then click **Switchboard Manager**.

[2] Macro is an action or a set of actions you can use to automate tasks.

[3] Event procedure is a procedure automatically executed in response to an event initiated by the user or program code, or triggered by the system.

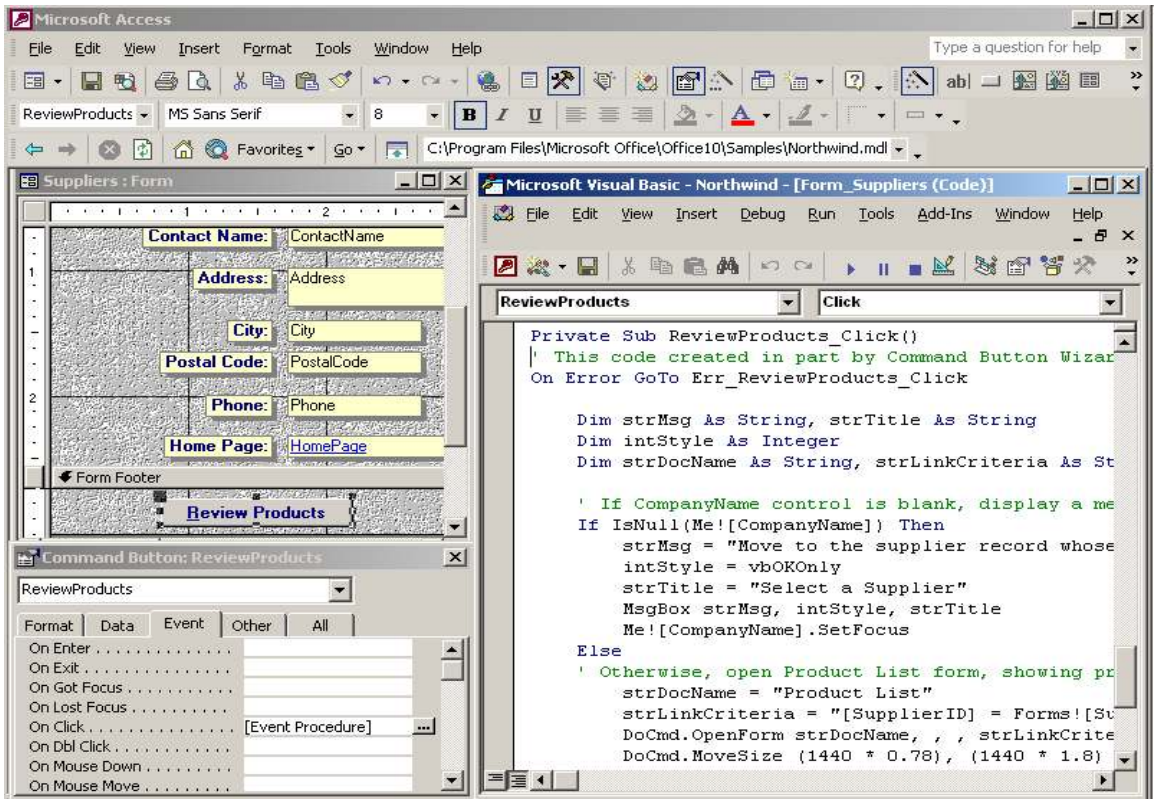


Fig. 10 Popup Event Procedure Example in Northwind

2. If Microsoft Access asks if you'd like to create a switchboard, click **Yes**.
3. In the **Switchboard Manager** dialog box, click **Edit**.
4. In the **Edit Switchboard Page** dialog box, type a name for the switchboard in the **Switchboard Name** box, and then click **New**.
5. In the **Edit Switchboard** Item dialog box, type the text for the first switchboard button in the **Text box**, and then click a command in the **Command** box. For example, type **Review Products** in the **Text** box, and then click **Open Form In Edit Mode** in the Command box.
6. Depending on which command you click, Microsoft Access displays another box below the **Command** box. Click an item in this box, if necessary. For example, if you clicked **Open Form In Edit Mode** in the **Command** box in step 5, click the name of the form you want to open in the **Form** box, such as **Review Products**, and then click **OK**.
7. Repeat steps 4 through 6 until you've added all the items to the switchboard. If you want to edit or delete an item, click the item in the **Items On This Switchboard** box, and then click **Edit** or **Delete**. If you want to rearrange items, click the item in the box, and then click **Move Up** or **Move Down**. Click **Close** then.

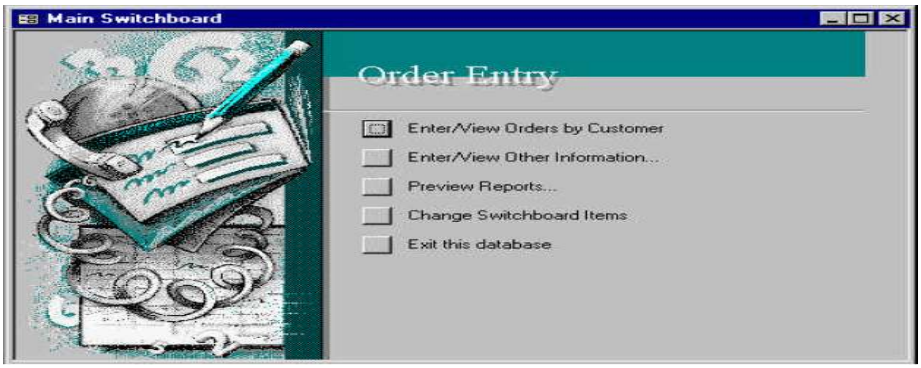
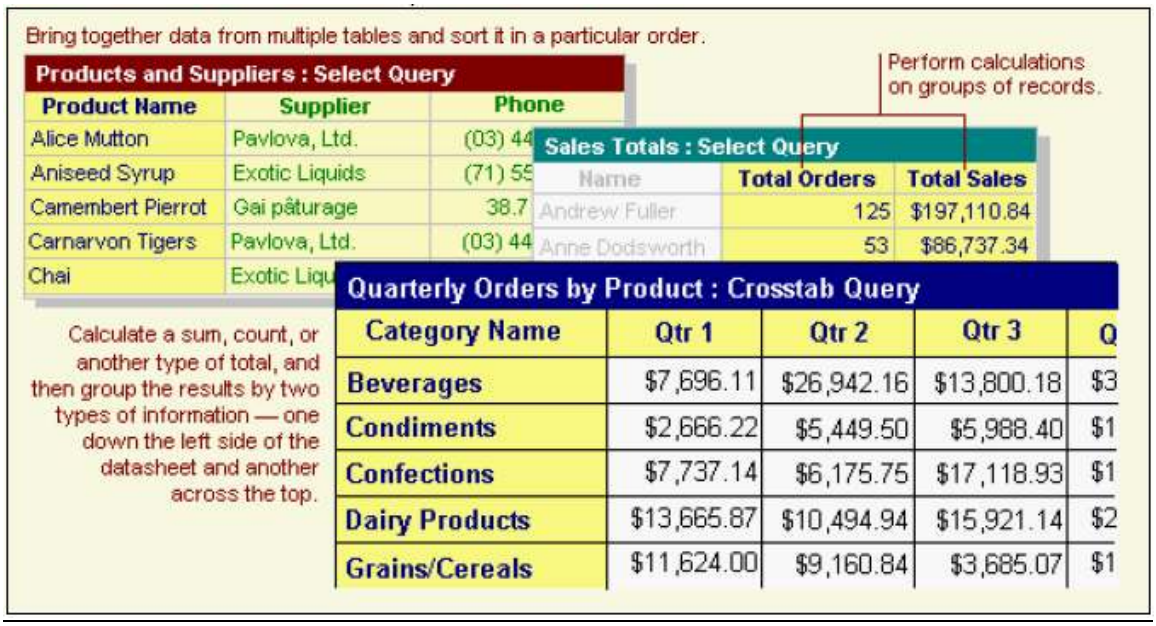


Fig. 11: Example of Switch Board Form

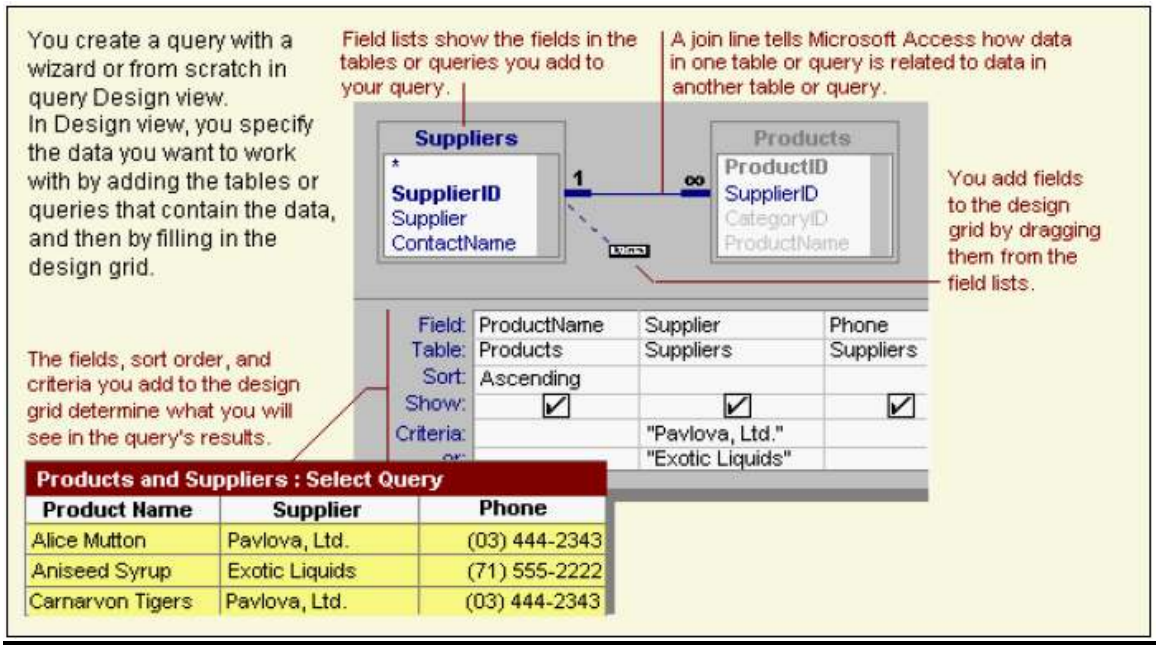
D. MS Access Queries and SQL

1. Introduction to Query

You use queries to view, change, and analyze data in different ways. You can also use them as the source of records for forms and reports.

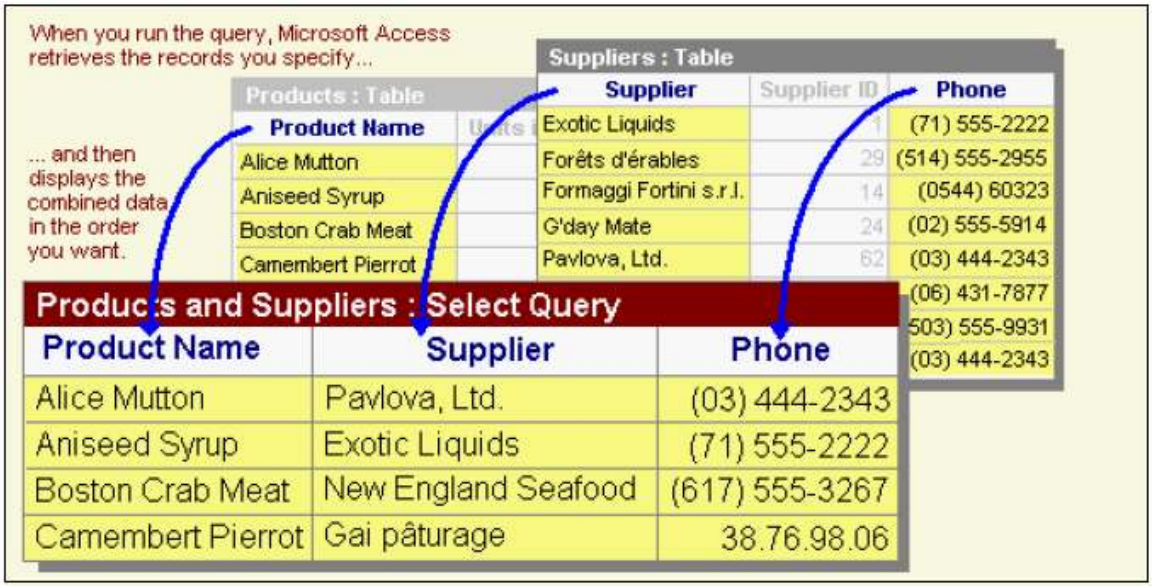


1.1 Creating a Query



1.2 The Select Query

The most common type of query is a select query. A select query retrieves data from one or more tables using criteria you specify, and then displays it in the order you want.



2. Creating Select Queries

2.1 Creating a Select Query with a Wizard

The Simple Select Query Wizard creates queries that retrieve data from the fields you specify in one or more tables or queries. If you want, the Wizard can also sum, count, and average values for groups of records or all records, and it can calculate the minimum or maximum value in a field. However, you can't limit the records it retrieves by setting criteria.

1. In the Database window, click **Queries→Create Query by using Wizard**.
2. In the **Simple Query Wizard** window shown in **Fig.1**, click the name of the table or query you want to base your query on, and then select the fields whose data you want to retrieve.
3. Click an additional table or query if desired, and then select the fields you want to use from it. Repeat this step until you have all the fields you need.
4. Follow the directions in the wizard dialog boxes. In the last dialog box, you can choose either to run the query or to see the query's structure in **Design View**.

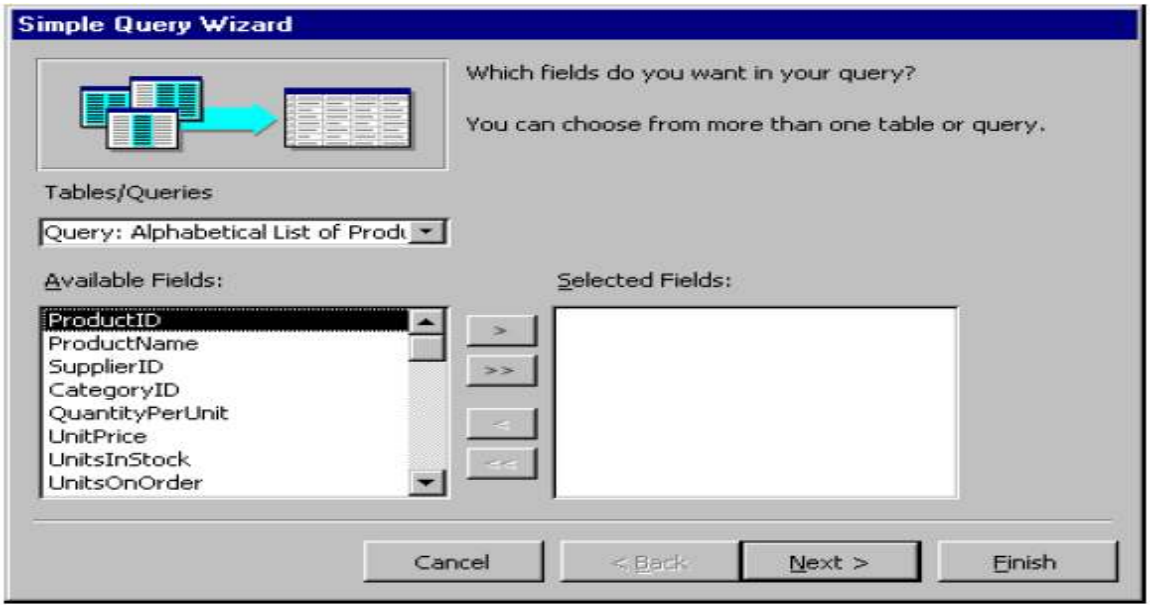


Fig. 1 Simple Query Wizard Window

Note:

If the resulting query isn't exactly what you want, you can rerun the wizard or change the query in **Design view**, which is a window where you can design queries as shown in **Fig. 2**. To open a query in Design view, go to the Database window, click on **Queries**, right-click the query you want to open, and then click **Design View**. If the query is already open, you can switch to Design view by clicking **View**  on the toolbar.

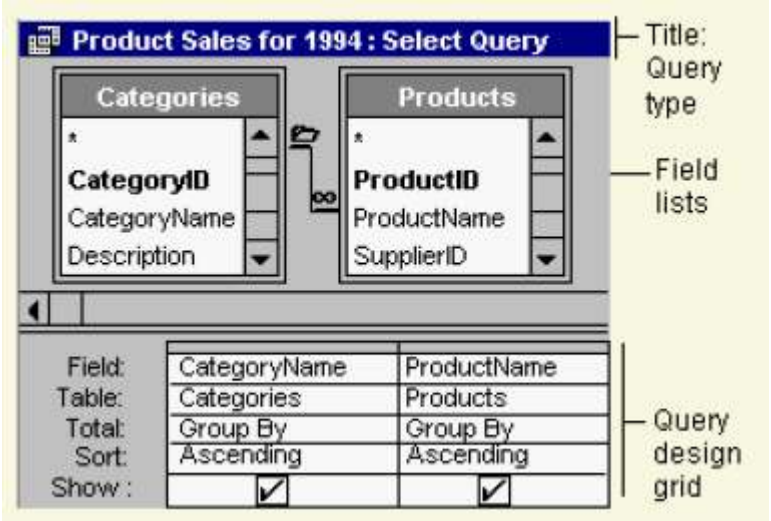


Fig. 2 Query Design View

2.2 Creating a Select Query in Design View

1. In the Database window, **click on Queries→Create Query in Design View**.
2. In the **Show Table** dialog box, click the tab that lists the objects whose data you want to work with.
3. Double-click the name of each object you want to add to the query, and then click Close.
4. If you have multiple tables or queries in the query, make sure they are connected to each other with a join line so that Microsoft Access knows how the information is related.
5. Add fields to the query by dragging the field names from the field list to the design grid.
6. Refine your query by entering criteria, adding a sort order, creating calculated fields, computing the sum, average, count, or another type of total on the data it retrieves, or otherwise modifying the query's design.
7. To save the query, click **Save** on the toolbar. Enter a name that follows Microsoft Access object-naming rules, and then click **OK**.
8. To see the results of the query, click **View**  on the toolbar.

3. Creating Queries of Multiple Tables

The power of queries lies in being able to bring together or perform an action on data from more than one table or query.

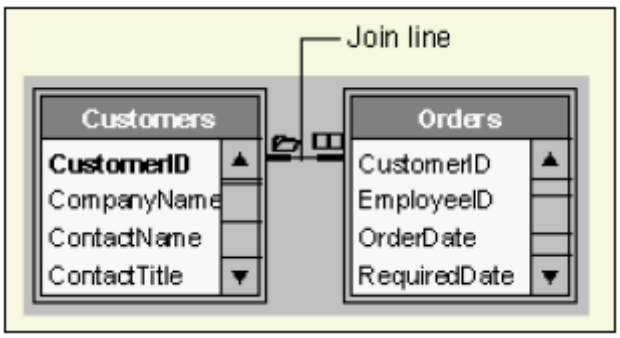
Example: You might want to view a customer's information with the orders the customer placed. To see this information, you need data from the Customers and Orders tables. When you add more than one table or query to a query, you need to make sure their field lists are joined to each other with a join line as shown in **Fig. 3** so that Microsoft Access knows how to connect the information.

Note:

- If tables in a query aren't joined to one another, either directly or indirectly, Microsoft Access doesn't know which records are associated with which, so it displays every combination of records (called a "**cross-product**" or "**Cartesian product**") between the two tables. Therefore, if each table had 100 records in it, the query results will contain 10,000 records (100X100)! It also means the query might take a long time to run and ultimately might produce less meaningful results.
- If you previously created relationships between tables in the **Relationships** view window, Microsoft Access automatically displays join lines when you add related tables in query **Design view**. If **referential integrity**[4] is enforced, Microsoft Access also displays a "1" above the join line to show which table is on the "one" side of a one-to-many relationship and an infinity symbol ∞ to show which table is on the "many" side.
- Even if you haven't created relationships, Microsoft Access automatically creates a join if you add two tables to a query and the tables each have a field with the same or compatible data type and if one of the join fields is a primary key. The "one" and "many" symbols are not displayed in this case, because referential integrity is not enforced.
- Sometimes the tables you add to the query don't include any fields that can be joined. In this situation, you have to add one or more extra tables or queries to serve solely as a bridge between the tables whose data you want to use.

  Example: If you add the Customers and Order Details tables to a query as in **Fig. 4**, they won't have a join line between them because they don't have any fields that can be joined. But the Orders table is related to both tables, so you can include the Orders table in your query to provide a connection between the other two.

- Once tables and queries are joined, and you've added fields from both tables/queries to the **design grid**[5] as shown in **Fig. 2** in query Design view, the default join tells the query to check for matching values in the join fields. This is called an **inner join** in database terminology. When it finds matches, it combines those two records and displays them as one record in the query results. If one table or query doesn't have a matching record in the other table or query, neither record appears in the query results.



[4] Referential integrity: rules that you follow to preserve the defined relationships between tables when you enter or delete records. If you enforce referential integrity, Microsoft Access prevents you from adding records to a related table when there is no associated record in the primary table, changing values in the primary table that would result in orphan records in a related table, and deleting records from the primary table when there are matching related records in a related table.

[5] Design grid: the grid that you use to design a query or filter in query Design view or in the Advanced Filter/Sort window. For queries, the grid was formerly known as the QBE grid.

Fig. 3 Join Line in Query Design View

Fig. 4 Example

For a sample of query in Northwind sample database, please see **Fig. 5**.

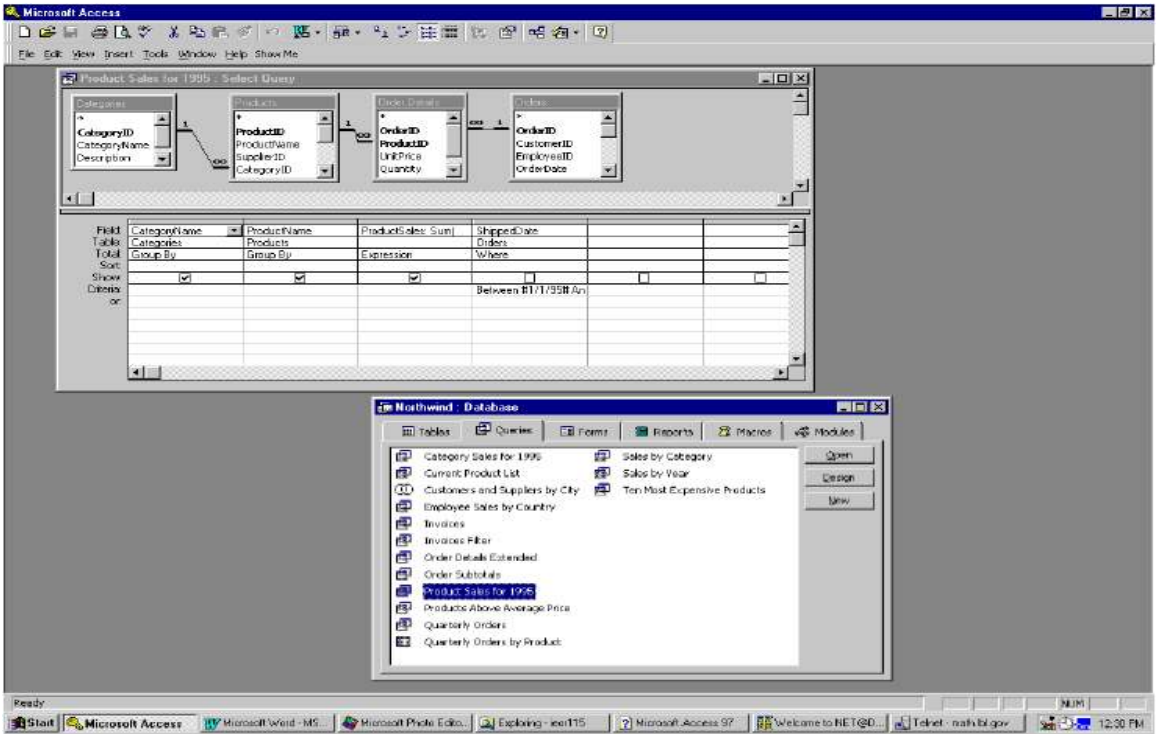


Fig. 5 Sample Query in Northwind Database

4. Creating a Calculation Query

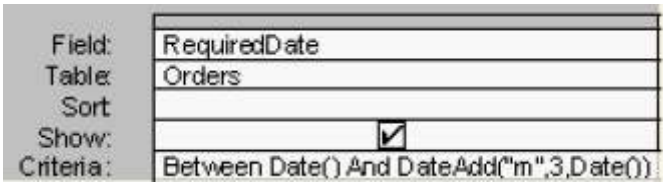
There are many types of calculations you can perform in a query. For example, you can calculate the sum or average of the values in one field, multiply the values in two fields, or calculate the date three months from the current date.

You can perform calculations in a query with either ***predefined calculation*** (called **totals**) that Microsoft Access provides or ***custom calculations*** you define.

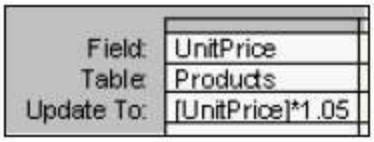
Note:

- When you display the results of a calculation in a field, the results aren't actually stored in the underlying table. Instead, Microsoft Access reruns the calculation each time you run the query so that the results are always based on the most current data in the database. Therefore, you **can not** manually update the calculated results.

- You don't have to display the results of a calculation in a field, however. Instead, you can use them as criteria to determine the records the query selects or to determine which records to perform an action on. For example, you can specify the following expression in the Criteria row to tell the query to return only records that have values in the RequiredDate field that are between today's date and three months from today's date.



- You can also use a calculation to update data from an update query. For example, you can enter the following expression in the "**Update To"** cell to increase all the values in the **UnitPrice** field by 5 percent.



Predefined Calculations

Predefined calculations, called **totals** or aggregate funcitons, can be used to compute the following amounts for groups of records or for all the records combined in the query: sum, average, count, minimum, maximum, standard deviation, or variance with functions **Sum, Avg, Count, Min, Max, StDev**(standard deviation), and **Var**. You can choose one type of calculation for each field.

Calculations on all records

CountOfOrderID	SumOfExtendedPrice
2820	4835407.19

Calculations on groups of records

Category Name	CountOfProductID
Beverages	12
Condiments	12

- You can calculate some types of **totals** using the **Simple Query Wizard**. Or, you can calculate all types of totals using the **Total** row in the query design grid of the query design view by selecting the aggregate function for the calculation you want to perform on a field.
- In the query design grid, you can also specify criteria to limit the groups before performing calculations on those groups, limit the results after the calculations on groups are performed, and limit the records before they are grouped and before calculations are performed.

Calculate a sum, average, count, or other total on groups of records in a query

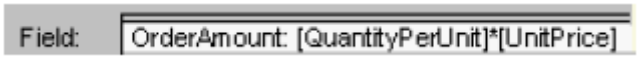
1. Create a select query in Design view. Add the tables whose records you want to use in the calculation, and then add the fields on which you want to perform calculations, define groupings, and specify criteria.
2. Click **Totals**  on the toolbar. Microsoft Access then displays the **Total** row in the query design grid.

3. For each field you want to calculate, click its cell in the **Total** row, and then click one of the following aggregate functions: Sum, Avg, Min, Max, Count, StDev, or Var. For the field or fields you want to group on, leave **Group By** in the **Total** cell.
4. If you want, you can enter criteria to affect the results of the calculation or sort the results.
5. Click **View**  on the toolbar to view the results.

Custom Calculations

A ***custom calculation*** enables you to perform numeric, date, and text calculations on each record using data from one or more fields. For example, with a custom calculation, you can multiply one field's values by a set amount, find the difference between two dates stored in separate fields, combine several values in a Text field, or create sub-queries. Using the options in the **Total** row in the design grid, you can perform the calculation on groups of records and calculate a sum, average, count, or other type of total on the calculated field. To use total option, click Totals  on the tool bar.

- For ***custom calculations***, you need to create a new calculated field directly in the design grid. You create a calculated field by entering an expression into an empty **Field cell** in the query design grid. For example,



- The expression can be made up of multiple calculations for example, **Sum([UnitsInStock]+[UnitsOnOrder])** . You can also specify criteria for a calculated field to affect the results of the calculation.

Aggregate Functions

Table 1 lists all the aggregate functions you can use on **Total** row in the query design grid.

Select	To find the	Use with these field data types
Sum	Total of the values in a field.	Number, Date/Time, Currency, and AutoNumber
Avg	Average of the values in a field.	Number, Date/Time, Currency, and AutoNumber
Min	Lowest value in a field.	Text, Number, Date/Time, Currency, and AutoNumber
Max	Highest value in a field.	Text, Number, Date/Time, Currency, and AutoNumber
Count	Number of values in a field, not counting Null (blank) values.	Text, Memo, Number, Date/Time, Currency, AutoNumber, Yes/No, and OLE Object
StDev	Standard deviation of the values in a field.	Number, Date/Time, Currency, and AutoNumber
Var	Variance of the values in a field.	Number, Date/Time, Currency, and AutoNumber

Table 1 Aggregate Functions

5. Writing Queries in SQL view:

MS Access allows you to write queried directly into SQL statements. When you are in the design view of a query, click menu **View** and select **SQL View**. Here you can directly type SQL statements. There may be a couple of reasons why you would want to do so. You may be very proficient with SQL, in which case the design view is not necessary. And sometimes it is more convenient to use design view

to create the basic part of a query and then go to SQL view and manipulate it there to come up with the required query.

An introductory tutorial on SQL can be found on sqlcourse2.com, which also provides you with the ability to practice what you learn on-line with immediate feedback. You will receive immediate results on a web page after submitting your SQL Commands.