

MS Access Lab 5

Topic: Query

Summary

- Introduction to Query
- Creating **Select** Queries
- Creating Queries of **Multiple Tables**
- Creating **Calculation** Queries

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.

Bring together data from multiple tables and sort it in a particular order.

Perform calculations on groups of records.

Calculate a sum, count, or another type of total, and then group the results by two types of information — one down the left side of the datasheet and another across the top.

Products and Suppliers : Select Query		
Product Name	Supplier	Phone
Alice Mutton	Pavlova, Ltd.	(03) 44
Aniseed Syrup	Exotic Liquids	(71) 55
Camembert Pierrot	Gai pâturage	38.7
Carnarvon Tigers	Pavlova, Ltd.	(03) 44
Chai	Exotic Liquids	

Sales Totals : Select Query		
Name	Total Orders	Total Sales
Andrew Fuller	125	\$197,110.84
Anne Dodsworth	53	\$86,737.34

Quarterly Orders by Product : Crosstab Query				
Category Name	Qtr 1	Qtr 2	Qtr 3	Q
Beverages	\$7,696.11	\$26,942.16	\$13,800.18	\$3
Condiments	\$2,666.22	\$5,449.50	\$5,988.40	\$1
Confections	\$7,737.14	\$6,175.75	\$17,118.93	\$1
Dairy Products	\$13,665.87	\$10,494.94	\$15,921.14	\$2
Grains/Cereals	\$11,624.00	\$9,160.84	\$3,685.07	\$1

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.

When you run the query, Microsoft Access retrieves the records you specify...

... and then displays the combined data in the order you want.

Products : Table		Suppliers : Table		
Product Name	Units in Stock	Supplier	Supplier ID	Phone
Alice Mutton		Exotic Liquids	1	(71) 555-2222
Aniseed Syrup		Forêts d'érables	29	(514) 555-2955
Boston Crab Meat		Formaggi Fortini s.r.l.	14	(0544) 60323
Camembert Pierrot		G'day Mate	24	(02) 555-5914
		Pavlova, Ltd.	62	(03) 444-2343
				(06) 431-7877
				503) 555-9931
				(03) 444-2343

Products and Suppliers : Select Query		
Product Name	Supplier	Phone
Alice Mutton	Pavlova, Ltd.	(03) 444-2343
Aniseed Syrup	Exotic Liquids	(71) 555-2222
Boston Crab Meat	New England Seafood	(617) 555-3267
Camembert Pierrot	Gai pâturage	38.76.98.06

Creating a Query

You create a query with a wizard or from scratch in query Design view. In Design view, you specify the data you want to work with by adding the tables or queries that contain the data, and then by filling in the design grid.

Field lists show the fields in the tables or queries you add to your query.

A join line tells Microsoft Access how data in one table or query is related to data in another table or query.

You add fields to the design grid by dragging them from the field lists.

The fields, sort order, and criteria you add to the design grid determine what you will see in the query's results.

Field:	ProductName	Supplier	Phone
Table:	Products	Suppliers	Suppliers
Sort:	Ascending		
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:		"Pavlova, Ltd."	"Exotic Liquids"

Products and Suppliers : Select Query		
Product Name	Supplier	Phone
Alice Mutton	Pavlova, Ltd.	(03) 444-2343
Aniseed Syrup	Exotic Liquids	(71) 555-2222
Carnarvon Tigers	Pavlova, Ltd.	(03) 444-2343

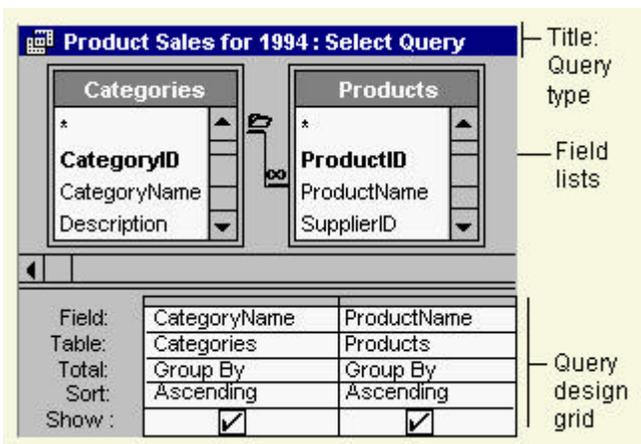
Creating a Select Query with a Wizard

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. You can't limit the records it retrieves by setting criteria, however.

1. In the Database window, Go to **Objects** → **Queries** → **Create Query by using Wizard**
2. In the **Simple Query Wizard** window (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**¹.

Note: If the resulting query isn't exactly what you want, you can rerun the wizard or change the query in Design view.

¹ Design view -Queries
A window in which you design queries.



To open a query in Design view, go to the Database window, click on **Objects** → **Queries**, click the query you want to open, and then click Design.

If the query is already open, you can switch to Design view by clicking View  on the toolbar.

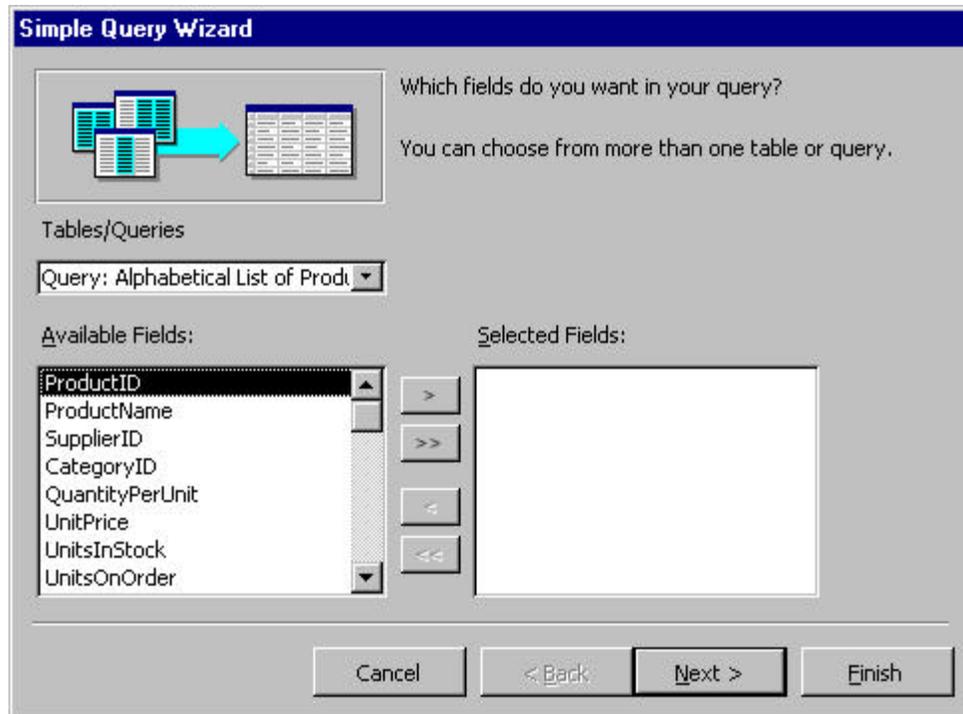


Fig. 1 : Simple Query Wizard window

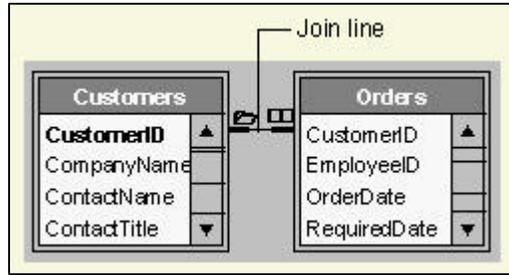
Creating a Select Query with Design View

1. In the Database window, Click on **Object** → **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.

Ways to bring together data from multiple tables/queries in a query

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 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's 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** window, Microsoft Access automatically displays join lines when you add related tables in query **Design view**. If **referential integrity**² 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, 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.



² 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.

Once tables and queries are joined, and you've added fields from both tables/queries to the design grid³ 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's results. If one table or query doesn't have a matching record in the other table or query, neither record appears in the query's results.

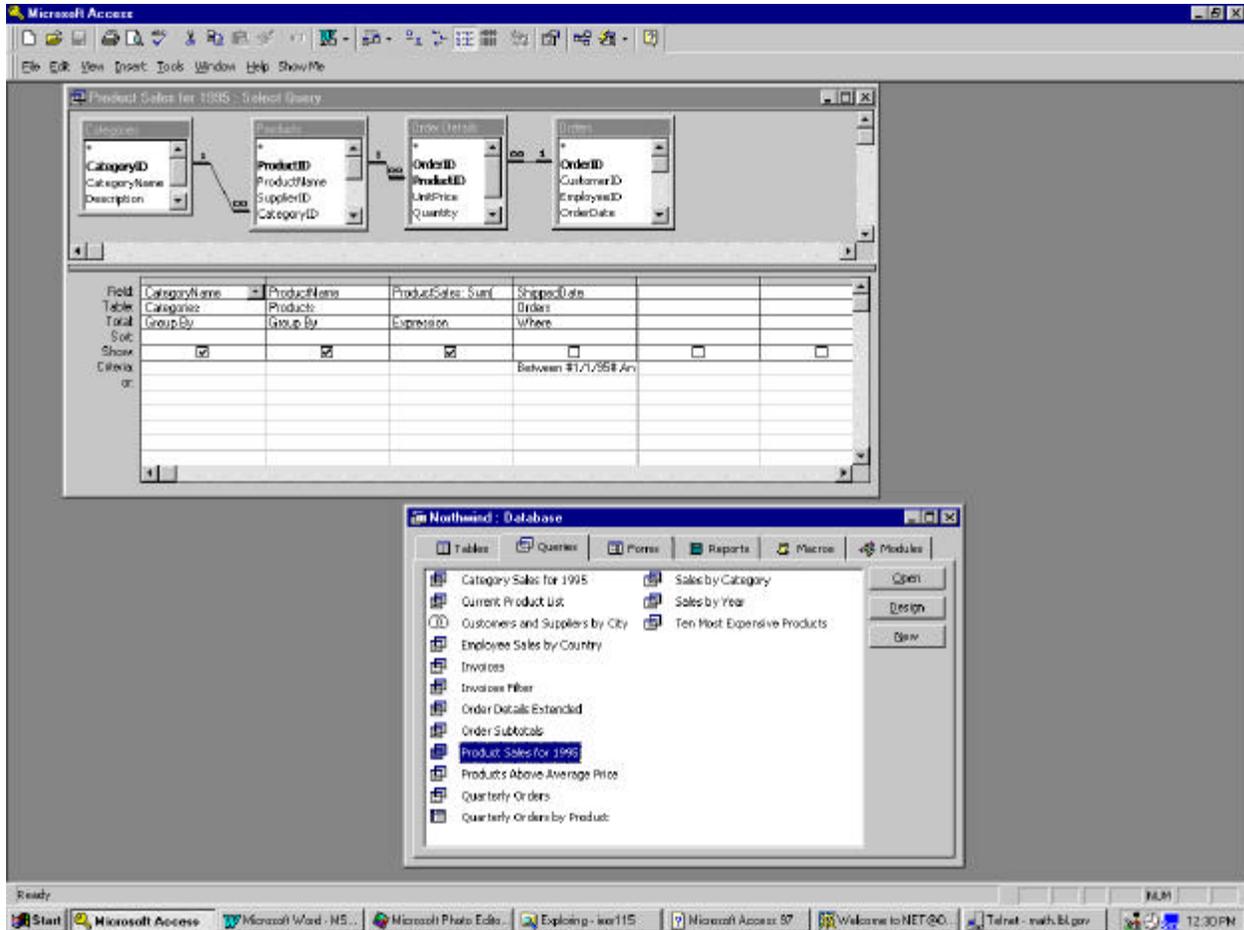


Fig 2: Sample of Query in Northwind.mdb

³design 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, this grid was formerly known as the QBE grid.

Field:	ProductName	ProductID	Category
Table:	Products	Products	Products
Sort:	Ascending		
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Criteria:			
or:			

Creating a Calculation Performing 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.

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't manually update the calculated results.

To display the results of a calculation in a field, you can use a predefined calculation that Microsoft Access provides or custom calculations you define. Use the predefined calculations, called "**totals**" if you want to compute the following amounts for groups of records or for all the records combined: sum, average, count, minimum, maximum, standard deviation, or variance. You choose one totals calculation for each field you want to calculate.

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, where you select 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 for which totals are calculated, limit the records included in the calculation, or limit the results that are displayed after the calculation is performed.

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.

Field:

OrderAmount: [QuantityPerUnit]*[UnitPrice]
--

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.

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.

Field:	RequiredDate
Table:	Orders
Sort:	
Show:	<input checked="" type="checkbox"/>
Criteria:	Between Date() And DateAdd("m",3,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.

Field:	UnitPrice
Table:	Products
Update To:	[UnitPrice]*1.05

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 displays the Total row in the design grid.

3. For the field or fields you want to group on, leave Group By in the Total cell.
4. 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.

Field:	ShipCountry	OrderID
Table:	Orders	Orders
Total:	Group By	Count

5. If you want, enter criteria to affect the results of the calculation.
6. If you want, sort the results.
7. Click View  on the toolbar to view the results.

About aggregate functions and other options in the query design grid's Total row

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

Writing Queries in SQL view:

MS Access allows you to write queries directly into SQL statements. When you are in the design view of a query, click 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.