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SEE-HOW guide!



Plain & Simple

Microsoft Access 2013



Andrew Couch

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Learn it.
In color.

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- Build a database and host it online or on-premise
- Add tables quickly using predesigned templates
- Interact with your data using queries and macros
- Help secure your data with passwords and encryption
- Create sophisticated reports and present your data

Here's HOW You'll Learn It

- Jump in wherever you need answers
- Follow easy *steps* and *screenshots* to see exactly what to do
- Get handy *tips* for new techniques and shortcuts
- Use *Try This!* exercises to apply what you learn right away

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[Recommended]

Microsoft Office/
Microsoft Access





Microsoft

Access 2013 Plain & Simple

Andrew Couch

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This book is dedicated to my Mum and Dad, who supported me through all my studies, never questioning what I would end up doing, and gently helped me to achieve several academic goals.

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Selecting data using queries

Queries are where a database can offer a real benefit over a spreadsheet because they allow you to construct sophisticated, updatable presentations of your data. These can vary in complexity from a simple filtered list based on a single table to more complicated presentations of summarized information involving many tables of data. Remember that a database encourages you to split your data into separate tables to reduce duplication of information when you are entering data, at the expense of having that data in several places. You will see that queries lie at the very heart of a database and allow you to reassemble the data from the different tables into a single view with greater flexibility than if the data were in one list.

The power of queries increases as you gain more experience with Access. For example, layering one query on top of another allows you to break down a complex problem into several simple steps. A query can display data both from tables and from other queries. Queries can also be parameterized to prompt users to enter filtering criteria, and they can be extended so that they are driven by selections that you make in forms. (See "Linking a form to a query" on page 224.)

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In this section:

- Selecting all or individual columns from one or more tables
- Joining tables to see unmatched or missing records
- Filtering by single and multiple combinations of choices
- Adding calculations with the expression builder
- Returning top records and eliminating duplicate
- Creating a summary calculation
- Prompting to filter data with parameters
- Turning rows into columns with a crosstab query
- Working with queries that use other queries

Selecting all columns from a table

A query allows you to choose information from one or more sources, which could be either tables or other queries, and link your choices together to present your final results. The query design tool offers several methods for selecting your fields.

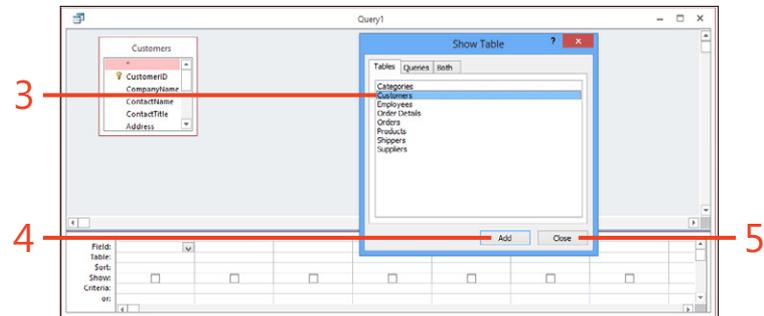
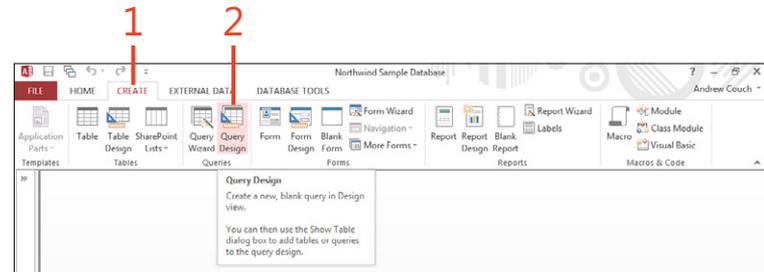
One key choice in how you construct a query is whether it will automatically include any new changes, such as adding new

Select all columns from a table

- 1 Click the Create tab.
- 2 Click Query Design.
- 3 Click the table name in the Show Table popup window.
- 4 Click Add.
- 5 Close the Show Table popup window.

(continued on next page)

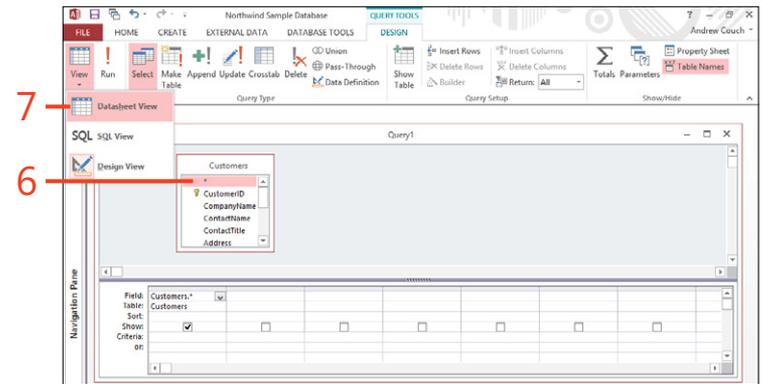
fields to the underlying table. Using `TableName.*` ensures that a query will include all fields from the underlying table, at the expense of being less efficient because it might include fields that you do not intend to use. However, if additional fields are later added to the underlying table, they will be shown automatically in the query results.



TIP To return to design view while viewing the data in the datasheet, click the Design View option in the View button drop-down list. The View button allows you to switch between working on your design and displaying the results.

Select all columns from a table *(continued)*

- 6 Double-click the asterisk (*) to add all the columns to the query grid.
- 7 Click View, and select Datasheet View.



Selecting individual columns from one or more tables

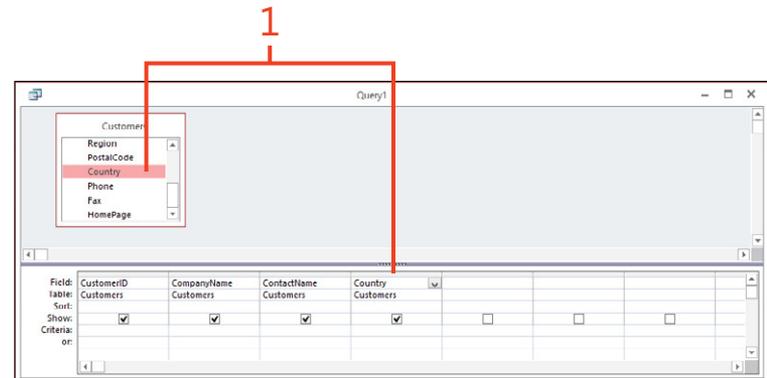
Selecting individual columns has the advantage of enabling you to see exactly what is being selected. It also simplifies filtering and sorting because you can apply the criteria and sorting against the selected columns.

If you use the * to include all columns in a table and need to sort by a column, you must add the column for sorting to the query

Select individual columns

- 1 In design view, double-click a column to add it to the grid (or drag it into the grid).

(because you cannot sort against the *), but clear the check marks in the row titled Show when adding the column because you are already showing the column as part of the *, which selects all columns.



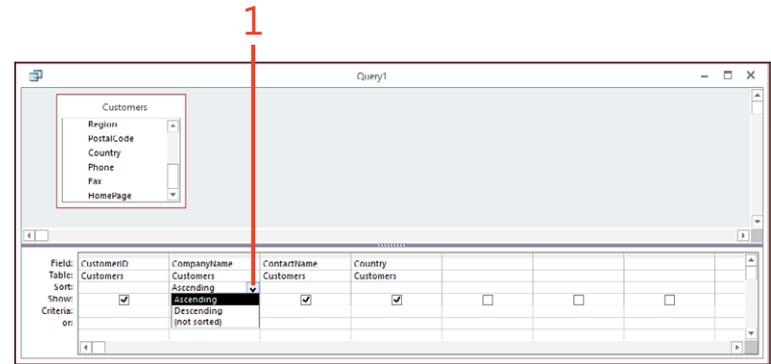
CAUTION Don't include the same field more than once. Otherwise, you are creating additional overhead. This can also create problems when you start to build forms and reports based on the query. The query automatically gives a new name to duplicated fields because each field name in a table or query must be unique.



TIP To delete columns, click just above the column name on the column header and press Delete. You can insert columns by pressing the Insert key after you select a column header. The ribbon also has buttons to support these operations.

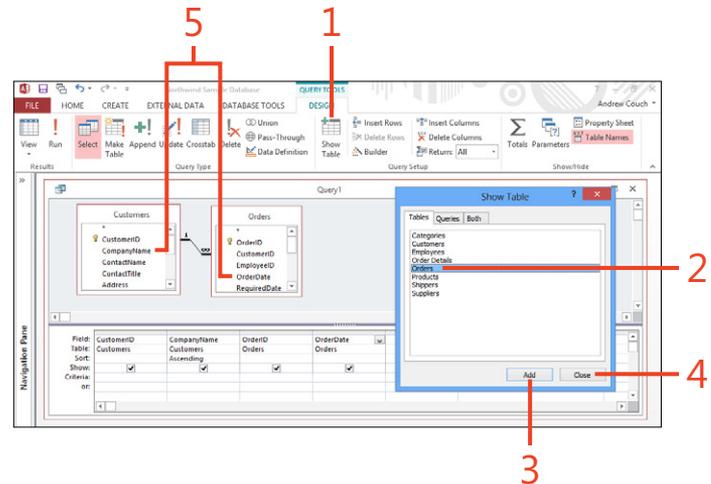
Sort by selected columns

- 1 Below one or more selected columns, choose either Ascending or Descending from the sorting drop-down list. To sort by a group of columns, put the columns in the order you want by dragging them as needed. Sorting is applied from left to right.



Join multiple tables

- 1 Click Show Table on the Design tab of the ribbon.
- 2 In the Show Table popup window, click a second related table to add to the query grid.
- 3 Click Add. (Note that the relationship is automatically shown in the grid.)
- 4 Click Close to close the Show Table popup window.
- 5 Select fields to display from more than one table.



TIP If you have relationships in your database, Access will use these to join your tables. If your tables are not joined, you can click a field in one table and drag it onto another table to link the tables together. All tables shown on the query grid should be joined together. Otherwise, you will get all the rows from one table shown against every row from another table.

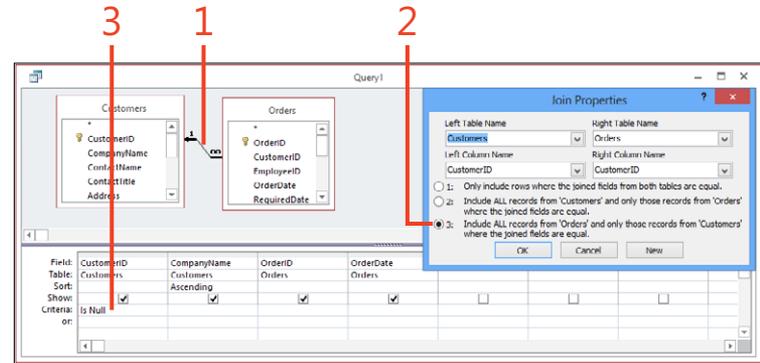
Joining tables to see unmatched or missing records

In “Join multiple tables” on page 99, we saw how to join more than one table on a query. Tables can be joined in one of three ways. The method of joining is shown on the diagram, with either no arrow or an arrow at one or the other end of the join. When you click the join, you will see a text description of how each choice will affect the data.

There are two classic uses of changing the join. The first allows you to identify unmatched child records (which can prevent you from creating relationships that enforce rule checking), and the second is useful when you appear to have missing records in the query results.

Find unmatched child records

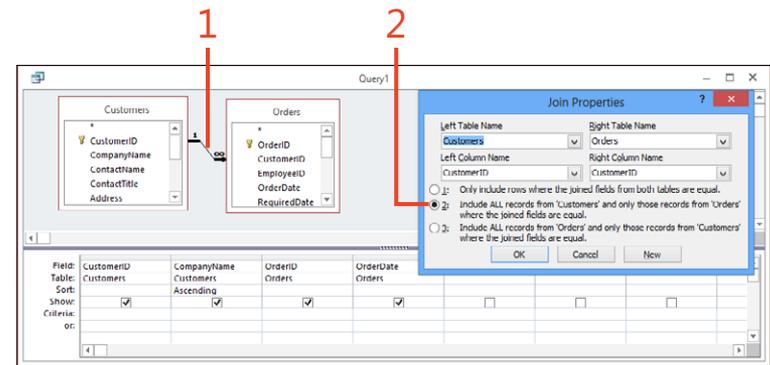
- 1 Double-click the relationship.
- 2 In the Join Properties popup window, click the option to include all child records. (In this case, the Orders table is a child of the Customers table.) This will now show all orders, whether or not there is a customer in the Customers table for the corresponding ID recorded in the Orders table. Click OK to close the Join Properties popup window.
- 3 Add criteria to identify where the parent key (ID in Customers table) has no value (Is Null). This filters the query results to show only those records in the Orders table where there are no matching customers in the Customers table.



TIP On the Create tab, you can create this type of query by using the Query Wizard, which will display a Find Unmatched Query option.

Display all parent records with and without child records

- 1 Double-click the relationship.
- 2 In the Join Properties popup window, click the option to include all parent records (from the Customers table).



TIP You can use this method to ensure that a report that has been created to use this query will display a list of all parent records, even when they do not have any child records.

Filtering by single and multiple combinations of choices

Each row in the query grid allows you to specify a combination of choices, which when taken together will limit the data displayed. Each line on the query grid allows you to specify a separate set of choices. This means that a query can apply very sophisticated sets of criteria to limit the data returned.

Choosing to restrict the data displayed in each column bases the matching on ranges of values, sets of values, and patterns in the data.

Filter to match similar text

- 1 In the criteria for a text field, type ***al***. Access changes this to Like **"*al*"**, which will display any record containing the letters *al* as part of the data in this column.



TIP Access uses the keyword *like* when matching part of the text in text fields. You do not need to type this because Access does it for you. Also note that searching is not case-sensitive.

The screenshot shows the Access query design grid for a query named 'Customers'. The grid has columns for Field, Table, Sort, Show, and Criteria. A red vertical line with the number '1' points to the Criteria cell for the ContactName field, which contains the text 'Like "*al*"'. The Show checkbox for ContactName is checked.

Field:	CustomerID	CompanyName	ContactName	
Table:	Customers	Customers	Customers	
Sort:		Ascending		
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Criteria:			Like "*al*"	
or:				

Add a second set of criteria

- 1 In the query grid, in the Or row, add further criteria by typing **ba***. This displays all records where either the company name starts with the letters *ba* or the contact name includes the letters *al*.



TIP If you add multiple criteria in each row, all the criteria in the row will apply. This means that we have an AND between the criteria; and between two rows, we have (row 1 criteria) OR (row 2 criteria).

The screenshot shows the Access query design grid for a query named 'Customers'. The grid has columns for Field, Table, Sort, Show, and Criteria. A red vertical line with the number '1' points to the Criteria cell for the CompanyName field in the second row, which contains the text 'Like "ba*"'. The Show checkbox for CompanyName is checked. The first row shows criteria for ContactName: 'Like "*al*"'. The Show checkbox for ContactName is checked.

Field:	CustomerID	CompanyName	ContactName	
Table:	Customers	Customers	Customers	
Sort:		Ascending		
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Criteria:		Like "ba*"	Like "*al*"	
or:				

Add a second set of criteria *(continued)*

The following table provides examples of using symbols in criteria to alter how data is matched.

Symbol	Example	Description
*	Like '*John' or Like 'John*' or Like '*John*'	Wildcard searching in text fields. You do not need to type Like.
#	#01/10/2012#	Matches a date. You do not need to type the pound (#) symbol.
BETWEEN	BETWEEN 1 and 4 BETWEEN #01/10/2012# AND #05/10/2012#	Number or date range comparison. Includes the first and last criteria.
IN	IN(1,22,44,55) IN('France','USA')	Set of data values.
<>, >, <, <=, >=, !=	> 25 <> 'France'	General and arithmetic comparison; <> and != both mean not equal to.
[?]	Like 'Fr[?]' Would match Fra, FrB, frC ...	Character pattern matching. Match any character (numbers and letters). Different from * in that [?] will include only records with only one character after 'Fr'. That is, it wouldn't return 'France'.
[#]	Like '000[#]' Would match 0001, 0002...	Character pattern match (0–9) for a single character.
[A-Z]	Like 'DNA[A-Z]' Would match DNAA, dnaB...	Character pattern match (A–Z) for a single character.

Adding calculations with the expression builder

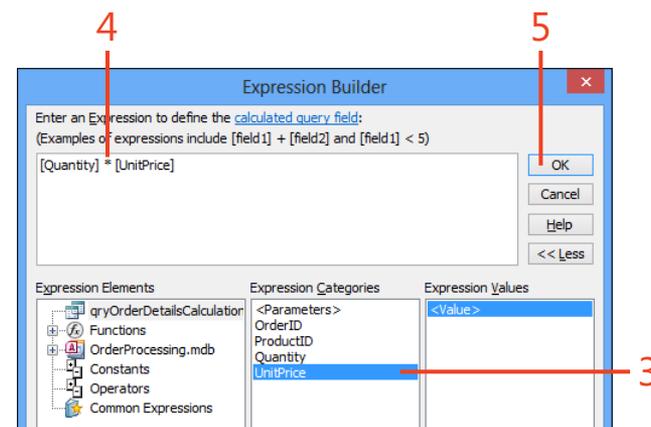
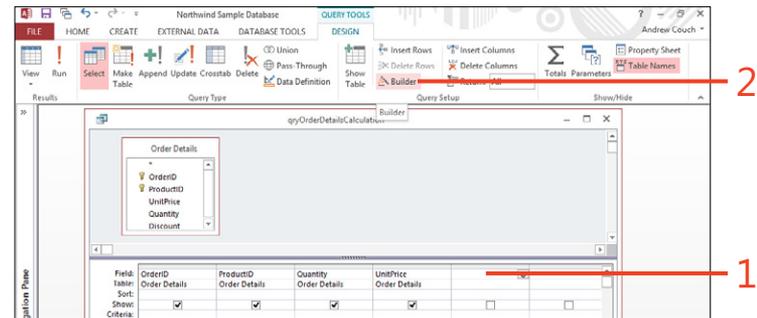
You can type calculations in queries directly into the query, both to create a column and as criteria filtering against an existing column. To avoid mistakes when referring to field names or to explore the myriad built-in functions, you can use the expression builder to provide assistance when creating more complex expressions.

Access provides a wide range of built-in functions to help you create expressions. Two particularly popular functions are the *NZ* function, which converts a NULL to a value such as 0 for a number field or to an empty string for a text field, and the *IF* function, which allows you to conditionally perform calculations. You will also find that the Zoom box is particularly useful when you are working with complex expressions.

Create an expression with the expression builder

- 1 Click a blank column heading. Make sure that you have already saved your query; otherwise, you will not see the column names in the expression builder.
- 2 Click Builder (or right-click and select Build).
- 3 In the Expression Builder dialog box, double-click the fields in the Expression Categories pane to add them to the expression.
- 4 Enter the functions between each field (such as *, +, -, and so on).
- 5 Click OK. The field expression will be read as Expr1:[Quantity]*[UnitPrice].

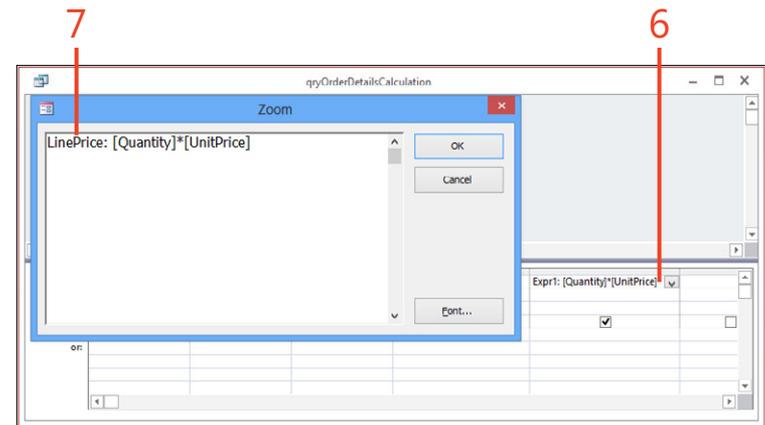
(continued on next page)



CAUTION When you add a NULL value in an expression, Access makes the entire expression NULL. For example, in the following addition operation, $5 + \text{NULL} = \text{NULL}$. This is where the *NZ* function is useful. In this case, it would convert the NULL to zero. So, rather than $[\text{Field1}] + [\text{Field2}]$, we can use $\text{Nz}([\text{Field1}]) + \text{Nz}([\text{Field2}])$, which gives the result $5 + 0 = 5$.

Create an expression with the expression builder *(continued)*

- 6 Click in the field, and press Shift+F2 (or right-click and select Zoom).
- 7 Edit the field title, and click OK.



TIP All fields must have a unique title, even calculated fields that you create yourself. You can also use this feature to change a field name to be displayed with an alternative name in a query.



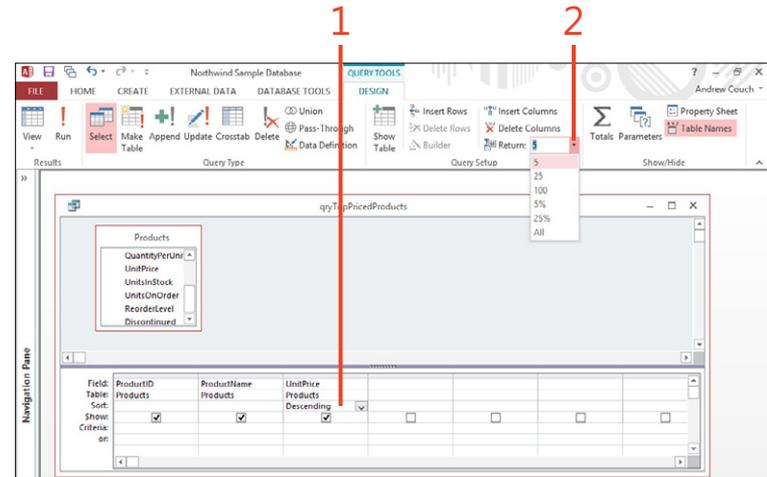
TIP When adding together strings (concatenating the strings—for example, [First Name] & " " & [Last Name]), use the & rather than a +, because the '+' prevents NULL values from making the result NULL. The '+' does not do this.

Returning the top matched records

If you order a set of results with a query, you might be interested in only a limited number of records—for example, the top five records, or the top 10% of records. A query has a Top Values property to give you control over the number of records being displayed.

Return the top matched records

- 1 Sort your data.
- 2 Click to select the number of records to show. You can enter values other than those shown in the list—for example, the top 3 records instead of the top 5.



TIP With our dataset, if we select the top 11 records, we actually see 12 records. This is because the top 11th and 12th records have the same value. Access always performs what is known as a TOP WITH TIES calculation, where records that tie for last place are always shown.

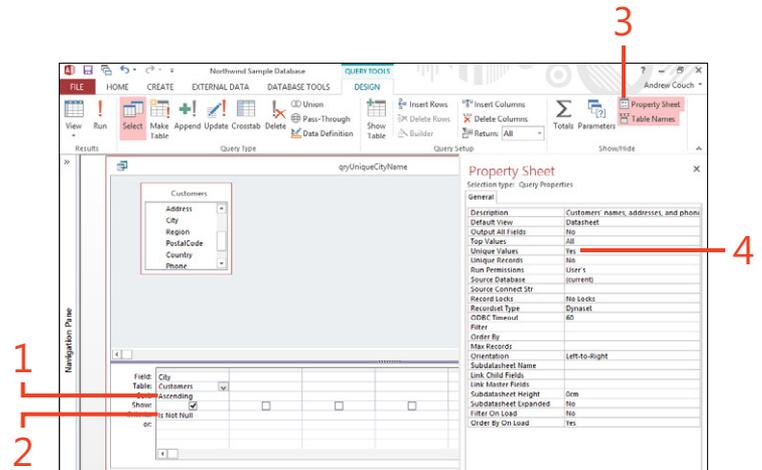
Eliminating duplicate values

Each row in a database table should contain unique and non-duplicated data. However, because using a query enables you to select only some of the fields, the values in those selected fields can be duplicated. This can be very useful when you are given a table of data from another source outside of Access and you want to identify a unique list of values in a particular field.

Eliminate duplicate rows

- 1 Select and optionally sort the field.
- 2 Eliminate any NULL values by typing Is Not Null in the criteria.
- 3 Click Property Sheet to display the Property Sheet, if it is not already shown. If your Property Sheet does not show the properties we have displayed, click anywhere on the gray background to see the query properties; the property sheet can display either query or field properties depending on where you last clicked in the query design tool.
- 4 Change the query property Unique Values to Yes.

For our example, we have a list of Customer records where we have more than one customer in each city and we want to display a list of unique city names.



TIP You can also find unique values by creating a summary query, where you create a query, select a single field, and then click the Totals button. By default, the field then uses a Group By Total, which produces an output similar to the method described here.

Prompting to filter data with parameters

If you have a query that you regularly use with different criteria, rather than changing the design of the query each time you want to change the criteria or creating multiple copies of the query with different criteria, you can define a set of parameters so that when you open the query it automatically asks you to enter values for these parameters and then displays the appropriate data.

Prompt with query parameters

- 1 Click Parameters.
- 2 Type a name for the parameter in square brackets. Ensure that the name is different from any column name in your query, or the parameter will not work.
- 3 Type a data type for the parameter, and click OK.
- 4 Type the parameter name without square brackets. IntelliSense will assist you here.
- 5 When you open this query, type a value for the parameter to see the restricted set of results.

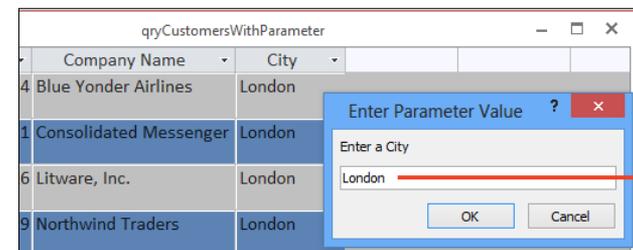
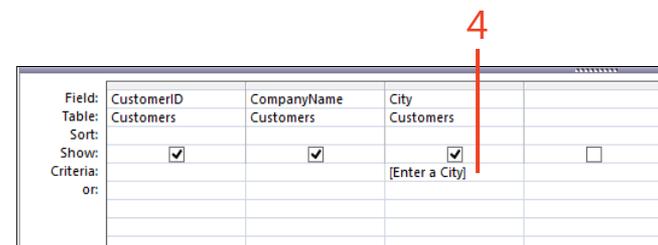
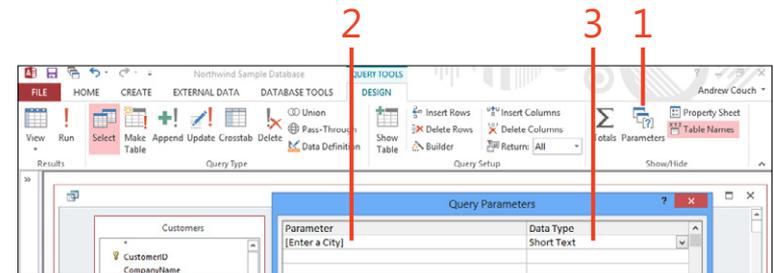


TIP When viewing a parameterized query in Datasheet view, pressing Shift+F9 enables you to enter different parameters and then refresh to display the new results.



TIP You can add wildcards to search with parameters—for example, by adding the criteria Like '*' & [Enter Product Name] & '*'. This is useful if you want to allow users to enter only a portion of the field contents rather than requiring them to enter an exact match.

This type of query can be also used to provide data for a form or report. This means that you can have a report that, when opened, prompts for parameters before displaying the results.



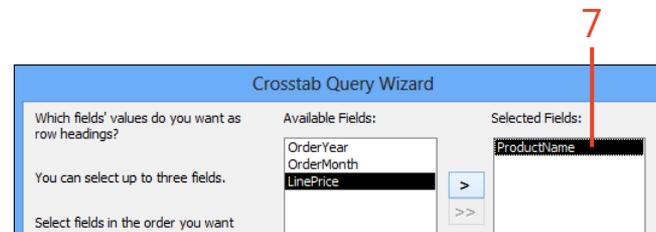
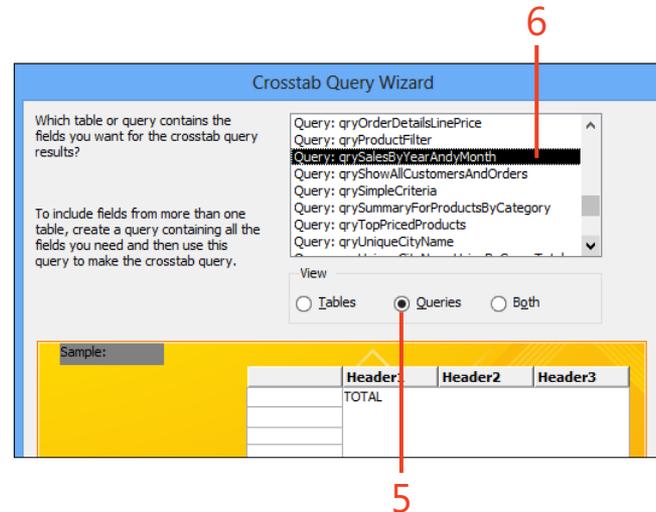
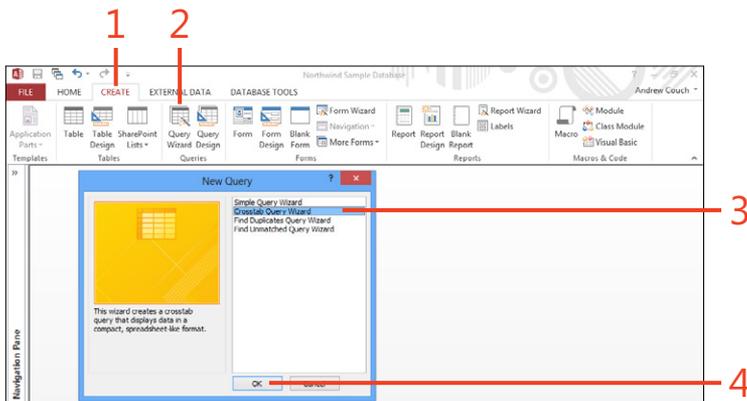
Creating a crosstab query with the Query Wizard

Crosstab queries can be constructed manually. However, it is simpler to use the Query Wizard to create the query, which you can later change in design view.

Create a crosstab query

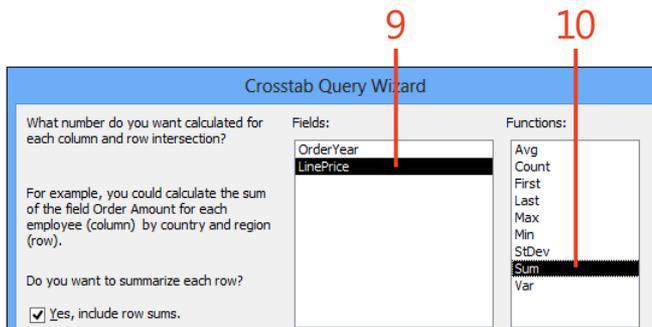
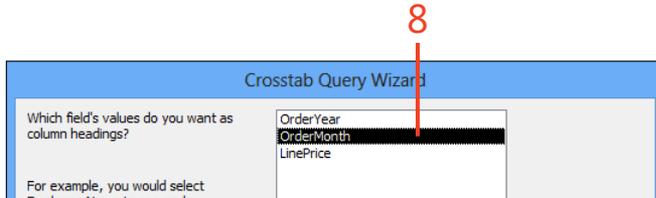
- 1 Click the Create tab.
- 2 Click Query Wizard.
- 3 In the New Query popup window, click Crosstab Query Wizard.
- 4 Click OK.
- 5 In the Crosstab Query Wizard, click Queries.
- 6 Select a query and click Next.
- 7 Select one or more columns to act as row headings, and click Next.

(continued on next page)

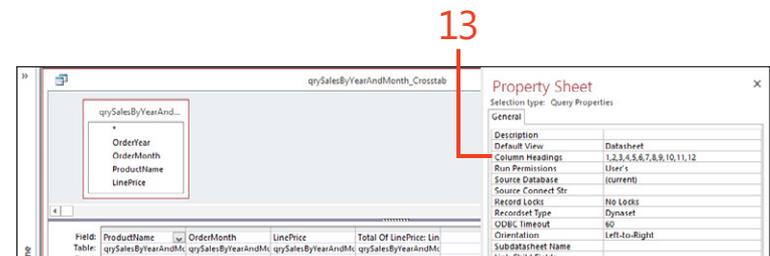
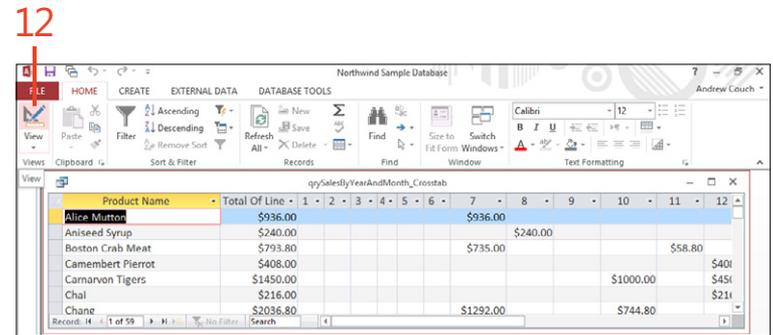
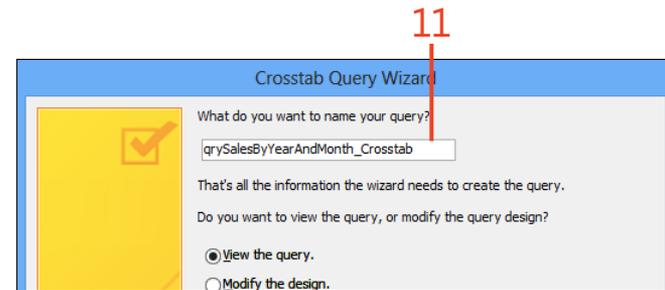


Create a crosstab query *(continued)*

- 8 Select one column to act as the new column heading, and click Next.
- 9 Select the column to summarize.
- 10 Select the calculation type to use, and click Next.
- 11 Type a name for your query, and click Finish.
- 12 Select design view.
- 13 In the query Column Headings property field, type a fixed set of headings.



 **TIP** The resulting crosstab query breaks down the orders received for each product into individual months (1–12), showing the sales of each product in each month in the month columns, with a row for each product. If new products and sales are added to the underlying tables, these will be included each time the crosstab query is run, adding new columns and rows as necessary.



 **TIP** The column headings in a crosstab query are dynamic (for example, you could have only months 1,6, and 7), but you can fix these so that a column is always shown, even when it has no data. In the query properties, you will find a Column Headings property. In our example, setting that to a value of 1,2,3,4,5,6,7,8,9,10,11,12 ensures that we have a column heading for each month.

Simplifying a problem with a query by using other queries

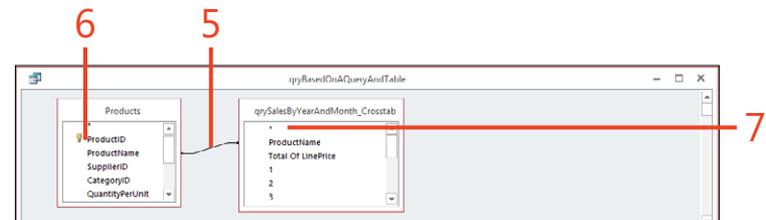
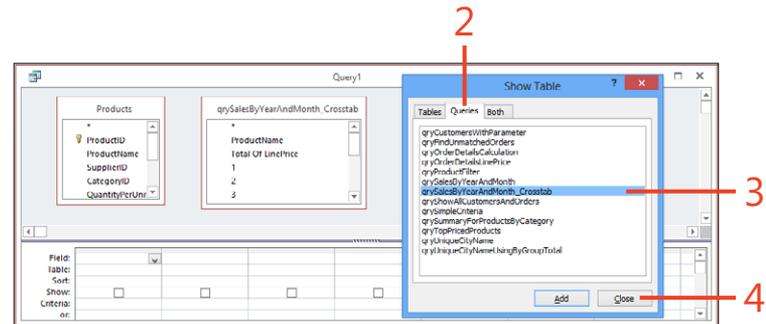
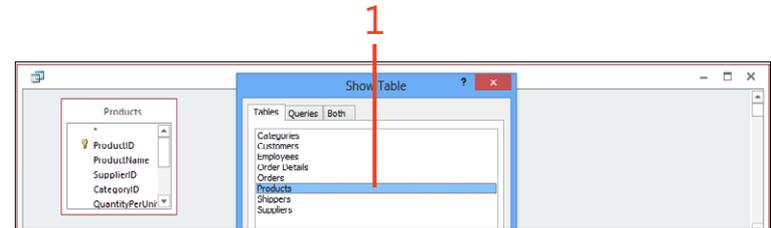
If you have a complex problem—for example, you need to join together several tables and then perform summary operations—you might find it helpful to break down the problem into one or more steps. First, create a query that joins together and filters all the data, and then create a second query that uses the first

query as a source of data and performs the summary operations.

Using a query to work from other queries can also improve productivity by reusing other queries that you have already constructed.

Create a query to combine data from a table and query

- 1 In the design view of a new query, in the Show Table popup window, double-click the table to add it to the query grid.
- 2 Click the Queries tab in the Show Table popup window.
- 3 Double-click a query name to add to the query grid.
- 4 Click Close.
- 5 To join the table to the query, drag the ProductName field between the tables.
- 6 Double-click a field from the table.
- 7 Double-click the * on the query to add all columns from the query to the query grid.



TIP Ideally, when joining together sources of data, you should use primary and foreign keys, but in some circumstances you might be forced to join results together by other fields. When you are joining on other fields, the combination of fields should contain unique data values.

Adding two sets of query results together

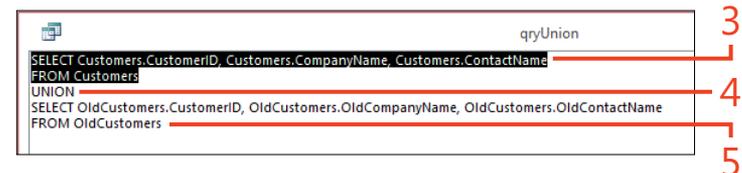
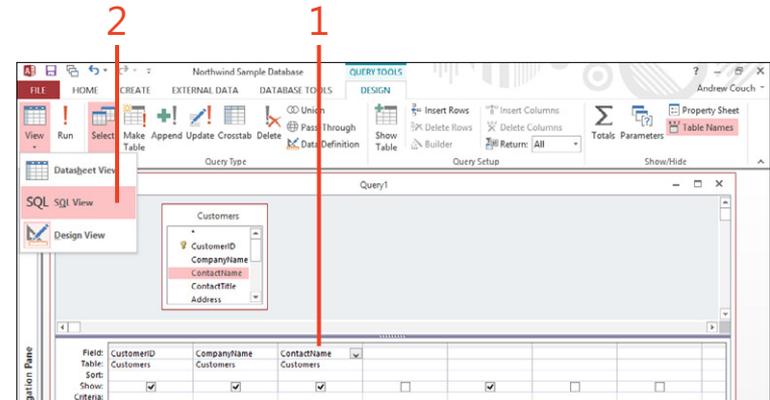
When you have two or more sets of data that have the same number of columns, same column order, and similar column data types, and you want to combine them into a single list (although this cannot be graphically displayed), you can do so by creating a special type of query called a UNION query. This query uses a special keyword UNION (meaning bring together) or UNION ALL (meaning bring together and show duplicates).

Add two result sets together

- 1 In design view, add your first table to the query grid and display the desired fields.
- 2 Switch the query to SQL View.
- 3 Remove the semicolon (;) from the end of the SQL query, highlight the SQL query, and copy the SQL query to the clipboard.
- 4 On a new line, type the keyword **UNION**.
- 5 On a new line, paste in the copied SQL query, and change any references in the copied SQL query to refer to the second table and column names. The order of fields, number of fields, and data types should be identical in both sections of the SQL query. Field names can be different.

You can combine multiple blocks of SQL with this keyword.

In our example, we have two tables, called Customers and OldCustomers, and we want to show the data in both tables in a single list.



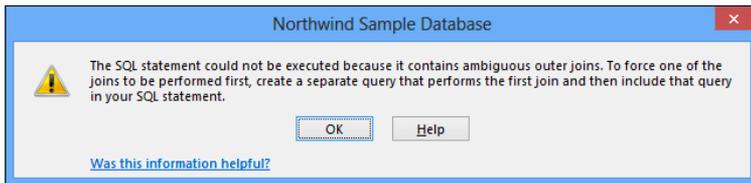
CAUTION You are not allowed to select either Attachment data, Long Text data, or OLE data type columns in a UNION query. You can use the * to select all fields as long as none of the fields have one of these data types.

Resolving ambiguous outer joins

When you join tables together on a query and you have a line without any arrows at either end, you have an equally matched join (sometimes called an INNER JOIN or simply a JOIN). In the earlier parts of this section, we displayed unmatched records and missing parent records by adding an arrow at one end of the join; this is called an OUTER JOIN (being LEFT or RIGHT depending on which end all records are being displayed from). If you add tables to a query where

you have already specified OUTER JOINS in the relationships, these will be shown by default when you add the tables to the query grid.

If you have a mixture of join types when you try to run a query, you will be warned that you have a join ambiguity, as shown here.



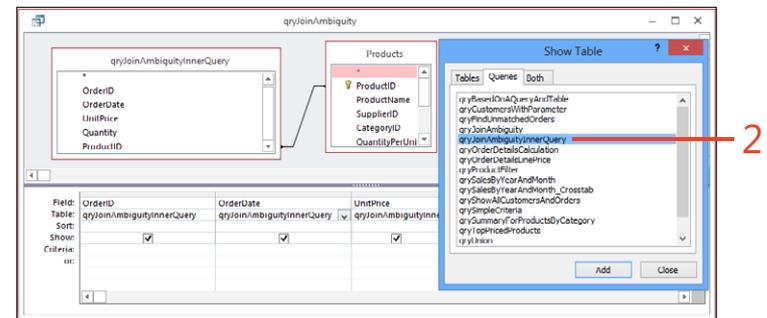
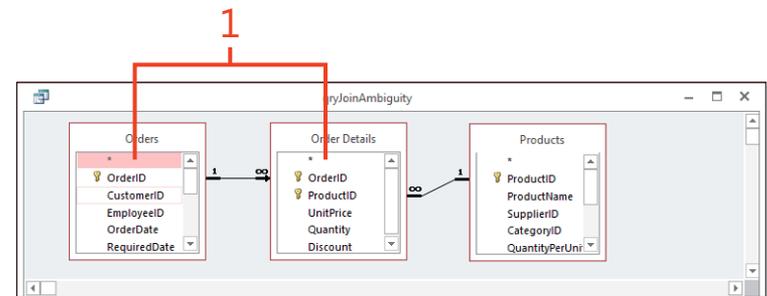
Creating an additional query to resolve a problem with mixed joins

We have a query that links together Orders, Order Details, and Products. Because we want to also show any Orders without Order Details, the join from Orders to Order Details is set to an outer join to include all Orders with or without Order Details. The join to products has been left as a matching join. This mixture causes a join ambiguity problem.

In our example, we could change the join between Order Details and Products to an outer join, but we want to demonstrate the solution that is proposed by the text in the join ambiguity warning box, where the query is changed to use another query that contains the outer join between Orders and Order Details.

Resolve join ambiguity

- 1 Click each of the tables where the join is different, and press Delete to remove the tables from the query.
- 2 Having created another query that joins together the tables we removed (with the outer join), add this query to the query design.



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About the Author

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