Exploring Microsoft Office Access 2007

Chapter 2: Relational Databases and Multi-Table Queries

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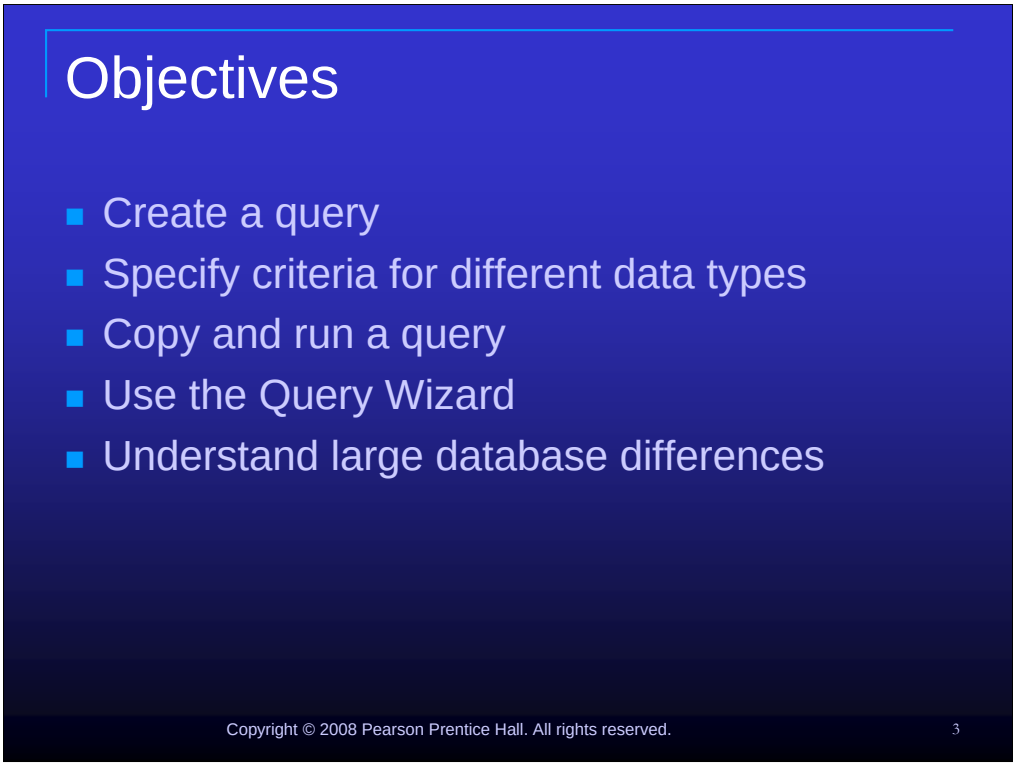
Objectives for the chapter are: design data, create tables, understand table relationships, share data with Excel and establish table relationships.



Objectives for this chapter also include: Create a query, Specify criteria for different data types, Copy and run a query,

Use the Query Wizard and Understand large database differences.

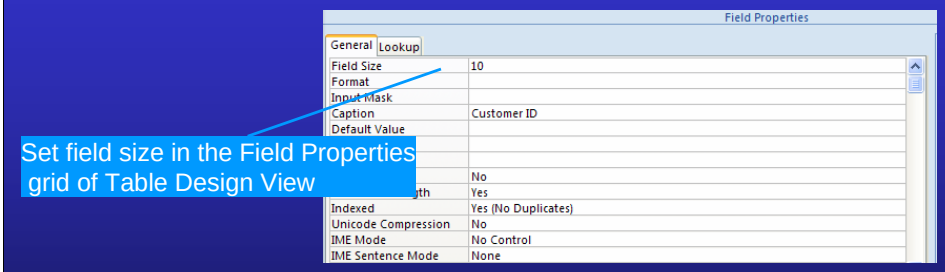
Table Design Considerations

Just as you first create a blueprint to build a house, you should first sketch or outline the design of a database table

Careful pre-planning will save you much time in the future

Just as you first create a blueprint to build a house, you should first sketch or outline your table design. (Add: Careful pre-planning saves you much time in the future. There are many factors that affect both the design and structure of a database.

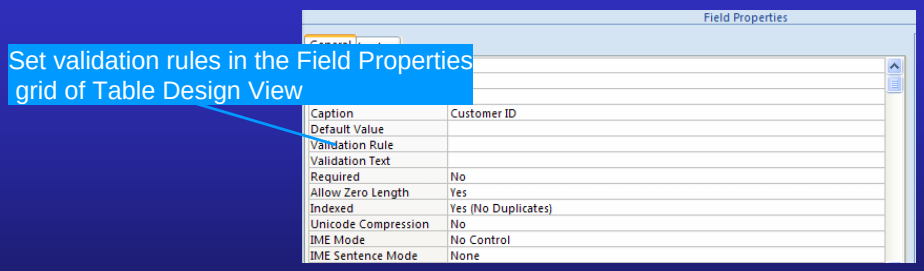
Table Design Considerations – Field Size Property



- Set the field size in Table Design View
- Always anticipate the current field size may one day need to be larger

Set the field size property of individual fields in Table Design View. Once the field size is set, data entry in that field is limited to the length specified. In order to prepare for the future, always anticipate the current field size may one day need to be larger.

Table Design Considerations – Validation Rules



- Used to avoid data entry errors by restricting what can be entered
- Validation text can be used to provide an explanation of the type of data that is allowed in a field

Validation rules are used to help avoid data entry errors by restricting what can be entered in a field. For example, if you want a number to be entered into a field, but want to assure that a zero is not entered, your validation rule could be <>0. If an attempt is made to enter a zero in the field, a generic error message is generated stating that a validation rule has been broken. If you include validation text with a validation rule, the user will receive a message that you specify. Therefore, it is recommended to provide validation text any time you use a validation rule so that they user can more easily understand the error.

Table Design Consideration – Sarbanes Oxley Act (SOX)

- Protects the general public and companies shareholders against fraudulent practices and accounting errors.
  - Requires that all business records be saved for a period of fie years and be made available to the SEC upon request

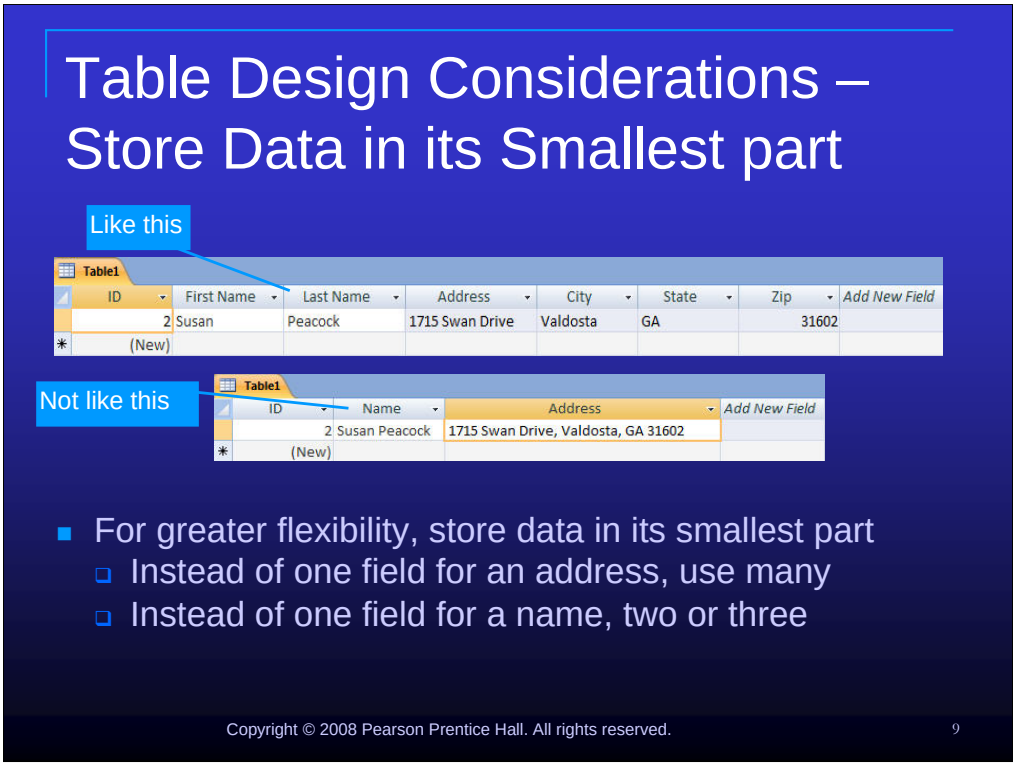
This regulation protects the general public and companies shareholders against fraudulent practices and accounting errors. To summarize the act, it requires that all business records be saved for a period of five years and be made available to the SEC upon request.

Table Design Considerations - PNPI

- Short for personal, non-public, information
- PNPI laws govern the safeguarding of data such as:
  - social security numbers
  - credit card numbers
  - bank account numbers
  - medical records

Short for personal, non-public, information, PNPI laws govern the safeguarding of data such as social security numbers, credit card numbers, bank account numbers and medical records.

Table Design Considerations – Store Data in its Smallest part

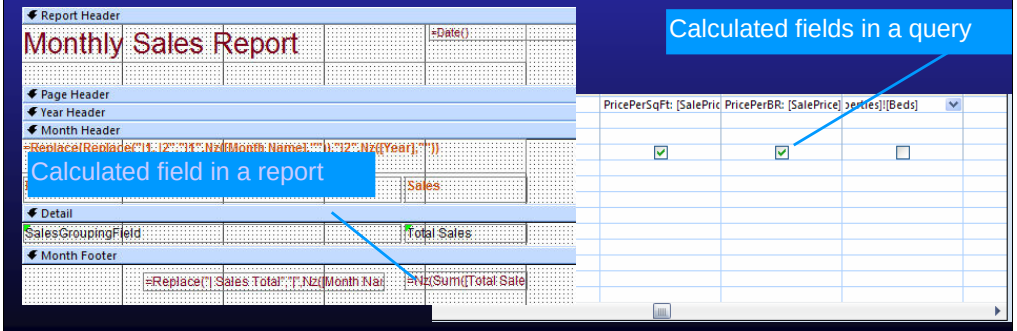


- For greater flexibility, store data in its smallest part
  - Instead of one field for an address, use many
  - Instead of one field for a name, two or three

For greater flexibility, store data in its smallest part. It is much more difficult to search for data when more than one piece of information is in one field. Examples include: instead of one field for a persons address, break the address into three fields – street address, city, state and zip. Instead of one field for a persons name, break the name into two or three fields – first, last and possibly middle initial.

Table Design Considerations – Avoid Calculated Fields

- Calculated fields should be used mainly in queries and reports



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Calculated fields should be used mainly in queries and reports. This is more efficient and allows for more accurate information.

Table Design Consideration - Plan for Date Arithmetic

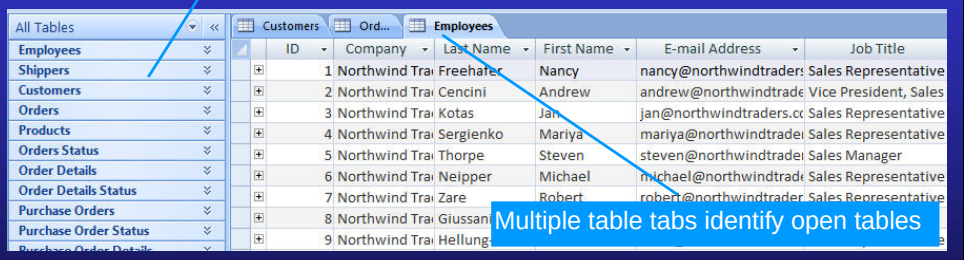
Fields declared as a data type of Date/Time

Field Name	Data Type	Description
Employee ID	Number	
Customer ID	Number	
Order Date	Date/Time	
Shipped Date	Date/Time	
Shipper ID	Number	
Ship Name	Text	
Ship Address	Memo	
Ship City	Text	
Ship State/Province	Text	
Ship ZIP/Postal Code	Text	
Ship Country/Region	Text	
Shipping Fee	Currency	
Taxes	Currency	

- Using a data type of date/time for all date fields allows the use of date arithmetic

Using a data type of date/time for all date fields allows the use of date arithmetic. An example of date arithmetic usage would be subtracting the shipping date from the order date of an item. The resulting number is the delay between the item being ordered and the item being shipped.

Table Design Considerations – Design Multiple Tables

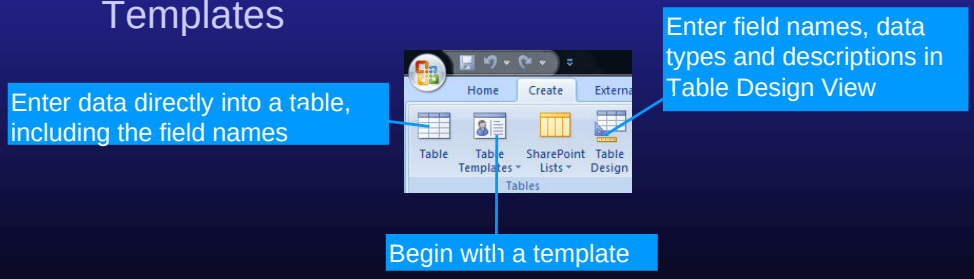


- Using multiple tables helps reduce redundancy
  - The process is also referred to as normalization

Using multiple tables helps reduce redundancy. The process of reducing duplicate information is also referred to as normalization.

Creating Tables – From the Create Tab

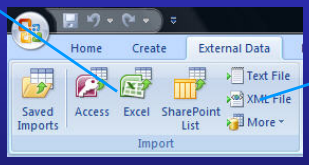
- Enter table data directly in fields
  - From the Create Tab, click Table
- Use a table template
  - From the Create Tab, click Table Templates



There are many methods that can be employed to create tables. From the Create tab, users can choose to enter table data directly in fields in datasheet view by clicking Tables form the Tables ribbon. They can also select the Table Template icon from the Tables ribbon.

Creating Tables – From the Import Tab

Click the appropriate application button



Choose a file type to import

- Click the application from which to import

or

- Choose the type of file you wish to import

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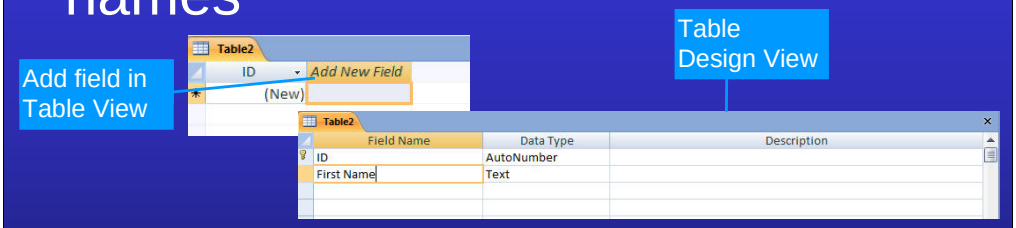
When the External Data tab is used, tables can be imported into Access by clicking the application icon you wish to import from or the type of file you wish to import.

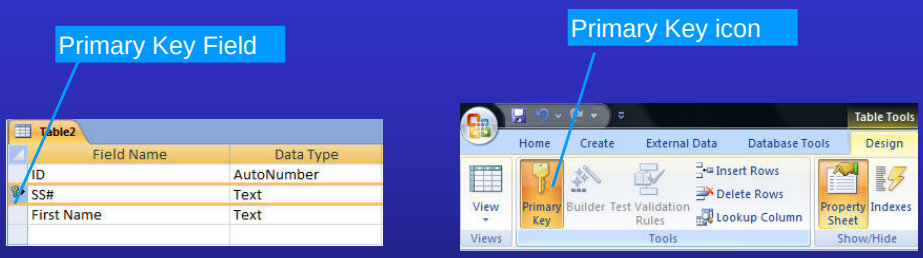
Create Tables – Specifying field names



- After choosing your method of creation begin implementing the table design
  - Use CamelCase notation for field names
  - Specify data types
  - Establish a primary key
  - Consider the need for a foreign key

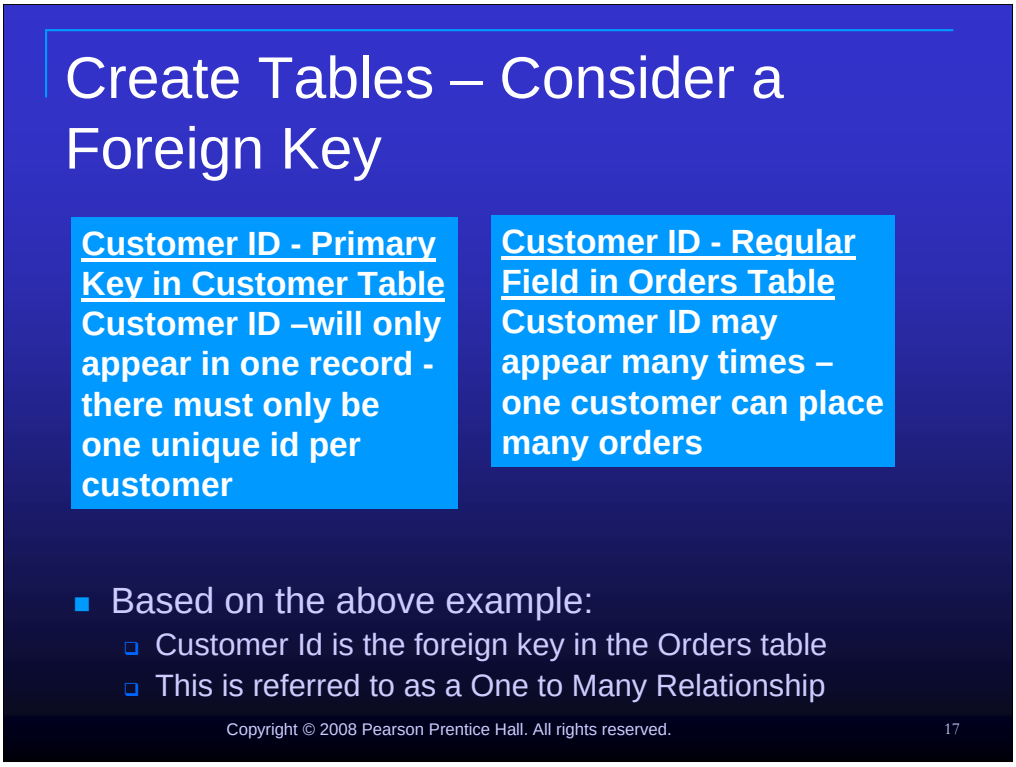
After choosing your method of creation begin implementing the table design. Be sure to use CamelCase notation for field names. You will also need to specify the data type for each field and establish the primary key that was determined when planning your table.

Create Tables – Primary Key



- Tables are automatically created with an AutoNumber field which serves as the primary key
- To change the primary key
  - Select a field in Design View
  - Click the primary key icon

Tables are automatically created with an AutoNumber field which serves as the primary key. To change the primary key, select a field in Design View and click the primary key icon on the tools ribbon of the Design tab.



When planning your table always consider the possibility that you will need a foreign key. A foreign key in one table is the primary key in another and is created when a relationship between two tables is made.

Example:

Customer ID is the Primary Key in the Customer Table

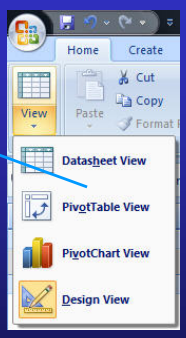
Customer ID will only appear in one record in this table. There must only be one unique id per customer.

Customer ID is a Regular Field in the Orders Table

Customer ID may appear many times in this table. One customer can place many orders Customer ID may appear multiple times.

Work with Table Views

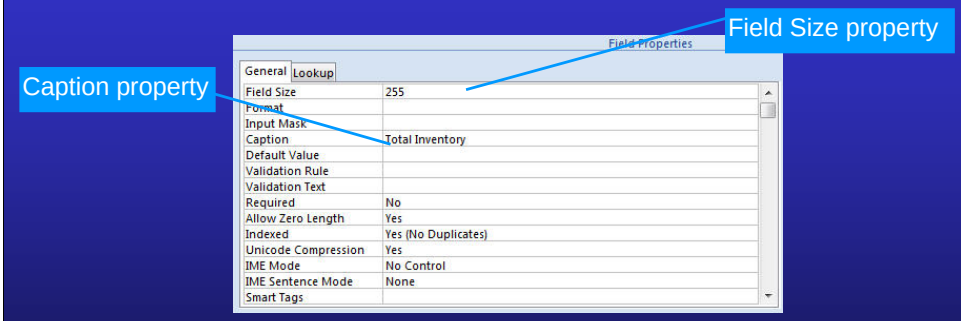
Table View Options



- Click the Home tab
- Click View from the View ribbon

To choose a table view, click the home tab and click View from the View ribbon. Choose the view desired. In Datasheet View, you will enter data directly in rows and columns. PivotTable View allows you to organize and summarize groups of records. PivotChart View displays a chart of the associated table data. Design View allows you to add or modify the structure of your table as well as individual field properties.

Work with Properties

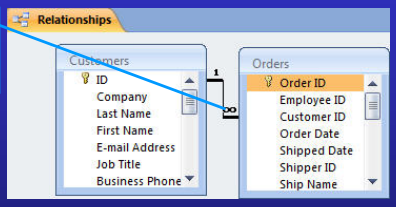


- Field Properties can be used to specify characteristics for individual fields
- Located in the lower pane of Table Design View

Field Properties can be used to specify characteristics for individual fields. Field Properties can be found in the lower pane of the Table Design View.

Working with Multiple Tables – Table Relationships

Relationship between two tables

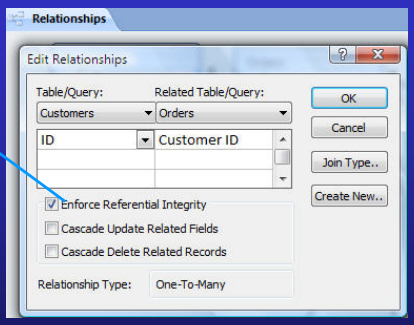


- The strength of Access is the fact that it is a relational database
  - This means you can have multiple tables and create relationships between each table
  - This helps eliminate redundant data

The strength of Access is the fact that it is a relational database. This means you can have multiple tables and create relationships between each table. This is extremely important in the effort to eliminate redundant data.

Working with Multiple Tables – Referential Integrity

Enforce Referential Integrity

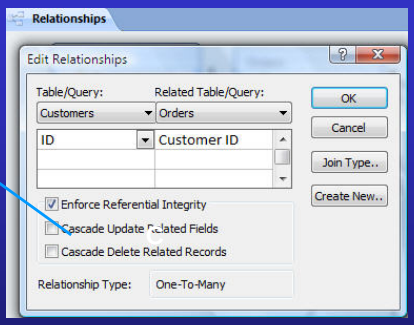


- Assures that the references to relationships between data is accurate
- Established when creating the relationship between two tables

Referential integrity helps assure that the references to relationships between data is accurate. It can be established when creating the relationship between two tables or at a later time by editing the relationship.

Working with Multiple tables - Cascades

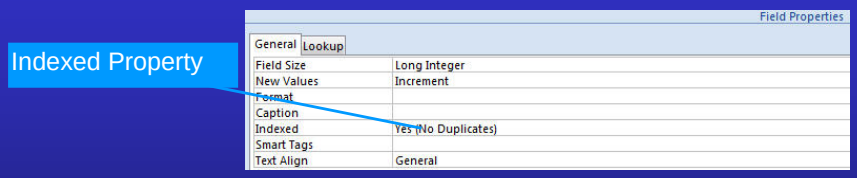
Cascade update and cascade delete



- When active, data changed in one table that is in a relationship will be changed in its related tables
- Can be set when establishing relationships between tables

When cascades are active, data changed in one table that is in a relationship will be changed in its related tables. Cascade Update means that data changed in one table will be changed in other tables that it shares a relationship with. Cascade delete means that if a record in is deleted in one table, the associated records in other tables it shares a relationship with will be deleted as well.

Indexing



- Index properties can be set in the Field Properties pane of table Design View
- Relates the field values to the records that contain the field value
- Helps speed up some sorting and searching processes

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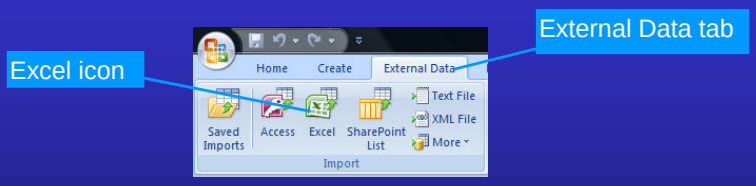
Index properties can be set in the Field Properties pane of table Design View. Indexing relates the field values to the records that contain the field value and helps speed up some sorting and searching processes.

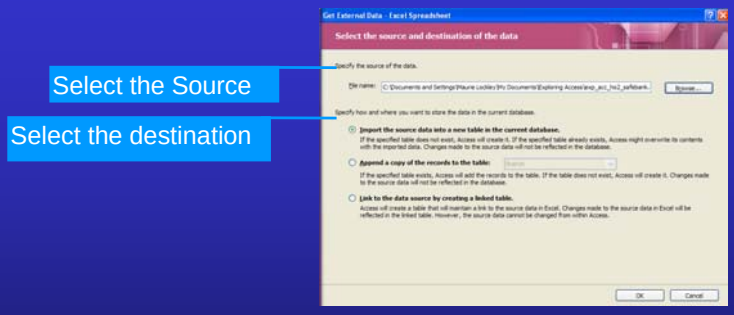
Sharing Data with Excel



- Data can be imported from Excel
  - It may be appended to an existing table
  - It may be used to create a new table

Data can be imported from Excel into Access. It may be appended to an existing table or used to create a new table.

Sharing Data with Excel

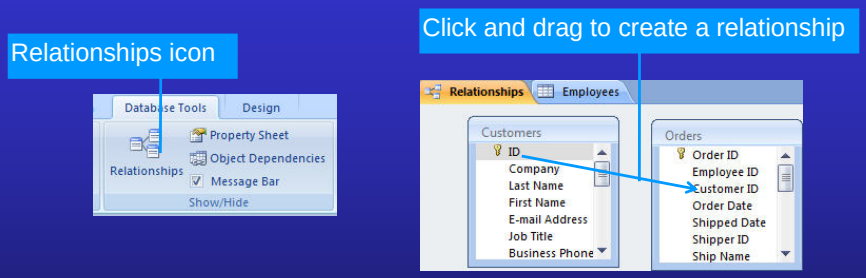


- Select the Excel file you would like to import
- Select how you would like to import the data
  - Appended – added to the end of an existing table
  - New table – creates a new table in a database
  - Linked – create a new table that is linked to the source file in Excel

To import data from Excel, complete the following steps. Click the Excel icon in the Import group. Then, in the Get External Data dialog box, select the Excel file you would like to import and specify how you would like to bring in the data. You have the following options:

Appended – added to the end of an existing table, New table – creates a new table in a database or Linked – create a new table that is linked to the source file in Excel. Click Ok to finish the import.

Establishing Relationships



- Click the Database tools and click the Relationships icon
- In the Relationship window, click and drag a field name from one table to a field name in a related table

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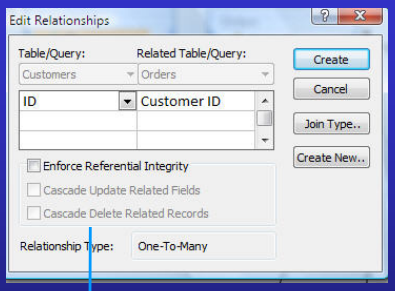
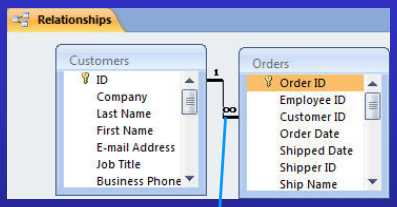
Click the Database tools tab and click the Relationships icon in the Show/Hide group to open the Relationships window.

In the Relationship window, click and drag a field name from one table to a field name in a related table.

Establishing Relationships



Set referential integrity and cascades



Infinity symbol notes referential integrity has been applied

- Enter the appropriate settings in the Edit relationships dialog box and click Create
- A join line will appear when one table is joined to another

After dragging a field name from one table to another, the Edit Relationships dialog box will appear. Enter the appropriate settings in the Edit relationships dialog box and click Create. A join line will appear when one table is joined to another. An infinity symbol be on the join line when referential integrity has been applied.

Queries

Relationships | Employees | Employees Query

ID	Last Name	First Name	Job Title
1	Freehafer	Nancy	Sales Representative
2	Cencini	Andrew	Vice President, Sales
3	Kotas	Jan	Sales Representative
4	Sergienko	Mariya	Sales Representative
5	Thorpe	Steven	Sales Manager
6	Neipper	Michael	Sales Representative
7	Zare	Robert	Sales Representative
8	Giussani	Laura	Sales Coordinator
9	Hellung-Larsen	Anne	Sales Representative
(New)			

Employees table

Relationships | Employees | Employees Query

Last Name	First Name	Job Title
Freehafer	Nancy	Sales Representative
Kotas	Jan	Sales Representative
Sergienko	Mariya	Sales Representative
Neipper	Michael	Sales Representative
Zare	Robert	Sales Representative
Hellung-Larsen	Anne	Sales Representative

Dataset resulting from querying table for only employees who are Sales Representatives

- Queries allow us to ask questions about data
- This record set that answers our question is called a dataset

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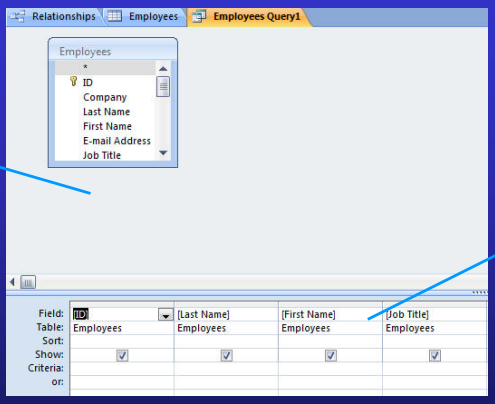
Queries allow us to ask specific questions about the data and receive a record set back that answers our questions. This returned record set is called a dataset. Simply running a query does not change the actual table data. However, you may alter the data in a dataset and the changes will be reflected in the underlying table.

Using Query Design View



Tables pane

Design pane

- Query Design grid has two panes – the table pane and the design pane
- Striking the F6 key will toggle you between sections

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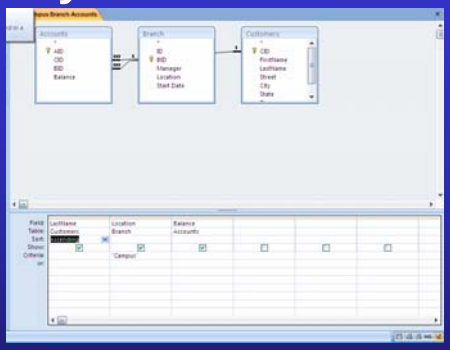
Query Design view has two panes – the table pane and the design pane. Striking the F6 key will toggle you between panes.

Select Query



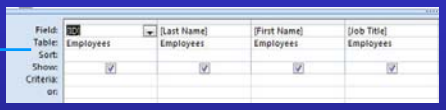
- Searches associated tables and returns a dataset that matches the query parameters
- Changes made to the dataset will be reflected in the associated tables

A select query is a basic query that searches associated tables and returns a dataset that matches the query parameters

Changes made to the dataset will be reflected in the associated tables.

Specifying Criteria in a Select Query

Fields in design grid allow us to specify criteria for the dataset



- Field row – displays the field name
- Sort row – enables you to sort the dataset
- Show row – controls whether or not you see a field in the dataset
- Criteria row – determines the records that will be selected for display

Parts of the Design Grid include:

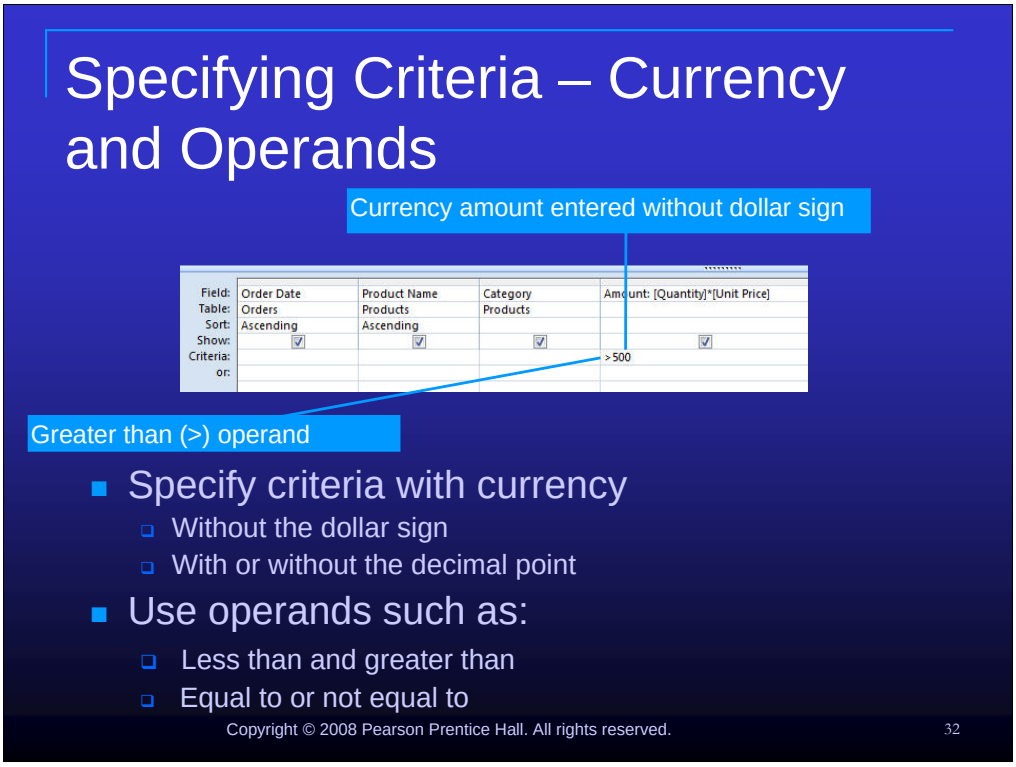
Field Row – displays the field name

Sort row – enables you to sort the dataset

Show Row – controls whether or not you see a field in the dataset

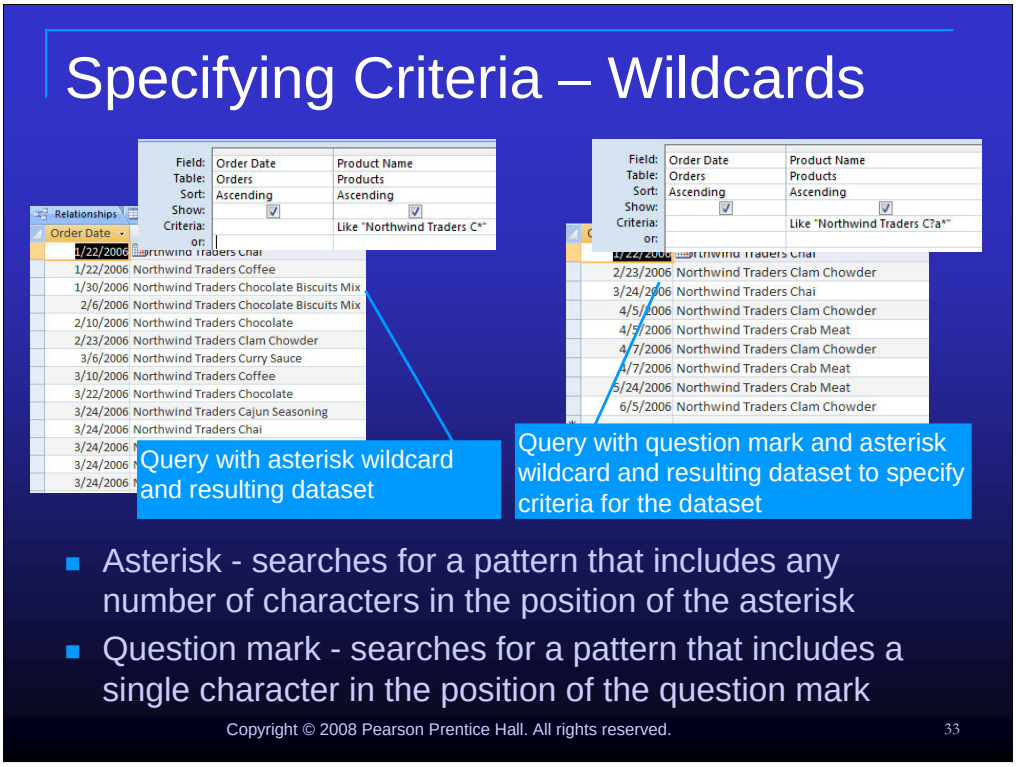
Criteria row – determines the records that will be selected for display

Specifying Criteria – Currency and Operands



- Specify criteria with currency
  - Without the dollar sign
  - With or without the decimal point
- Use operands such as:
  - Less than and greater than
  - Equal to or not equal to

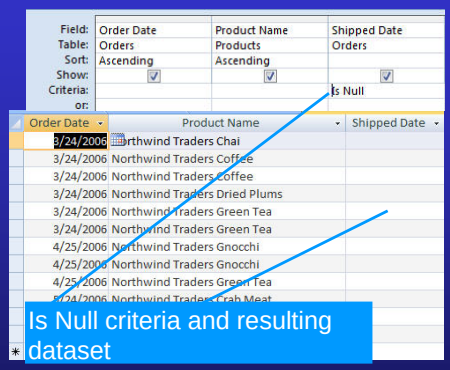
Specify criteria with currency without the dollar sign and with or without the decimal point. Use operands such as less than, greater than, equal to or not equal to, in order to compare your criteria against data in the specified field.

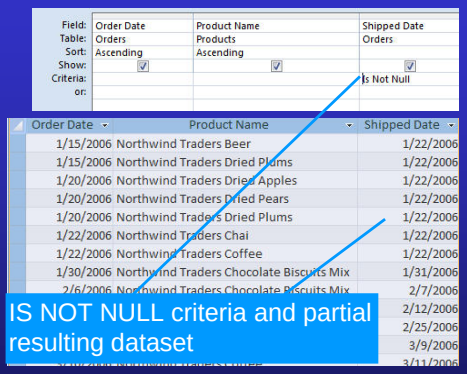


The asterisk wildcard searches for a pattern that includes any number of characters in the position of the asterisk.

The question mark searches for a pattern that includes a single character in the position of the question mark.

Specifying Criteria – Null Values





- IS NULL finds only records that have no value
- IS NOT NULL excludes Null value records

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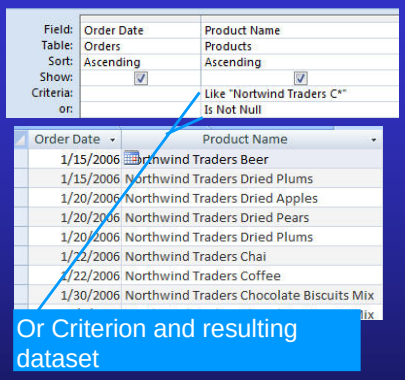
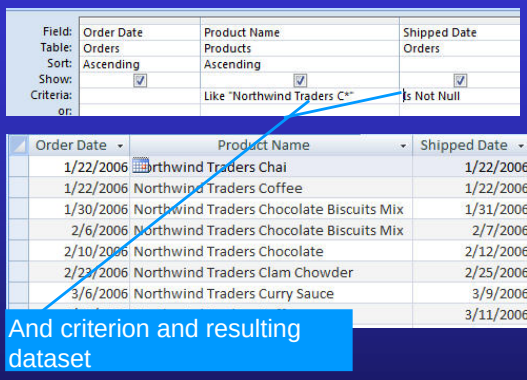
Specify IS NULL in the criterion field to find fields that have no data. Specify IS NOT NULL to exclude Null value fields from the dataset.

Specifying Criteria – And and Or



Or Criterion and resulting dataset



And criterion and resulting dataset

- OR finds records that can match one or more conditions
- AND finds records that must match all criteria specified

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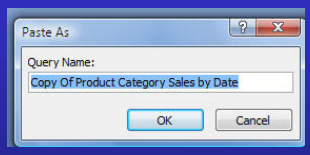
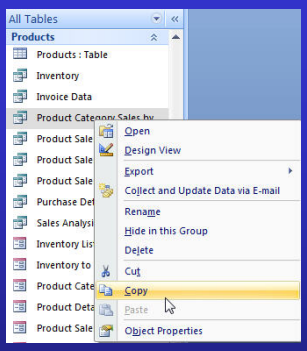
Use the OR criterion to find records that can match one or more conditions specified. Use the AND criterion to find records that must match all criteria specified.

Copy a Query

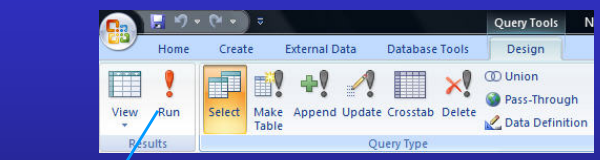




- Right click on the query - chose Copy form the shortcut menu
- Right click and chose paste
- In the Paste as dialog box, give the query a new name

One way to copy is query is to right click on the query in the Navigation pane and chose Copy from the shortcut menu. Right click again in the navigation pane and chose paste. In the Paste as dialog box, give the query a new name.

Run a Query



Run command

- Running, or executing, a query is done by clicking the Run command

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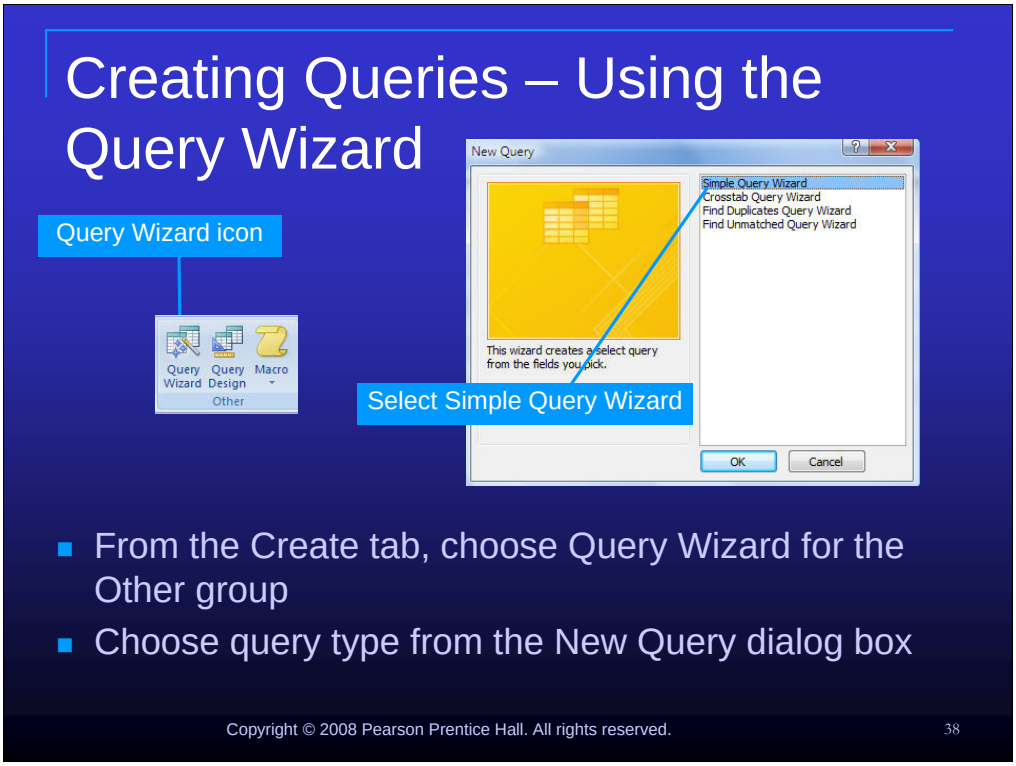
Running, or executing, a query is done by clicking the Run command located by clicking the Design tab and accessing the Results group.

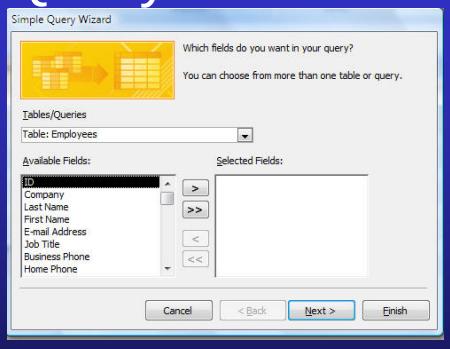
Creating Queries – Using the Query Wizard

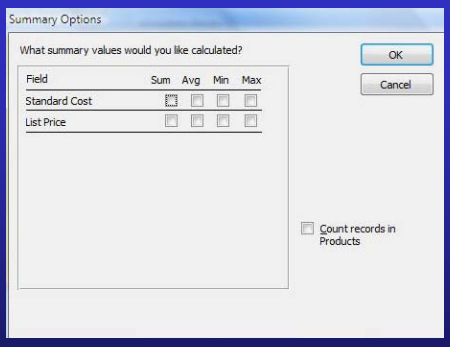


- From the Create tab, choose Query Wizard for the Other group
- Choose query type from the New Query dialog box

To create a query using the Query Wizard, click the Create tab, choose Query Wizard from the Other group and choose the query type from the New Query dialog box.

Creating Queries – Using the Query Wizard: continued

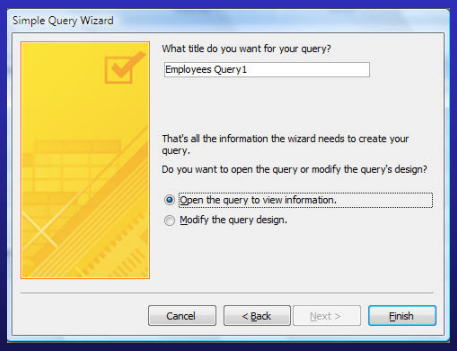




- Select the Table/Queries to include and choose the desired fields
- Select aggregate totals needed in the Summary Options box

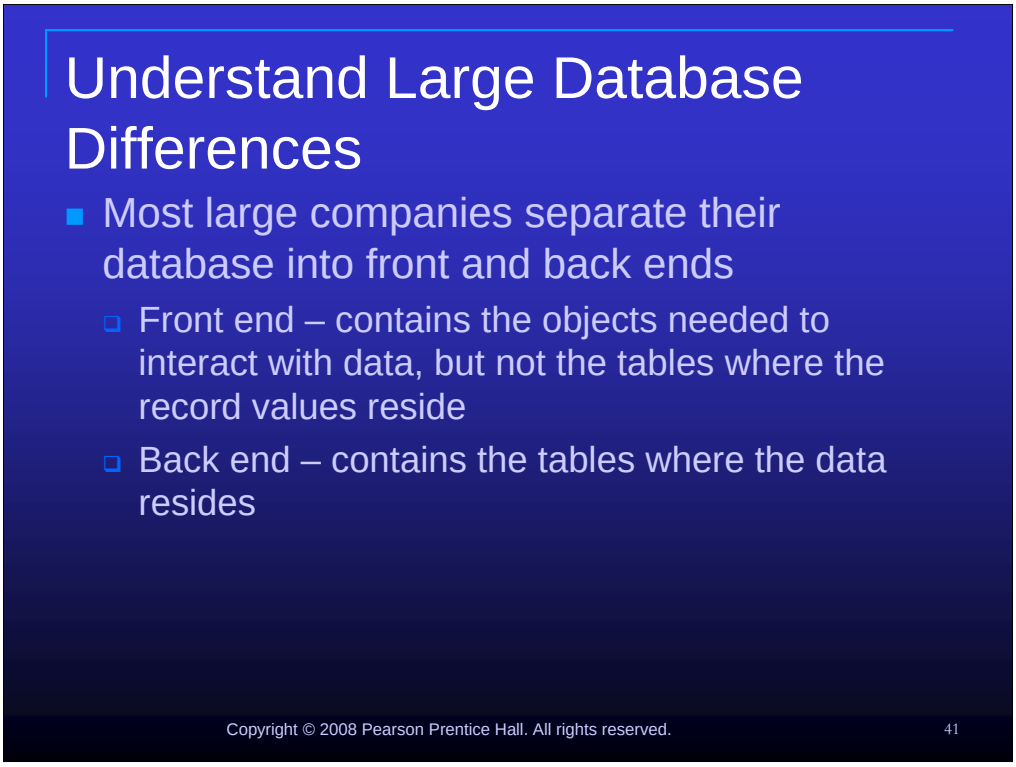
After establishing the type of query you wish to create, select the Table/Queries you wish to base your query on and choose the desired fields. Select aggregate totals you wish to display in the Summary Options box.

Creating Queries – Using the Query Wizard: continued



- Title your query and open in Datasheet View or Query Design View

The final step in using the Query Wizard is to name your query and open in Datasheet View or Query Design View.



To ensure data integrity, to maintain security and to avoid mishaps, most large companies separate their database into front and back ends.

Front end – contains the objects needed to interact with data, but not the tables where the record values reside.

Back end – contains the tables where the data resides

Be sure to read the material in the text carefully, complete the exercises as directed by your instructor, and ask questions as they arise.