

# Introduction to Computer Applications

CISY 1225  
Chapter 10

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## Next Week

- No new topics
- I will not be here
  - Mashtura will help you
- Class time is for practice
- Do your own practice
- Projects 10-1 and 10-2 available on Friday
- Try to finish all projects and exercises

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# CISY 1225 Custom book

## Chapter 10 Relational Databases and Queries

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# Exploring Microsoft Access 2010

by Robert Grauer, Keith  
Mast, Mary Anne Poatsy



## Chapter 2 Relational Databases and Queries

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## Objectives

- Create tables
- Understand table relationships
- Share data with Excel
- Establish table relationships
- Use the Query Wizard
- Create and modify
  - a single and multiple table query

## Table Design: Designing Data

- Table Definition
  - Storage location in a database
- Input vs. Output in Design

## Designing Fields Guidelines

1. Include the necessary data
2. Design for now and the future
3. Store data in its smallest parts
4. Add calculated fields to a table
5. Design to accommodate date arithmetic
6. Link tables using common fields

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## Include Necessary Data

- Determine what data is necessary
- Create a rough draft of reports that may be needed
- Create tables based on fields necessary for reports

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## Design for Now and the Future

- Organizations evolve over time
- Databases should evolve with the organization
  - Anticipate future needs of the organization
  - Build flexibility into system to satisfy future needs

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## Store Data in Smallest Possible Pieces

- Creating a name field with the entire name in it violates good database design and reduces the usefulness of the data
- Divide data into the smallest pieces that you're going to need to access
  - Example: Prefix, FirstName, LastName, Suffix
- Provide flexibility for the user

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## Calculated Fields in a Table

- Produce a value from an expression or function that references one or more existing fields
- Access 2010 allows the user to store calculated fields
  - Can be a benefit or a potential problem
  - Exercise caution when using calculated (derived) fields

## Design to Accommodate Date Arithmetic

- Calculated fields can also create date/time data
- Plenty of examples available for using date/time date arithmetic

## Link Tables Using Common Fields

- Tables may be joined based on a common field
- Join lines are created
  - Manually by the user, or
  - Automatically by Access when two fields in separate tables share the same name between two related tables
- Avoid Data redundancy errors
  - The unnecessary storage of duplicate data in two or more tables

## Creating Tables

- Create fields in Design View
- Import data from another database or application
  - Examples: Excel spreadsheets or Word text files
- Enter data directly into rows in Datasheet view

## Creating Fields in Tables

- Field names should be meaningful
- Rules for naming fields:
  - Length can be up to 64 characters
  - Can include letters, numbers and spaces
  - Access uses **CamelCase** notation
    - Use uppercase letters for each first letter of each new word
    - Example: ProductCost

## Field Data Types

- Every field has a data type
- Determines:
  - The type of data that can be entered
  - The operations that can be performed on that data
- Access recognizes 10 data types



## Access Data Types

- Number
- Text
- Memo
- Date/Time
- Currency
- Yes/No
- OLE
- AutoNumber
- Hyperlink
- Attachment

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## Foreign Key Review

A field in one table that is also a primary key of another table

SpeakerID is the primary key of the Speakers

SpeakerID is the foreign key in the SessionSpeaker table (duplicates are allowed)

SpeakerID	First Name	Last Name
1	YourName	YourName
2	Warren	Brasington
3	James	Shindell
4	Edward	Wood
5	Kristine	Park
6	William	Williamson
7	Holly	Davis
8	David	Tannen
9	Jeffrey	Jacobsen
10	Jerry	Masters
11	Kevin	Kline
12	Jessica	Withers
13	Betsy	Allman

SpeakerID	SessionID
1	S01
1	S04
1	S09
1	S10
1	S13
2	S01
3	S02
3	S06
3	S09
4	S09
4	S12
5	S02
5	S07

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# Using Table Views

## Datasheet View

Active record

ID	Company	Last Name	First Name	E-mail Address	Job Title	Business Ph
4	Company D	Lee	Christina		Purchasing Manager	(120)555-0100
5	Company E	O'Donnell	Martin		Owner	(120)555-0100
6	Company F	Pérez-Osarta	Francisco		Purchasing Manager	(120)555-0100
7	Company G	Xie	Ming Yang		Owner	(120)555-0100
8	Company H	Andersen	Elizabeth		Purchasing Representative	(120)555-0100
9	Company I	Mortensen	Sven		Purchasing Manager	(120)555-0100
10	Company J	Wacker	Roland		Purchasing Manager	(120)555-0100
11	Company K	Kirschner	Peter		Purchasing Manager	(120)555-0100
12	Company L	Edwards	Julie		Purchasing Manager	(120)555-0100
13	Company M	Ludick	Andre		Purchasing Representative	(120)555-0100
14	Company N	Grillo	Carlos		Purchasing Representative	(120)555-0100
15	Company O	Kupkova	Helena		Purchasing Manager	(120)555-0100
16	Company P	Goldschmidt	Daniel		Purchasing Representative	(120)555-0100
17	Company Q	Bagel	Jean Philippe		Owner	(120)555-0100
18	Company R	Aulzer Microni	Catherine		Purchasing Representative	(120)555-0100
19	Company S	Eggerer	Alexander		Accounting Assistant	(120)555-0100
20	Company T	Li	George		Purchasing Manager	(120)555-0100
21	Company U	Tham	Bernard		Accounting Manager	(120)555-0100
22	Company V	Ramos	Luisana		Purchasing Assistant	(120)555-0100
23	Company W	Entin	Michael		Purchasing Manager	(120)555-0100
24	Company X	Hasselberg	Jonas		Owner	(120)555-0100
25	Company Y	Rudman	John		Purchasing Manager	(120)555-0100
27	Company AA	Toh	Karen		Purchasing Manager	(120)555-0100
28	Company BB	Raghuw	Amranch		Purchasing Manager	(120)555-0100
29	Company CC	Lee	Soo Jung		Purchasing Manager	(120)555-0100

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## Work with Field Properties

- Field property
- Text data type
- Number data type
- Caption property
- Validation rule

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## Access Field Properties

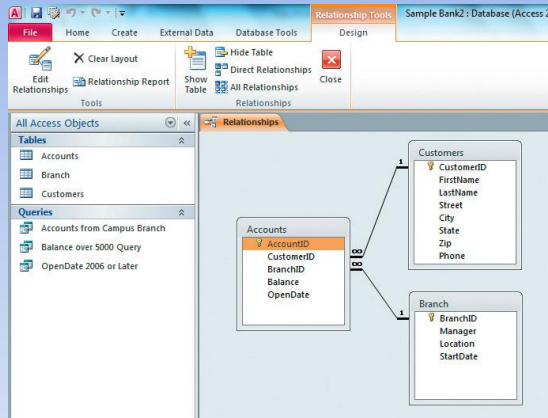
- Field Size
- Format
- Input Mask
- Caption
- Default Value
- Validation Rule
- Validation Text

## Access Field Properties (continued)

- Required
- Allow Zero Length
- Indexed
- Expression
- Result Type

## Understanding Table Relationships

- Efficiently combine data from related tables
- Create queries, forms, and reports

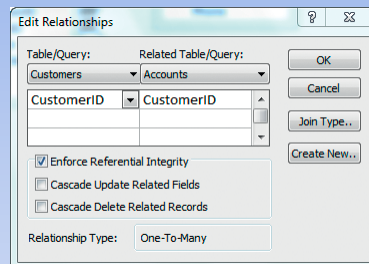


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## Establishing Referential Integrity

- Edit Relationships dialog box
- Select Enforce Referential Integrity checkbox



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## Set Cascade Options

- Cascade Update Related Fields
- Cascade Delete Related Records

Click Enforce Referential Integrity

Click Cascade Update in  
case the primary key changes

Click Cascade Delete with caution

The screenshot shows the 'Edit Relationships' dialog box. At the top, 'Table/Query:' is set to 'Customers' and 'Related Table/Query:' is set to 'Accounts'. Below this, a table structure is shown with 'CustomerID' as the primary key in both tables. The 'Enforce Referential Integrity' checkbox is checked. Underneath, 'Cascade Update Related Fields' is checked, and 'Cascade Delete Related Records' is unchecked. The 'Relationship Type' is set to 'One-To-Many'. On the right side, there are buttons for 'OK', 'Cancel', 'Join Type...', and 'Create New...'.

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## Indexing to Retrieve Data Quickly

- Provides quick sorting based on the primary key
- Provides quick retrieval of data based on the primary key

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## Options on External Data Tab

- Import & Link
- Export
- Collect Data
- Web Linked Lists

Click Excel to import spreadsheet data

External Data Tab



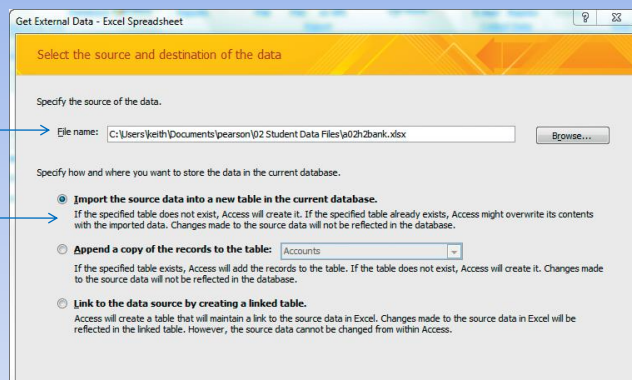
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## Import Data from Excel

Click Browse to find a spreadsheet

Decide what you want to do with the data



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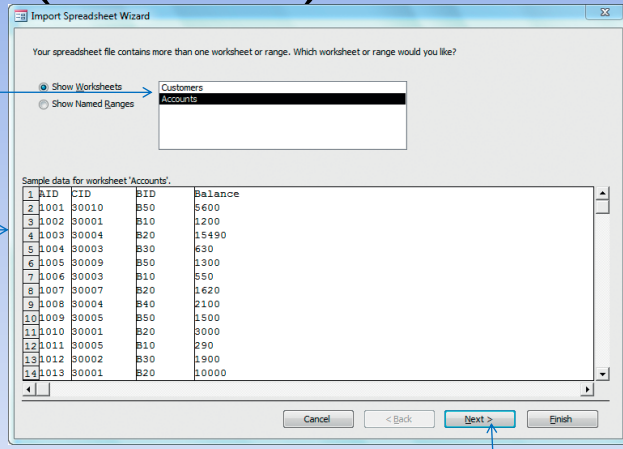
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# Import Data from Excel (continued)

Choose the worksheet to import

Preview of the worksheet data

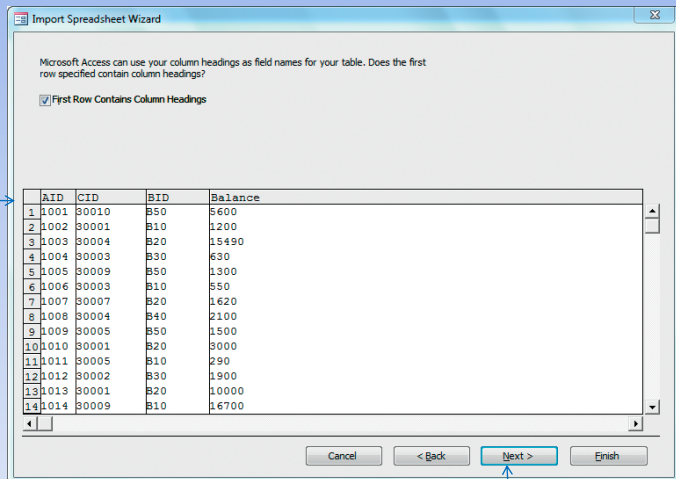
Click Next to continue



# Import Data from Excel (continued)

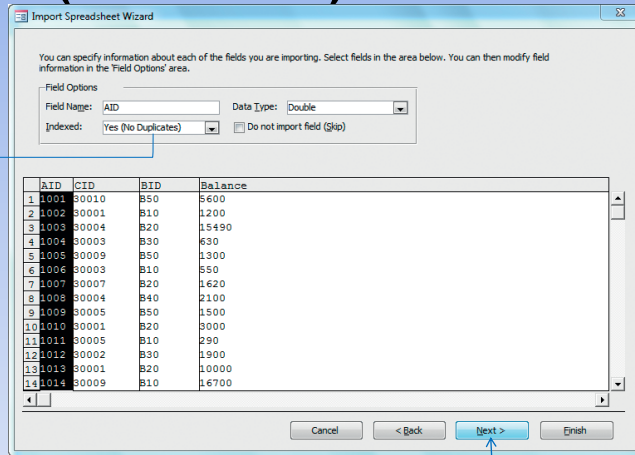
Column headings

Click Next to continue



# Import Data from Excel (continued)

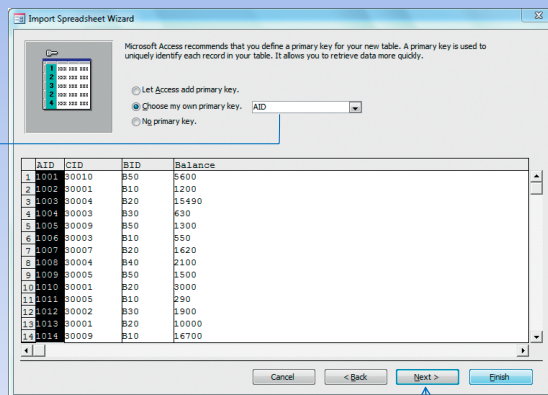
Change Indexed property to Yes (No Duplicates)



Click Next to continue

# Import Data from Excel (continued)

AID becomes the primary key

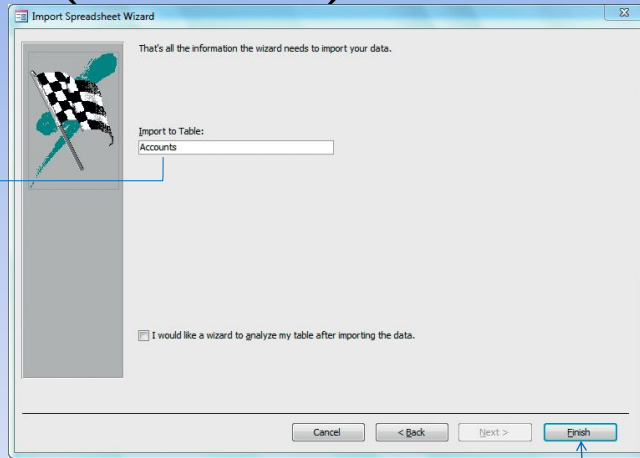


Click Next to continue



## Import Data from Excel (continued)

Accounts becomes the  
table name



Click Finish to  
import the data

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## Types of Relationships

- One-to-one relationship
  - Example: you have one birth certificate
- One-to-many relationship
  - You are taking multiple courses
- Many-to-many relationship
  - Artificially constructed relationship

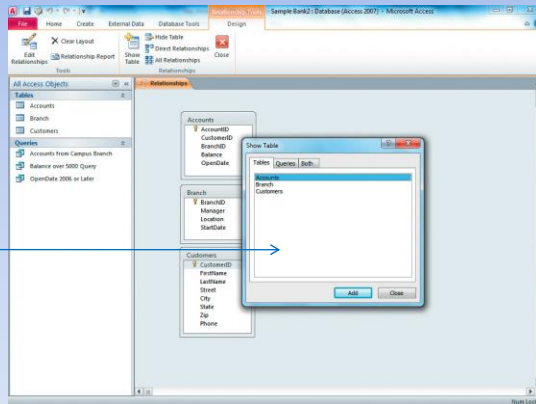
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## Establishing a One-to-Many Relationship

- Open Relationships window
- Add tables
- Establish relationships

Show Table window



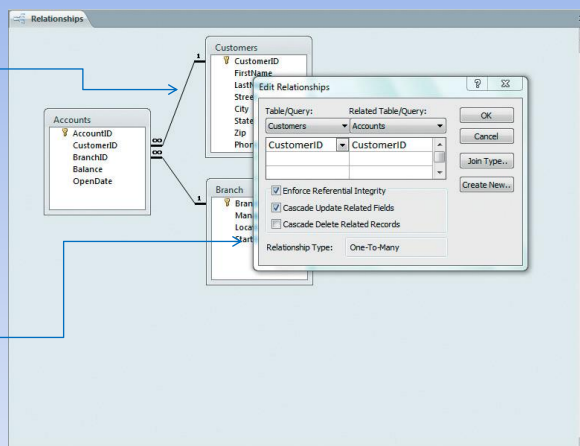
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## Relationships Between Tables

One-to-many relationships

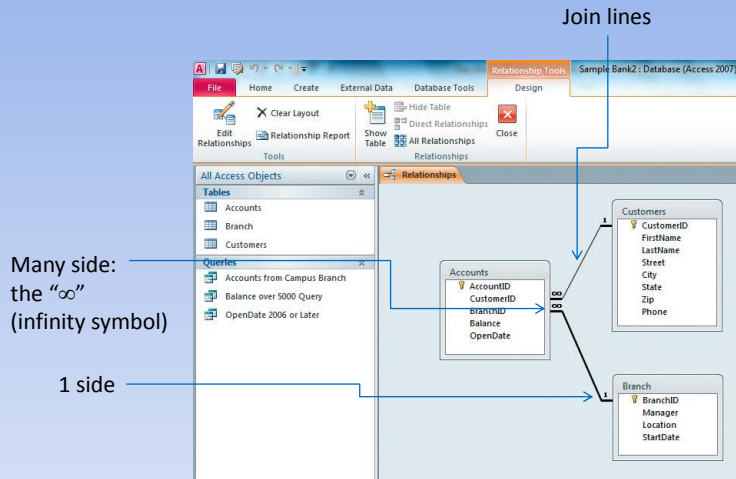
Edit Relationships dialog box



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## Relationships Window

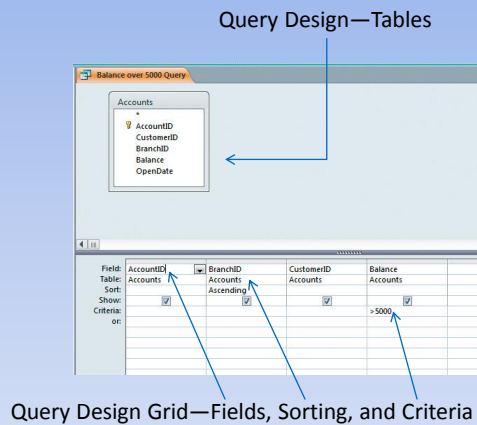


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## Single-Table Queries

- Show Table
- Design Grid to add
  - Field row
  - Table row
  - Sort row
  - Show row
  - Criteria



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## Datasheet View of Results

Query results in Datasheet view

Nine records match the criteria

AccountID	BranchID	CustomerID	Balance
1014	B10	30009	\$16,700.00
1013	B20	30001	\$10,000.00
1003	B20	30004	\$15,496.00
1019	B30	30004	\$14,250.00
1018	B30	30001	\$18,700.00
1018	B40	30005	\$7,800.00
1021	B50	30011	\$21,004.00
1020	B50	30001	\$12,000.00
1001	B50	30010	\$5,600.00

Only accounts with a balance over \$5,000

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## Specifying Criteria for Different Data Types

- Field data type
- Delimiters
- Criteria

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## Wildcards

- The question mark (?)
  - Example: *H?LL* will return *Hall*, *Hill*, and *Hull*
- The asterisk (\*)
  - Example: *S\*nd* will return *Sand*, *Stand*, and *StoryLand*

## Operators & Operands

- Operators
- Operands

## Null and Zero-Length Strings

- Null
- Is Not Null

## Query Sort

- Determines the order of records
- Determined from left to right

## AND, OR, and NOT Criteria

- And operator
- Or operator
- Not operator

Field:	AccountID	BranchID	CustomerID	Balance
Table:	Accounts	Accounts	Accounts	Accounts
Sort:		Ascending		
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:		"B20"		> 5000
or:				

Field:	AccountID	BranchID	CustomerID	Balance
Table:	Accounts	Accounts	Accounts	Accounts
Sort:		Ascending		
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:		"B20"		> 5000
or:				

Field:	AccountID	BranchID	CustomerID
Table:	Accounts	Accounts	Accounts
Sort:		Ascending	
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:		Not "B20"	
or:			

Field:	AccountID	BranchID	CustomerID
Table:	Accounts	Accounts	Accounts
Sort:		Ascending	
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:		"B20"	
or:		"B30"	

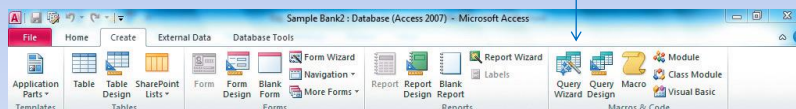
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## Using the Query Wizard

- Launch Query Wizard
- Modify Query in Design view

Query Wizard



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# Query Wizard

Which fields do you want in your query?  
You can choose from more than one table or query.

Tables/Queries  
Table: Customers

Available Fields: Last Name, Street, City, State, Zip, Phone

Selected Fields: CustomerID, FirstName

Buttons: >, >>, <, <<, Cancel, < Back, Next >, Finish

Fields already moved to the Selected Fields list

Select a Table or Query

Select detail or summary data

Remove all fields from the Selected Fields list

Remove a single field from the Selected Fields list

Move all fields to the Selected Fields list

Move a single field to the Selected Fields list

Would you like a detail or summary query?  
 Detail (shows every field of every record)  
 Summary  
 Summary Options ...

Buttons: Cancel, < Back, Next >, Finish

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# Multi-Table Queries

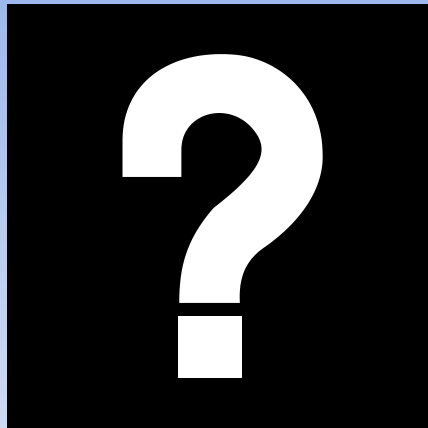
- Permit multiple tables
- Use related tables
- Similar to creating a single-table query
- Fixing a common problem



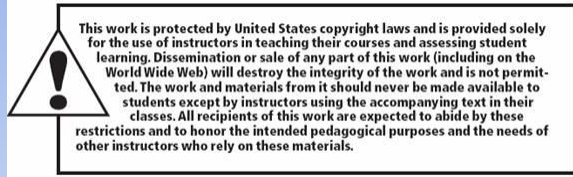
## Summary

- This chapter introduced the concept of tables and query design.
- Tables and forms are used to input data, and to create queries and reports to extract information from the database in an organized and useful way.
- The information to be extracted, though, is dependent on the quality of the underlying tables.

## Questions



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