Building Smarter Tables

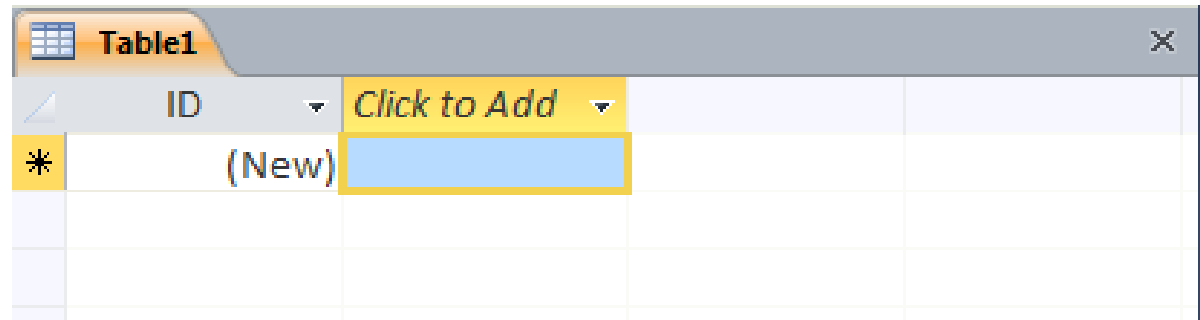# Designing tables

❑ Designing a table is a multistep process:
 – Create the new table.
 – Enter field names, data types, properties, and (optionally) descriptions.
 – Set the table's primary key.
 – Create indexes for appropriate fields.
 – Save the table's design.

Designing tables

There are two main ways to add new tables to an Access database. On the Ribbon

❑ Clicking on the **Table** button: Adds a complete new table in datasheet view, with an ID column already inserted, and a **Click to Add** column to the right of the ID field
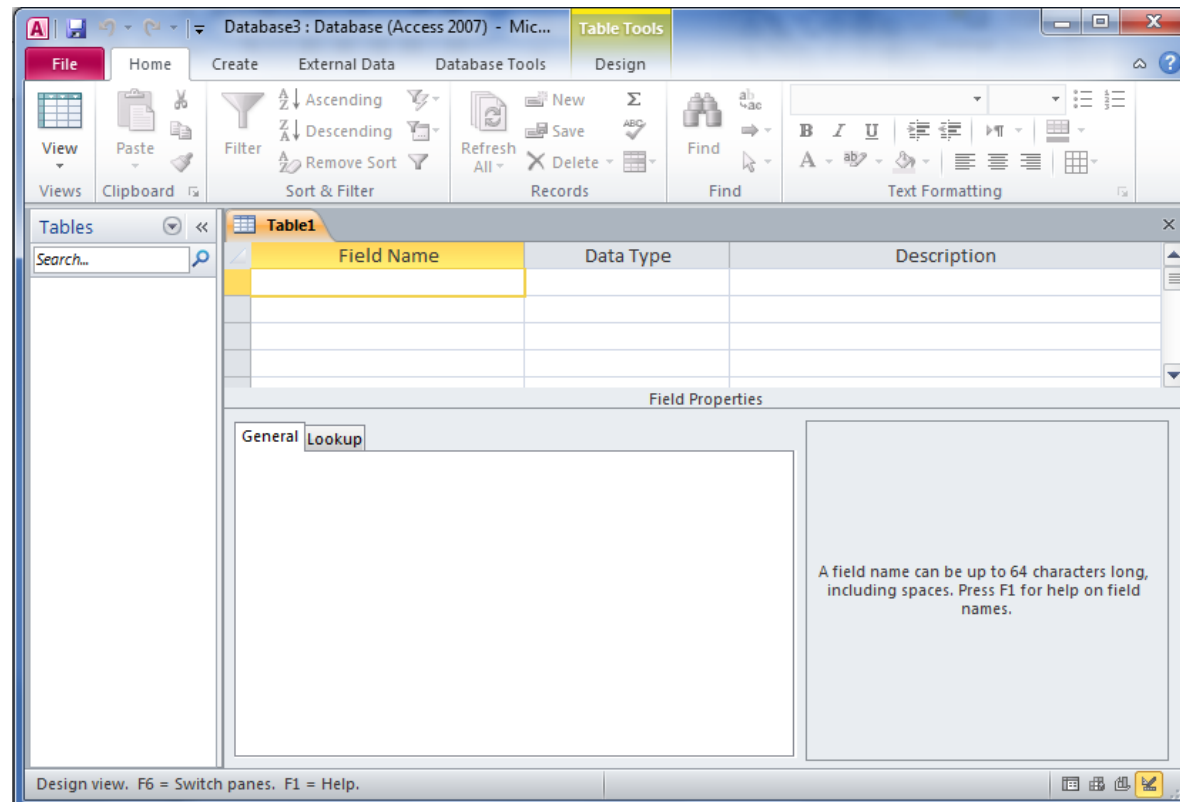
Designing tables

❑ When create a new field by typing data in Datasheet view, Access makes an educated guess about the data type by examining the information you've just typed in.

❑ Or Click to label "**Click to Add** " and select data type of field

❑ Enter data in the new column.

❑ Assign the field's name by right-clicking the field's heading → Rename Column, and entering a name for the field.

Designing tables

❑ Clicking on the **Table Design** button: Adds a table in Design view to the database.

Designing tables

❑ In the design view Window:
  – Field Name: enter field name.
  – Data type: select data type of field.
  – Field properties: set the properties of fields.
  – Description: Add a description for a field.
❑ In the design view, you can:
  – Add a new field to the end of your table.
  – Add a new field between existing fields.
  – Move a field.
  – Delete a field.

Setting the Primary Key

❑ **Choosing a primary key:**
- Uniquely identify each record.
- Cannot be null.
- Must exist when the record is created.
- Must remain stable.
- Should be simple and contain as few attributes as possible.

Setting the Primary Key

❑ **Primary keys provide other benefits:**
  - A primary key is always an index.
  - An index maintains a order of one or more fields that greatly speeds up queries, searches, and sort requests.
  - When add new records to table, Access checks for duplicate data and doesn't allow any duplicates for the primary key field.
  - By default, Access displays a table's data in the order of its primary key.

Setting the Primary Key

❑ **Creating the primary key:** can be created in any of three ways. With a table open in Design view:

– Select the field to be used as the primary key and click the Primary Key button in the Tools group in the ribbon's Design tab.

– Right-click on the field and select Primary Key.

– Save the table without creating a primary key, and allow Access to automatically create an AutoNumber field.

Access Data Types

❑ When designing table, specify data type of each field by selecting Data Type in Data Type column
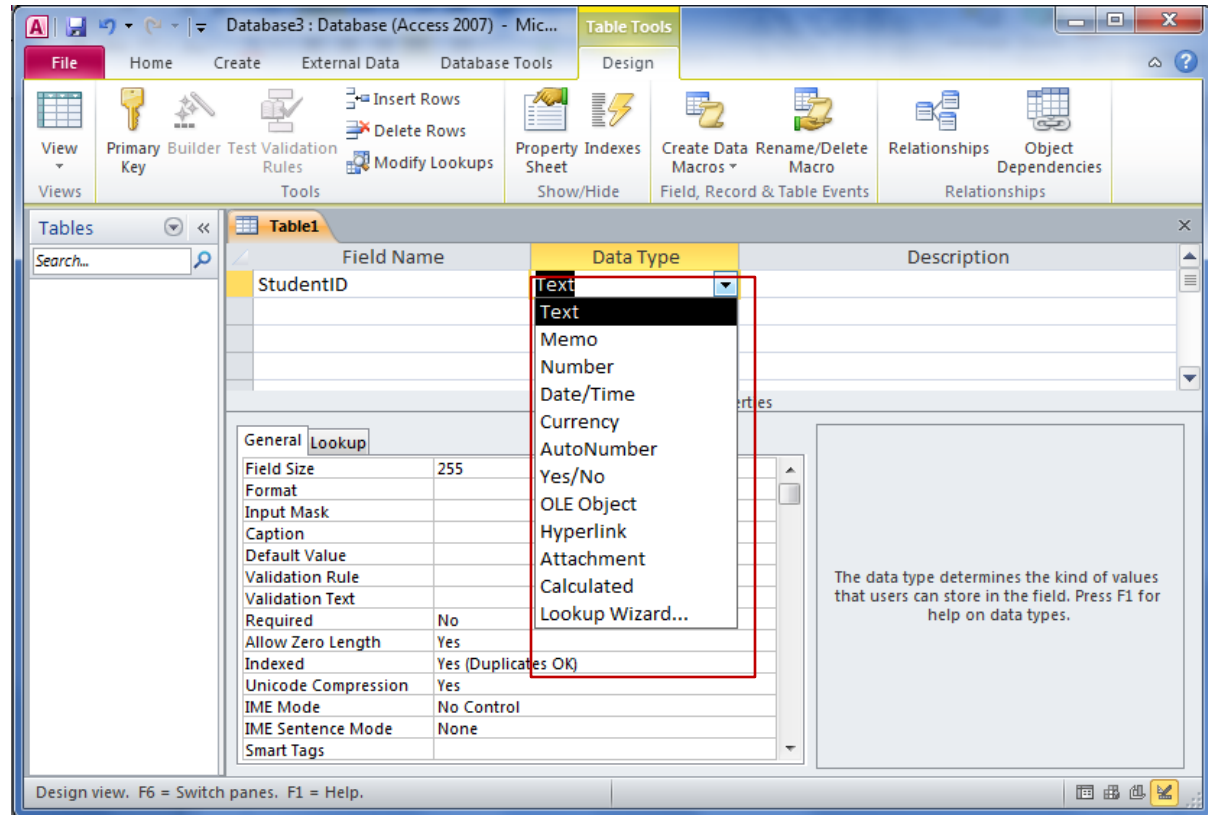
Access Data Types

Data Type	Type of Data Stored	Storage Size
Text	Alphanumeric characters	255 characters or less
Memo	Alphanumeric characters	65,536 characters or less
Number	Numeric values	1, 2, 4, or 8 bytes, 16 bytes
Date/Time	Date and time data	8 bytes
Currency	Monetary data	8 bytes
AutoNumber	Automatic number increments	4 bytes, 16 bytes

Access Data Types

Data Type	Type of Data Stored	Storage Size
Yes/No	Logical values: Yes/No, True/False	1 bit (0 or –1)
OLE Object	Pictures, graphs, sound, video	Up to 1GB (disk space limitation)
Hyperlink Link	to an Internet resource	64,000 characters or less
Attachment	A special field that enables you to attach external files to an Access database.	Varies by attachment
Lookup Wizard	Displays data from another table	Generally 4 bytes
Calculated	the value automatically, based on an expression with simple math and combine the values from other fields.	

Assigning field properties

Each field data type has its own set of properties.

- **Field Size**: applied to Text fields, specified number of characters (1–255). The default is 50.

- **Format**: Changes the way data appears after you enter it. There are many different types of formats depend on data type.

- **Input Mask**: Used for data entry into a predefined format.

Assigning field properties

❑ **Decimal Places**: Specifies the number of decimal places for the Currency and the Single, Double, and Decimal Number data types.

❑ **Caption**: Optional label for form and report fields. Access uses the Caption property instead of the field name in these situations.

❑ **Default Value**: The value automatically provided for new data entry into the field.

Assigning field properties

- **Validation Rule**: Ensures that data entered into the field conforms to some rule.
- **Validation Text**: Displays a message when data fails validation.
- **Required**: Specifies whether you must enter a value into a field.
- **Allow Zero Length**: Determines whether you may enter an empty string ("") into a text field to distinguish it from a null value.
- **Indexed**: Speeds up data access and (if desired) limits data to unique values.

Assigning field properties

❑ **Format**: specifies the data is displayed or printed
- – (space): Display spaces as characters.
- – "Some Text": Display the text between the quotes as literal text.
- – ! (exclamation point): Left-aligns the display.
- – *(asterisk): Fills empty space with the next character.
- – \(backslash): Displays the next character as literal text.
- – [color]: Displays the output in the color (black, blue, green, cyan, red, magenta, yellow, or white)

Assigning field properties

❑ **Number and Currency field format**

– **General Number**: The number is displayed in the format in which it was entered.

– **Currency**: Add a thousands separator, use a decimal point with two digits to the right of the decimal. A Currency field value is shown with the currency symbol.

– **Fixed**: Always display at least one digit to the left and two digits to the right of the decimal point.

Assigning field properties

- **Standard**: Use the thousands separator with two digits to the right of the decimal point.
- **Percent**: Percent values are displayed with two decimal places to the right of the decimal point.
- **Scientific**: Scientific notation is used to display the number.
- **Euro**: Prefixes the euro currency symbol to the number.

Assigning field properties

❑ Date/Time field formats

– General Date: If the value contains a date only, don't display a time value and vice versa.

– Dates are displayed in the built-in Short Date format (mm/dd/yy).

– Long Date: Sunday, May 13, 2012.

– Medium Date: 13-May-12.

– Short Date: 5/13/12.

– Long Time: 9:21:17 AM.

– Medium Time: 09:21 AM.

– Short Time: 09:21.

Assigning field properties

❑ **Text and Memo field formats**: displayed as plain text by default. If a particular format is to be applied to Text or Memo field data, use the following symbols to construct the format specified:

- – @: A character or space is required.
- – &: A character is optional (not required).
- – <: Force all characters to their lowercase equivalents.
- – >: Force all characters to their uppercase equivalents.

Assigning field properties

❑ Yes/No field formats: displays Yes, No, True, False, On, or Off, depending on the value stored in the field and the setting of the Format property for the field.

❑ Access predefines these rather obvious format specifications for the Yes/No field type:
  – Yes/No: Displays Yes or No
  – True/False: Displays True or False
  – On/Off: Displays On or Off

Assigning field properties

❑ **Input Mask**: makes it easier for users to enter the data in the correct format. An input mask limits the way the user inputs data into the application.

❑ The following characters are used to compose the Input Mask string:

  – 0: A digit is required, and plus (+) and (–) minus signs are not permitted.

  – 9: A digit is optional, and plus (+) and (–) minus signs are not permitted.
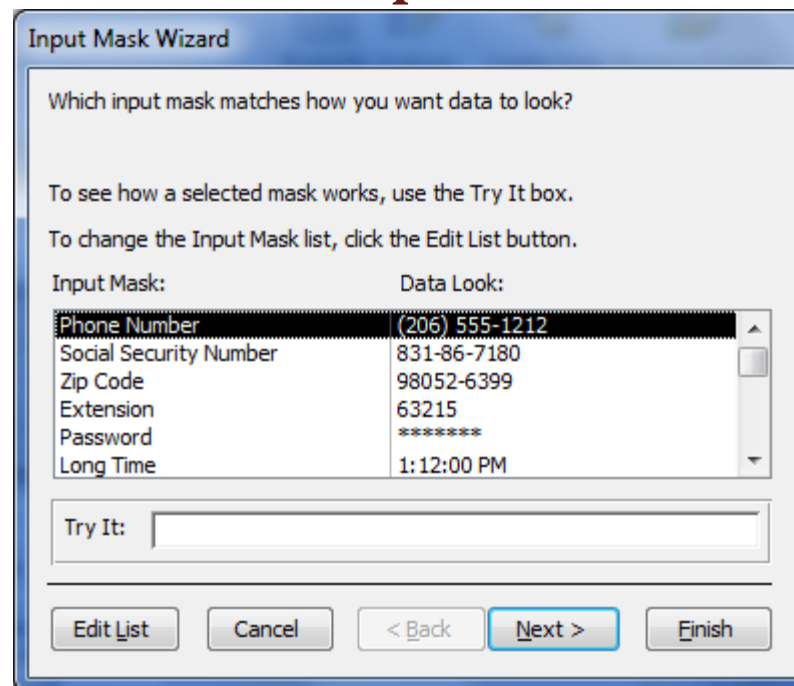
Assigning field properties

- #: Optional digit or space. Spaces are removed when the data is saved in the table.
- L: A letter from A to Z is required.
- ?: A letter from A to Z is optional.
- A: A character or digit is required.
- a: A character or digit is optional.
- &: Permits any character or space (required).
- C: Permits any character or space (optional).
- . (period): Decimal placeholder.
- , (comma): Thousands separator.

Assigning field properties

- : (colon): Date and time separator.
- ; (semicolon): Separator character.
- - (dash): Separator character.
- / (forward slash): Separator character.
- <: Converts all characters to lowercase.
- >: Converts all characters to uppercase.
- !: Displays the input mask from right to left. Characters fill the mask from right to left.
- \ (back slash): Displays the next character as a literal.

Assigning field properties

❑ The Input Mask Wizard: Although you can manually enter an Input Mask, you can easily create an Input Mask for Text or Date/Time type fields with the Input Mask Wizard.

Assigning field properties

❑ **Caption**: determines what appears in the default label attached to a control created by dragging the field from the field list onto a form or report and in Datasheet view that include the field.

❑ **Validation Rule:** establishes requirements for input into the field. It ensures that data entered into the table conforms to the requirements of the application.

❑ **The Validation Text**: contains a string that is displayed in a message box when the user's input doesn't satisfy the requirements of the Validation Rule property.

Assigning field properties

❑ **Required**: instructs Access to require input into the field. The value of a required field can't be Null.

❑ **Allow Zero Length**: specifies whether you want a zero-length string ("") to be a valid entry for a Text or Memo field. Allow Zero Length accepts the following values:

  – Yes: A zero-length string is a valid entry.

  – No: The table will not accept zero-length strings, inserts a Null value into the field when no valid text data is supplied

Assigning field properties

❑ **Indexed**: use a field as an index in the table.
  – **No**: The field is not indexed (default).
  – **Yes (Duplicates OK):** The field is indexed and Access permits duplicate values in the column.
  – **Yes (No Duplicates)**: The field is indexed and no duplicates are permitted in the column.

Understanding Attachment Fields

❑ Access 2010 includes the Attachment data type, enabling you to bring entire files into your Access database.

❑ When click on an attachment field, Access opens a small Attachments dialog enabling you to locate files to attach to the table.
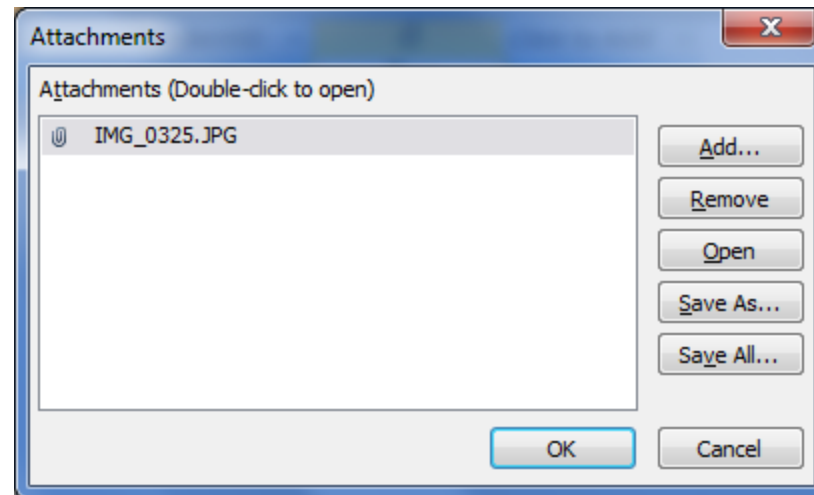
Relationships

❑ **Lookups with Related Tables**: Displays data from another related table.

- Open the child table in Design view.
- Select the field that links to the parent table, in the Data Type column, choose the Lookup Wizard option.
- Choose *"I want the lookup column to get values from another table or query"* →Next
- Choosethe parent table → Next

Relationships

- Add the field you use for the link to the list of Selected Fields → Next.
- Choose a field to use for sorting the lookup list →Next.
- The next step shows a preview of your lookup list. Make sure the "*Hide key column*" option is selected →Next.
- Choose a name for the lookup column.

Relationships

❑ More Exotic Relationships: Relational databases support a number of different types of relationships between tables, all designed to enforce the concept of referential integrity.

- **One-to-One Relationship**: one record in a table to zero or one record in another table.
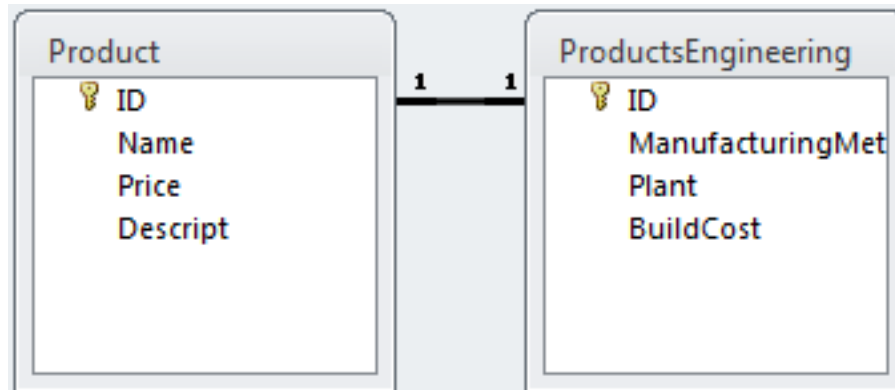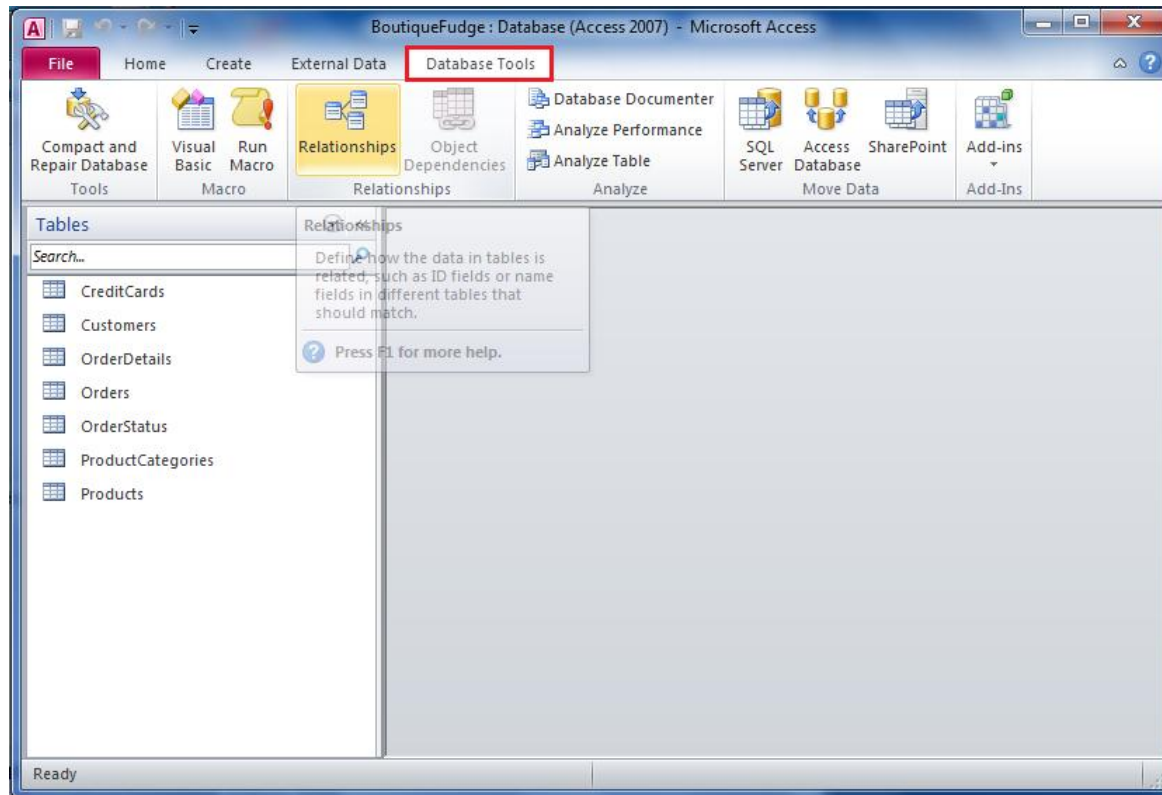
Relationships

- **One-to-many (parent-child) relationship:** that links a single record in one table to zero, one, or more records in another table.
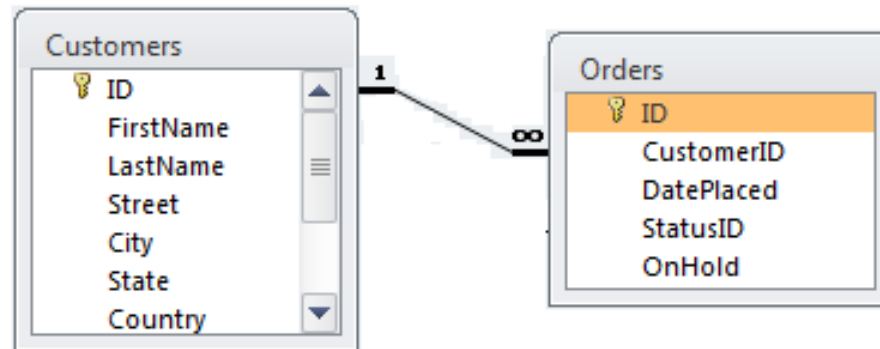
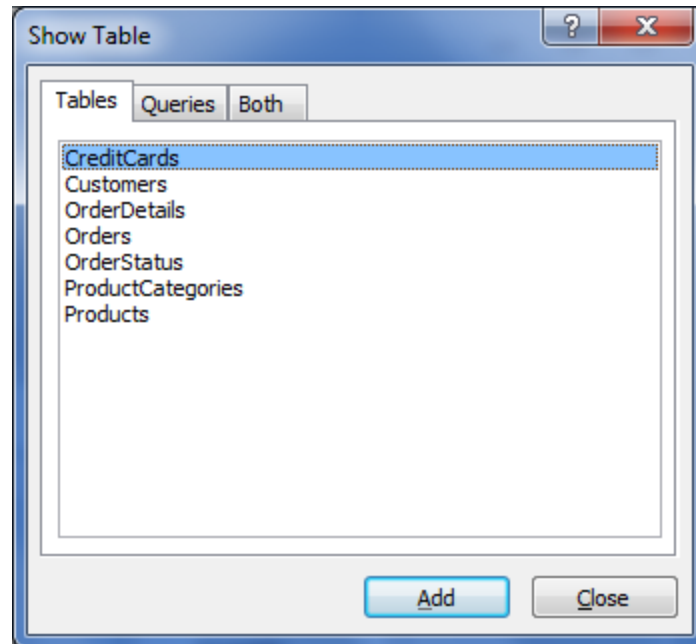- **Many-to-Many Relationship:** one or more records in one table to one or more records in another table.

Creating Relationships

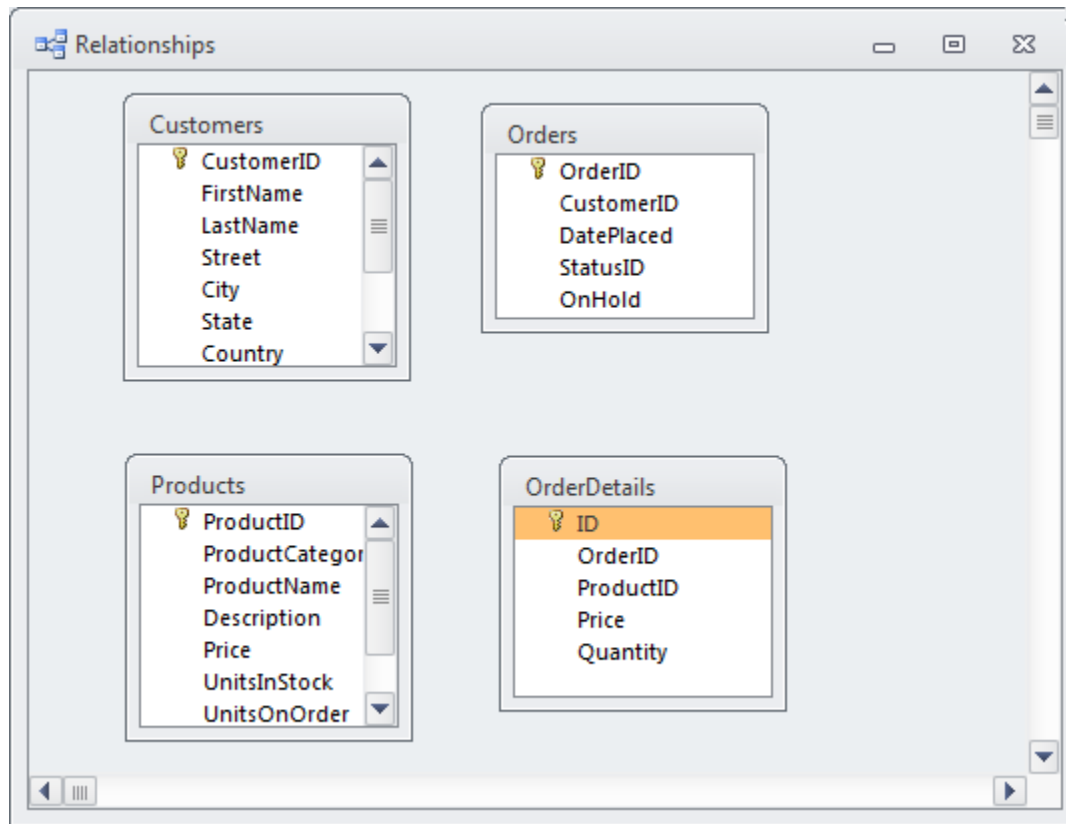❑ Select tab Database tools on the Ribbon and click *Relationships* button.

Creating Relationships

❑ Access will open *Relationships* tab with *Show Table* Dialog box. Select tables, queries or both, and hit *Add.*

Creating Relationships

❑ Appear the Relationships windows

Creating Relationships

❑ Click & hold the primary key of *parent table,* drag it and drop over *the foreign key of the child table.* Appear *Edit Relationships* dialog window.

❑ Specifying the Join Type between tables, and Enforce Referential Integrity.
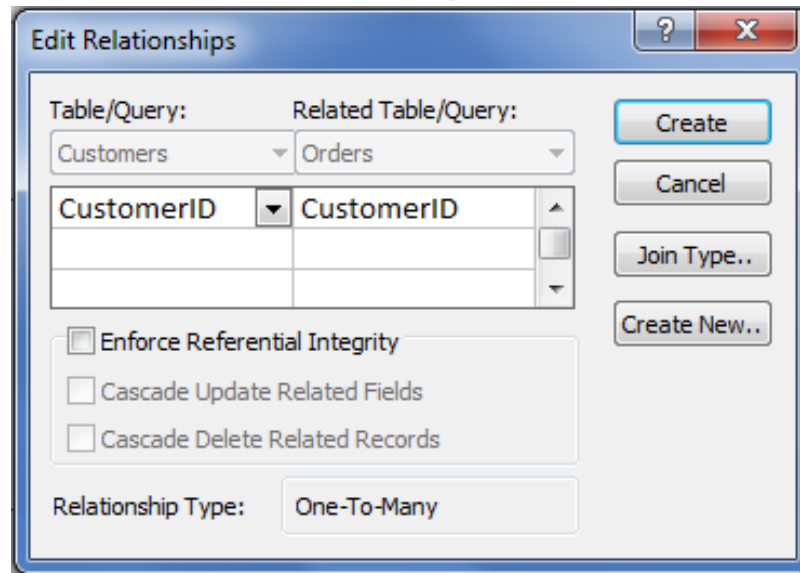
Creating Relationships

❑ **Enforcing referential integrity**: requires that every value of the foreign key you refer to in the child table must exist in the parent table.

– Enforcing referential integrity also enables two other options *cascading updates* and *cascading deletes.*

❑ **Cascade Update Related Fields***:* When user changes the contents of a related field then the new value is updated through all related tables.

Creating Relationships

❑ **Cascade Delete Related Records**: this option instructs Access to delete all related child records when a parent record is deleted.
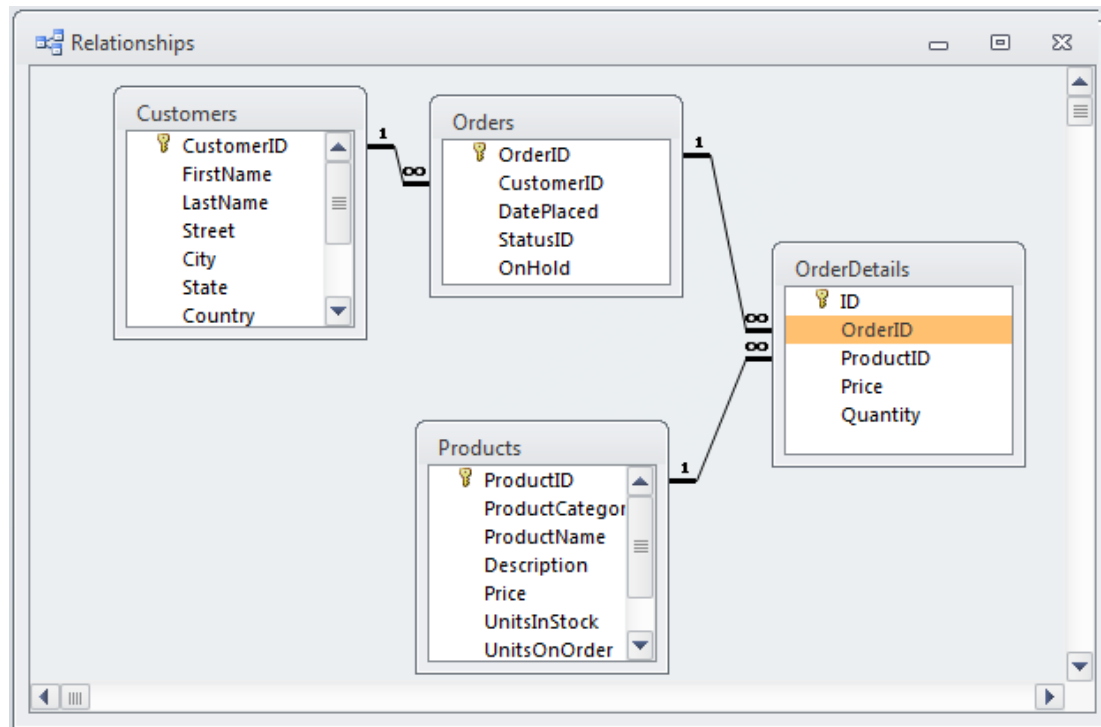
Deleting relationships

❑ You must first click on the line connecting the tables and press Delete to delete the relationship, and then delete each of the table pictures to completely remove the relationship.