

# 29. Microsoft Access 2007

Java

**Fall 2009**

*Instructor: Dr. Masoud Yaghini*

# Outline

---

- Database Design
- Starting Microsoft Access
- Tables
- Queries
- Forms
- Reports



# Database Design



## Design and Document Your Database

- A designers best tools are a pencil and paper
- It is important to plan what you are going to do
- The sooner you touch the computer the sooner you'll make a mistake

## Step 1: Determining Database Aims

- What have I got?
  - (Inputs)
- What do I want?
  - (Outputs)
- What do I need to do to get there?
  - (Process)

# Step 2: Entity discovery

- An entity is a class of persons, places, objects, events, or concepts about which we need to capture and store data.
  - Persons: agency, contractor, customer, department, division, employee, instructor, student, supplier.
  - Places: sales region, building, room, branch office, campus.
  - Objects: book, machine, part, product, raw material, software license, software package, tool, vehicle model, vehicle.
  - Events: application, award, cancellation, class, flight, invoice, order, registration, renewal, requisition, reservation, sale, trip.
  - Concepts: account, block of time, bond, course, fund, qualification, stock.

## Step 3: Determining Attributes or Fields

- An attribute is a descriptive property or characteristic of an entity.
- Synonyms include element, property, and field.
- STUDENT entity's attributes:
  - First Name
  - Last Name
  - Date of Birth
  - Address
  - ....

## Step 4: Data Types and Domains

- The data type for an attribute defines what type of data can be stored in that attribute.
- The domain (size) of an attribute defines what values an attribute can legitimately take on.



## Step 4: Data Types and Domains

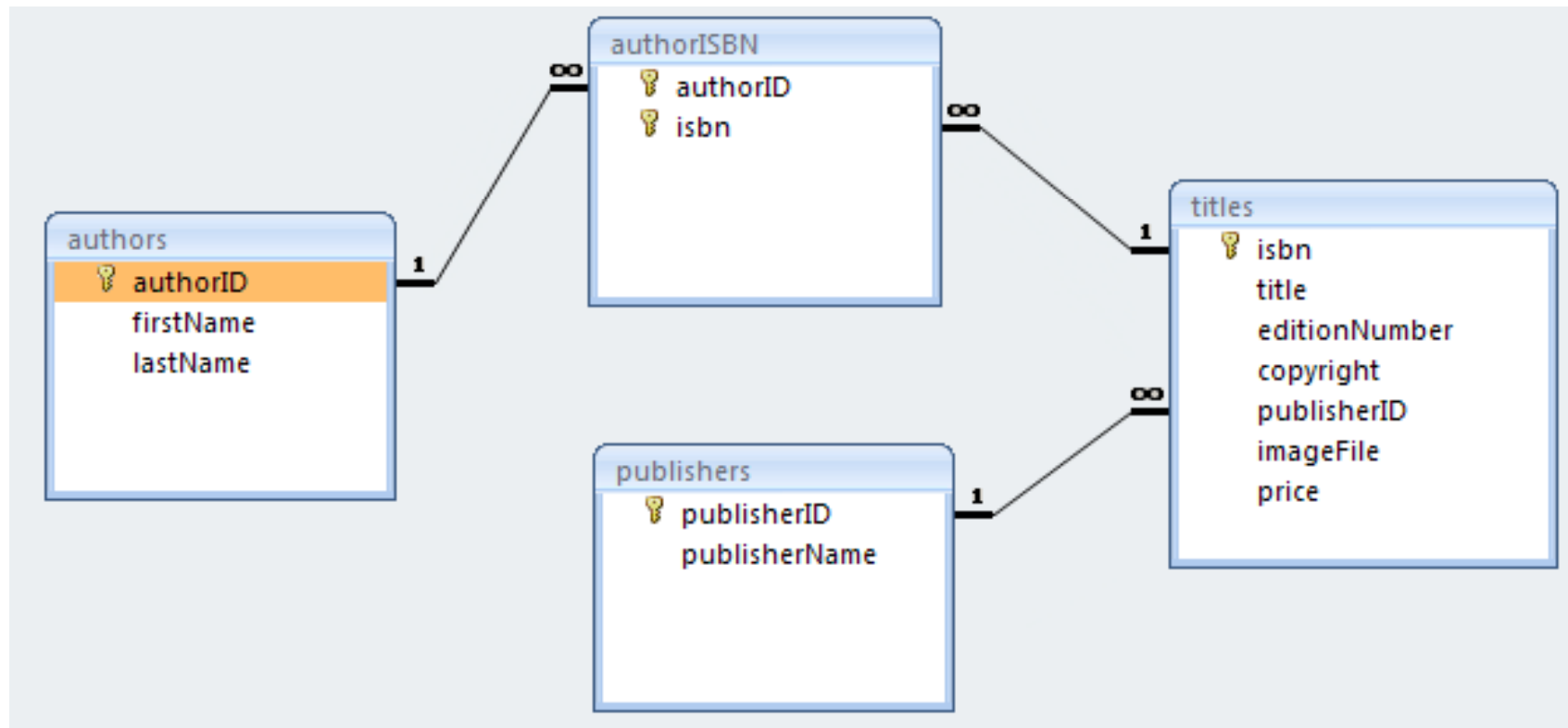
PK	Name	Type	Size
✓	authorID	Autonumber	Long Integer
	firstName	Text	20
	lastName	Text	30

## Step 5: Identify Primary Keys

- To ensure that each record is unique in each table, we can set one field to be a Primary Key (Key Field) field.
- A Primary Key is a field that that will contain **no duplicates** and **no blank values**.

## Step 6: Determining Relationships

- A relationship is a natural business association that exists between one or more entities.



## Step 7: Design Forms and Reports

- Design all Forms and Reports to entry and get information from database

## Step 8: Create Database in Access

---

- Create all designed Tables, Forms, Queries and Reports in Access

# Starting Microsoft Access



## What is MS Access?

- **MS Access** is a relational-database program that can handle any database-related task you have.

## Why Access?

- Access make it easy to work with your data.
- Access is a component of the popular Microsoft Office software suite.
- Access makes it easy to publish your information to the Internet via World Wide Web.

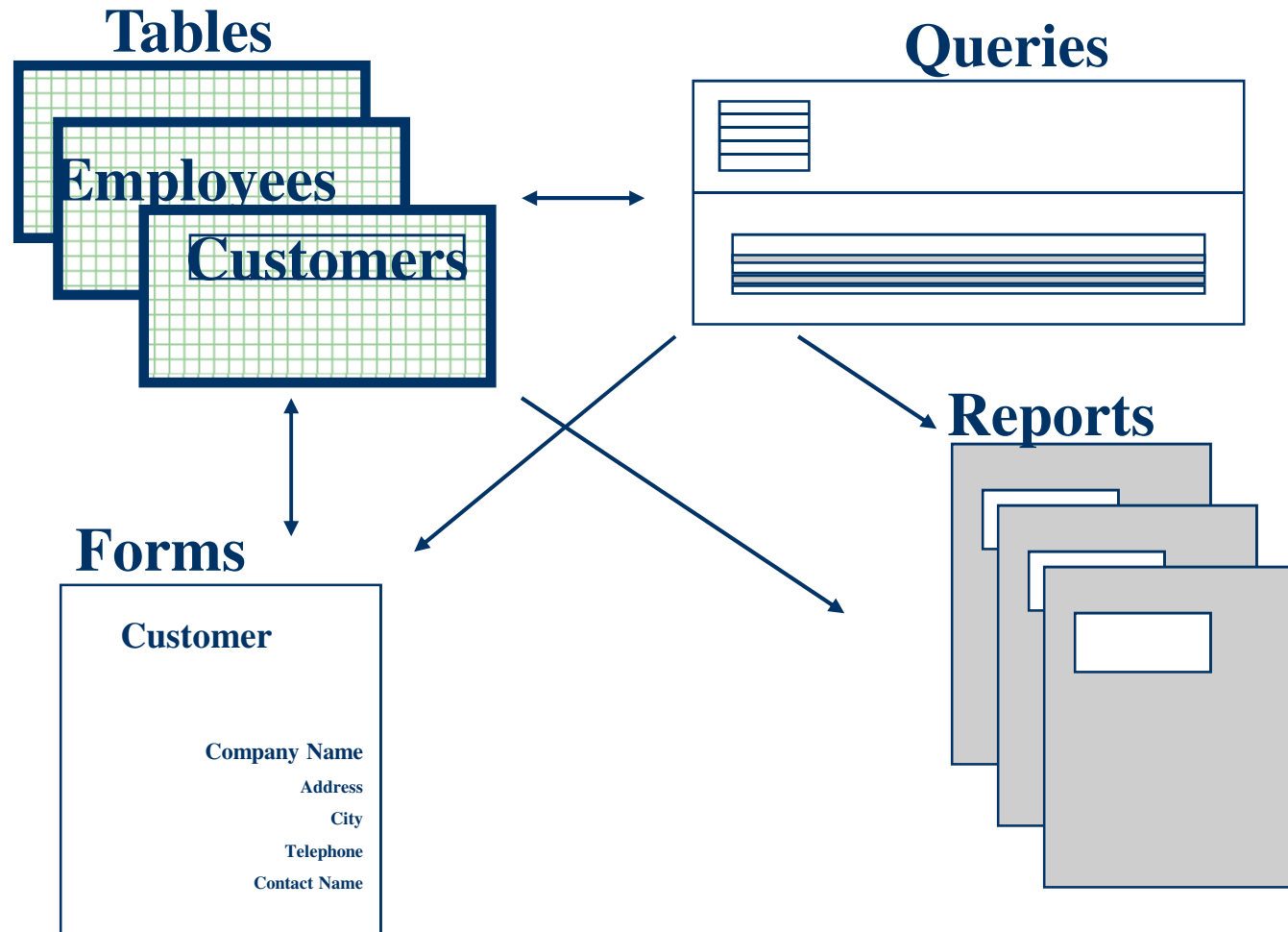


## When not to Use Access

### **Access is not suitable if you want**

- To share the database across the network between many users
- Security and robustness
- To store a lot of data and need good performance
- To depend on the application for important business processes.

# Basic Access Components



# Basic Access Components

- Tables
  - Tables store data
- Queries
  - A means of asking questions of your database
  - Can look across a number of Tables
- Forms
  - A friendly view of the database
  - Used for data input, menus, display and printing
- Reports
  - Output of information from your database in the form of a printed report

## Starting Microsoft Access

- Click on “Microsoft Access” in the Start menu.
- Or if you have set up a shortcut on your Desktop, click on the Access shortcut icon

## Starting Microsoft Access

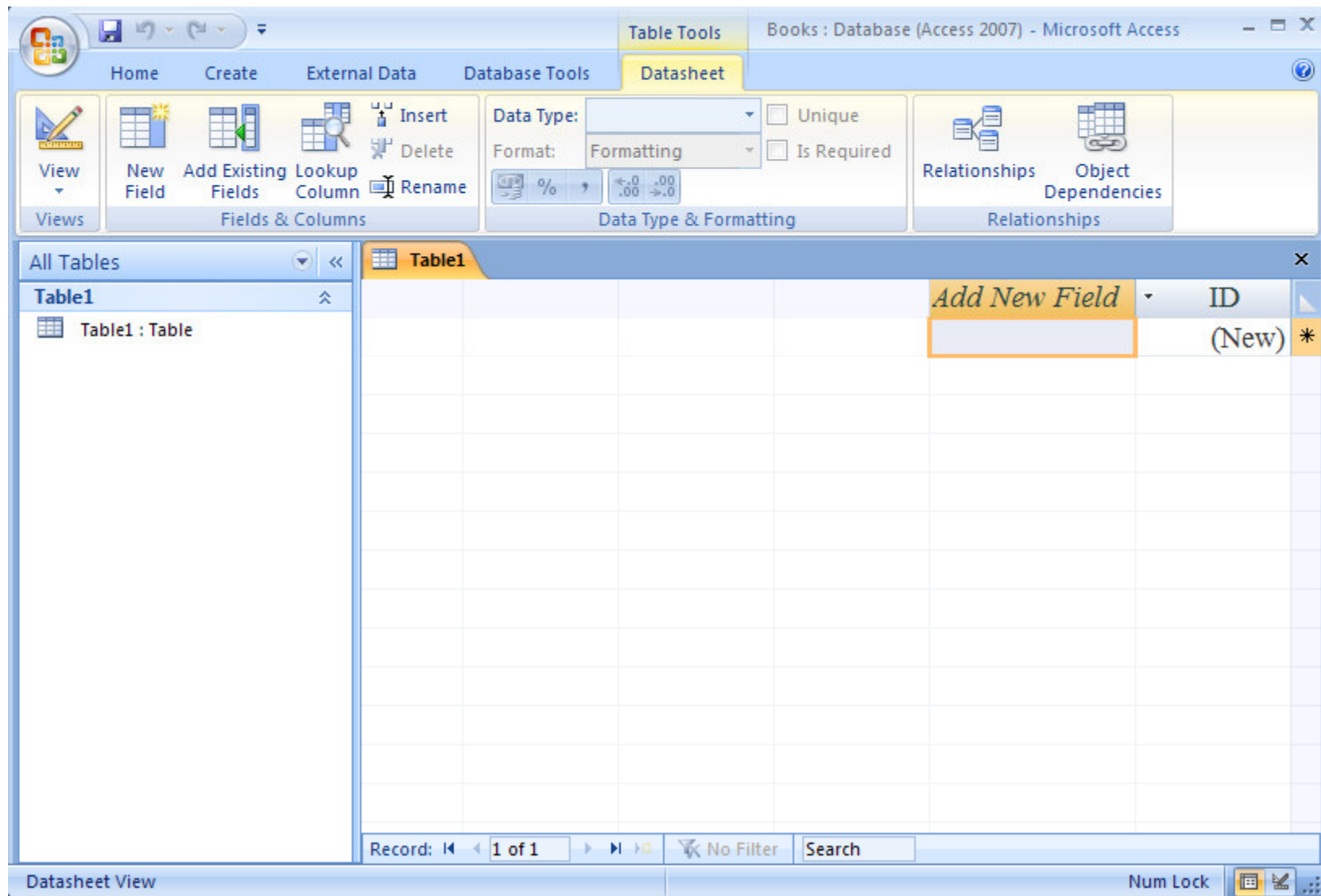


## Creating a Database

- Select New from Office Button
- Select Blank Database
- Name your database, 'Books'
  
- Database is saved .accdb file extension
- Access automatically saves data as it is entered, so a file name must be established before working in the database.

# Microsoft Access 2007

## Creating a Database



## Opening a Database

- To open a database
  - Open from Open Recent Databases
  - Press CTRL+O
  - Open from Office Button





# Tables



## Creating A Table

1. Close any open tables
2. Click the **Create** button
3. Click **Table**
4. Click **View** icon to go to **Design View**
5. Save the table name
6. Type the field names, select the data type, then set the properties for each.

## Creating A Table

The screenshot displays the Microsoft Access 2007 interface in Design view for a table named 'authors'. The ribbon at the top includes 'Home', 'Create', 'External Data', 'Database Tools', and 'Design'. The 'Design' ribbon contains tools for 'View', 'Primary Key', 'Builder', 'Test Rules', 'Validation Rules', 'Lookup Column', 'Property Sheet', 'Indexes', and 'Show/Hide'.

The 'All Tables' pane on the left shows the 'authors' table. The main workspace displays the table structure with the following fields:

Field Name	Data Type	Description
authorID	AutoNumber	
firstName	Text	
lastName	Text	

The 'Field Properties' pane at the bottom shows the 'General' tab for the selected 'lastName' field. The properties are as follows:

Property	Value
Field Size	255
Format	
Input Mask	
Caption	
Default Value	
Validation Rule	
Validation Text	
Required	No
Allow Zero Length	Yes
Indexed	No
Unicode Compression	Yes
IME Mode	No Control
IME Sentence Mode	None
Smart Tags	

A note on the right side of the Field Properties pane states: "A field name can be up to 64 characters long, including spaces. Press F1 for help on field names."

The status bar at the bottom indicates "Design view. F6 = Switch panes. F1 = Help." and "Num Lock" is active.

## Table Design

---

- Add and delete fields
- Edit field names
- Set data type
- Set field properties
- Set Primary key
- It is saved with the save command
- Use F1 for help

## Data Types

<b>Data Type</b>	<b>Description</b>
<b>Text</b>	Contain alphanumeric characters A maximum of 255 characters.
<b>Memo</b>	Use for comments or notes. Can be up to 64,000 characters
<b>Number</b>	Numerical data that will (or can) be calculated
<b>Date/Time</b>	Date and time information
<b>Currency</b>	Monetary values
<b>AutoNumber</b>	Automatically counts entries, incrementing as you enter data. Each entry will be unique.
<b>Yes/No</b>	Use for Yes/No, True/False and On/Off options
<b>OLE Object</b>	A linked object from an external source
<b>Hyperlink</b>	Creates a “clickable” hyperlink
<b>LookUp Wizard</b>	Lets you choose a value from another table or from a list of values

## Number

Field Size	Stores Number	Decimal Precision	Storage Size (Byte)
<b>Byte</b>	0 to 255 (no fractions)	None	1
<b>Decimal</b>	$-10^{28}$ to $10^{28}$ , Decimal precision of 28	28	12
<b>Integer</b>	-32,768 to 32,767 (no fractions)	None	2
<b>Long Integer</b>	-2,147,483,648 to 2,147,483,647 (no fractions)	None	4
<b>Single</b>	$-3.402823E38$ to $-1.401298E-45$ for negative values and from $1.401298E-45$ to $3.402823E38$ for positive values,	7	4
<b>Double</b>	$-1.79769313486231E308$ to $-4.94065645841247E-324$ for negative values and from $4.94065645841247E-324$ to $1.79769313486231E308$ for positive values,	18	8

## Field Properties

- Each field has a set of properties that you use to customize how a field's data is stored, handled, or displayed.
- **Field Size:** to set the maximum size for data stored in a field set to the Text, Number, or AutoNumber data type.
- **Format:** to customize the way numbers, dates, times, and text are displayed and printed.
- **Input Mask:** to make data entry easier and to control the values users can enter. E.g. you could create an input mask for a Phone Number field that shows you exactly how to enter a new number: (\_\_\_\_) \_\_\_\_ - \_\_\_\_.

## Field Properties (cont.)

- **Default Value:** to specify a value that is automatically entered in a field when a new record is created. Example, set the default value for the City field to New York.
- **Required (Yes/No):** to specify whether a value is required in a field.
- **Caption:** Assigning a Caption to provide helpful information to the user through captions on objects in various views



## authors Table

PK	Name	Type	Size
✓	authorID	Autonumber	Long Integer
	firstName	Text	20
	lastName	Text	30

## publishers Table

PK	Name	Type	Size
✓	publisherID	Autonumber	Long Integer
	publisherName	Text	30

## titles Table

PK	Name	Type	Size
✓	isbn	Text	20
	title	Text	100
	editionNumber	Number	Integer
	copyright	Text	4
	publisherID	Number	Long Integer
	imageFile	Text	20
	price	Number	Double

## authorISBN Table

PK	Name	Type	Size
✓	authorID	Number	Long Integer
✓	isbn	Text	20

## Switching Between Views

- Use the **View** button to switch between the **Design** and **Datasheet** Views.

# Microsoft Access 2007

## Datasheet View

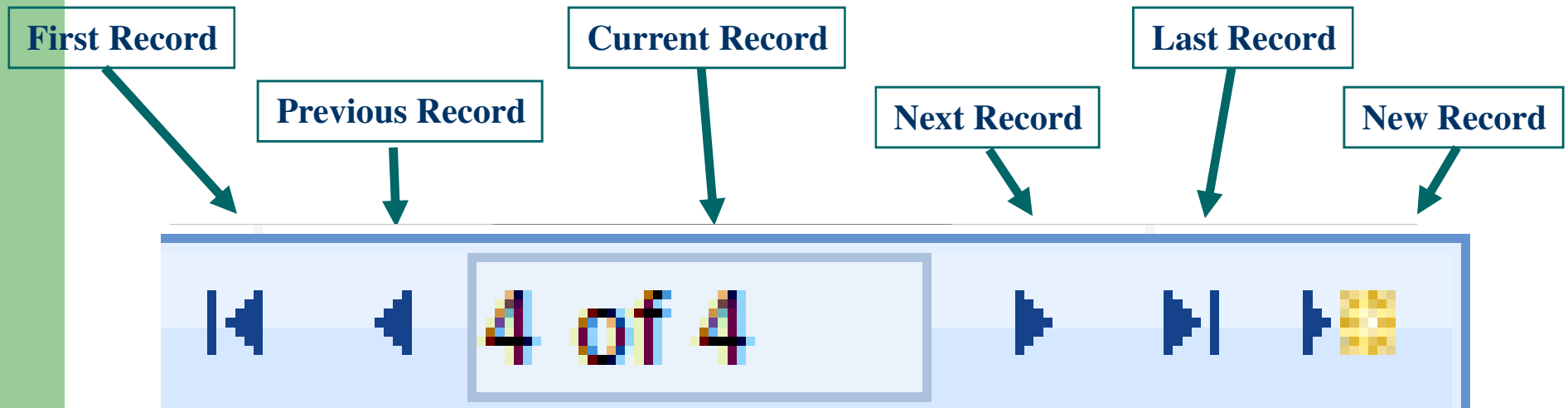
The screenshot shows the Microsoft Access 2007 interface in Datasheet View. The ribbon includes 'Table Tools' with sub-tabs for 'Home', 'Create', 'External Data', 'Database Tools', and 'Datasheet'. The 'Home' tab is active, showing options for 'View', 'Clipboard', 'Font', 'Rich Text', 'Records', 'Sort & Filter', and 'Find'. The 'authors' table is selected in the 'All Tables' pane on the left. The main area displays a grid with columns for 'lastName', 'firstName', and 'authorID'. The data is as follows:

<i>Add New Field</i>	lastName	firstName	authorID
	Deitel	Harvey	1
	Deitel	Paul	2
	Nieto	Tem	3
	Santry	Sean	4
			(New) *

At the bottom, the status bar shows 'Record: 4 of 4', 'No Filter', and 'Search'. The 'Num Lock' indicator is also visible.

# Navigating Fields and Records

- To move through records



## Working With Tables

- When entering data
  - The pencil shape in the left column indicates that the current changes have not been saved.
  - New record     **Ctrl +**
  - Current Date   **Ctrl ;**
  - Current Time   **Ctrl :**
  - Sort Ascending or Descending
  - Find Data
  - Filter By Selection



## Importing Data

- If data exists, import instead of re-enter
- Data can be imported from many sources such as:  
Excel spreadsheets, Lotus, XML
- For Importing data:
  1. File, Get External Data
  2. Choose Import or Link
  3. Select the file
  4. Follow the Import Wizard Prompts

## Entering sample data

- Now we can enter sample data in each tables:
  - authors
  - publishers
  - titles
  - authorISBN

# Creating Relationships

- Go to Database Tools and select Relationships
- Select show table and select all tables to show
- Select each field and drag it and drop it on the field in other table

The screenshot shows the 'Edit Relationships' dialog box with the following configuration:

Table/Query:	Related Table/Query:
authors	authorISBN
authorID	authorID

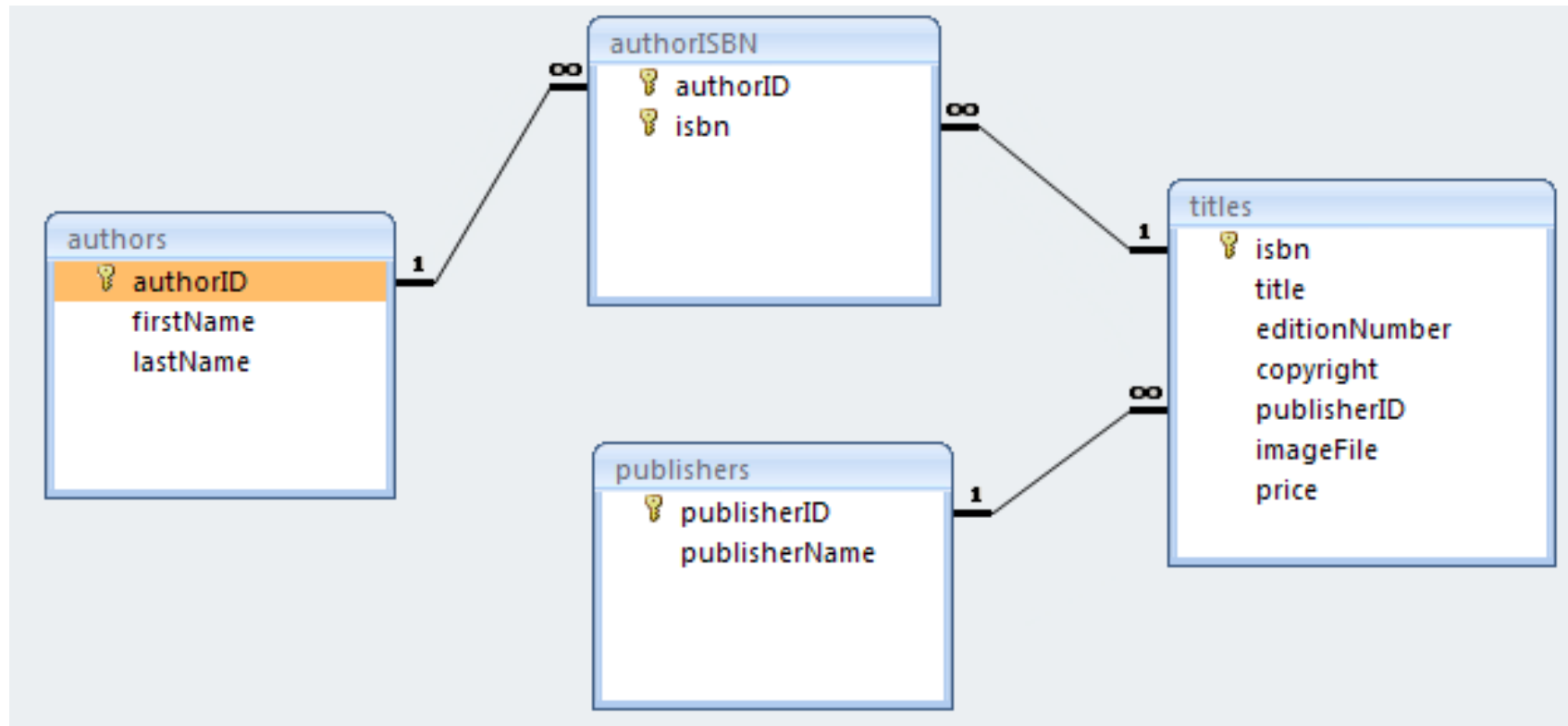
Options:

- Enforce Referential Integrity
- Cascade Update Related Fields
- Cascade Delete Related Records

Relationship Type: One-To-Many

Buttons: OK, Cancel, Join Type.., Create New..

# Creating Relationships

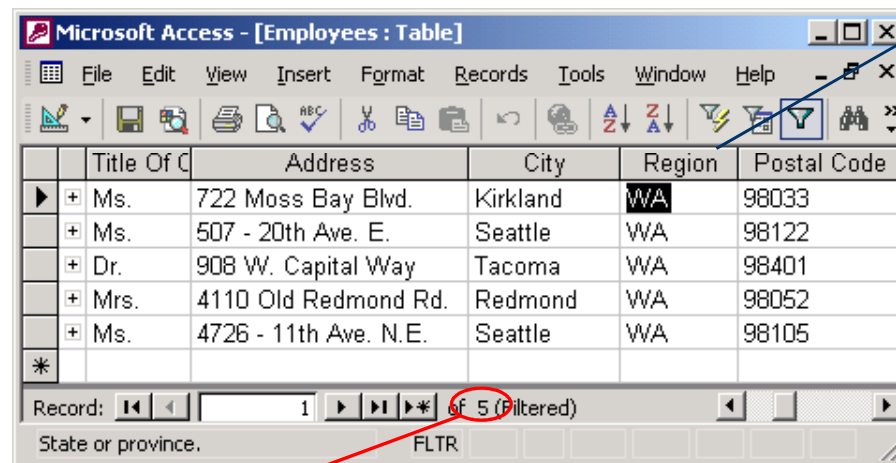


## Filters and Sorting

- A filter applies a criteria to display a subset of records
- Filter by Selection is easiest
- Filter by Form allows for comparative criterion (e.g.  $>$ ,  $<$ ) and allows for *or* filters (e.g. either cosmetics or shoes)
- Remove Filter button redisplay complete table

## Filter By Selection

These Records Were Filtered By Selection (Region = WA)



	Title Of C	Address	City	Region	Postal Code
▶ +	Ms.	722 Moss Bay Blvd.	Kirkland	WA	98033
+	Ms.	507 - 20th Ave. E.	Seattle	WA	98122
+	Dr.	908 W. Capital Way	Tacoma	WA	98401
+	Mrs.	4110 Old Redmond Rd.	Redmond	WA	98052
+	Ms.	4726 - 11th Ave. N.E.	Seattle	WA	98105
*					

Record: 1 of 5 (Filtered)

State or province. FLTR

Only 5 of the 9 Total Records Are Displayed In This Filter

## Is Data Entry Difficult?

- First delete all relationships
- Use **Lookup Wizard** to create a lookup column for the following fields:
  - publisherID in titles table from publishers table
  - authorID in authorISBN table from authors table
  - isbn in authorISBN table from titles table

# Microsoft Access 2007

## A lookup column

The screenshot displays the Microsoft Access 2007 interface. The ribbon is set to 'Table Tools' with the 'Datasheet' tab selected. The 'titles' table is open in Datasheet View. The 'publisherID' field is a lookup column, and a dropdown menu is open, showing 'Prentice Hall' and 'Prentice Hall PTG' as available values. The current record in the table is:

imageFile	publisherID	copyright	editionNu	title	isbn
		2004	4	C How to P.	0131426443

The status bar at the bottom indicates 'Record: 1 of 1', 'No Filter', and 'Search'.



The image features a large green shape on the left side, which has a white, rounded rectangular cutout. The word "Queries" is written in a dark blue, sans-serif font within this white cutout. A thick, dark blue horizontal bar extends from the right edge of the green shape across the middle of the page.

# Queries

# Queries

- Query provides the resulting records from a question
- **Queries**
  - let you easily repeat sort and filter commands
  - let you display and/or print only selected columns
  - connect one or more tables through similar fields
  - create new fields based on calculated values
  - add or remove specific information from tables with action queries

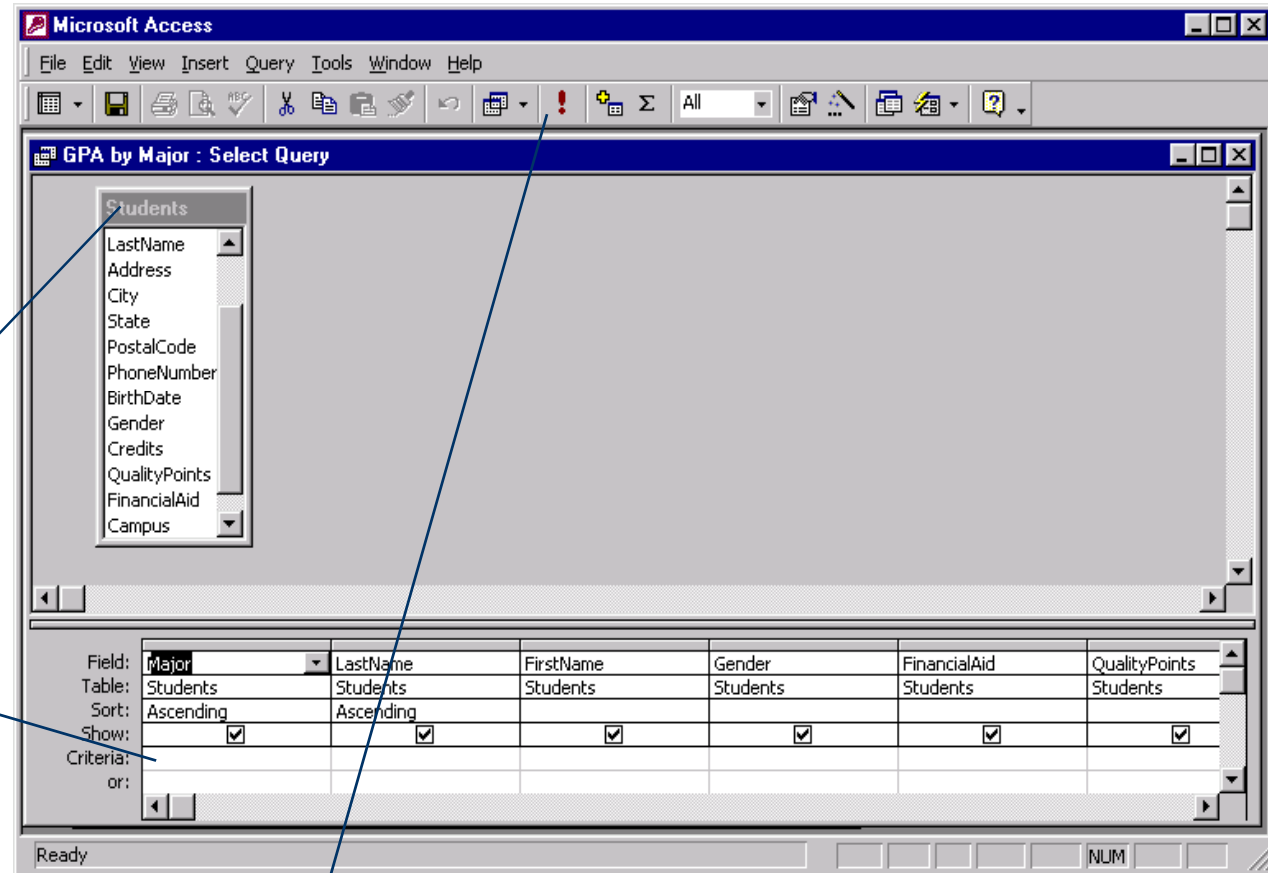
# Queries

- Queries can be opened in three views:
  - Design View: graphical tool used to develop queries
  - Dynaset: The records that satisfy the query criteria, looks and acts like a table
  - SQL View: displays query in SQL statements

## Query Design View

Table

Criteria



Run Button

## Select Query Dynaset

	Major	Last Name	First Name	Gender	FinancialAid	QualityPoints	Credits	GPA
▶	Business	Adili	Ronnie	M	<input type="checkbox"/>	155	60	2.58
	Business	Gibson	Christopher	M	<input checked="" type="checkbox"/>	90	45	1.78
	Business	Ramsay	Robert	M	<input type="checkbox"/>	375	105	3.57
	Communication	Joseph	Cedric	M	<input checked="" type="checkbox"/>	60	35	1.71
	Engineering	Berlin	Jared	M	<input checked="" type="checkbox"/>	150	50	3.00
	Engineering	Heltzer	Peter	M	<input type="checkbox"/>	162	50	3.24
	Liberal Arts	Camejo	Oscar	M	<input checked="" type="checkbox"/>	75	30	2.50
	Liberal Arts	Parulis	Christa	F	<input checked="" type="checkbox"/>	80	30	2.67
	Liberal Arts	Weissman	Kimberly	F	<input type="checkbox"/>	170	45	3.78
	Undecided	Frazier	Steven	M	<input checked="" type="checkbox"/>	60	28	2.14
	Undecided	Liquer	Lindsey	M	<input checked="" type="checkbox"/>	42	24	1.75

The results of the query are displayed as a dynaset

## Create A Query

- Click the Query tab
- Click the New button
- Choose **Design View** and select the tables or queries upon which to base the query
- Add fields to the “Query by Design” window
- Save query
- Run the query

# Query Criteria

- Criteria limits the records returned by the query
- Criteria on the same line must all be met – “AND” criteria

FTE	HireDate
tblEmployeeData	tblEmployeeData
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<100	<#1/1/95#

- Criteria on different lines will return records that meet any criteria – “OR” criteria

FTE	HireDate
tblEmployeeData	tblEmployeeData
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<100	
	<#1/1/95#

## Criteria Operators

Operator	Condition
<	less than
>	greater than
=	equal to
<=	less than or equal to
>=	greater than or equal to
<>	not equal
*	all records - usually used with a leading character, such as B*
?	a single character wildcard
<b>Between</b>	selects values between two values, Between x and y
<b>Like</b>	must match a pattern - sometimes created by Access from wildcard input, Like “*System*”
<b>null</b>	returns blank records



## Multiple Table Queries

- Join tables on common fields

The screenshot shows the Microsoft Access 2007 interface. At the top is a ribbon with various icons. Below the ribbon, three tables are displayed in a design view:

- tblEmployeeData**: Fields include EmployeeID (marked with an asterisk), FirstName, LastName, and Title.
- tblExpenditures**: Fields include ID (marked with an asterisk), EmployeeID, BudgetCode, and Amount.
- tblBudgetCo...**: Fields include BudgetCode (marked with an asterisk), Description, and TotalBudget.

Lines connect the EmployeeID field in tblEmployeeData to the EmployeeID field in tblExpenditures, and the BudgetCode field in tblExpenditures to the BudgetCode field in tblBudgetCo... Below the tables is a grid for defining the query fields and criteria.

Field:	EmployeeID	FirstName	LastName	BudgetCode	Description	Amount
Table:	tblExpenditures	tblEmployeeData	tblEmployeeData	tblExpenditures	tblBudgetCodes	tblExpenditures
Sort:						
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:						
or:						

A green rectangular background with a white cutout on the left side. The cutout is a rounded rectangle with a semi-circular end on the left. A dark blue horizontal bar with rounded ends is positioned at the bottom right, overlapping the green background.

# Forms

## Forms

- Fields can be arranged for easy data entry
- Input aids
  - Check boxes
  - List boxes
  - Combo boxes
  - Calculations

# Database Form

The screenshot shows the Microsoft Access 2007 interface with a form for the 'Products' table. The form is titled 'Products' and contains the following fields:

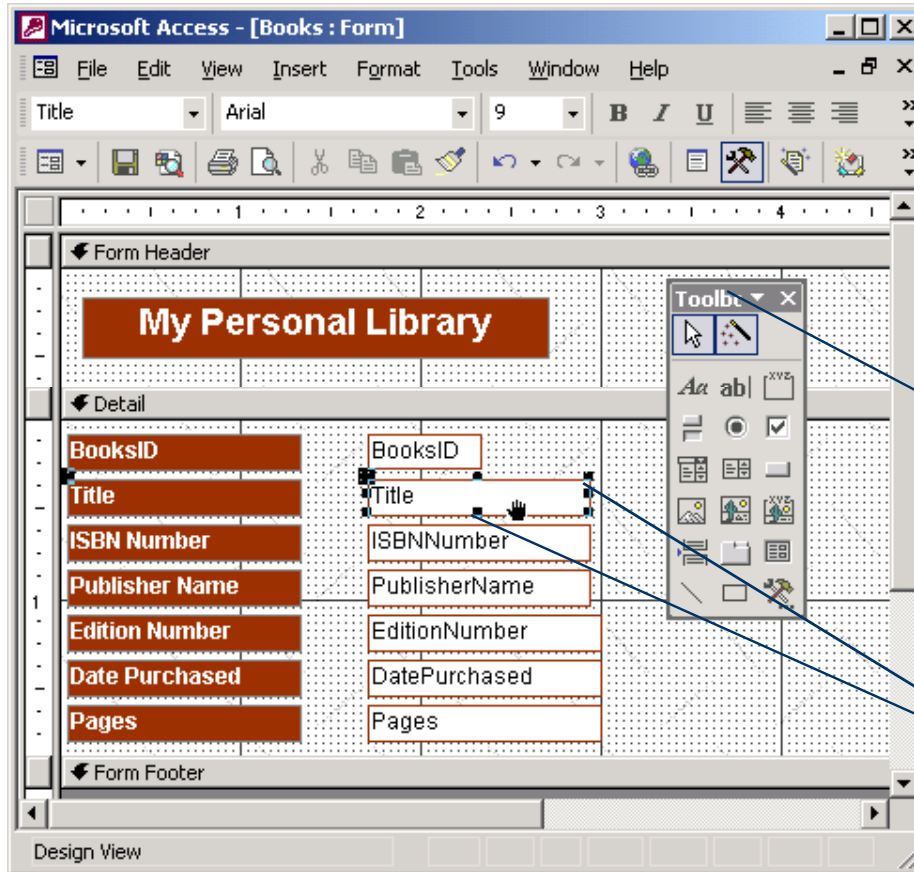
Product ID:	6
Product Name:	Grandma's Boysenberry Spread
Supplier:	Grandma Kelly's Homestead
Category:	Condiments
Quantity Per Unit:	12 - 8 oz jars
Unit Price:	\$25.00
Units In Stock:	120
Units On Order:	0
Reorder Level:	25
Discontinued:	<input type="checkbox"/>

Navigation buttons are located at the bottom of the form, showing 'Record: 6 of 77'. The buttons include a double left arrow (Go To First Record), a single left arrow (Go To Previous Record), a single right arrow (Go To Next Record), and a double right arrow (Go To Last Record). The 'Go To First Record' and 'Go To Last Record' buttons are circled in red in the original image.

Handwritten annotations with arrows point to the following elements:

- Table Name:** Points to the 'Products' label at the top of the form.
- Field Names:** A bracket groups the labels for Product ID, Product Name, Supplier, Category, Quantity Per Unit, Unit Price, Units In Stock, Units On Order, and Reorder Level.
- Go To First Record:** Points to the double left arrow button.
- Go To Next Record:** Points to the single right arrow button.
- Go To Last Record:** Points to the double right arrow button.

# Form Design View



Click and drag to move Toolbox

Sizing handles

## Form View

The screenshot shows a window titled "Books" with a form titled "My Personal Library". The form contains several data entry fields:

Field Name	Value
Title	The Magician's Nephew
BooksID	1
ISBN Number	0-06-440505-2
Publisher Name	Harper Collins
Edition Number	1
Date Purchased	6/3/1995
Pages	202

At the bottom of the form, there is a record navigation bar. The text "Record: 1 of 44" is displayed, with the number "1" and "44" circled in red. Navigation icons for first, previous, next, and last records are visible to the left of the numbers.

Current Record

Total Number of Records

# Creating AutoForms

- From an open table
  - Click the New Object button
  - Choose AutoForm
  - Save the Form
- From Form tab
  - Click New
  - Choose Design View or AutoForm
  - Select the table or query that contains the data for the form
  - Click OK

## Creating A Form

- From the Form tab
  - Click New
  - Choose Design View or AutoForm
  - Select the table or query that contains the data for the form
  - Click OK



## Navigating with Forms

- Tab from field to field
- Click the New Record button to add a record
- Use navigation bar to move from record to record

## Form Design

- Click the View button to switch between Form View and Design View
  - Move Objects
  - Resize Objects
  - Format Objects



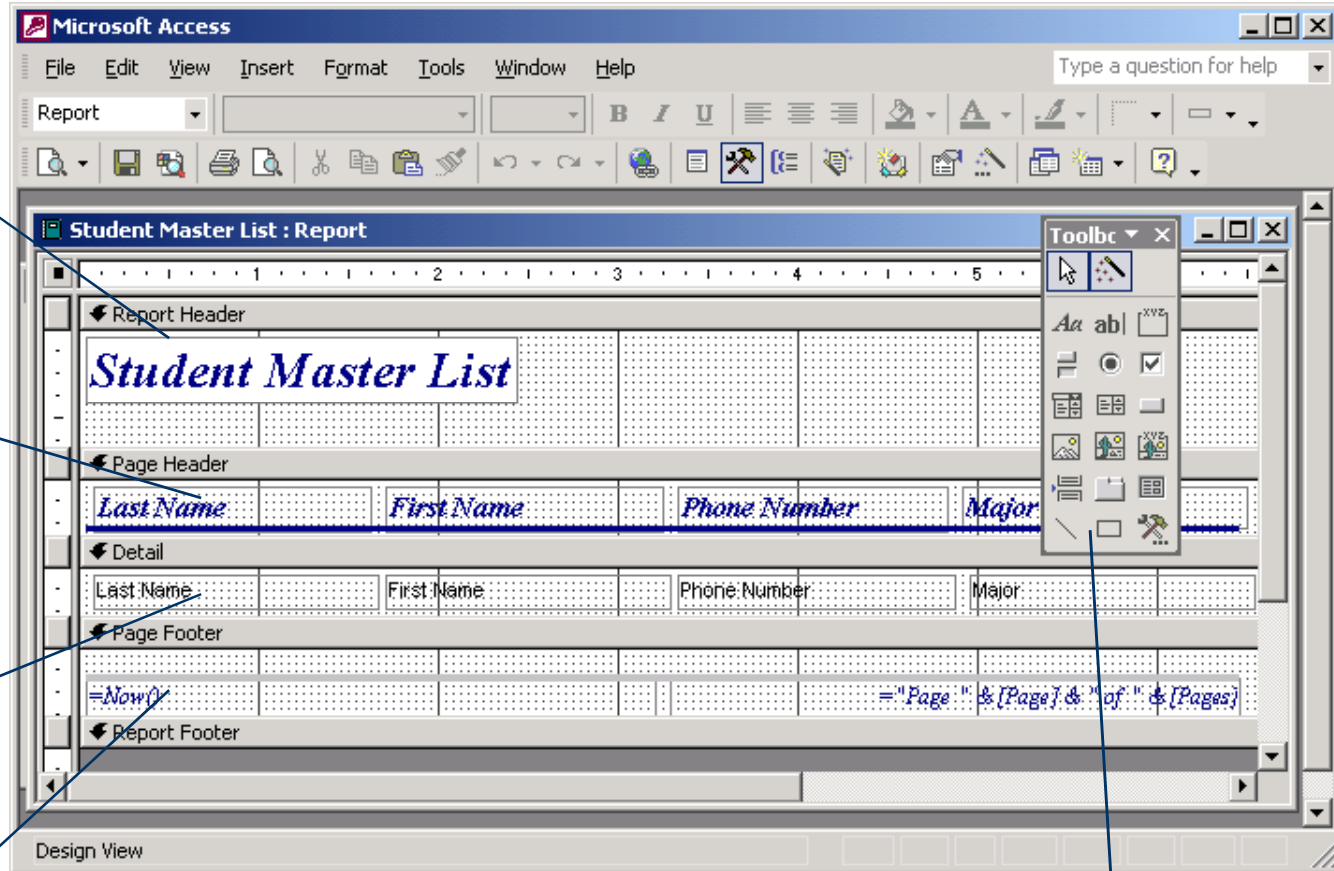
# Reports



## Reports

- Reports are for previewing and printing only – no data entry
- Reports can group data and perform calculations
- Reports can be exported to Excel or Word

# Report Design View



Report Header

Page Header

Detail Section

Page footer

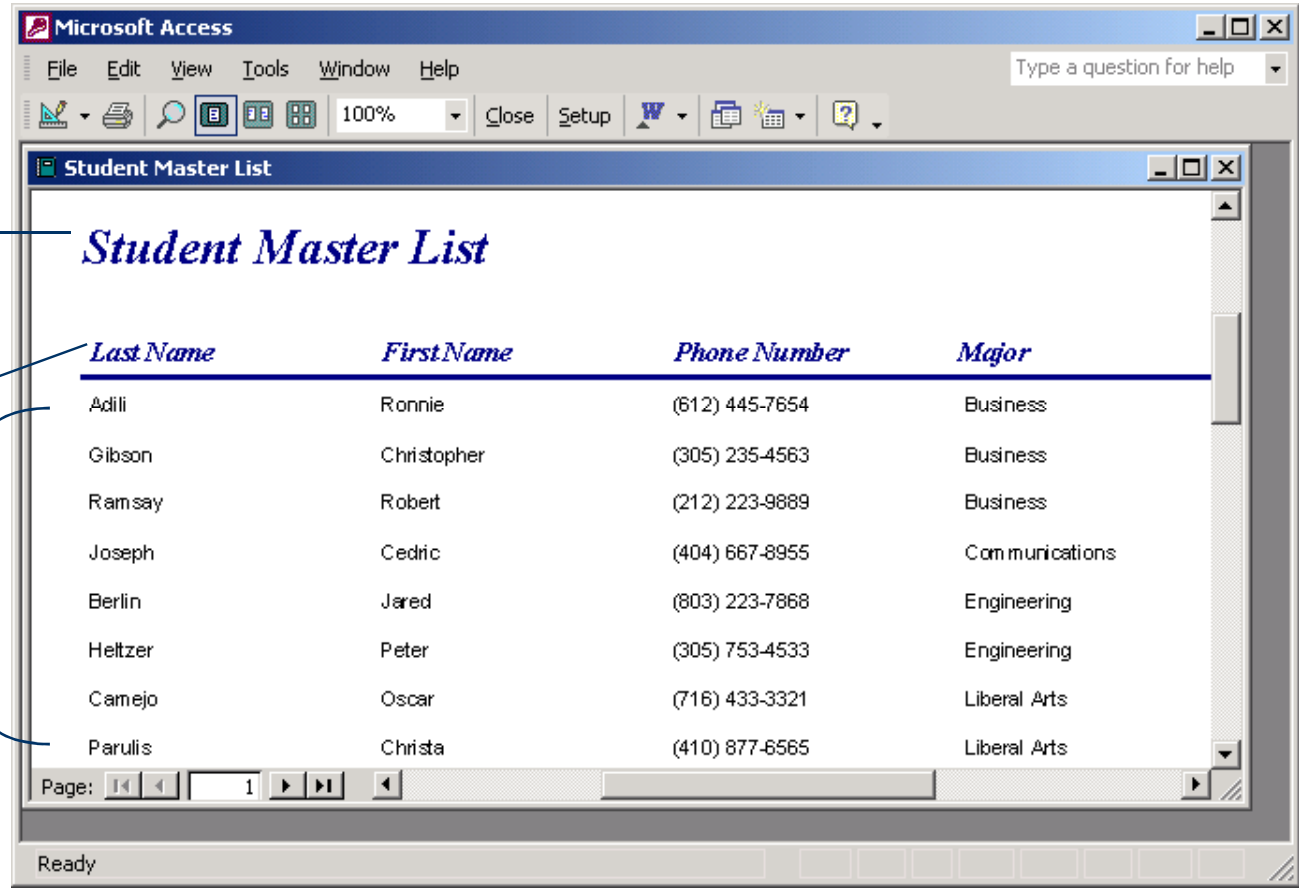
Toolbox

# Report Print Preview

Report Header

Page Header

Detail Section



## Report

Zoom

Close Print Preview

Report Header

Page Header

Detail Section

<u>Product Name:</u>	<u>Product ID:</u>	<u>Quantity Per Unit:</u>	<u>Unit Price:</u>
Aniseed Syrup	3	12 - 550 ml bottles	\$10.00
Chef Anton's Cajun Seasoning	4	48 - 6 oz jars	\$22.00
Chef Anton's Gumbo Mix	5	36 boxes	\$21.35
Genen Shouyu	15	24 - 250 ml bottles	\$15.50
Grandma's Boysenberry Spread	6	12 - 8 oz jars	\$25.00
Gula Malacca	44	20 - 2 kg bags	\$19.45

Page: 4

Ready

# Anatomy of a Report

<b>Report Section</b>	<b>Description</b>
<b>Report Header</b>	Prints once at the beginning of the report
<b>Page Header</b>	Prints at the top of each page (including the first page)
<b>Group Header</b>	Prints at the start of each group
<b>Detail Section</b>	Contains the main body of the report. Prints once for every record included in the report.
<b>Group Footer</b>	Prints once at the bottom of each group. Sometimes contains formulas for group totals.
<b>Page Footer</b>	Prints at the bottom of each page.
<b>Report Footer</b>	Prints once at the end of the report. Often used to contain report totals.



# Report Types

- Columnar report
  - Simplest type
  - Lists every field for every record in a single column
- Tabular report
  - Displays selected fields in a row
  - One record per row

## Creating A Report

- Click the Report tab
- Click New
- Choose one of the following
  - Design View
  - Report Wizard
  - AutoReport

## Report Wizard

Easiest way to create a report

- Specify the table or query
- Select one or more fields
- Select layout (columnar/ tabular)
- Select a style
- Modify the resulting report



**The End**