29. Microsoft Access 2007

Java

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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.
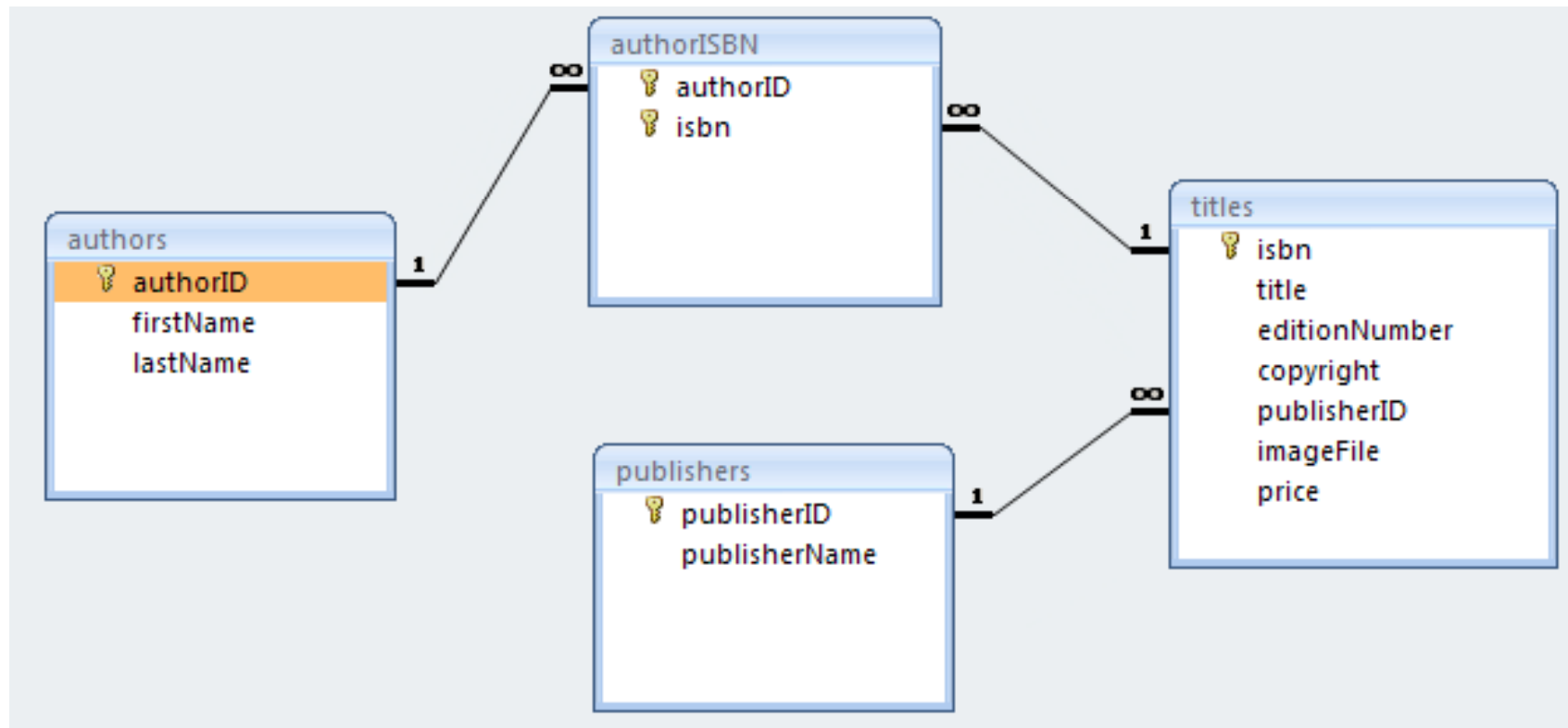
Step 7: Design Forms and Reports

- 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

- 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.

Creating a Database
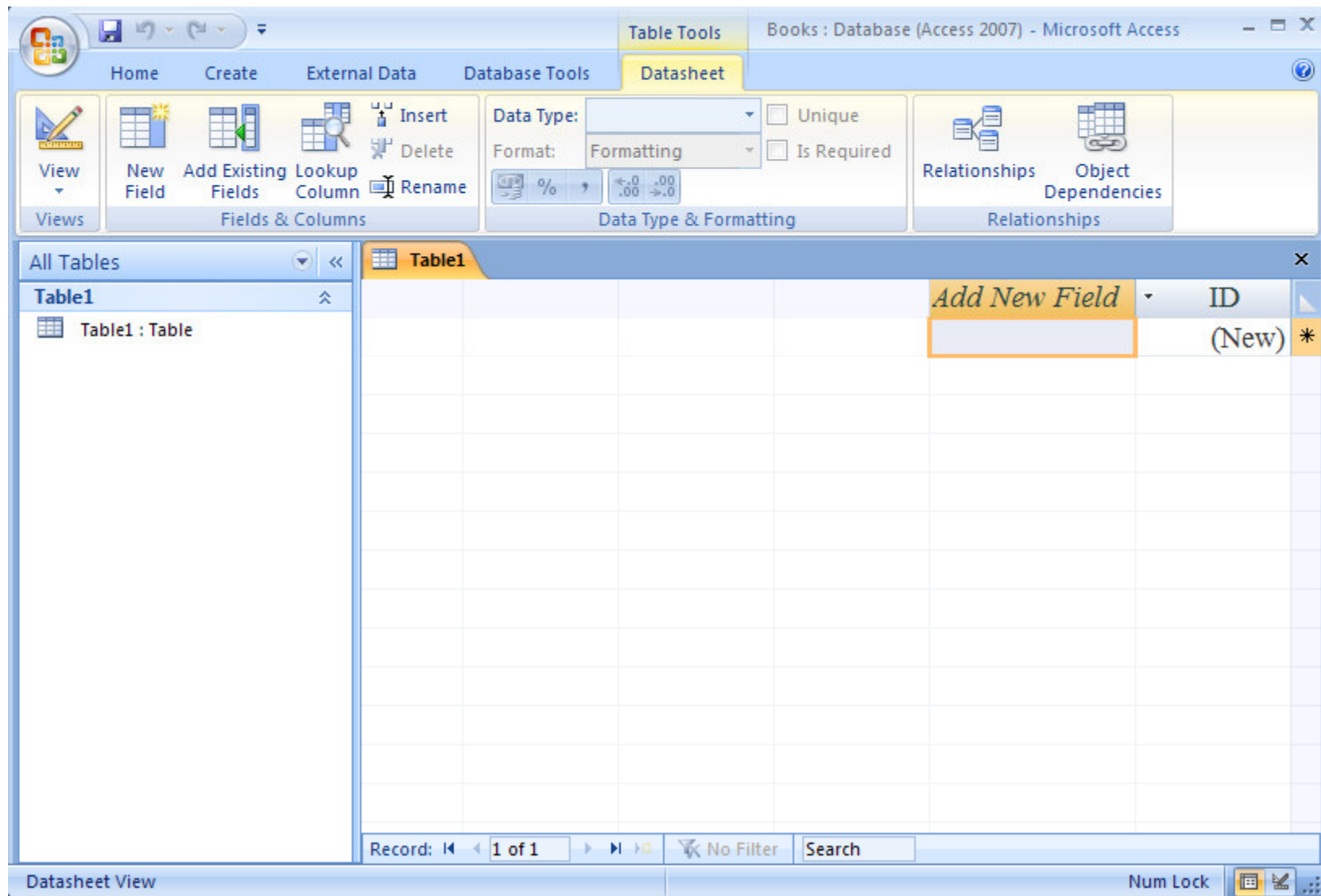
Opening a Database

- 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

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

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

Number

Field Size	Stores Number	Decimal Precision	Storage Size (Byte)
Byte	0 to 255 (no fractions)	None	1
Decimal	–10^28 to 10^28, Decimal precision of 28	28	12
Integer	–32,768 to 32,767 (no fractions)	None	2
Long Integer	–2,147,483,648 to 2,147,483,647 (no fractions)	None	4
Single	–3.402823E38 to –1.401298E–45 for negative values and from 1.401298E–45 to 3.402823E38 for positive values,	7	4
Double	–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.

Datasheet View

Navigating Fields and Records

- **To move through records**

First Record		Current Record		Last Record	
	Previous Record		Next Record		New Record

4 of 4
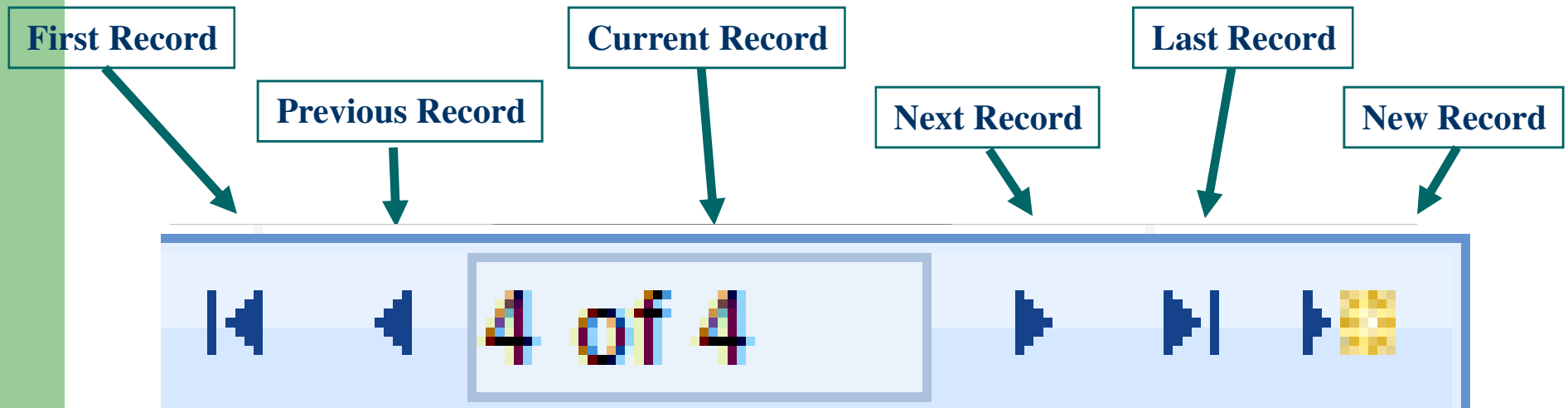
Working With Tables

- 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

Creating Relationships
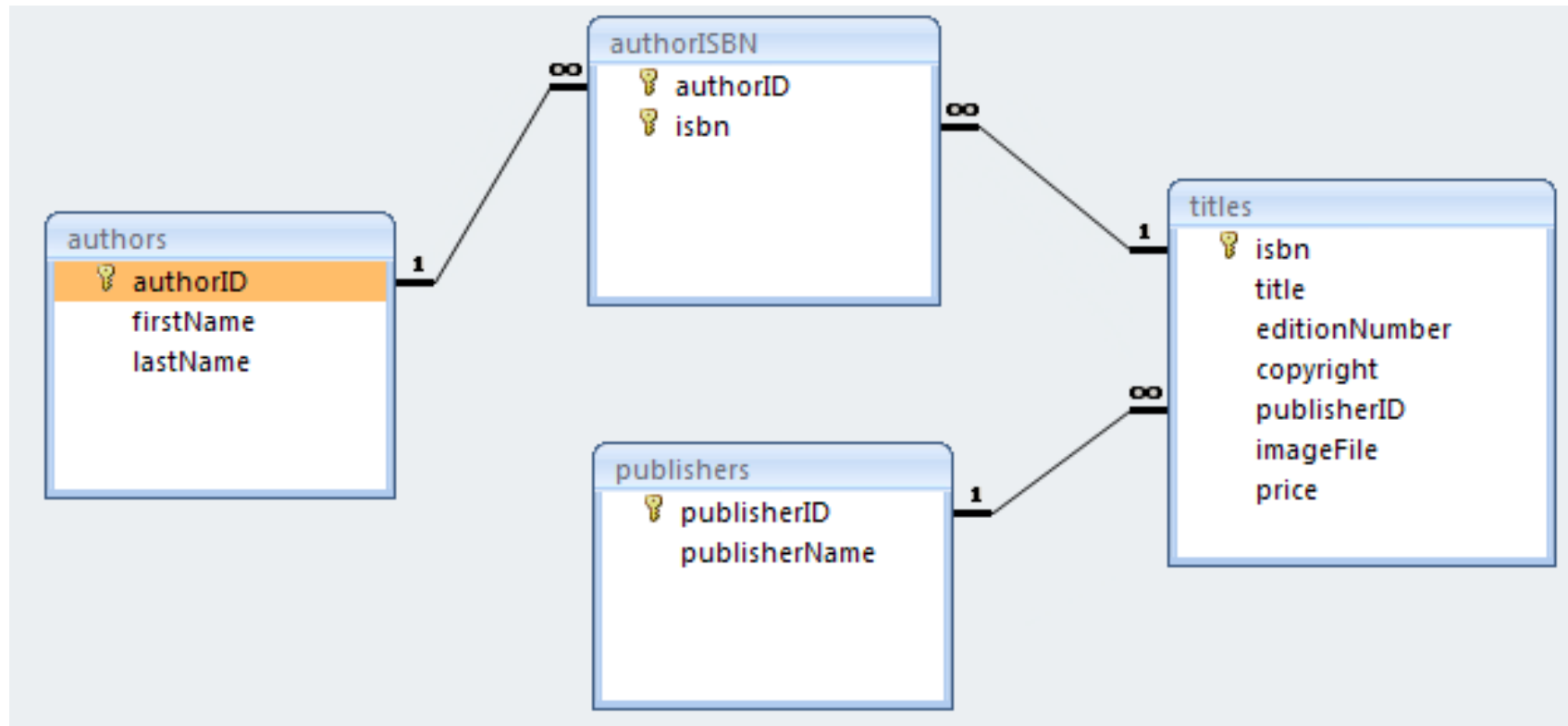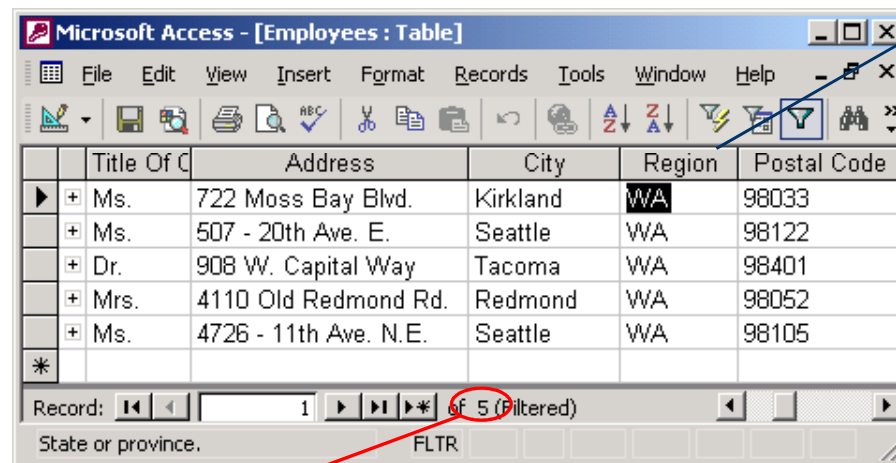
Filters and Sorting

- 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 redisplays complete table

Filter By Selection

These Records Were Filtered By Selection (Region = WA)

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

A lookup column

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
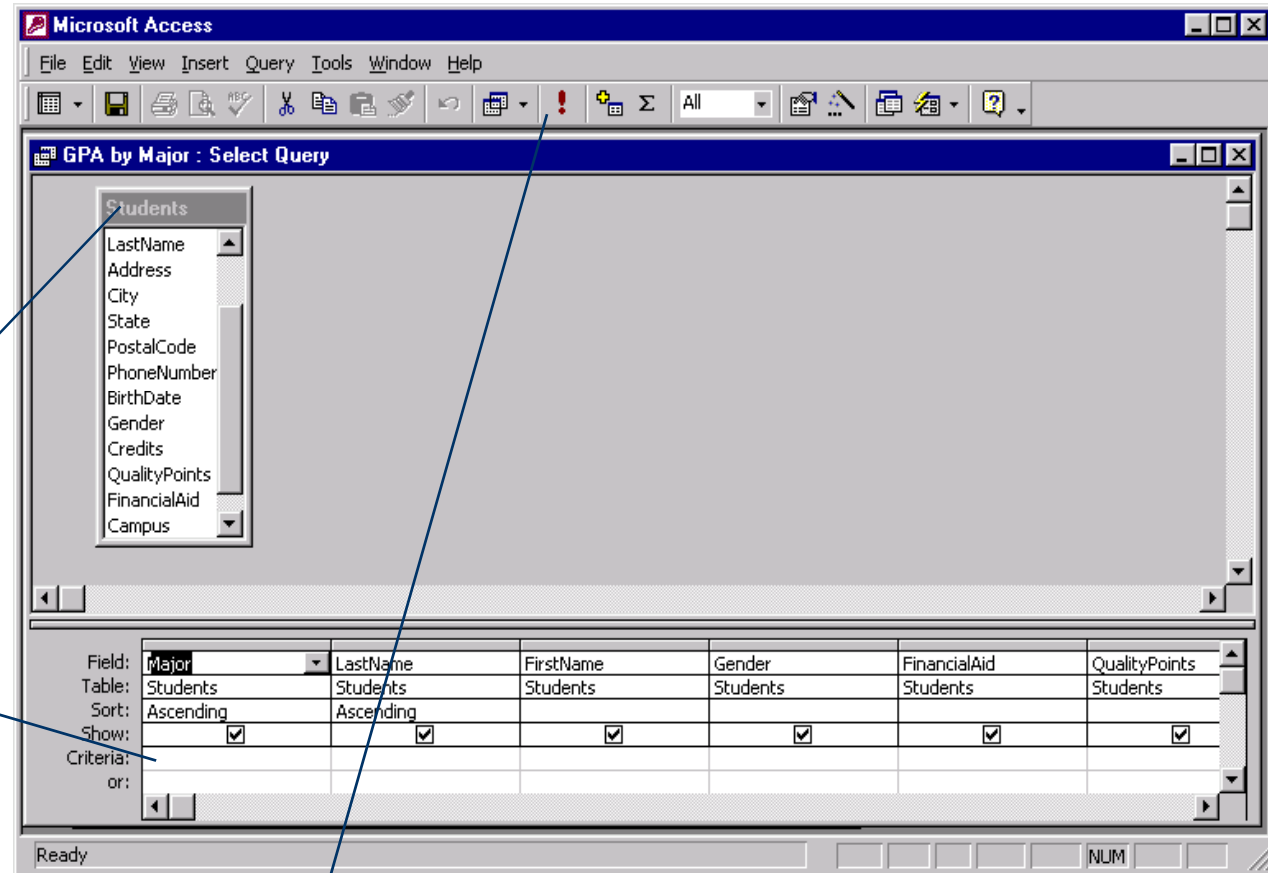
Run Button

Select Query Dynaset

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
☑	☑
<100	<#1/1/95#

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

FTE	HireDate
tblEmployeeData	tblEmployeeData
☑	☑
<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
Between	selects values between two values, Between x and y
Like	must match a pattern - sometimes created by Access from wildcard input, Like "*System*"
null	returns blank records

Multiple Table Queries

- Join tables on common fields

Forms

Forms

- Fields can be arranged for easy data entry

- Input aids
  - Check boxes
  - List boxes
  - Combo boxes
  - Calculations

Database Form

Table Name

Field Names

Go To
First Record

Go To
Next Record

Go To Last Record

Form Design View

Click and drag to move Toolbox

Sizing handles

Form View

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
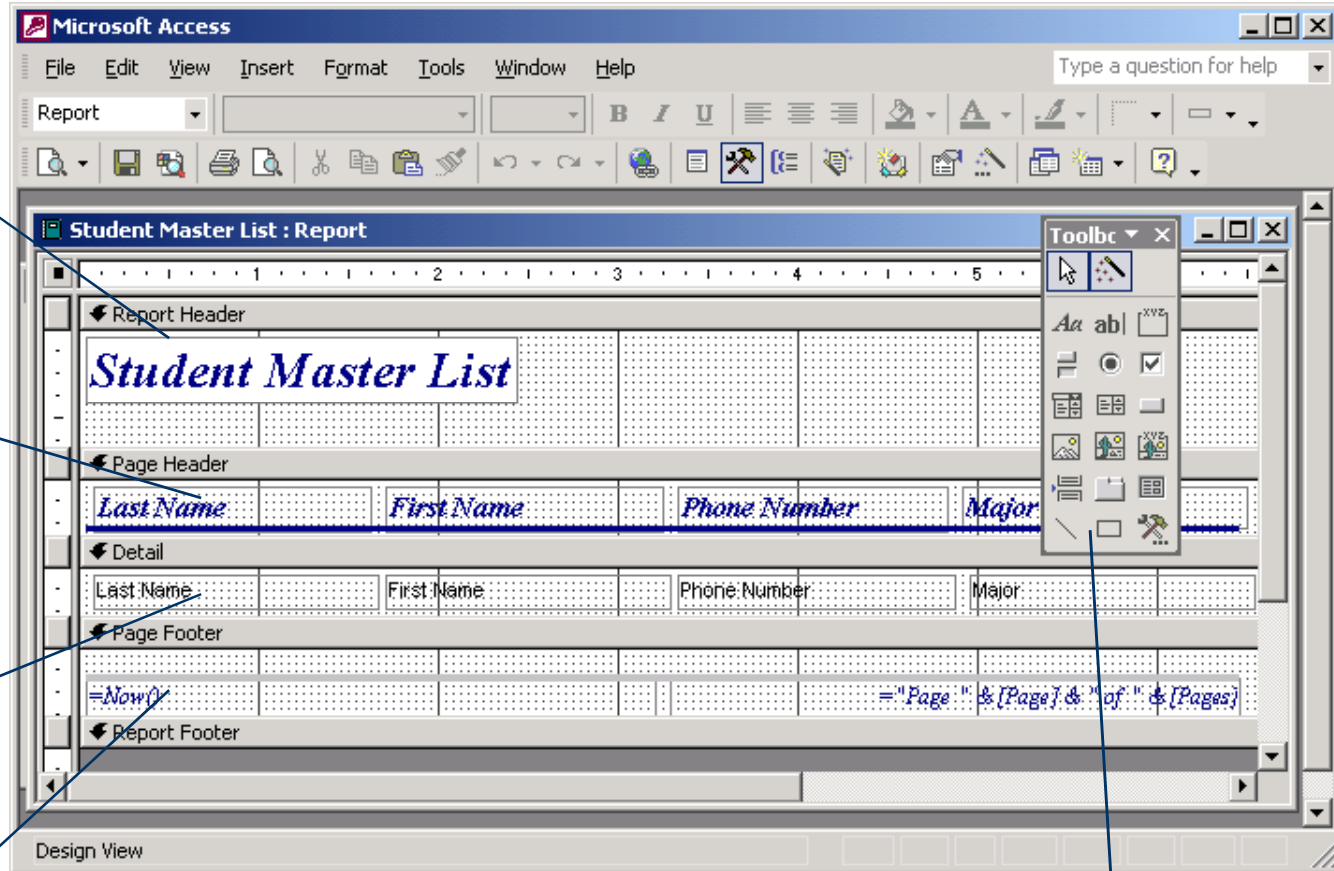 - Move Objects
  - Resize Objects
  - Format Objects

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
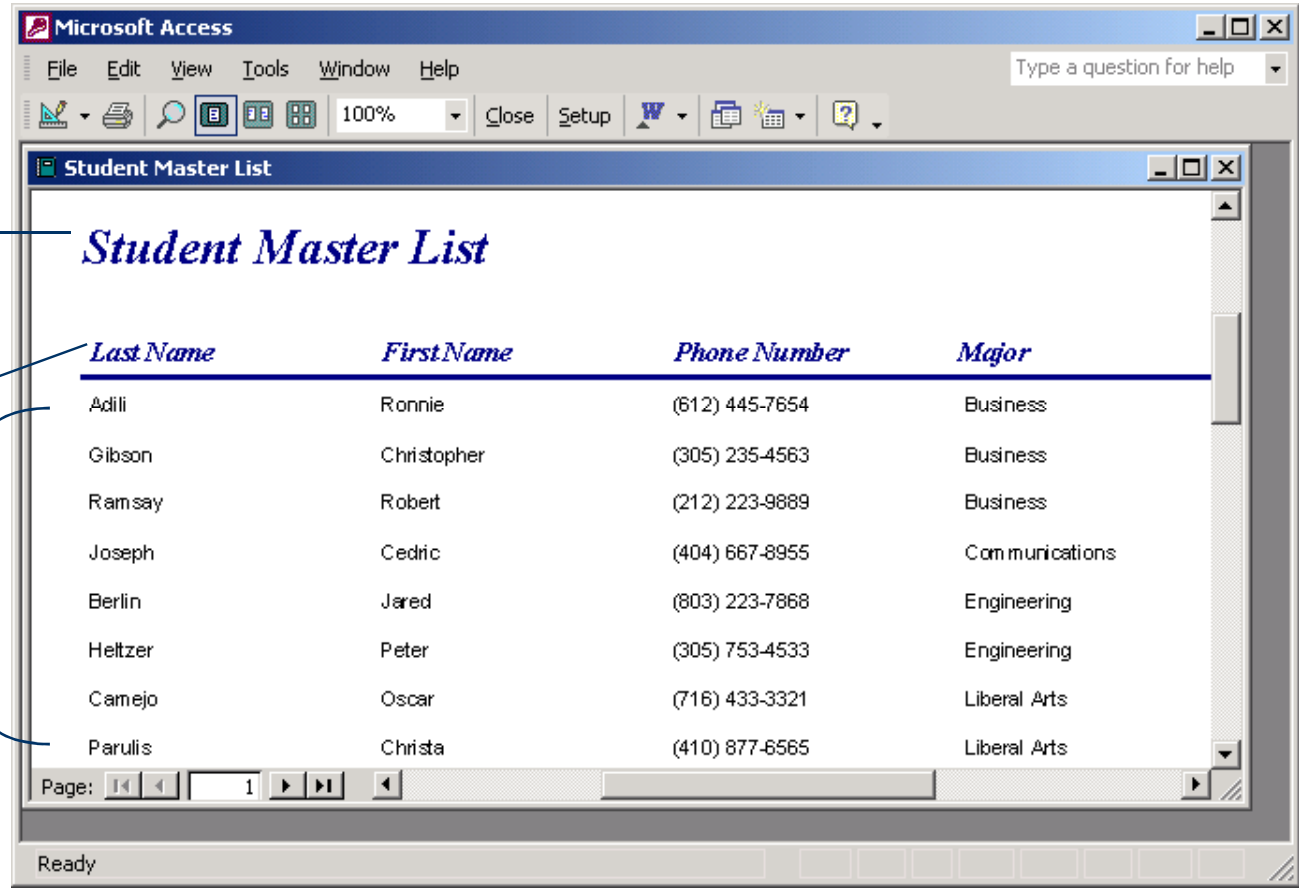
Page footer

Toolbox

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Report Print Preview

Report Header

Page Header

Detail Section

Report

Zoom

Close Print Preview

Report Header

Page Header

Detail Section

Anatomy of a Report

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