

Microsoft Access 2010

Basics & Database Fundamentals

Microsoft Access Basics & Database Fundamentals

3.0 hours

Microsoft Access is a relational database application. It's the perfect tool when you begin to outgrow your data collection in Excel. With Access you can obtain better collection results by creating user-friendly forms with rules to protect the validity of your data. You can create queries to analyze and filter your data, and reports that can be regenerated anytime you need them. Topics for this workshop include database concepts, planning a database, and a hands-on introduction to tables, queries, forms and reports. This workshop is a prerequisite for the other Access workshops.

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Pandora Rose Cowart
Education/Training Specialist
UF Health IT Training

C3-013 Communicore
PO Box 100152
Gainesville, FL 32610-0152

(352) 273-5051
prcowart@ufl.edu
<http://training.health.ufl.edu>

What is a Database?

A variety of definitions exist for a **database**; but essentially it's a collection of information. A filing cabinet, a Rolodex, a library card catalog, and even the Internet are all types of databases.

Most often the word "database" is used to describe a collection of related "data" (information) stored on computers. An electronic database should allow you to store, sort, and retrieve data.

You can create simple databases by creating a Word Table or an Excel spreadsheet. These can be used to keep data such as names and addresses.

For example, here we have simple database of our patients:

MedRec#	First Name	Last Name	DOB	Doctor
123-456	Jack	Nimble	06/08/72	Edwards
987-654	Jill	Pail	08/27/65	Lewis
753-951	Mary	Bluebell	12/08/51	Edwards

Here is a simple database of our doctors:

EmpID #	First Name	Last Name	Phone #
999-999	Ken	Edwards	555-1234
888-888	Laura	Lang	555-4567
777-777	Yolanda	Lewis	555-7890

Why use Microsoft Access?

Microsoft Access is a "relational" database application. Relational means we can link together sets of data, we can **relate** the data. We can keep track of the patients, the doctors and when the patients last saw their doctors, what happened at each visit and so on. Access allows us to *relate* our data, without the repetition that may occur anywhere else.

In an Access database, we can create both of the datasets and link them.

MedRec#	First	Last	DOB	Doctor
123-456	Jack	Nimble	06/08/72	Edwards
987-654	Jill	Pail	08/27/65	Lewis
753-951	Mary	Bluebell	12/08/51	Edwards

EmpID #	First	Last	Phone #
999-999	Ken	Edwards	555-1234
888-888	Laura	Lang	555-4567
777-777	Yolanda	Lewis	555-7890

In Access the data is saved in **Tables**. As the Tables change, the rest of the Access database will reflect the newest information (i.e. the Queries, Forms and Reports).

Queries show the data in a Table format. A Query can pull from multiple Tables and allow you to limit the records (rows) display by using criteria and showing only the fields (columns) you want. We can find the phone number for Jill Pail's Doctor, and provide Ken Edwards with a list of his patients.

Forms can be created to provide a "user-friendly" side to your database. They are used to view and enter your data in an interactive formatted structure. Forms are also used to make menus and search windows.

Reports are created to print out your data in a formatted structure. They allow you to group and organize your data. They can also be used to create Form letters and mailing labels.

Planning the Database

The most important part of creating a relational database is planning. This can be difficult when you are first learning to use Microsoft Access. Here are some questions that may help:

1. Input - What data do I already have for the database?
2. Output - What information do I want to get out of the database?
3. Process - What do I need to do to get there?

Sometimes it helps to plan the final Reports that you want from your database to see if you already have a method of collecting all the data you want to display. For example, we want to have a chart of how many patients attended their appointments. Do we track the 'cancellations' vs. the 'no shows'? What about the late arrivals and the rescheduled? If we want to differentiate, we need to make sure we are going to collect that data. This is why it's so important to plan everything, to try to predict the "what ifs" that may occur once you have your data collected.

The Tables are the core of your Access database; it's where all the 'data' is truly saved. Tables are essential to using any of the other Access Tools. When planning out your database try to remember the basic design rules for your Tables.

Design Rules

Organizing Data

Once you have an idea of the data you would like to collect, you need to decide how many tables you might want to use to organize the data efficiently. In Excel we might keep several numbered columns to keep track of things, i.e. Medication1, Medication 2..., but in Access we should create a second table to track the numbered fields.

No Derived Fields

By using the relationships between our data sets, we can derive missing data. If we are creating a new appointment for a patient, we only need to put in their Medical Record Number (or other unique identifier). The patient's name, phone number and other information can be derived from the Patient Table.

Data is broken down into Smallest Logical Parts

Pulling fields together in Access is fairly simple; pulling them apart can be very difficult. Think of this as breaking up the data into its smallest *sort-able* part.

Descriptive Field Names

It's tempting to use abbreviations when we are creating our data tables, but if the title we use is too vague or too abbreviated we may not be able to recall why we created that field. DOB – Date of Birth or Department of Bread? SSN – Social Security Number or Shands System Number?

Unique Field Names

Be sure to differentiate between the field names in each Table. We can have a 'First Name' in our Patient Table and a 'First Name' in our Doctor Table but this can lead to confusion when we try to pull both Tables into one database object, such as a Query.

No Calculated Fields

In Microsoft Excel we can perform our calculations on the same sheet as our data, but a Table in Access is stagnant data, it doesn't change unless you make it change. Access will let you create calculations in Queries, Forms and Reports.

Unique Records

It's important that each Table has a way to keep records unique. We can do this by setting one field (column) to be a **Primary Key** field. When a field is set as a Primary Key, Access will not allow any duplication or blanks.

When there is not a unique field in your data set, you can use an AutoNumber. AutoNumbers are incremented or random fields that are always unique, and thus ideal for your primary key.

Basic Access Objects

Access consists of four main database objects: Tables, Queries, Forms, and Reports. Each object has at least two views, Design and Data. The **Design View** is where we build the structure of that database object. The data view is different for each object. Tables and Queries have a **Datasheet View**, Forms have a **Form View**, and Reports have a **Report View**, or a **Print Preview** view.

Tables

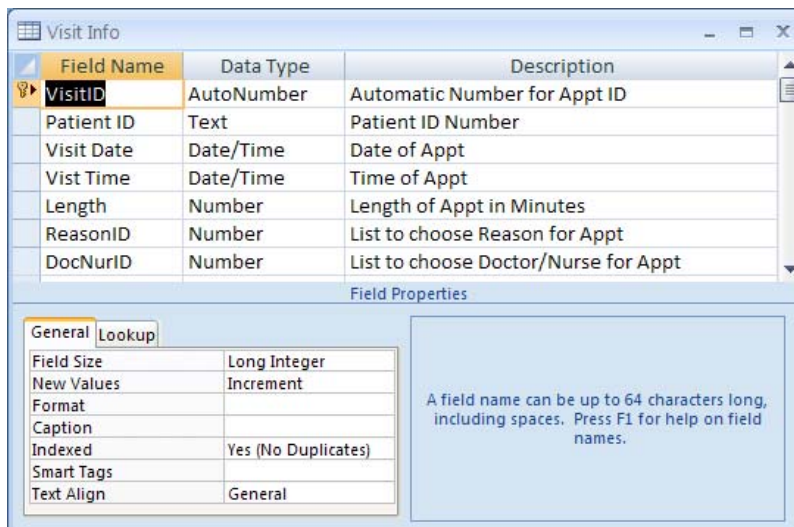
Tables store data. The Tables are the true 'database' (base of data). These need to be created and properly linked (related) in order to effectively use the other Access tools. Tables are the core of your database, everything else in Access depends on the Tables.

The **Design View** of a Table allows you to create and modify:

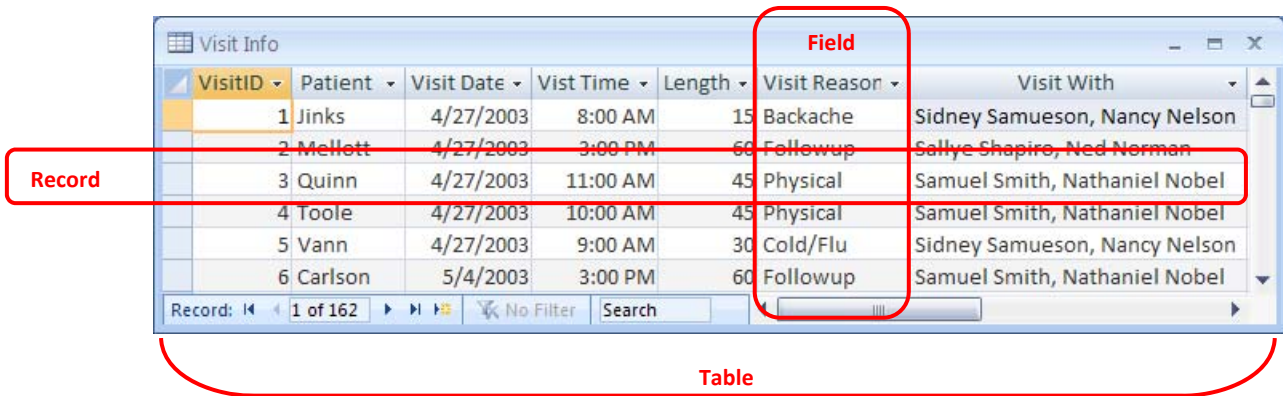
- **Field Names** (the column headings)
- The type of data stored in a field (**Data Type**). In this workshop we use:

Data Type	Description
Text	Allows any alphanumeric characters, up to 255 characters
Number	Limited to Numbers only
Date/Time	Allows Dates and/or Times only
AutoNumber	Creates a unique sequential number for each record.
Yes/No	This is a binary field (only two answers, Yes/No, True/False)
Lookup Wizard...	The lookup wizard allows you to link the field to another Table or to type in a list of your own creation.

- **Descriptions**, which will be displayed in the status bar in the Data view of Forms
- And the **Properties** of each field, such as how many characters can be entered (text field size), or how the data is formatted (05/05/95 or May 5, 1995).



The **Datasheet View** of a Table allows you to create and modify the data within a grid structure based on the settings in the Design View.



Vocabulary

A collection of fields make up a record. A collection of records make up a Table. A collection of Tables make up a database

Field – One column of a Table common to all the records

Record – One row of a Table containing all data about a particular entry

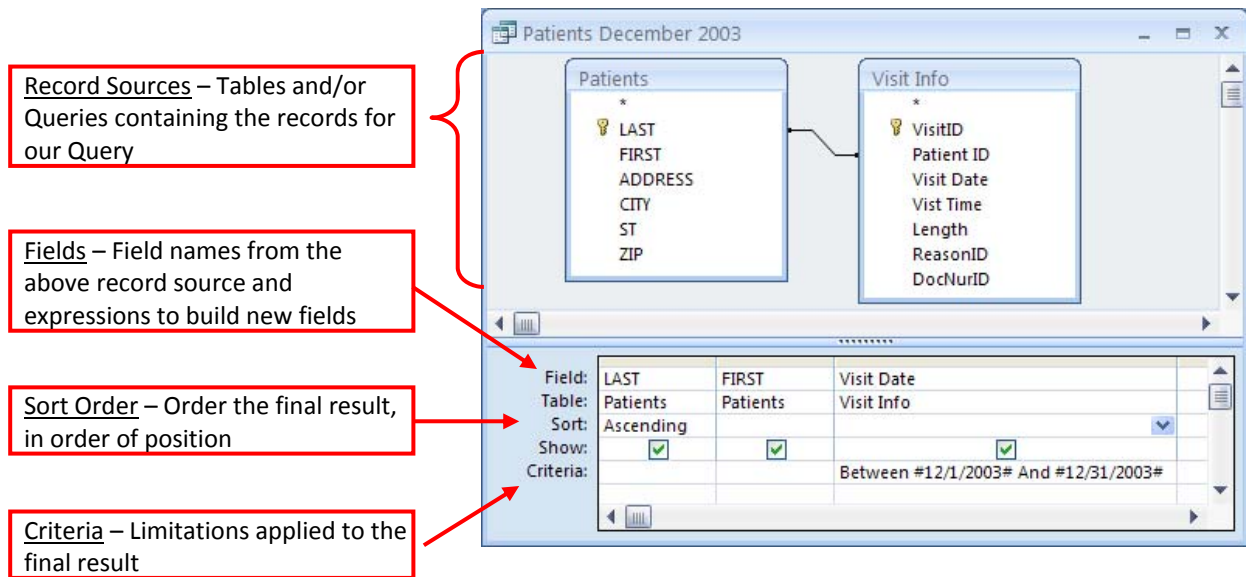
Table – One set of related data

Database – Structured collection of related Tables

Queries

Queries show a selection of data based on criteria (limitations) you provide. Queries can pull from one or more related Tables and/or other Queries.

The **Datasheet View** of a Query looks like a Table. All data added or modified in a Query, will be saved in the Table. The **Design View** is where the structure of the Query is created. This is where we choose the record sources and fields, and set the sort order and criteria.



Forms

Most Forms display one record at a time, in a formatted user-friendly environment. You can build your Form so it will display multiple records. As you develop Forms you can create navigation buttons, insert graphics, and change the colors to display everything consistently. Forms have three basic views: Design View, Layout View and Form View.

Your record source can be a Table or Query. If we want to *all* the patients use the Table; if we only want to see Dr. Edward's Patients, use a Query.

LAST	FIRST	ADDRESS	CITY	ST	ZIP
Adams	Annie	6831 NW 4th Ave	Gainesville	FL	32655
Appleton	April	PO Box 456	Starke	FL	32689
Arlington	Arnold	234 SE 45th Road	Gainesville	FL	32597
Brown	Bobbie	234 Peter Pan Terrace	Gainesville	FL	32597
Bruce	Butch	3243 SE 4th Terrace	Gainesville	FL	32608

The data entered or modified in a Form is automatically saved to the Table. The Table is the true location of the data; the Form is a "pretty" way to view/modify/create the data.

If you would like to view more than one record at a time you may use a "Multiple Items" Form, or a "Split Form". Multiple Items, sometimes called a Tabular or Continuous Form, shows multiple formatted records. Split Forms show the Form view and a datasheet view in the same window.

LAST: Adams
FIRST: Annie
ADDRESS: 6831 NW 4th Ave
CITY: Gainesville
ST: FL
ZIP: 32655

Multiple Items

LAST	FIRST	ADDRESS	CITY
Adams	Annie	6831 NW 4th Ave	Gainesville
Appleton	April	PO Box 456	Starke
Arlington	Arnold	234 SE 45th Road	Gainesville
Brown	Bobbie	234 Peter Pan Terrace	Gainesville
Bruce	Butch	3243 SE 4th Terrace	Gainesville
Cappers	Cathy	RR 2 Box 659	Waldo
Carlson	Carly	1943 NW Main Street	Gainesville
Clark	Carl	9213 Kiwi Road	Gainesville
Dawson	Debbie	832 Hook Place	Gainesville

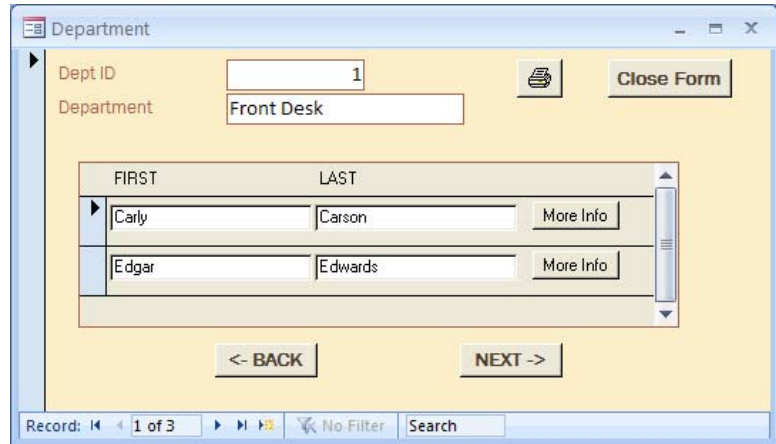
Split Form

LAST: Adams
FIRST: Annie
ADDRESS: 6831 NW 4th Ave
CITY: Gainesville
ST: FL

LAST	FIRST	ADDRESS	CITY	ST	ZIP
Adams	Annie	6831 NW 4th Ave	Gainesville	FL	32655
Appleton	April	PO Box 456	Starke	FL	32689
Arlington	Arnold	234 SE 45th Road	Gainesville	FL	32597
Brown	Bobbie	234 Peter Pan Terrace	Gainesville	FL	32597
Bruce	Butch	3243 SE 4th Terrace	Gainesville	FL	32608

For the Basic Workshop we will use the AutoCreate buttons to make our Forms. Once the Form is created, you can use the **Layout View** to change the placement and size of the fields. In the **Intro to Forms and Reports** workshop we will learn to build these database objects in the Design View.

As your Forms become more involved, you can use the **Design View** to add objects like command buttons to move between records, Forms and Reports.



Reports

Reports are designed to create an organized output of data from your database. With a Report, you can group and summarize information. You can't edit the data in a Report, but if you make the modifications in the Table, Query, or Form you will see the results when you open the Report again. Reports have four basic views: Report View, Print Preview, Layout View, and Design View.

Example of Grouping

For the Basic Workshop we will use the wizard and AutoCreate buttons to make our Reports.

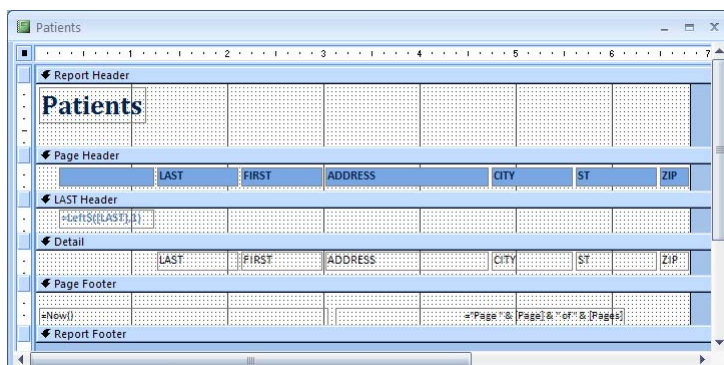
	LAST	FIRST	ADDRESS	CITY	ST	ZIP
A						
	Adams	Annie	6831 NW 4th Ave	Gainesville	FL	3265
	Appleton	April	PO Box 456	Starkie	FL	3268
	Arlington	Arnold	2345 E 45th Road	Gainesville	FL	3259
B						
	Brown	Bobbie	234 Peter Pan Terrace	Gainesville	FL	3259
	Bruce	Butch	3245 SE 4th Terrace	Gainesville	FL	3260
C						
	Cappes	Cathy	RR 2 Box 659	Waldo	FL	3456
	Carlson	Carly	1943 NW Main Street	Gainesville	FL	3256
	Clark	Carl	9215 Kiwi Road	Gainesville	FL	3266

The **Print Preview** and **Report View** allow you to view how the data falls into the Report.

- The Print Preview will show you how the data falls on the page, and how it will appear when printed.
- The Report view lets you see a continuous flow of the data without page breaks.

The **Design View** and **Layout View** allow you to resize and move the fields.

- The Design View allows you to add objects (like text boxes that contain formulas).
- The Layout view allows you to resize the field and see the data at the same time.



Class Exercise

Create the Database

1. Open Access
 2. Choose Blank Database
 3. Use the FILE NAME: Patient Appointments
 4. Close the new Table that is automatically created
-

Create the Patients Table

1. Click on the Create Tab and choose TABLE DESIGN
2. Type the first Field Name: **Pt Med Rec #**
 - a. Data Type: Text
 - b. Description: Patient's Medical Record Number
3. Enter in the rest of the fields (descriptions not necessary):

Field Name	Data Type	Description
Pt Med Rec #	Text	Patient's Medical Record Number
Pt First Name	Text	
Pt Last Name	Text	
Pt Prim Phone #	Text	
Pt Birth Date	Date/Time	

4. Set the Pt Med Rec # to be the key
 - a. Click on the big yellow key on the toolbar
 5. Save the Table as **Patients**
-

Entering First Record

1. Turn to the Datasheet View
2. Enter our first Med Rec #: **123-456**
3. Press tab move to the next field

Pt Med Rec #	Pt First	Pt Last	Pt Phone	Pt Birth Date
123-456	Shaun	Fuller	3525551234	1/1/1

- a. First Name: **Shaun**
 - b. Last Name: **Fuller**
 - c. Birth Date: **1/1/1**
 - If you set it as a DATE/TIME field Access will add in the "200" for 2001
 - d. Phone #: **3525551234**
 - No dashes
-

Exit the Database

1. Exit the database, Access will probably not ask you to save
 - a. But it did save the record, it does so automatically.
2. Open your database from the desktop
3. Open the table (double-click) from the navigation pane

Rearrange Fields

1. In Design View, move Pt Birth Date above the Pt Phone
2. Switch to the Data View and Enter the next record

Pt Med Rec #	Pt First	Pt Last	Pt Birth Date	Pt Phone
789-123	Jacob	Smith	2/2/92	3525554321

Adding Fields

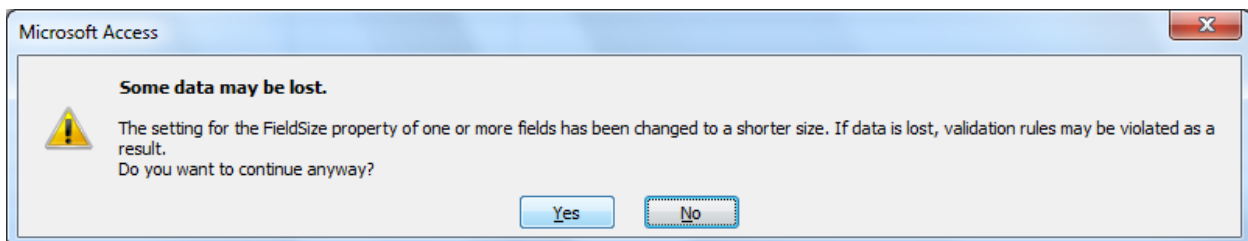
1. In Design View, create Pt Gender, text field, above Pt Birth Date
 - a. Insert Rows from Design Tab, or from the right-click menu
2. In Data View Enter "Male" (the whole word) for Shaun and Jacob
3. Enter a new record

Pt Med Rec #	Pt First	Pt Last	Pt Gender	Pt Birth Date	Pt Phone
555-555	Jennifer	Underwood	F	March 3, 1983	352-555-5555

- a. Enter Gender as just one character
- b. Enter birth date as March 3, 1983; it should change to 3/3/1983
- c. Type in the hyphens for the phone number

Modify Field Properties – Field Size

1. In Design View, set **Field Size** of Gender to be 1
 - a. When you save you will get an error message saying data may be lost click **Yes**



- b. Data is lost, our Male entries should now only read M

Modify Field Properties – Format

1. In Design View, set the **Format** of the Birthday to be a Medium Date
 - a. Notice there is no "field size" for a date field, because it doesn't matter how many characters you type in, as long as it's a valid date.

Modify Field Properties – Input Mask

1. In Design View, set an **Input Mask** for the Phone Number
 - a. In Field Properties, click in the Input Mask line; click the Build button (...)
 - b. In the Input Mask Wizard, Phone Number is already selected. Click FINISH.
 - c. Save and View Results

Pt Med Rec #	Pt First	Pt Last	Pt Gender	Pt Birth Date	Pt Phone
123-456	Shaun	Fuller	M	01-Jan-01	(352) 555-1234
339-852	Jennifer	Underwood	F	03-Mar-83	352-555-5555
839-482	Jacob	Smith	M	02-Feb-92	(352) 555-4321

2. Fix Jennifer's Phone Number

Enter a New Record

1. Enter a new record

Pt Med Rec #	Pt First	Pt Last	Pt Gender	Pt Birth Date	Pt Phone
527-594	Doris	Jones	F	4/4/74	3525555432

2. Close the Table
3. Open the Patient's Table

Pt Med Rec #	Pt First	Pt Last	Pt Gender	Pt Birth Date	Pt Phone
123-456	Shaun	Fuller	M	01-Jan-01	(352) 555-1234
339-852	Jennifer	Underwood	F	03-Mar-83	(352) 555-5555
527-594	Doris	Jones	F	04-Apr-74	(352) 555-5432
839-482	Jacob	Smith	M	02-Feb-92	(352) 555-4321

Create Female Patient's Query

1. Go to the Create Tab and choose QUERY DESIGN
2. ADD Patients to the Query, close the Show Table box
3. Add Patient's Name and Gender by double-clicking on the fields
4. Datasheet View

Pt First	Pt Last	Pt Gender
Shaun	Fuller	M
Jennifer	Underwood	F
Doris	Jones	F
Jacob	Smith	M

Customizing a Query

1. In the Datasheet view notice the sort order is by Med Rec #
2. In the Design view, set Query to **Sort by** Pt Last Name **Ascending**
3. Go to the Data View, patients should read, Fuller through Underwood
4. In the Design View, set the **Criteria** line for the Pt Gender field to be F
 - a. In Datasheet view, you should only have two people: Jennifer and Doris

Field:	Pt First Name	Pt Last Name	Pt Gender
Table:	Patients	Patients	Patients
Sort:			
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:			"F"
or:			

Pt First	Pt Last	Pt Gender
Doris	Jones	F
Jennifer	Underwood	F

5. Close and save the Query as **Female Patients**

Create Patients Form

1. Select Patients Table from left Navigation Pane so it becomes the default data source
2. On the Create Tab click on the FORM button
3. We are in the Form's Layout view
 - a. Adjust the field widths
4. Change to the "Form" view (first button on the Home Tab)
5. Create a new FEMALE patient, anyone you want
6. Open the Patients TABLE, view new person
 - a. From the left Navigation Pane, double-click
7. Open the Female Patients QUERY, view new person
 - a. New patient has been saved, even though the Form has not been saved
8. Close all, Save Form as "Patients"

Create Simple Report

1. Select Table from left Navigation Pane so it becomes the default data source
2. On the Create Tab click on the REPORT button
 - a. In Layout View, adjust the columns to fit the data
 - b. Right-click to go to the Print Preview
 - c. Data sorted in the order it was created in the Table
 - d. Close and Save as Patients

Create Grouped Report

1. Select Patient Table from left Navigation Pane so it becomes the default data source
2. On the Create Tab click on the REPORT WIZARD button
 - a. Step 1 (Select fields)
 - Use double arrow (>>) to move over all fields
 - b. Next Step 2 (Grouping) -
 - Group by Pt Last Name,
 - Grouping Options "1st Letter"
 - Group by Pt Birth Date *twice*
 - Grouping Options by Month & by Week
 - Ungroup all fields (no blue in the left side)
 - Group by Gender
 - c. Next Step 3 (sorting)
 - Sort by Last Name and First Name Ascending
 - d. Next Step 4 (layout) - Choose Outline 1
 - e. Next Step 5 (style) - Choose Office
 - f. Next Step 6 (saving) - Patients by Gender
3. Right-click and go to the layout view, adjust the birthday field
4. Close and save the Report

Create Appointments Table

1. Click on the Create Tab and choose TABLE DESIGN
2. Create Table as shown here
3. Set Appt ID # to be the Primary Key

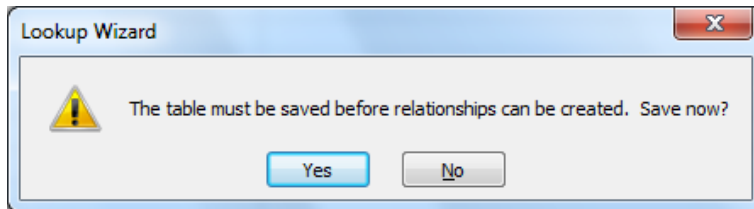
Field Name	Data Type
Appt ID #	AutoNumber
Pt Med Rec #	Text
Appt Doctor	Text
Appt Date	Date/Time
Appt Time	Date/Time
Appt Reason	Text
Appt Type First	Yes/No
Appt Type Follow-up	Yes/No
Appt Type Emergency	Yes/No
Appt Location	Text

Create Lookup Location

1. Change the Data Type for Appt Location to be LOOKUP WIZARD
 - a. Step 1 - I will type in the values I want
 - b. Next Step 2 – Mag Ctr, Med Plaza, South Tower
 - c. Next Step 3 – Label Appt Location
 - d. *Finish*
2. Appt Location field type still says TEXT
 - a. View Lookup tab in the properties at the bottom of the window

Create Lookup Pt Med Rec #

1. Change the Data Type for Pt Med Rec to be LOOKUP WIZARD
 - a. Step 1. I want the lookup column to look up the values in a Table or Query
 - b. Next Step 2. (Patients Table is already selected)
 - c. Next Step 3. Bring over: Pt Med Rec, Pt Last Name, Pt Birth Date
 - d. Next Step 4. Sort by: Pt Last Name, Pt Birth Date
 - e. Next Step 5. UNCHECK the hide key column
 - f. Next Step 6. "Choose a field that uniquely identifies the row". (Pt Med Rec #)
 - g. Next Step 7. Label of Pt Med Rec is fine, click Finish
 - h. Click Yes to the warning message "The Table must be saved before the Relationship can be created"



Add an Appointment

1. In Datasheet view enter a new record
 - a. Med Rec #: 123-456
 - b. Appt Doctor: Jekyll
 - c. Appt Date: 10/17
 - d. Appt Time: 2p
 - e. Appt Reason: Mood Swings
 - f. Check Appt Type First
 - g. Appt Location: Choose from list

Modify Appt Table

1. Change CAPTION property for the check boxes so you can read title

Field Name	Caption
Appt Type First	First Appt
Appt Type Follow-up	Follow-up
Appt Type Emergency	Emergency

2. Change Appt Time FORMAT property to remove the seconds

Create Schedule Query with Multiple Tables

1. Go to the Create Tab and click the **Query Design** button
2. Add both Tables and close the show Table window
 - a. From the **Appointment** Table Double-click on **Pt Med Rec #**
 - b. From the **Patient Table** Double-click on **Pt First Name** and **Pt Last Name**
 - c. From the **Appointment** Table Double-click on **Appt Doctor**, **Appt Date**, **Appt Time**, and **Appt Reason**
3. Add a new record in the Datasheet view
 - a. Select the Med Rec for Ms Underwood
 - b. Change Jennifer to Jenny
 - c. Set the Doctor, Date, Time, and Reason

Pt Med Rec	Pt First Name	Pt Last Name	Appt Doctor	Appt Date	Appt Time	Appt Reason
339-852	Jenny	Underwood	Scholls	8/29/2015	2:00 PM	Foot Oder

4. Close and Save Query as **Schedule**

Create Patient Appointment Form

1. Go to the Create Tab and click the FORM WIZARD
 - a. Choose the Table: Patients
 - Use the Double Arrow to bring over everything (>>)
 - b. DO NOT CLICK NEXT
 - c. Choose Table: Appointments
 - Bring over: Doctor, Date, Time, Reason
 - d. Click FINISH - We are skipping the rest of the steps

Using Patient Appointments Form

1. Click in the Pt Last Name field
 - a. Click the binoculars to FIND (or press Ctrl-F)
 - b. Type in Underwood
 - c. Schedule another appt for Ms Underwood
2. Create a new Patient
 - a. Schedule them for an appointment
3. Close and Save the Form

View the Final Results

1. View each object in the database
 - a. Your Tables
 - b. Your Queries
 - c. Your Reports

Backing up Database

1. From the **File Tab** choose **Info**
 - a. Choose **Compact and Repair**
 - You should do this every time it crashes, or begins to run slowly, or starts acting funny, or before you share it with me
2. From the **File Tab** choose **Save & Publish**
 - a. Under advanced choose **Back up Database**
 - You should do this on a regular basis, but definitely before you make any major changes, or before you share it with me
3. Exit Access
 - a. Right-Click on File, Choose "Send to Compressed Zipped Folder"
 - If you would like to email yourself the file, email the "Zipped Folder"
 - The Access Database inside the zipped folder is READ ONLY, meaning you cannot make changes to it. If you want to make the file editable, you will need to drag it out of the zipped folder.

Congratulations, you now know enough to be dangerous.

For more in depth instructions, including the reasoning for the exercises see the "Instructors Notes" on our webpage: http://training.health.ufl.edu/access_handouts.aspx