Microsoft Access 2010: Basics & Database Fundamentals

This workshop assumes you are comfortable with a computer and have some knowledge of other Microsoft Office programs. Topics include database concepts, introduction to Tables, Queries, Forms and Reports. The Class Exercise is very basic starting from the beginning and making modifications.

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 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

EmpID #	First Name	Last Name	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:

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:

- **Input** -What data do I already have for the database?
- **Output** -What information do I want to get out of the database?
- **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**.

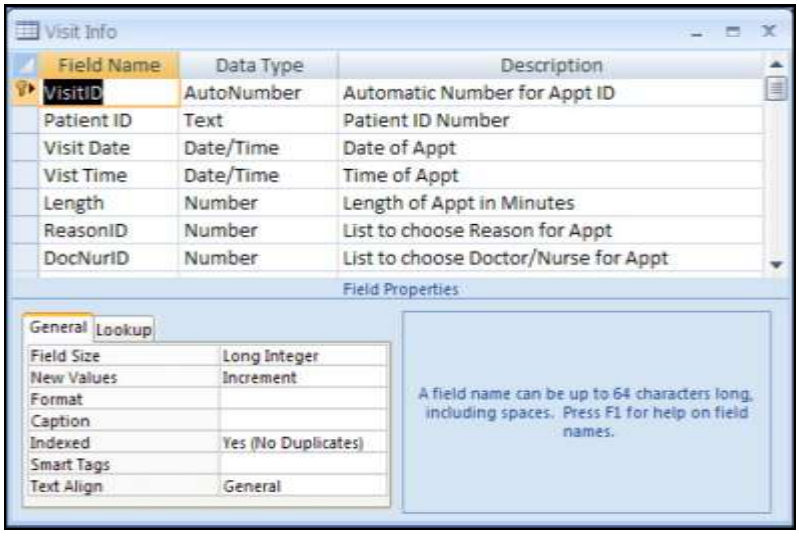
Tables

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 class 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

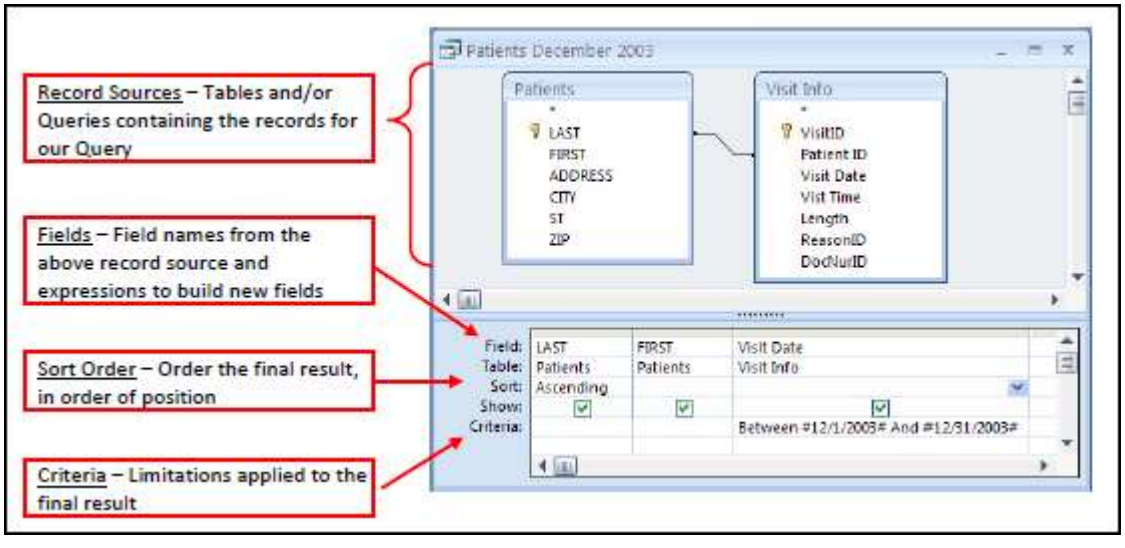
A collection of fields make up a record. A collection of records make up a Table. A collection of Tables make up a database.

- **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.



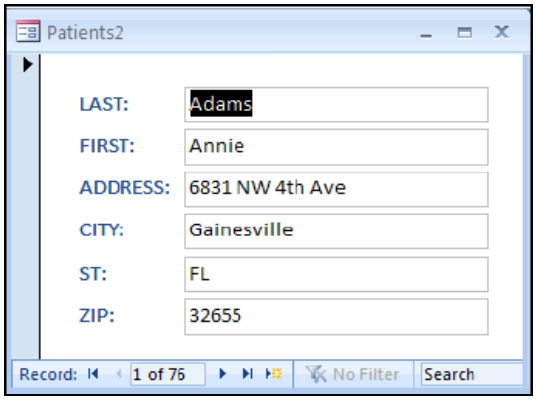
Record Sources – Tables and/or Queries containing the records for our Query
Fields – Field names from the above record source and expressions to build new fields
Sort Order – Order the final result, in order of position
Criteria – Limitations applied to the final result

Forms

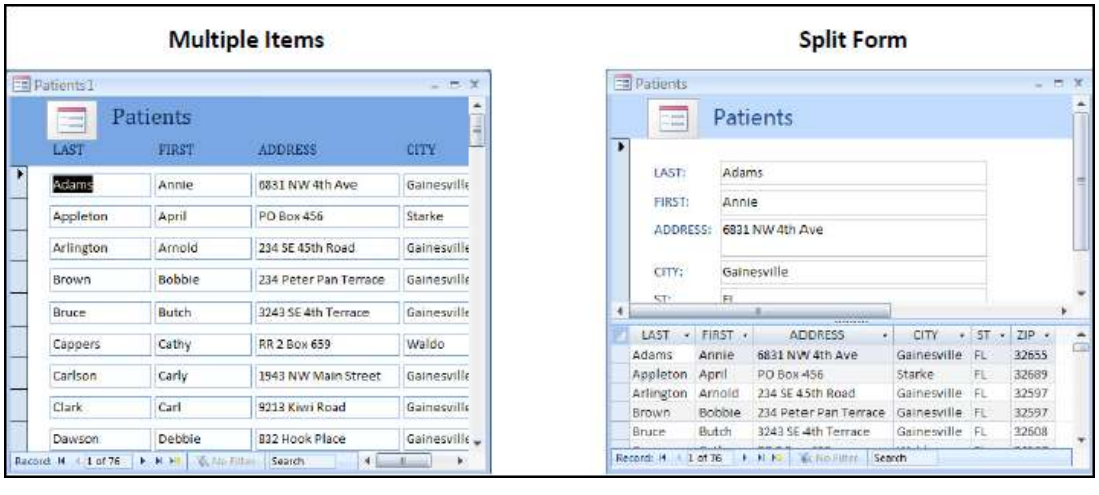
Most Forms display one record at a time, in a formatted user-friendly environment. You can build your Form so it will display multiple records. As you develop Forms you can create navigation buttons, insert graphics, and change the colors to display everything consistently.

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.

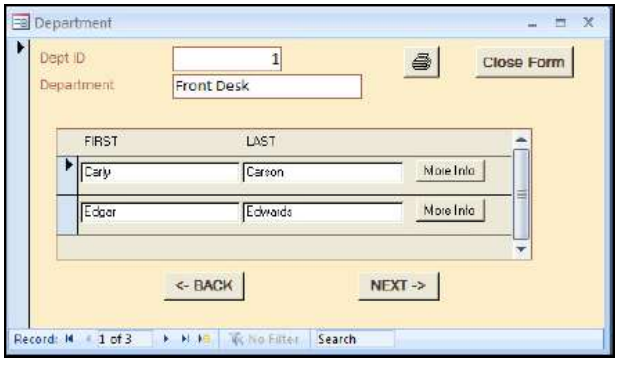
The data entered or modified in a Form is automatically saved to the Table. The Table is the true location of the data; the Form is a "pretty" way to view/modify/create the data.



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.



For this class 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. 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

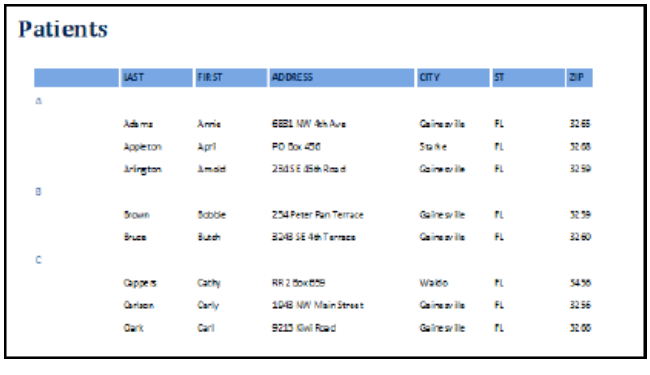
Reports are designed to create an organized output of data from your database. With a Report, you can group and summarize information. You can't edit the data in a Report, but if you make the modifications in the Table, Query, or Form you will see the results when you open the Report again.
Reports have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

Examples of Grouping

For this basic class we will use the wizard and AutoCreate buttons to make our Reports.

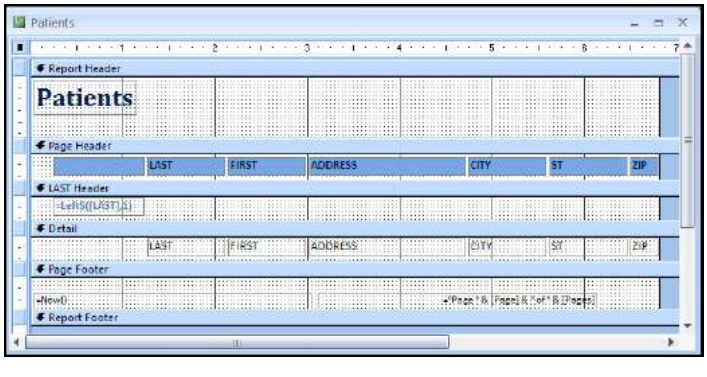
The **Print Preview** and **Report View** allow you to view how the data falls into the Report.

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 Microsoft Access 2010
2 Click on **Blank Database, Create** (notice default location)
3 Close the new Table that is automatically created, right mouse on the tab & close table.
4 File, Save Database As: Patient Details

***If you get the yellow Security tab, click on **Enable Content** button.*

Create a Patients Table

1. Click on the **Create** tab and choose **Table Design**
2. Type in the first line under **Field Name**: **Pt Med Rec #**
a. **Data Type**: Text
b. **Description**: Patient's Medical Record Number
3. Enter in the rest of the fields as shown below (descriptions not necessary for the remaining items):

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. Click on the **Pt Med Rec #** (entire row), we want to make it the **Primary key**
a. Click on the big yellow key on the toolbar
5. Now let's save that table, **File, Save object As**, (the Table) as **Patients**

Entering the First Record

1. **Home** tab, **View**, **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. Phone #: **3525551234** − No dashes
d. Birth Date: **1/1/1** − If you set it as a **DATE/TIME** field. Access will add the "200" for 2001

Rearrange Fields

1. To rearrange a field you need to be in the Design View. Go to **Home** tab, **View**, **Design View**.
2. Move **Pt Birth Date** above the **Pt Phone** by selecting entire row (solid arrow) & drag up. (watch for rectangle while moving)
3. Enter the next record as shown below by going **Home** tab, **View**, **Datasheet View**.

*****Always say Yes when asked to save the Table dialog box that appears!***

Pt Med Rec #	Pt First Name	Pt Last Name	Pt Birth Date	Pt Prim Phone #
123-456	Shaun	Fuller	1/1/2001	3525551234
789-123	Jacob	Smith	2/2/1992	3525554321

Adding another Field

1. **Home** tab, **View, Design View**, create **Pt Gender**, text field, above **Pt Birth Date**
a. **Insert Rows** from **Design** tab, or from the right-click menu. Be in the row below where you want to insert above.
2. In **Datasheet View** enter "**Male**" (the whole word) for Shaun and Jacob.
3. Enter a new record with details shown below.

Pt Med Rec #	Pt First Nam	Pt Last Name	Pt Gender	Pt Birth Date	Pt Prim Phor
123-456	Shaun	Fuller	Male	1/1/2011	3525551234
789-123	Jacob	Smith	Male	2/2/1992	3525554321
555-555	Jennifer	Walton	F	3/3/1983	352-555-5555

a. Enter the Gender as just one character "**F**"
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 – Change Field Size

1. **Home** tab**, View, Design View**, select the row of **Pt Gender.** In the **Field Properties** area, below, it shows the **Field Size** is 255, we now will change the **Field Size** of Pt Gender to be **1**.
2. Click on **File, Save.**

** When you save you will get an error message saying data may be lost click, click **Yes.** (as shown below) It will be ok!

Yes, data is lost, but look at our Male entries; it shows only the letter **M**. Go into the **Datasheet View** to verify!

Modify Field Properties – Format Date

1. **Home** tab, **View**, **Design View**, select the row for **PT Birth Date.** In the **Field Properties** area, below, set the **Format** of the **Pt Birth Date** to be a **Medium Date.**
2. Click on **File, Save.**
3. Go to **Datasheet View.** (See the dates now, shown below)

Pt Med Rec	Pt First Name	Pt Last Nam	Pt Gende	Pt Birth Date	Pt Prim Phor
123-456	Shaun	Fuller	M	01-Jan-01	3525551234
789-123	Jacob	Smith	M	02-Feb-92	3525554321
555-555	Jennifer	Walton	F	03-Mar-83	352-555-5555

Modify Field Properties – Input Mask – Change Phone Number

1. **Home** tab**, View**, **Design View**, select the entire row for **Pt Prim Phone Number.** In the **Field Properties** area below, click in the **Input Mask** line; then click the Build button (…) which shows up on the right side.
2. In the **Input Mask Wizard** dialog box that appears, the **Phone Number** is already selected. Click **Finish**.

3. **View** results under **Datasheet View** and always click **Yes** to **Save** when prompted. See phone numbers now.

Pt Med Rec #	Pt First Name	Pt Last Name	Pt Gender	Pt Birth Date	Pt Prim Phone #
123-456	Shaun	Fuller	M	1/1/2001	(352) 555-1234
555-555	Jennifer	Walton	F	3/3/1983	352-555-5555
789-123	Jacob	Smith	M	2/2/1992	(352) 555-4321

Now, let's fix Jennifer's Phone Number. Remove it; just type the numbers, nothing else. **3525555555** They all look the same now!

Enter a New Record & Sort

1. Enter a new record with details below in **Datasheet View.**

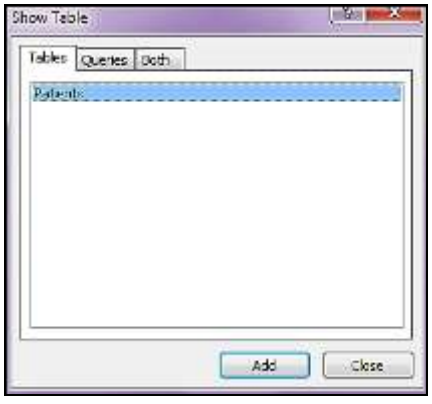
527-594	Doris	Jones	F	4/4/1954	(352) 555-5432

2. Close the Table, right mouse on tab and **Close**.
3. Now double click to open the **Patient's** Table, notice all detail are there! No saving Necessary!
4. The table below is sorted by **Pt Med Rec #**. Click on the drop down arrow beside **Pt Med Rec#** to sort the data to appear just like shown below. Or **Home** tab, **Sort**, **Ascending/Descending**.

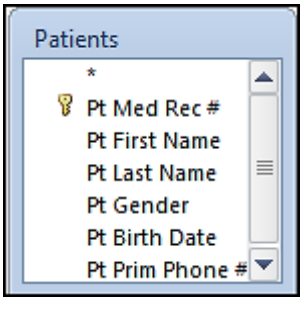
Pt Med Rec #	Pt First Nam	Pt Last Name	Pt Gender	Pt Birth Date	Pt Prim Phor
123-456	Shaun	Fuller	M	01-Jan-01	(352) 555-1234
527-594	Doris	Jones	F	04-Apr-54	(352) 555-5432
555-555	Jennifer	Walton	F	03-Mar-83	(352) 555-5555
789-123	Jacob	Smith	M	02-Feb-92	(352) 555-4321

Create A Gender Patient's Query

1. Go to the **Create** tab and choose **Query Design.** A **Show Table** dialog box opens.



2. Click **Add** on the **Show Table** dialog box; a **Patients** window appears, now click the **Close** button on the **Show Table** dialog box.
3. Now watch below and we will add **Pt First Name** & **Pt Last Name** and **Pt Gender** by double-clicking on the 3 fields inside the small **Patients** dialog box that appears.



Now go to the **Home** tab**, View, Datasheet View.**

Pt First Nam	Pt Last Name	Pt Gender
Shaun	Fuller	M
Doris	Jones	F
Jennifer	Walton	F
Jacob	Smith	M

Customizing a Query to Sort By Female

1. In the **Datasheet View**, the sort order is by **Med Rec #** as it is on the **Patients** table.
2. Go to **Design View**, set to **Sort by** (in the **Pt Last Name** column**) Ascending** in **Field Properties** area below.

Field:	Pt First Name	Pt Last Name	Pt Gender
Table:	Patients	Patients	Patients
Sort:		Ascending	
Show:			

3. Go to the **Datasheet View**, patients should read, Fuller through Walton
4. In the **Design View**, set the **Criteria** line for the **Pt Gender** field by typing in a **F.**

Field:	Pt First Name	Pt Last Name	Pt Gender
Table:	Patients	Patients	Patients
Sort:		Ascending	
Show:	☑	☑	☑
Criteria:			"F"

4. In **Datasheet View**, you should only have two people: Jennifer and Doris.
5. **File, Save Object as (**Query), **Female Patients**

Create Simple Form

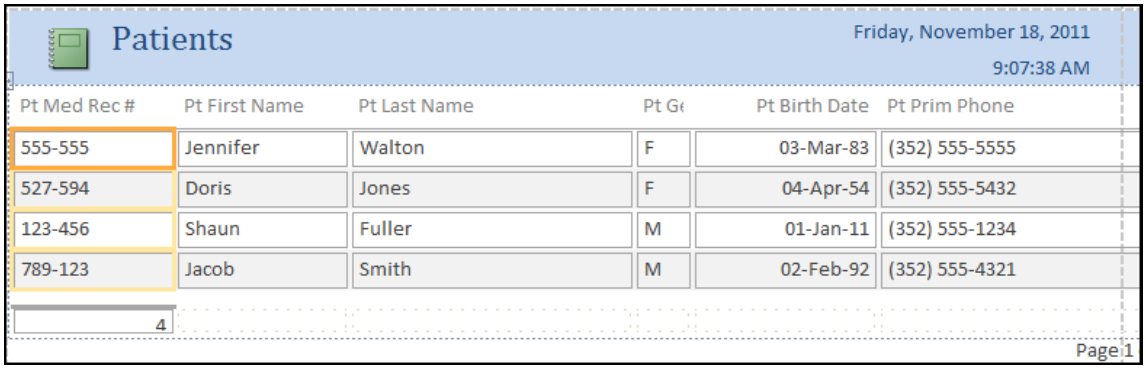
1. Select the **Table** (double click) from left Navigation Pane so it becomes the data source
2. On the **Create** tab click on the **Form** button. You now see your data displayed as a Form.
3. **File** and **Save Object As** (Form)**, Patient Form.**

Notice the arrows at the bottom to navigate the records, a **Search** and the **New Record.**

Create Simple Report

1. Select the **Patients** Table from left Navigation Pane so it becomes the data source. On the **Create** tab click on the **Report** button.
2. You are now in **Layout View**, notice the **Report Layout Tools** tabs, adjust the columns to fit the data by using the 2 headed arrows. The dotted lines will help guide you as this is the print area. Notice you can drag from the far right side of the columns.
3. Right-click on the top of (green) **Report** tab, to the **Print Preview** to see what your data will look like. **Close** Preview to go back**.**

c. **File** and **Save Object As** (Report)**, Patient Report.**



Patients

Friday, November 18, 2011
9:07:38 AM

Pt Med Rec #	Pt First Name	Pt Last Name	Pt G	Pt Birth Date	Pt Prim Phone
555-555	Jennifer	Walton	F	03-Mar-83	(352) 555-5555
527-594	Doris	Jones	F	04-Apr-54	(352) 555-5432
123-456	Shaun	Fuller	M	01-Jan-11	(352) 555-1234
789-123	Jacob	Smith	M	02-Feb-92	(352) 555-4321

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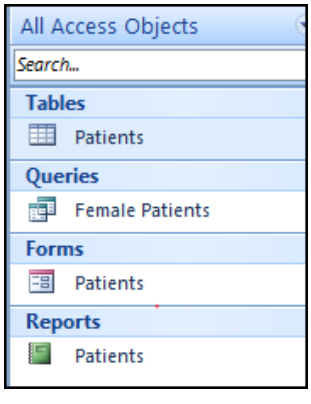
Page 1

Your Access database now has a **Table, Query, Form** and a **Report.**



Backing up Database, Exit and Zipped Files

1. From the **File Tab** choose **Info.** Choose **Compact and Repair** − You should do this every time it crashes, or begins to run slowly.
2. From the **File Tab** choose **Save & Publish.** Under advanced choose **Back up Database** − You should do this on a regular basis, but definitely before you make any major changes. It will put todays date in the name of file.
3. Exiting Access & Zipping. File, Close Database. Zip by Right-Clicking on File, Choose "Send to Compressed Zipped Folder" − The Access Database inside the zipped folder is READ ONLY, meaning no one cannot make changes to it. To make the file editable, you will need to click on "Save As" and save it outside of the zipped folder or simply drag outside of the zipped folder.

Congratulations, you now know enough to be dangerous.