

Introduction to Database Concepts and Microsoft Access 2016

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Database Concepts and Access 2016

- Introduction
 - Database
 - Microsoft Access
- Design and Creation
 - **Plan**
 - Tables
 - Queries
 - Forms
 - Reports

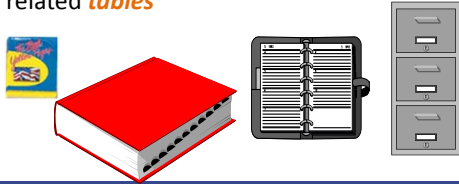
Things to Do

- Contact your customer support
- Talk to your ISM
- Backup
- Backup
- Backup



What is a Database?

- A structured collection of related data
- An filing cabinet, an address book, a telephone directory, a timetable, etc.
- In Access, your Database is your collection of related **tables**

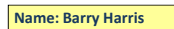
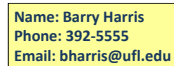
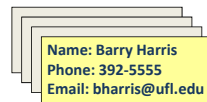


Data vs. Information

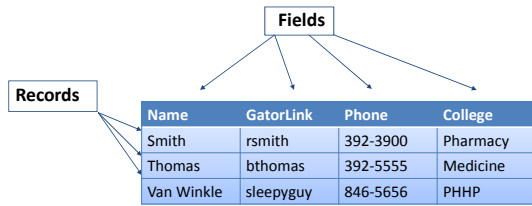
- Data – a collection of facts made up of text, numbers and dates:
Murray 45000 7/18/96
- Information - the meaning given to data in the way it is interpreted:
*Mr. **Murray** is a sales person whose annual salary is **\$45,000** and whose hire date is **July 18, 1996**.*

Basic Database Concepts

- Table
– A set of related records
- Record
– A collection of data about an individual item
- Field
– A single item of data common to all records



Example of a Table



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
 - If you don't plan you will often have to start again
- Document what you are doing
 - Will you remember what you did in three months?



Questions To Ask Yourself

- What have I got?
 - (Inputs)
- What do I want?
 - (Outputs)
- What do I need to do to get there?
 - (Process)
- How am I going to build it?
 - (Application/Program)



Database Options

	Freeware/ Shareware	Microsoft Excel	Microsoft Access	Oracle/SQL
Simplicity	Basics	Intermediate	Advanced	Hire a programmer
# of Users	1	1	Multiple	Multiple of Multiples
Multiple datasets	No	No	Yes	Yes
Security	Always consult with your computer security team if you are working with any sensitive data.			

Why Use Access?

- Familiar look and feel of Windows
- Easy to start building simple databases
- Can build sophisticated systems
- It's already on your computer
- True relational database



What is a *Relational* Database?

- A relational database is a collection of tables from which data can be accessed in many different ways without having to reorganize the database tables.
 - That is, once *relationships* are created, tables can "talk" to each other. We can link (*relate*) the tables to find:
 - Which doctors have seen a patient
 - Which students are in a class
 - Which item is selling the most on Friday's

Basic Design Rules

- Organizing Data

Once you've chosen your fields, you need to decide if they belong in different tables. Data should be kept in separate tables if you have an indeterminate number of entries. One employee can have a number of evaluations.

Emp ID	First Name	Last Name	Eval 1	Eval 2
123-456	Sally	Shapiro	1/15/10	1/14/11
125-985	Samuel	Smith	1/12/11	
248-890	Sidney	Samuelsson		

Emp ID	Eval Date
123-456	1/15/2016
123-456	1/14/2011
123-985	1/12/2011



Basic Design Rules

- No Derived Fields

If a field you are not using as a link exists in another table, it should not be repeated in the current table. Listing it in both places leads to data entry errors. Since we have the Emp ID in both tables, there is no need to include the Employee's Last Name in the Evaluation table.

Emp ID	First Name	Last Name
123-456	Sally	Shapiro
125-985	Samuel	Smith
248-890	Sidney	Samuelsson

Emp ID	Last Name	Eval Date
123-456	Shapiro	1/15/2016
123-456	Shapiro	1/14/2011
123-985	Smith	1/12/2011

You can use a query to pull values from both tables into one datasheet.

Basic Design Rules

- Data is broken down into Smallest Logical Parts

Each segment of data you want to sort or filter should be kept in its own field. For example, what if I needed to sort by City or Zip Code? Pulling fields together is fairly simple, pulling them apart can difficult.

ID	Home Address
987	123 West Newberry Road, Gainesville, FL 32601
654	456 South 3rd Road, Apt 12, Newberry, FL 32684

ID	Addr1	Addr2	City	State	Zip
987	123 West Newberry Rd		Gainesville	FL	32601
654	456 South 3rd Road	Apt 12	Newberry	FL	32684

You can join fields together in queries, forms and reports.

Basic Design Rules

- Descriptive Field Names

Be careful of using too many abbreviations in your field names. You have up to 64 characters, but long field names can be difficult to use in expressions. Be Clear, Be Concise and Be Consistent.

ID	FN	LN	DOB	DOH	SSN	CMT
1234	Sally	Shapiro	6/17/1970	7/02/2001	123-450	N/A

Emp ID	Emp First Name	Emp Last Name	Emp Birth Date	Emp Hire Date	Emp System Signal #	Emp Comments
1234	Sally	Shapiro	6/17/1970	7/02/2001	123-450	N/A

Basic Design Rules

- Unique Field Names

Often we will have the same type of data in multiple tables. Table IDs, Comments, First Names, Last Names are all fields that could refer to different datasets.

PATIENT TABLE	
First Name	Last Name
Annie	Adams
April	Appleton
Arnold	Arlington
Bobbie	Brown
Butch	Bruce

DOCTOR TABLE	
First Name	Last Name
Sally	Shapiro
Samuel	Smith
Sidney	Samuelsson

When these two Last Name fields are pulled into the same query they will appear with the table name in front of the field name:

Patient Table.Last Name
Doctor Table.Last Name

Basic Design Rules

- No Calculated Fields

In Microsoft Excel, we enter the data and create our formulas all at once. In Access you are creating a "Data" table, a table of the raw data. If you want Access to do the calculations, you can create an expression elsewhere in a query, form, or report.

Emp ID	Hourly Rate	Hours Worked	Pay
123	\$10.00	40	\$390.00

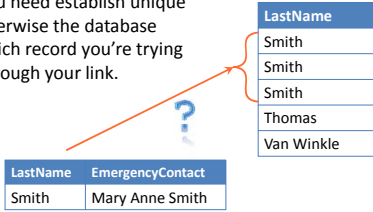
Pt Med Rec	Height (m)	Weight (kg)	BMI
456-456	2	91	23

Using the Expression field type embeds a query in the table and may not carry through to the data entry forms.

Basic Design Rules

- Unique Records

If you want to link multiple tables together, you need establish unique records, otherwise the database can't tell which record you're trying to access through your link.



Primary Keys

LastName	GatorLink	Phone	College
Smith	rsmith	273-5051	Pharmacy
Thomas	bthomas	392-5555	Medicine
Van Winkle	sleepyguy	846-5656	PHP

To ensure that each record is unique in each table, we can set one field to be a *Primary Key* field.

A Primary Key is a field that that will contain **no duplicates** and **no blank values**.

Looking at the table above, what would be the best Primary Key?

Primary Keys

LastName	GL ID	Phone	College
Smith	rsmith	273-5051	Pharmacy
Thomas	bthomas	392-5555	Medicine
Van Winkle	sleepyguy	846-5656	PHP

While each column in this particular data set has unique data, the field that will work best for us is GL ID (GatorLink). Many employees will work for the same college, have the same last name and possibly even share telephone numbers, but each employee should have a unique GatorLink ID.

When there is not a unique field in your data set, you can use an **AutoNumber**. Access can create incremented or random AutoNumbers for your primary key.

Basic Design Rules

- Unique Records

We use the unique primary key as our link between our tables, this helps ensure we connect to the correct record.

ID	LastName	GatorLink	Phone	College
1	Smith	rsmith	3-5051	Pharmacy
2	Smith	rsmith	273-5051	COP
3	Smith	rsmith	273-5051	Pharmacy
4	Thomas	bthomas	392-5555	Medicine
5	Van Winkle	sleepyguy	846-5656	PHHP

Emp ID	EmergencyContact
2	Mary Anne Smith

Let's Start Planning

Patients

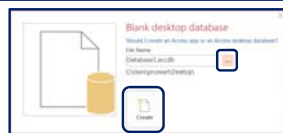
Appointments

Opening a Database

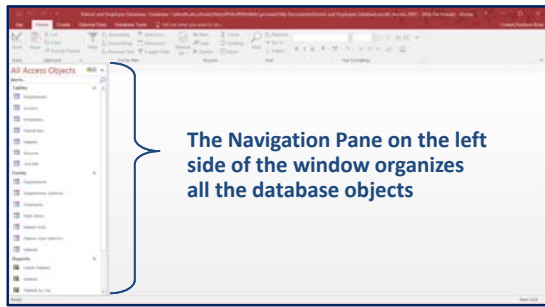
- ◆ To open a database when you start Access
 - Choose the database the left hand Recent pane, or click **Open Other Files** to browse for another database.



- ◆ To create a database
 - Click on the **Blank Desktop Database** button. Use the yellow folder button to browse for a location. Name the file and click the **Create** button.



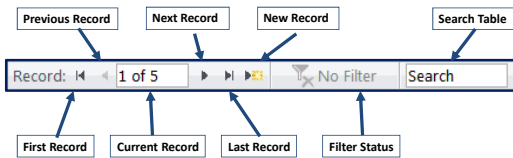
The Access Database Window



Navigating the Dataset

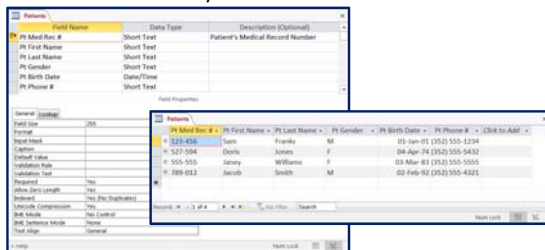
- Using the Keyboard
 - ◊ Tab
 - ◊ Shift-Tab
 - ◊ Enter
 - ◊ Home/End
 - ◊ Ctrl-Home
 - ◊ Ctrl-End
 - ◊ The Arrow Keys
 - ◊ Ctrl-F to Find

Navigation Buttons



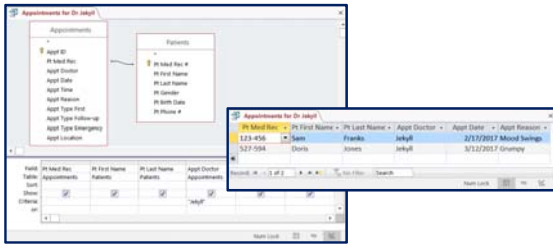
Introducing Tables

- Database is a collection of Tables
- Data Storage
- The foundation of your database



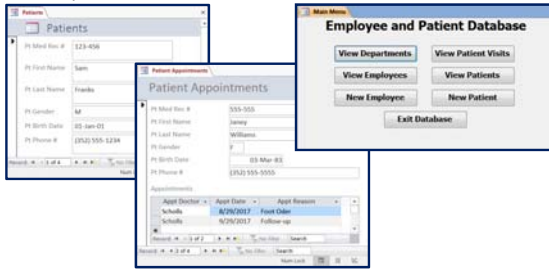
Introducing Queries

- A means of asking questions (querying) of your data
- Can look across a number of Tables and other Queries
- Can perform Calculations and Combine fields



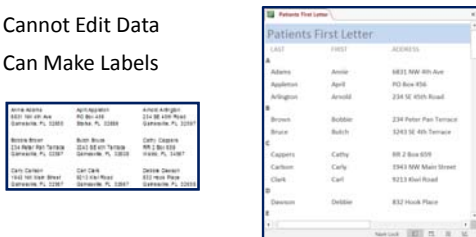
Introducing Forms

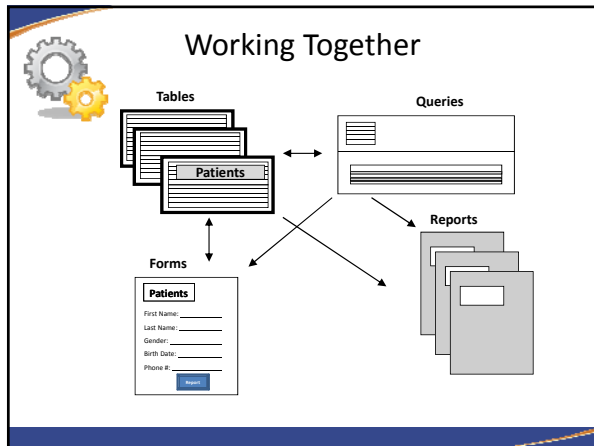
- A friendlier view of the database
- Used for data input, menus, display and printing
- Can perform Calculations and Combine fields



Introducing Reports

- Output of *information* in a printed report
- Allows you to group and summarize data
- Can perform Calculations and Combine fields
- Cannot Edit Data
- Can Make Labels





Let's take a break!
