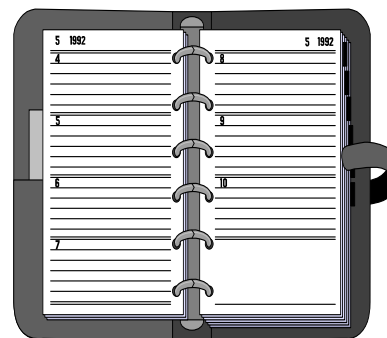
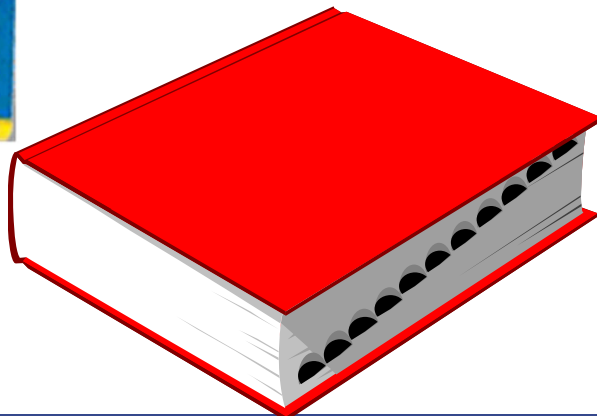


# Access Basics 1: Planning and Building a Table

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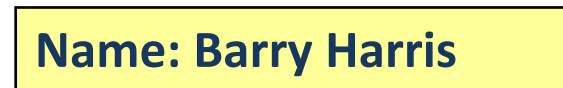
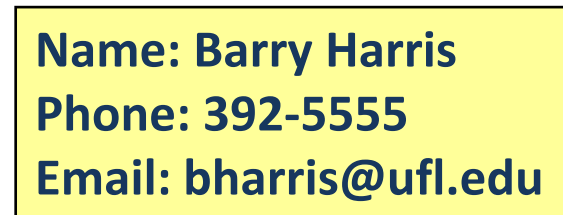
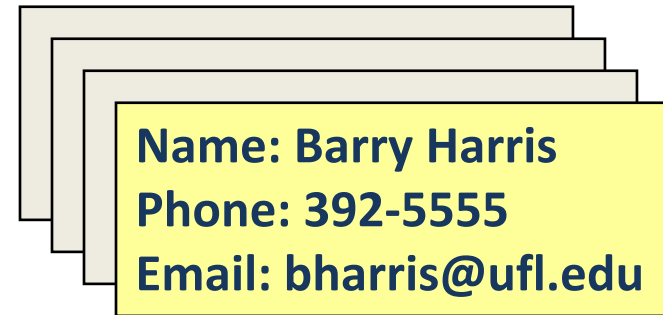
# What is a Database?

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

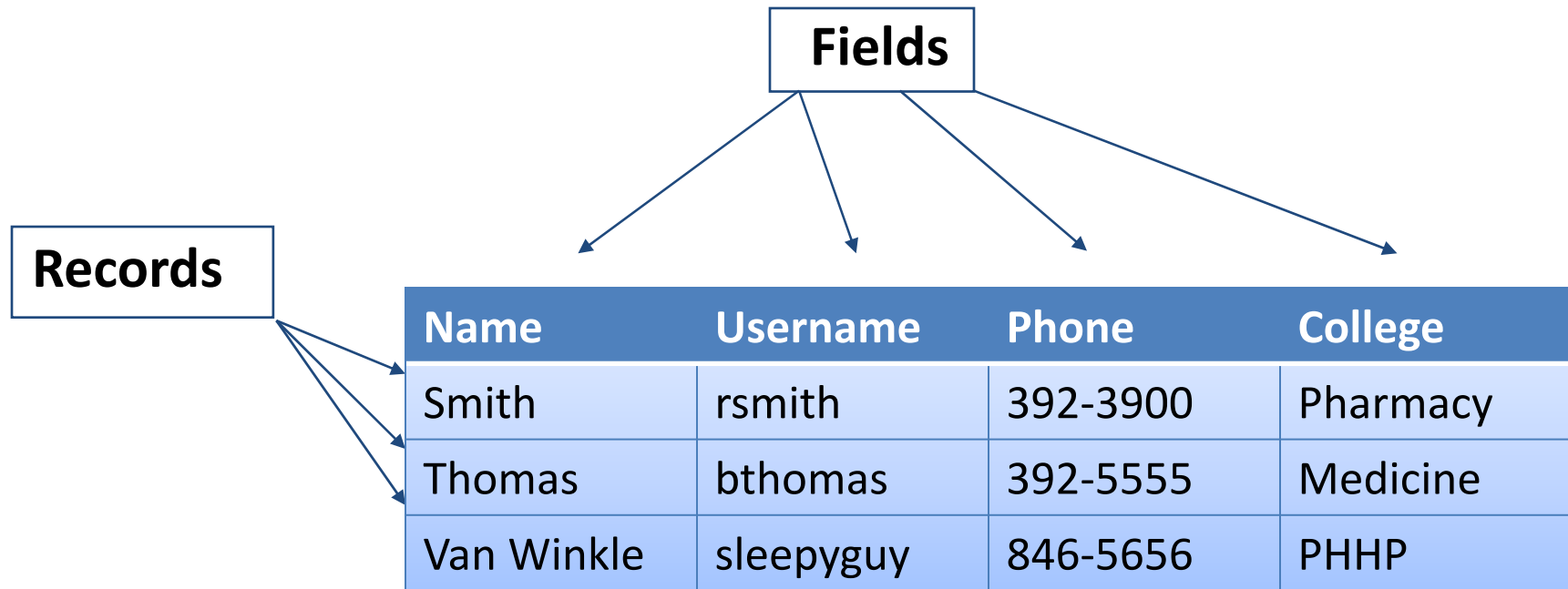


# Basic Database Concepts

- **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



# 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)





## 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 many evaluations.

Emp ID	First Name	Last Name	Eval 1	Eval 2
123-456	Sally	Shapiro	1/15/16	1/14/17
125-985	Samuel	Smith	1/12/16	
248-890	Sidney	Samuelson		



Emp ID	Eval Date
123-456	1/15/2016
123-456	1/14/2017
123-985	1/12/2016

# 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	Samuelson

Emp ID	Last Name	Eval Date
123-456	Shapiro	1/15/2016
123-456	Shapiro	1/14/2017
123-985	Smith	1/12/2016

*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 be 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	6/17/1980	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	6/17/1980	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	Samuelson

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	<del>Pay</del>
123	\$10.00	40	<del>\$390.00</del>

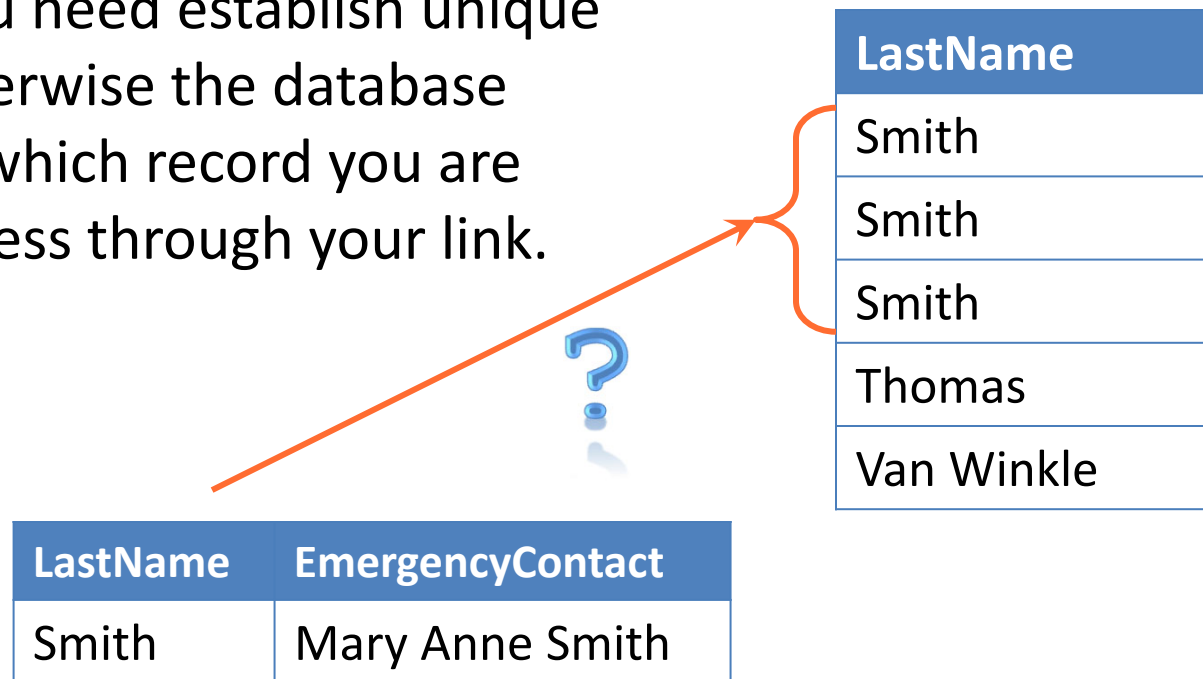
Pt Med Rec	Height (m)	Weight (kg)	<del>BMI</del>
456-456	2	91	<del>23</del>

*Using the Calculated 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 not tell which record you are trying to access through your link.





# Primary Keys

LastName	Username	Phone	Department
Smith	rsmith	273-5051	Pharmacy
Thomas	bthomas	392-5555	Medicine
Van Winkle	sleepyguy	846-5656	Nursing


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	Username 	Phone	Department
Smith	rsmith	273-5051	Pharmacy
Thomas	bthomas	392-5555	Medicine
Van Winkle	sleepyguy	846-5656	Nursing

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

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	Username	Phone	Department
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

<b>Patients</b>





# Questions To Ask Yourself – What have I got? What do I want?

## Patients

### Contact Information

- Name
- Address
- Phone Number

### Medical Information

- Doctor
- Insurance
- Last Appt Date
- Allergies
- Medications

### Identifiers

- DOB
- SSN
- MRN

### Demographics


- Gender
- Age
- Eye Color





# Initial Plan

## Patients

- Name
  - Address
  - Phone Number
  - Doctor
  - Insurance
  - Last Appt Date
  - Allergies
  - Medications
  - DOB
  - SSN
  - MRN
  - Gender
  - Age
  - Eye Color
- 



# Organizing Data

Patient	Medication
1	A, B, C
2	$\beta$ , c
3	D, a, b

If I decide to run a report on this dataset for the Patients taking Medication B, I have to look for multiple different values.

**B** - Brand Name

**b** - Generic Name

**$\beta$**  - Possible misspelling



# Organizing Data

Take the data that needs to be listed multiple times, and make a new table of values, often called a Lookup Table.

Medications			
A	a	$\alpha$	...
B	b	$\beta$	...
C	c	$\chi$	...
D	d	$\delta$	...

Patients	Med 1 ↓	Med 2 ↓	Med 3 ↓
1	A ↓	B ↓	C ↓
2	B ↓	C ↓	
3	D ↓	A ↓	B ↓

In our main table, we can create Lookups (drop down lists) for our field (column).

# Organizing Data

Patients	Med 1 ↓	Med 2 ↓	Med 3 ↓	Med 4	Med 5	Med 6	...	Med 100?
1	A ↓	B ↓	C ↓					
2	B ↓	C ↓						
3	D ↓	A ↓	B ↓					



Patient	Medication
...	...

# Organizing Data

Patients		
1	...	
2	...	
3	...	

Patients Medications (Rx)		
1↓	A↓	...
1↓	B↓	...
1↓	C↓	...
2↓	B↓	...
3↓	D↓	...
2↓	C↓	...
3↓	A↓	...
3↓	B↓	...

Medications		
A	...	
B	...	
C	...	
D	...	

We end up with three tables. Unique Patients, Unique Medications, and a "Junction" table to connect them.

# Many to Many

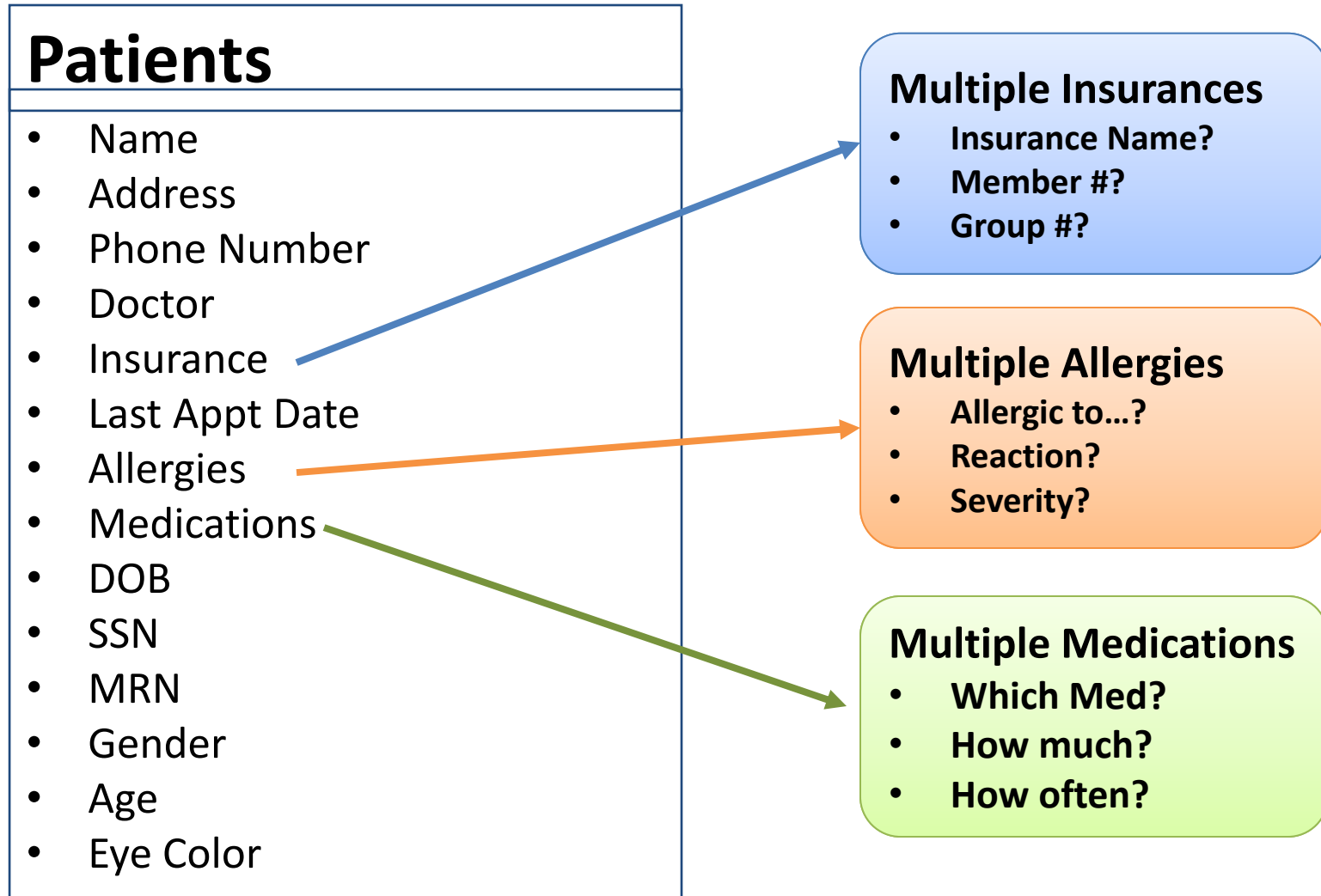
One		Many		One
Patient	=>	Prescribed	<=	Medication
One Patient was prescribed many Medications One Medication was prescribed to Many Patients				
Student	=>	Checked Out	<=	Library Books
One Student checked out many Library Books One Library Book was checked out by Many Students				
Professors	=>	Taught	<=	Classes
One Professor taught many Classes One Class was taught by Many Professors				

---

This is sort of an advanced concept for a "basics" class, but hopefully this shows the importance of PLANNING before we start building.



# Organizing Data



# No Derived Fields

None of our fields are originating in another table, so for this dataset we can skip this rule.

An example of a derived field might be, if we had a table of doctors, we would not list the doctors first and last name in our Patient table.

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

Pat ID	Doc ID	<del>Doc Name</del>
1	123-456	<del>Shapiro, Sally</del>
2	123-456	<del>Shapiro, Sally</del>
3	123-985	<del>Smith, Samuel</del>

# Broken down into Smallest Logical Parts

- **Name**
  - Title
  - First Name
  - Middle Name
  - Last Name
  - Degrees
  - Suffix
- **Address**
  - Address 1
  - Address 2
  - City
  - State
  - Zip
  - County
  - Country
- **Phone Number**
  - Home Number
  - Work Number
  - Cell Number

**First Name**  
**Last Name**  
**Address**  
**City**  
**State**  
**Zip**  
**Primary Phone #**

# Broken down into Smallest Logical Parts

## Patients

- First Name
- Last Name
- Address
- City
- State
- Zip
- Primary Phone #
- **Primary** Doctor
- Last Appt Date
- DOB
- SSN
- MRN
- Gender
- Age
- Eye Color

### Drop Down menus?

- Gender ↓
- Eye Color ↓



# Descriptive Field Names

- **DOB = Department of Babies?**
- **SSN = Secret Shands Number?**
- **MRN = Medical Record Notation?**

It's okay to abbreviate but try to spell them out enough to make your field names more identifiable.

- **Date of Birth**
- **Social Sec #**
- **Med Rec #**



# Unique Field Names

## PATIENT

- First Name
- Last Name

## DOCTORS

- First Name
- Last Name

## EMPLOYEES

- First Name
- Last Name

When we look at the design view of our database objects, we need to be able to differentiate between the source tables.

## PATIENT

- Pat First Name
- Pat Last Name

## DOCTORS

- Doc First Name
- Doc Last Name

## EMPLOYEES

- Emp First Name
  - Emp Last Name
- 

# Current Plan

- First Name
- Last Name
- Address
- City
- State
- Zip
- Primary Phone #
- Primary Doctor
- Last Appt Date
- DOB
- SSN
- MRN
- Gender
- Age
- Eye Color



## Patients

- Pt First Name
- Pt Last Name
- Pt Address
- Pt City
- Pt State
- Pt **Zip Code**
- Pt Primary Phone #
- Pt Primary Doctor
- Pt Last Appt Date
- Pt **Date of Birth**
- Pt **Social Sec #**
- Pt **Med Rec #**
- Pt Gender
- Pt Age
- Pt Eye Color

# No Calculated Fields

## Patients

- Pt First Name
- Pt Last Name
- Pt Address
- Pt City
- Pt State
- Pt Zip Code
- Pt Primary Phone #
- Pt Primary Doctor
- Pt Last Appt Date
- Pt Date of Birth
- Pt Social Sec #
- Pt Med Rec #
- Pt Gender
- Pt Age
- Pt Eye Color

Data in a table is stagnant, it doesn't change unless we modify it. These two examples change outside of the scope of the patient.

If we keep track of the attended appointments, we can find the maximum date of the attended appointments and add it to our reports.

If I know your Birthdate, I can calculate your age.



# Unique Records (Primary Key)

## Patients

- Pt First Name
- Pt Last Name
- Pt Address
- Pt City
- Pt State
- Pt Zip Code
- Pt Primary Phone #
- Pt Primary Doctor
- Pt Date of Birth
- Pt Social Sec #
- Pt Med Rec #
- Pt Gender
- Pt Eye Color

This list of fieldnames that we are building is going to be the headings in our table.

Pt First Name	Pt Last Name
Jennifer	Smith
Mary	Smith
Jennifer	Jenkins


First and Last names can't be keys. Good *Candidate Keys* would be Pt Social Sec # and Pt Med Rec #.


Make the key your first field.



# Patient Table Plan

## Patients

Pt Med Rec #   
Pt First Name  
Pt Last Name  
Pt Address  
Pt City  
Pt State  
Pt Zip Code  
Pt Primary Phone #  
Pt Primary Doctor  
Pt Date of Birth  
Pt Social Sec #  
Pt Gender





# Patient Table Plan

<b>Patients</b>
Pt Med Rec # 
Pt First Name
Pt Last Name
Pt Phone #
Pt Date of Birth

