

Who I am: Joseph Gohlke (Ben's dad)

jgohlke@gmail.com

Education: UCF, BS Computer Science

Experience: almost 30 years in industry

- 10+ years - Telephone Billing, mostly writing DB access jobs

- 5 years - other

- 15 years – DOD, Military simulation

- Why have a Database?
- Data Persistence
- Data Integrity
  - Transaction Scope (Atomic Transactions)
    - Commit
    - Rollback (bank – money transfer from account to account)
- Locking
- Semaphores
- Multi-user data access/update

- What is a database?
  - Files
  - Running Application
- What is a database made up of:
  - Schema – Owner
  - Database Objects
  - Tables
  - Columns
  - Unique Constraints
  - Primary Keys
  - Foreign Keys, No orphans
    - Creating a child with no parent
    - Deleting a parent that has children
  - Indexes – Performance

- Data Modeling

SQL Definition (from Wikipedia):

Originally based upon [relational algebra](#) and [tuple relational calculus](#), SQL consists of a [data definition language](#) and a [data manipulation language](#). The scope of SQL includes data insert, query, update and delete, [schema](#) creation and modification, and data access control. Although SQL is often described as, and to a great extent is, a [declarative language](#) ([4GL](#)), it also includes [procedural](#) elements.

Table:

iron\_yard\_orl\_users

User_name	String
Last_login	Date

<i>User_Name</i>	<i>Last_Login</i>
jgohlke	July 5, 2015
bgohlke	July 6, 2015

```
Select user_name from  
iron_yard_orl_users;
```

```
User_name  
-----  
jgohlke  
bgohlke
```

```
Select user_name, last_login from  
iron_yard_orl_users;
```

```
User_name    Last_login  
-----  
jgohlke      July 5, 2015  
bgohlke      July 6, 2015
```

## 1<sup>st</sup> Normal Form – Domain of the attribute is atomic and each value is only 1 item

*Each attribute is dependent on the full key of the table.*

*No attribute is dependent on a subset of the full table key.*

### Master Record – Iron Yard Guest Contact

<b><i>Key</i></b>	<b><i>Sex</i></b>	<b><i>Eye Color</i></b>	<b><i>Hair Color</i></b>	<b><i>Height</i></b>
Joseph Gohlke	Male	Blue Eyes	Gray Hair	6'1"

## 1<sup>st</sup> Normal Form Cont'

For a US phone number, 10 digits in the format 3-3-4

No storing phone numbers like:

“407-730-3483, 407-205-1234”

If you need to model a 1:N relationship where a given master record has more than 1 phone number, it would look like:

- Child Record – Iron Yard Guest Phone Numbers

<b><i>Master Key</i></b>	<b><i>Phone</i></b>	<b><i>Phone Type</i></b>
Joe Gohlke	407-730-3483	Mobile
Joe Gohlke	407-123-4567	Office

**2nd Normal Form – non-prime attributes not repeated (plus 1<sup>st</sup> NF)**

Not like this:

Child Record – Iron Yard Guest Phone Numbers

<i><b>Master Key</b></i>	<i><b>Phone</b></i>	<i><b>Nickname</b></i>
Joseph Gohlke	407-730-3483	Joe
Joseph Gohlke	407-123-4567	Joe



## 2nd Normal Form Cont'

Like this instead:

Master Record – Iron Yard Guest Contact

<i><b>Key</b></i>	<i><b>Sex</b></i>	<i><b>Eye Color</b></i>	<i><b>Hair Color</b></i>	<i><b>Height</b></i>	<i><b>Nickname</b></i>
Joseph Gohlke	Male	Blue Eyes	Gray Hair	6'1"	Joe

***3rd Normal Form – attributes are related to key***  
***No transitive dependencies (plus 2nd NF)***

Child Record - Vehicles

<b><i>Key</i></b>	<b><i>Manufacturer</i></b>	<b><i>Model</i></b>
Joseph Gohlke	Ford	Mustang
Joseph Gohlke	Ford	F-150

### 3rd Normal Form Cont'

#### Child Record - Office

<i><b>Key</b></i>	<i><b>Office Type</b></i>	<i><b>Work Phone</b></i>	<i><b>Office Address</b></i>
Joseph Gohlke	Corporate	407-321-5432	101 S Garland Suite 104 Orlando, FL
Joseph Gohlke	Home	407-123-4567	123 Some Street Anytown, FL

No storing non-key data twice!