

# Intro To Databases

## With SQLite3

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# Database?

PostgreSQL



OpenLDAP™  
<http://www.OpenLDAP.org>



# What is a database?

- Organized Collection of Data
  - Schemes
  - Tables
  - Queries
  - Reports
  - Views

# Schema

- Blueprint
- Describes how database is constructed
- Help prevent bad data from being stored
- Data definition language

# Table

- Collection of related data
- Held in a structured format
- Columns
  - by name
  - Primary Key
- Rows
- Data types defined by schema

# Query

- Ask questions
- Insert data
- Update data
- Data manipulation language
- Data control language

# Report

- Formatted
- Results of queries
- Common formats
  - Plan Text
  - HTTP
  - PDF
  - LDIF



# View

- Table made out of the result of a query
- Can be queried again
- Hide complexity of data
- Takes little space to store

# Introducing SQLite

- Public Domain
- Most widely deployed database in the world
- Embedded SQL Database engine
- In process library
- Replacement for `fopen()`

# What does fopen() do

## DESCRIPTION

The fopen() function opens the file whose name is the string pointed to by path and associates a stream with it.

# How to get SQLite3

- Debian based distribution
  - apt-get install sqlite3
- Fedora based distribution
  - yum install sqlite3
- Arch based distribution
  - pacman -S sqlite
- The rest
  - <https://sqlite.org/download.html>

# SQL

- Structured Query Language
- Domain specific programming language
- Manage Data in RDBMS
- Based on
  - relational algebra
  - tuple relational calculus

# Fetch the Materials Now!

- [https://github.com/Oflameo/intro\\_to\\_databases\\_with\\_sqlite3](https://github.com/Oflameo/intro_to_databases_with_sqlite3)
- `git@github.com:Oflameo/intro_to_databases_with_sqlite3.git`
- [https://github.com/Oflameo/intro\\_to\\_databases\\_with\\_sqlite3.git](https://github.com/Oflameo/intro_to_databases_with_sqlite3.git)
- `git clone`

# Invoking SQLite3

- `sqlite3 mydata.db`
  - Gets sqlite3 interactive shell
  - Creates database named mydata.db
  - Has tab completion
- `sqlite3 -line mydata.db '[insert sql here]'`
  - Does not get sqlite3 interactive shell
  - Creates database named mydata.db

# Load Data

- `sqlite> .read demo.sql`
- Table

`sqlite> .table`

`contact renewal`



# Look at the schema!

```
sqlite> .schema
```

```
CREATE TABLE `contact` (  
  `id` INTEGER PRIMARY KEY NOT NULL,  
  `email` varchar(255) default NULL,  
  `first_name` varchar(255) default NULL,  
  `last_name` varchar(255) default NULL,  
  `phone_number` varchar(100) default NULL,  
  `city` varchar(255),  
  `state` varchar(50) default NULL,  
  `country` varchar(100) default NULL,  
  `address` varchar(255) default NULL,  
  `contact_id` mediumint  
);
```

```
CREATE TABLE `renewal` (  
  `id` INTEGER PRIMARY KEY NOT NULL,  
  `contact_id` mediumint,  
  `first_joined` mediumint default NULL,  
  `last_renewal` mediumint default NULL,  
  `comment` TEXT default NULL  
);
```

# The select statement

- Most common data manipulation phrase in SQL
- Displays things in database
- Can be use with other phrases
- Works like
  - insert
  - delete
  - update

Manual Button

# Print the contact table

- What query print the contact table?

# Select first 3 rows of contact table

- Output looks like this, what is the query?

1|dapibus@necluctus.ca|Andrew|Cummings|1-434-456-2655|Helena|MT|United States|Ap #537-6368 Quisque St.|1

2|iaculis@necmollisvitae.co.uk|Brielle|York|1-661-278-4644|Boston|MA|United States|P.O. Box 804, 4159 Nunc Ave|2

3|ridiculus.mus@Morbivehicula.net|Cullen|Fletcher|1-116-210-2207|Eugene|OR|United States|Ap #483-6298 Senectus Ave|3

# Print Igor's row

- Igor is first name
- Output looks like this, what is the query?

25|ipsum.primis@imperdieterat.net|Igor|Garrett|1-343-755-8635|Shreveport|Louisiana|United States|8972 Blandit Rd.|25

31|pede.Cum@Praesentinterdum.net|Igor|Wolfe|1-704-428-7040|Dover|DE|United States|939-5757 Aliquet, Street|31

98|turpis@semperpretium.org|Igor|Moody|1-318-291-5578|Portland|Oregon|United States|606-3008 Magna. Rd.|98

# Print Igor Moody's row

- Output looks like this, what is the query?

```
98|turpis@semperpretium.org|Igor|Moody|1-318-  
291-5578|Portland|Oregon|United States|606-  
3008 Magna. Rd.|98
```

# Delete Igor Moody's row

- What is the query?

# Insert Igor Moody's row

- Insert Igor Moody's row

```
INSERT INTO `contact`  
(`email`,`first_name`,`last_name`,`phone_number`,`city`,`state`,`country`,`address`,`contact_id`  
) VALUES  
("turpis@semperpretium.org","Igor","Moody","1-318-291-5578","Portland","Oregon","United States","606-3008 Magna. Rd.",98);
```



# Select the inserted data

- Output looks like this, what is the query?

```
101|turpis@semperpretium.org|Igor|Moody|1-  
318-291-5578|Portland|Oregon|United States|  
606-3008 Magna. Rd.|98
```

# Find everyone in Pittsburgh

- Output looks like this, what is the query?

```
24|mollis.non.cursus@adipiscing.com|Mariam|  
Mccarthy|1-977-395-2894|Pittsburgh|  
Pennsylvania|United States|762-6174 Pede  
Street|24
```

# Do it again only showing Names and Addresses

- Output looks like this, what is the query?

mollis.non.cursus@adipiscing.com|Mariam|  
Mccarthy|Pittsburgh|Pennsylvania|United  
States|762-6174 Pede Street

# Cullen Fletcher moving to Pittsburgh

- What query updates Cullen Fletcher's city and state to Pittsburgh and PA respectively?

# Check Cullen Fletcher's city and state

- Output looks like this, what is the query?

3|ridiculus.mus@Morbivehricula.net|Cullen|  
Fletcher|1-116-210-2207|Pittsburgh|PA|United  
States|Ap #483-6298 Senectus Ave|3

# Joins

- Combines rows from one table to rows from another table
  - Natural join : joins columns with the same name
  - Cross join: blindly runs two tables together
  - Left join: doesn't care if table on the right has NULLS
  - Natural left join: joins columns with the same name and doesn't care if table on the right has NULLS

# Trying Natural Join

- Query for the first 2 records of the database with the contact\_id from contact table joined to contact\_id from renewal table.
- What the output should be.

1|dapibus@necluctus.ca|Andrew|Cummings|1-434-456-2655|  
Helena|MT|United States|Ap #537-6368 Quisque St.|1|  
1361071133|1425861202|nec, leo. Morbi neque tellus,  
imperdiet non, vestibulum nec,

2|iaculis@necmollisvitae.co.uk|Brielle|York|1-661-278-4644|  
Boston|MA|United States|P.O. Box 804, 4159 Nunc Ave|2|  
1415063680|1419419452|pede. Praesent eu dui. Cum sociis  
natoque

# Okay, time to clean up!

```
sqlite> drop table renewal;
```

```
sqlite> drop table contact;
```

```
sqlite> .table
```

```
sqlite> vacuum;
```

Check size of the mydata.db and then remove it.