Intro to SQL

Focusing on Sqlite

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Game Plan

- Installing Sqlite
- Why you need SQL
- What is SQL
- What is Sqlite
- Basics of SQL syntax and database design
- How adding a SQL[1] database to an existing project can simplify your code

[1] If pronounced "sequel", "a" is the correct article.

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Let's get it Installed!

Mac and Linux

There's a 99% chance it's already installed. Open a terminal window and try `sqlite3`, and if that doesn't work, `sqlite`. If for some reason your OS didn't come with it, install it at `https://www.sqlite.org`

Windows

You could have unknowingly installed Sqlite when installing something else. Give it a try in Powershell or CMD, but it's likley you'll need to install Sqlite at: `https://www.sqlite.org`

If it works you will see:
(The specific version does not matter.)

```
SQLite version 3.30.0 2019-10-04 15:03:17
Enter ".help" for usage hints.
Connected to a transient in-memory database.
Use ".open FILENAME" to reopen on a persistent database.
sqlite>
```

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What’s the point of this, anyways?

Non-CS majors that don’t know SQL say, “Can’t I just use a GUI tool like MS Access?”

CS majors that don’t know SQL say, “There’s plenty of tools in the language I’m already using, why do I need another one?”

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- SQL gets to the point.

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  - 90% of syntax is the same, but some things you "get away with" on one database you won't in others.
- Technically a fully-fledged programming language, although rarely used this way[2].

[2] With one important exception we'll see later.

Relational Databases

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Department

<u>Name</u>	Manager	Building

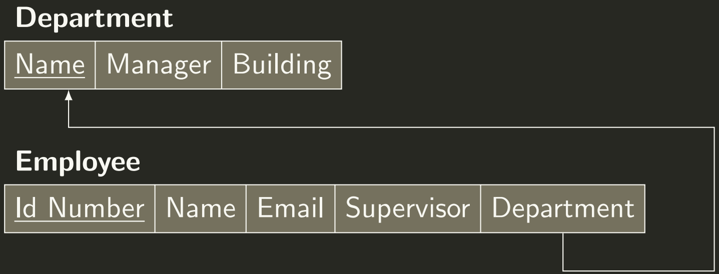
Employee

<u>Id Number</u>	Name	Email	Supervisor	Department

Insert about 100 more tables here . . .

Relational Databases

Very few pieces of data exist in a vacuum



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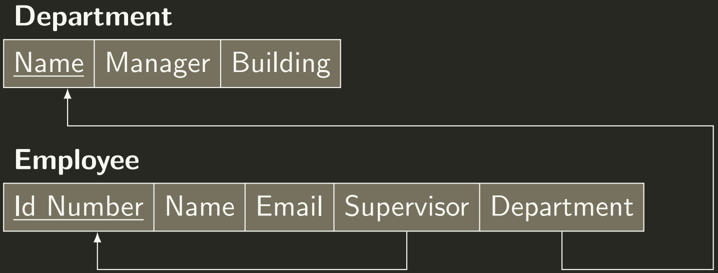

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- SQL builds consistency protection directly into the data storage[3].
  - Bad data is rejected... No Exceptions!
  - Strict column types
  - Foreign keys: Can't insert an employee if his department is non-existent.
  - Triggers: Arbitrary code that can stop mistakes in their tracks.

[3]This is assuming the SQL database is set up properly.

Basics of SQL: Making a Table

1. Open a terminal.
2. Navigate to a directory you can use for temporary files.
3. Type in `$ sqlite demo.db`
4. On the `sqlite>` prompt that will come up, enter the commands below.

IN SQL WE ALWAYS SHOUT!

```
CREATE TABLE "employee" (
    "id" INTEGER PRIMARY KEY,
    "name" VARCHAR,
    "dob" VARCHAR,
    "joinDate" VARCHAR
);
```

To see if it worked:

```
.tables
.schema "employee"
```

Basics of SQL: Inserting and Reading Data

To make things more readable:

```
.mode column
.nullvalue NULL
.headers on
```

Add Some Data:

```sql
INSERT INTO "employee"
     VALUES (12, "Sam Smith", "1980-05-06", "2008-06-22");
INSERT INTO "employee" (id, "dob")
     VALUES (44, "1968-04-18");
```

Read It Back:

```sql
SELECT * FROM "employee";
SELECT "id", "name" FROM "employee";
```

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