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Friday - Week 2

SQL Primer

Structured Query Language

SQL

- SQL is a standardised way of interacting with a database
- Usually this is going to be a **relational database**

Relational Databases

- A database is made of tables
- Tables have a rows and columns
- Columns ar the attributes of your data
- Rows are the unique instances of each set of attributes:
    - Identified by a key (Primary Key)
    - Also called a record

Relational Databases

- Tables in an relational DB have relationships
  - Also called links

- An attribute in one table may refer to a key in another table (Foreign Key)

Just as flexible as OO coding

- Much like object orientation lets us model almost anything,
- A relational DB lets us store that same information
- This is not always a one-to-one mapping

CRUD

- Create
- Read
- Update
- Delete

- We call these transactions

Create

- Adding rows to one or more tables
- Try be

Read

- Read one or more rows (from one or more tables)

Update

- Change the record in one or more rows (in one or more tables)

Delete

- Destroy the database

- Technically: Deletes one or more rows from one or more tables

A though experiment

- Imagine a building stored in a database

- We store address information in the address table
- We store floor information in the floor table
- We store room information in the room table

We decide to move the address

- We move the entrance from one side of the building to another

- We delete the old address and try to add the new one,
- But we cannot find the floors
- The identifying part of them was that they were all in the same building

Another though experiment

- We have a customer that buys products from us
- Internal to our DB they have a customer ID
- They decide to ask us to delete all their information
- We do so.
- But our sales records still report their customer ID

A new customer comes along

- We've coded out DB to use the next available ID
- Suddenly this new customer is attributed all the previous sales from the deleted customer

DROP * ;

Be careful how you delete.

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Working with a Database

So how do we work with these in JAVA?

- We need a server
- We need a connection manager
- We need a command to run (Create/read/etc.)

Getting a server

- We will use SQLite for today
- This is not a ***REAL*** database (but it pretends really well)
- It’s all contained in one file
    - That we don’t even need to execute/run

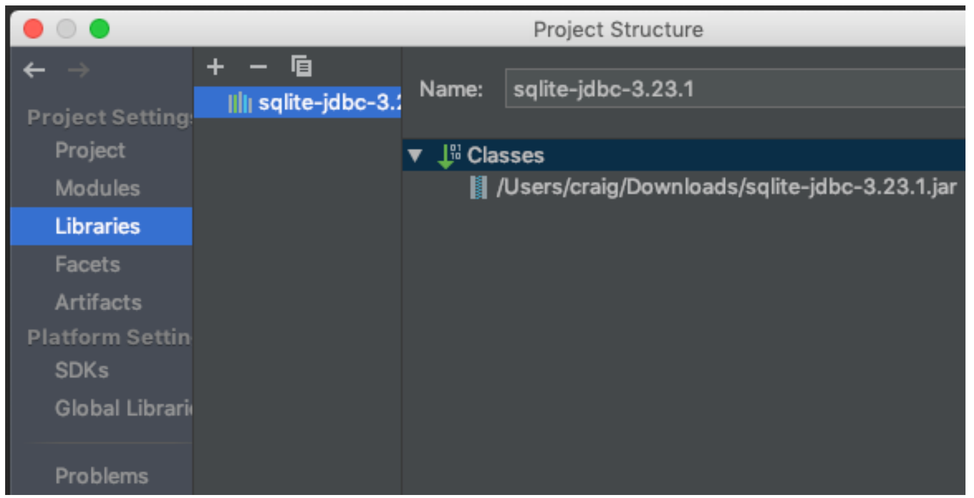
Getting SQLite JDBC

- We want the latest connection manager (or driver)

- https://bitbucket.org/xerial/sqlite-jdbc/downloads/

We add the JDBC to the project

- Project Structure
- Libraries
- Add
- Pick the SQLIte JDBC jar
- Click Apply and OK



Add the database to the project

- We create a folder called “resources”
- We mark it as “Resources Root”
- We can then copy our DB file into this folder
- In my example I use “chinook.db”

Code to open the DB

```
public static void connect() {
    Connection conn = null;
    try {
        // db parameters
        // String url = "jdbc:sqlite:C:/sqlite/db/chinook.db";
        String url = "jdbc:sqlite:chinook.db";
        // create a connection to the database
        conn = DriverManager.getConnection(url);

        System.out.println("Connection to SQLite has been established.");

    }
```

Code continued

```
catch (SQLException e) {
        System.out.println(e.getMessage());
    } finally {
        try {
            if (conn != null) {
                conn.close();
            }
        } catch (SQLException ex) {
            System.out.println(ex.getMessage());
        }
    }
}
```

Shamelessly stolen from:

- http://www.sqlitetutorial.net/sqlite-java/sqlite-jdbc-driver/

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Tasks

Task: SQL

- Work through the W3 schools SQL examples:
  - NOT ALL (unless you want to)
  - I would ask that you complete up to “SQL Joins”

- This task is for those without any SQL experience, or those who want to revise the basics

Task 16:

- Build a simple app that uses a sqlite file to store data
  - Print out ‘some’ data from any one of the tables
- Use the Northwind database
  - Here: https://github.com/jpwhite3/northwind-SQLite3/raw/master/Northwind_small.sqlite
- Access the database and perform a select statement
  - IE: http://www.sqlitetutorial.net/sqlite-java/select/