CSE 414: Section 2
A SeQueL to SQL

Oct 4th, 2018

Administrivia

WQ1 due **Tomorrow**! (Friday, Oct 5th at 11:59 PM)

HW2 due **Tuesday, Oct 9th** at 11:59 PM

Last day to turn in HW1 (with late days)

Git Demo

How to add git remote upstream?

Pull homework and starter code files

SQL 3-Valued Logic

SQL has 3-valued logic

- FALSE = 0

  [ex] price < 25 is FALSE when price = 99

- UNKNOWN = 0.5

  [ex] price < 25 is UNKNOWN when price = NULL

- TRUE = 1

  [ex] price < 25 is TRUE when price = 19

SQL 3-Valued Logic (con’t)

Formal definitions:

C1 AND C2 means min(C1,C2)

C1 OR C2 means max(C1,C2)

NOT C means means 1-C

The rule for SELECT ... FROM ... WHERE C is the following:

if C = TRUE then include the row in the output

if C = FALSE **or C = unknown** then do not include it

Importing Files (HW2)

First, create the table.
Then, import the data.

```
.mode csv
    .import ./population.csv Population
    .import ./gdp.csv GDP
    .import ./airport.csv Airport

.import /path/to/file NameOfTable
```

Aliasing

- Good style for renaming attribute operations to more intuitive labels
- Essential for self joins (ex: `FROM [table] AS T1, [table] AS T2`)
- You can alias without “AS” in the FROM clause (i.e. “AS” keyword can be omitted)

```
SELECT [attribute] AS [attribute_name]
FROM [table] AS [table_name]
… [table_name].[attribute_name] …
```

Filters

LIMIT *number* - limits the amount of tuples returned

[ex] SELECT * FROM table LIMIT 1;

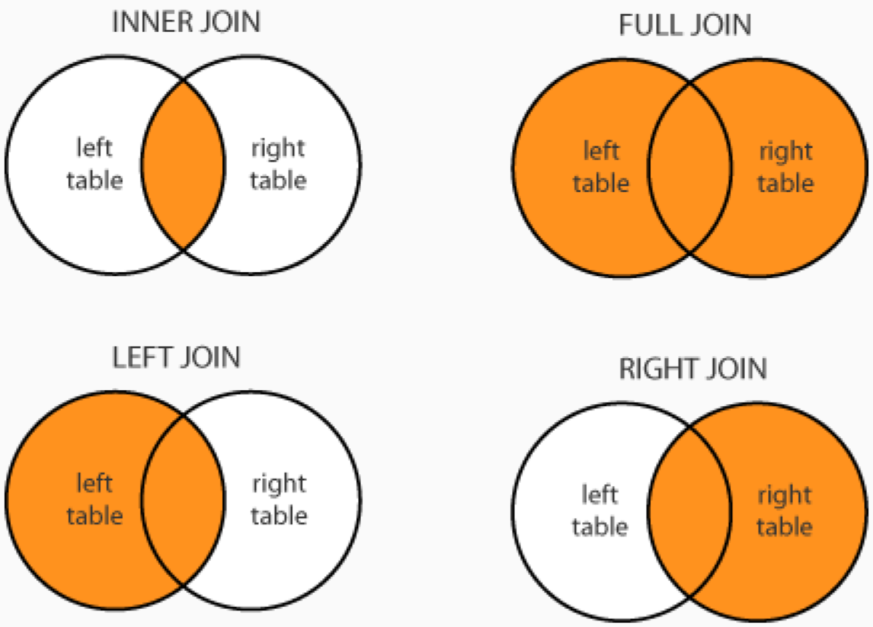
DISTINCT - only returns different values (gets rid of duplicates)

[ex] SELECT DISTINCT column_name FROM table;

Joining

Inner vs. Outer

Self Joins



For more information and different types of joins see:
https://blogs.msdn.microsoft.com/craigfr/2006/08/16/summary-of-join-properties/

Join Semantics

- Think as “nested loops”.

- NOT the most efficient implementation on a large database! (we will talk about other ways to join later in the course)
    - Hash Join
    - Sort-Merge Join

Nested Loop Semantics

```
SELECT x_1.a_1, …, x_n.a_n
FROM x_1, …, x_n
WHERE <cond>
```

```
for each tuple in x_1:
    …
        for each tuple in x_n:
            if <cond>(x_1, …, x_n):
                output(x_1.a_1, …, x_n.a_n)
```

Aggregates

- Computes aggregated values for a set of tuples.

COUNT(attribute) - counts the number of tuples
SUM(attribute)
MIN/MAX(attribute)
AVG(attribute)
...

Grouping and Ordering

GROUP BY [attribute], …, [attribute_n]

HAVING [predicate] - operates on groups

ORDER BY

SQL Query Evaluation Order

FWGHOS

(From, Where, Group By, Having, Order By, Select)