CSE 344: Section 2
A SeQueL to SQL

April 5th, 2018

Administrivia

WQ1 due **Friday, April 6th** at 11:00 PM

HW2 due **Wednesday, April 11th** at 11:30 PM

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, make 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] …
```

Aggregates

- Aggregates will make the query return a single tuple.

COUNT(attribute) - counts the number of tuples

SUM(attribute)

MIN/MAX(attribute)

AVG(attribute)

…

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;

Grouping and Ordering

GROUP BY [attribute], …, [attribute_n]

HAVING [predicate] - operates on groups

ORDER BY

SQL Query Evaluation Order

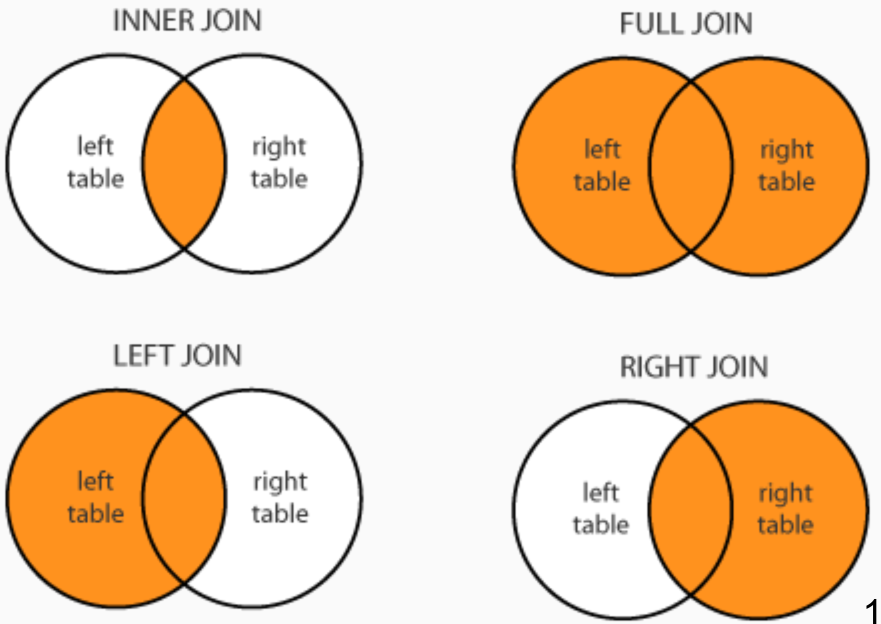
FWGHOS

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

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

- For now, we are primarily focusing on “nested loops” semantics
- 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)
```