Week 4 Tutoring

CSE 180

Aggregates

- Used for computing summary results over a table
- Applied on **scalar** values
  - Exception of COUNT
- Types of aggregates:
  - COUNT()
  - SUM()
  - AVG()
  - MIN()
  - MAX()

COUNT

- COUNT(*): returns total number of records (tuples)
- COUNT(STUDENT): return number of **non null** values over the column student.
- COUNT(DISTINCT STUDENT): return number of distinct **non null** values over the column student

SUM

- SUM(STUDENT): Sum all non null values over the column student.
- SUM(DISTINCT STUDENT): Sum all distinct non null values over the column student

AVG

- AVG(GRADE): return the average of non null values over the column grade.
- AVG(DISTINCT GRADE): return average of distinct non null values over the column grade

MIN/MAX

- MIN(GRADE): return the minimum value of non null values over the column grade.
- MAX(GRADE): return the maximum value of non null values over the column grade.

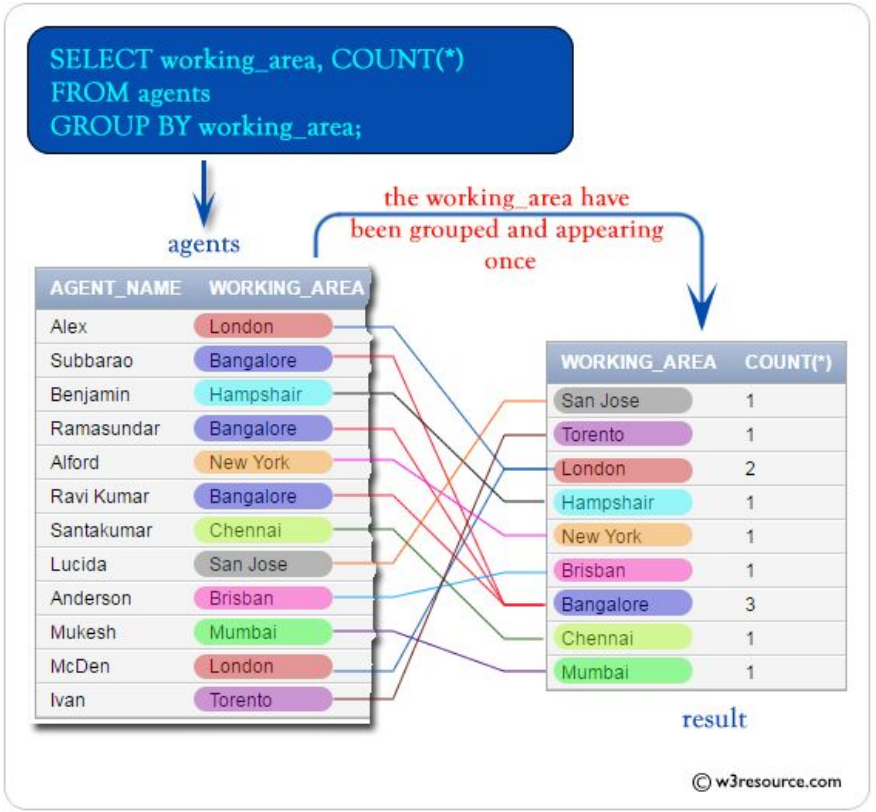
Empty Results

SUM, AVG, MIN, MAX on an empty result (no tuples) is NULL.

COUNT of an empty result is 0.

GROUP BY

A group-by clause takes the tuples from the FROM clause and divides them into groups based on a certain conditions.



Query Notation

SELECT [DISTINCT] c1, c2, ..., cm AGGOP(...)

FROM R1, R2, ..., Rn

[WHERE condition]

[GROUP BY <list grouping attributes>]

[ORDER BY < list of attributes [ASC | DESC]>]

Important Notes

- If SELECT clause has aggregates AGGOP, then c1, c2, ..., cm must come from the list of grouping attributes
- Aggregates can’t appear in WHERE clauses.
- The non-aggregate columns in the SELECT clause must come from the
- attributes in the GROUP BY clause.

HAVING

the HAVING clause was added to SQL because the WHERE keyword cannot be used with aggregate functions.

So what's the difference between these two?

```
SELECT e.execName, SUM(m.length)
FROM MovieExec e, Movies m
WHERE m.producerC# = e.cert#
GROUP BY e.execName
HAVING MIN(m.movieYear) < 1930;
```

```
SELECT e.execName, SUM(m.length)
FROM MovieExec e, Movies m
WHERE m.producerC# = e.cert#
  AND
      (SELECT MIN(m1.movieYear)
      FROM m1.movieYear
      WHERE m1.producerC# = e.cert#) < 1930
GROUP BY e.execName;
```

```
SELECT e.execName, SUM(m.length)
FROM MovieExec e, Movies m
WHERE m.producerC# = e.cert#
GROUP BY e.execName
HAVING MIN(m.movieYear) < 1930;
```

Notice that there are multiple minimum values generated for different groups..

```
SELECT e.execName, SUM(m.length)
FROM MovieExec e, Movies m
WHERE m.producerC# = e.cert#
  AND
      (SELECT MIN(m1.movieYear)
      FROM m1.movieYear
      WHERE m1.producerC# = e.cert#) < 1930
GROUP BY e.execName;
```

The only minimum value is generated before these tuples are grouped. So this query won't work right for our purpose.