

CSE 350

Advanced Data Structures

Topic 8: SQL Revisited \bowtie , \bowtie , ...

SELECT Applicant, Zipcode

FROM Permits

WHERE `Permit Type` = 'REPAIR'

what col?

where?

what rows?

```
SELECT *  
FROM Permits, Noise_Complaints  
WHERE Permits.City = Noise_Complaints.City
```

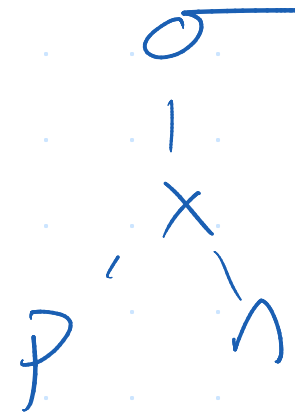
SELECT *

FROM Permits AS ~~p~~, Noise_Complaints n

WHERE ~~p~~.City = n.City

optimization

$$\sigma(P \times N) \equiv$$



SELECT *

FROM Permits p JOIN Noise_Complaints n
ON p.City = n.City

↑ Join Condition

p n

What permits were issued in a city with more than 10 noise complaints?

↳ id, city, date, type description

SELECT #

FROM Permits

WHERE City

IN

(Select city, ~~count(*)~~

FROM Noise_complaints

GROUP BY CITY

HAVING COUNT(*) > 10

)

without

... and ~~with~~ where-nesting

```
SELECT P.#  
FROM Permits P, (
```

```
  SELECT city,  
  FROM Noise_complaints  
  GROUP BY CITY  
  HAVING COUNT(*) > 10
```

```
) N
```

```
WHERE P.city = n.city }
```

... EXISTS, IN

SELECT #

FROM Permits P

WHERE

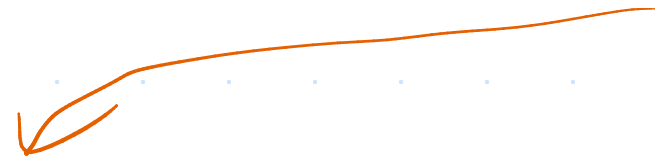
(SELECT count(*)
FROM Noise_complaints n
WHERE P.CITY = n.city
) > 10

Sidebar: Computing aggregates

init() \rightarrow agg val



once
per
row $\left(\text{accumulate(agg val, row val)} \rightarrow \text{agg val} \right)$



finalize(agg val) \rightarrow result

Records

$r_1 < \underline{\text{Buffalo}}, \$10 >$

$r_2 < \underline{\text{Buffalo}}, \$5 >$

$r_3 < \underline{\text{Deper}}, \$7 >$

aggval

$<0, 0>$

$<1, 10>$

$<2, 15>$

$<3, 22>$

⋮

$<42, 168>$

↑ $\frac{468}{42} = 11$
finalize

GBcity, aggval

{ }

{ Buffalo $\rightarrow <1, 10>$ }

{ Buffalo $\rightarrow <2, 15>$ }

{ Buffalo $\rightarrow <2, 15>$ }

{ Deper $\rightarrow <1, 7>$ }

SELECT on Sets

SELECT DISTINCT A
FROM R

SELECT on Lists

```
SELECT *  
FROM Permits  
ORDER BY issue_date  
LIMIT N ]
```

NULL

Problem 1

Zip =

)	4	6	8	0
---	---	---	---	---

Problem 2

Issued (but Status = 'Processing')

3-Valued Logic

Zip = 14250

↑

NULL

↑

UNKNOWN

AND

	T	F	<u>U</u>
T	T	F	U
<u>F</u>	F	F → F	
U	U	F	U

OR

	T	F	U
T	T	T	T
F	T	F	✓
U	T	✓	U

NOT

<u>T</u>	F
F	T
U	U

Give me all rows
where condition is true
↳ Not false
↳ Not unknown

WHERE Zip = 14250


```
SELECT * FROM Permits  
WHERE Zip = 14250 OR NOT (Zip = 14250)
```

✓ OR (NOT ✓)

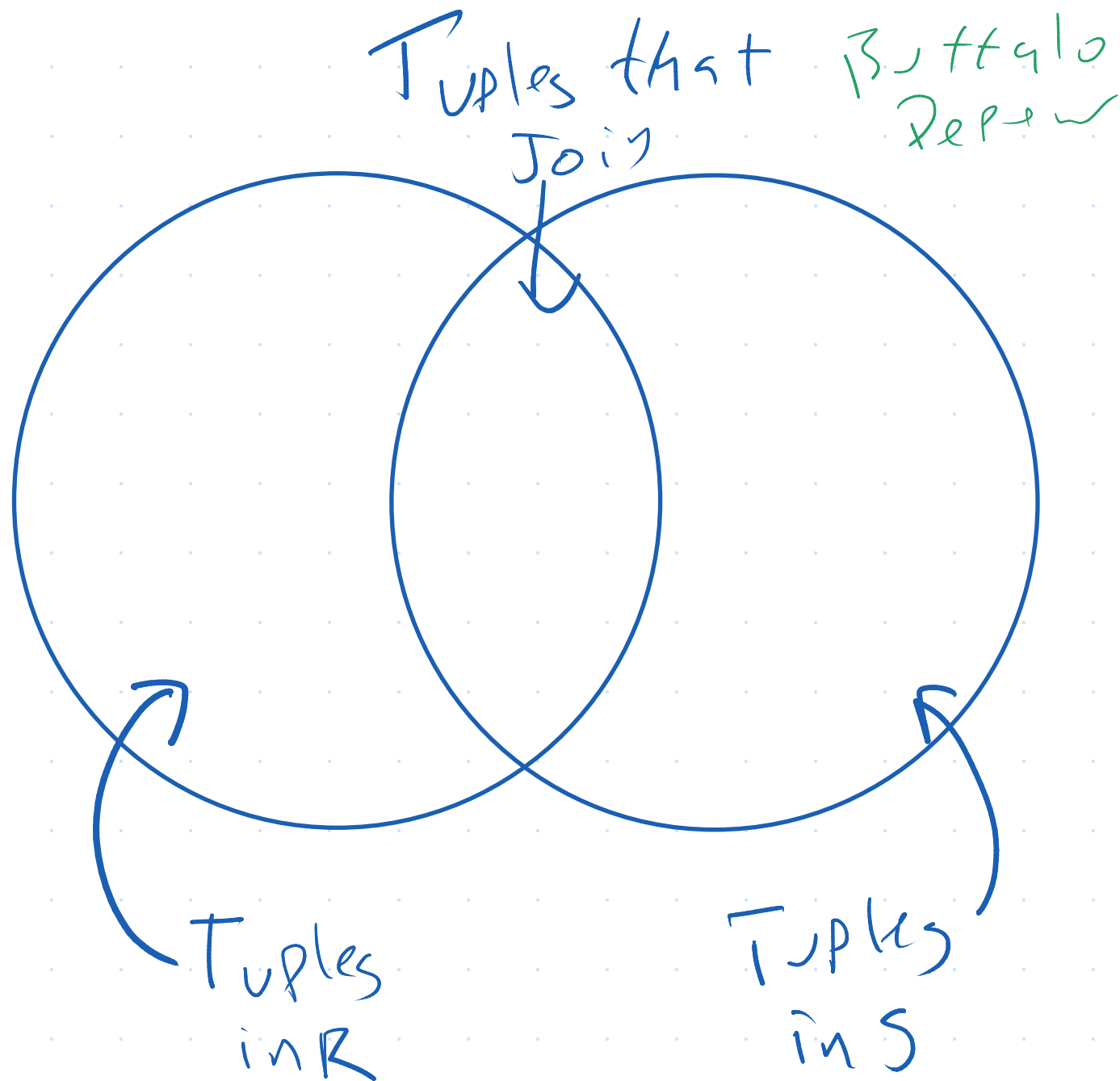
✓ OR ✓

✓

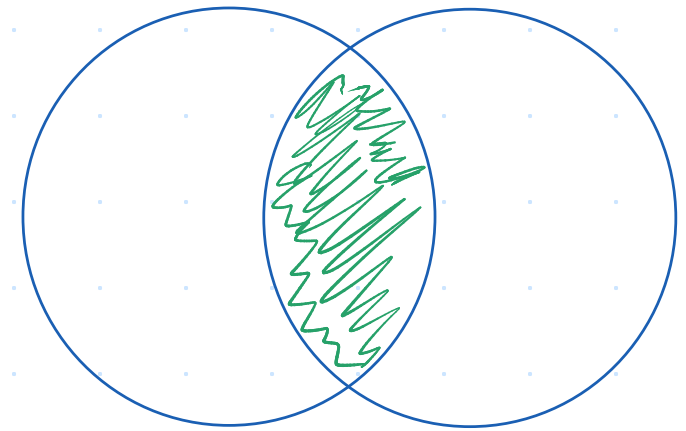
```
SELECT City, Count(*) FROM Permits
```

Outer Join

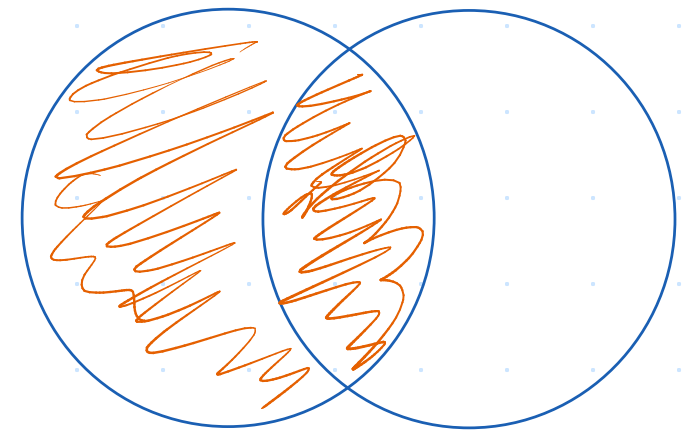
SELECT * FROM R _____ JOIN S ON R.A = S.A



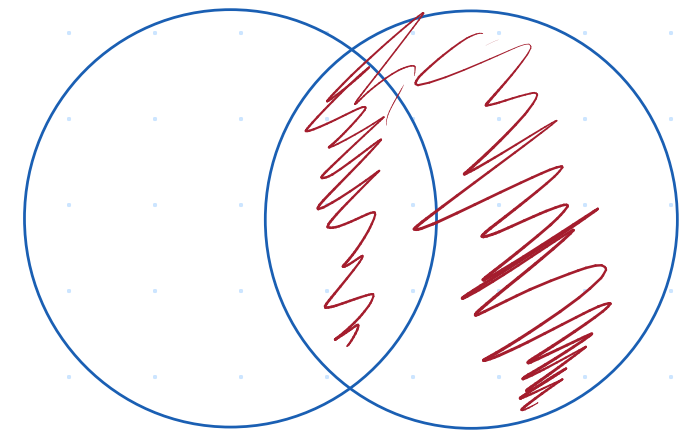
FROM R JOIN S
FROM R INNER JOIN S



FROM R LEFT OUTER JOIN S



FROM R RIGHT OUTER JOIN S



FROM R OUTER JOIN S
FROM R FULL OUTER JOIN S

