

# COSC 460 Lecture 10: SQL 3 Nested Queries

Professor Michael Hay  
Fall 2016

# Putting it together

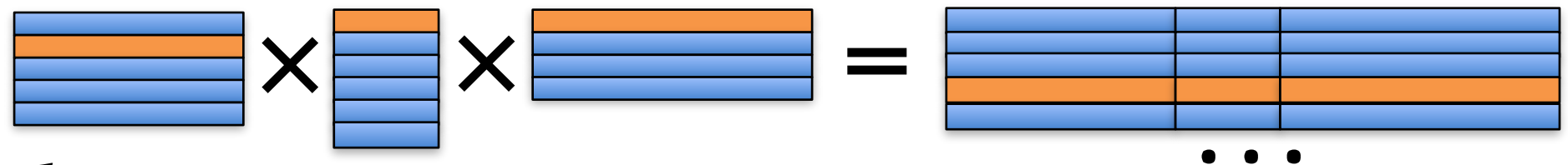
**SELECT** *columns or expressions*

4. Compute one output row for each “wide row”

(or for each group of them if query has grouping/aggregation)

**FROM** *tables*

1. Generate all combinations of rows, one from each table; each combination forms a “wide row”

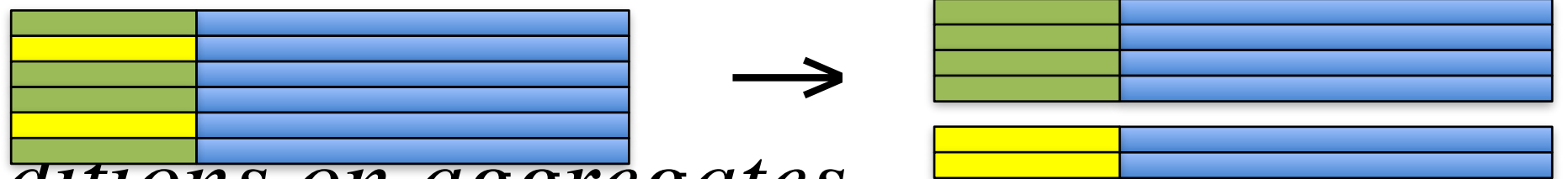


**WHERE** *conditions*

2. Filter—keep only “wide rows” satisfying *conditions*

**GROUP BY** *columns*

3. Group—“wide rows” with matching values for *columns* go into the same group



**HAVING** *conditions on aggregates*

5. Filter groups based on aggregates

**ORDER BY** *output columns;*

6. Sort the output rows

# Exercise

**Instructions:** ~1 minute to think/  
answer on your own; then discuss with  
neighbors; then I will call on one of you

<b>cName</b>	<b>state</b>	<b>enrollment</b>
Colgate	NY	2700
Bucknell	PA	3650
Williams	MA	2000
Cornell	NY	21000

- Write a query to find states whose total college enrollment exceeds 20,000. On the input relation above, it would produce this output:

<b>state</b>
NY

# Question

Suppose the Student and Apply relations were as shown on the right. Consider the following query. Which student is *not* included in the result?

- A. Amy
- B. Bob
- C. Craig
- D. Doris
- E. More than one is not included

```
select S.sID, sName, count(*)  
from Student S, Apply A  
where S.sID = A.sID  
group by S.sID, sName  
having count(*) < 3;
```

**Instructions:** *I will give you 1-2 minutes to think on your own.*

**Vote 1.**

*Then you will discuss w/ neighbor (1 min).*

**Vote 2.**

*Then we'll discuss as class.*

**Correct answer: E**

## Student

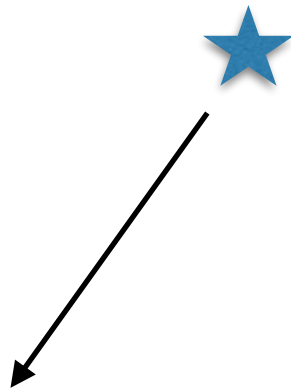
```
123,Amy,3.9,1000  
234,Bob,3.6,1500  
345,Craig,3.5,500  
456,Doris,3.9,1000
```

## Apply

```
123,Colgate,CS,Y  
123,Colgate,english,N  
123,Bucknell,CS,Y  
234,Bucknell,biology,N  
345,Williams,chemistry,Y
```

# Question

```
select sName
from Student S
where s.sID in (select sID
                from Apply
                where cName NOT in (select cName
                                    from College
                                    where state = 'NY'))
```



This query finds names of students...

- A. Who applied to schools outside of NY.
- B. Who did not apply to schools outside of NY.
- C. Who only applied to schools outside of NY.
- D. Who only applied to schools inside of NY.
- E. None of the above

**Instructions:** *I will give you 1-2 minutes to think on your own.*

**Vote 1.**

*Then you will discuss w/ neighbor (1 min).*

**Vote 2.**

*Then we'll discuss as class.*

# Exercise

**Instructions:** ~1 minute to think/  
answer on your own; then discuss with  
neighbors; then I will call on one of you

```
select *  
from Student  
where GPA = (select max(GPA) from Student)
```

The query above finds all students having the highest GPA.  
Modify this query to find all students having the highest  
GPA *among students from a high school of equal size*.

## Student

678, Fay, 3.8, 400  
876, Irene, 3.9, 400  
345, Craig, 3.5, 400  
789, Gary, 3.4, 400  
567, Edward, 2.9, 1500  
765, Jay, 2.9, 1500  
234, Bob, 3.6, 1500

## Result

876, Irene, 3.9, 400  
234, Bob, 3.6, 1500

# Question

**Instructions:** ~1 minute to think/  
answer on your own; then discuss with  
neighbors; then I will call on one of you

Write a query that finds the largest number of CS applications received by any one school.

Hint: write a subquery in the FROM clause, or use the WITH keyword to create a temporary relation.