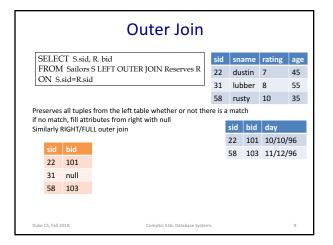


Equi Join											
SELECT * sid sname rating age											
FROM Sailors S, Reserves R							22	22 dustin		7	45
WHERE S.sid=R.sid and age = 45 31 lubber 8 55											
A	A special case of theta join 58 rusty 10 35										
Join condition only has equality predicate =											
sid	sname	rating	age	sid	bid	day		sid	bid	day	
22	dustin	7	45	22	101	10/10/96	5	22	101	10/10/	96
22	dustin	7	45	58	103	11/12/90	5	58	103	11/12/	96
31	lubber	8	55	22	101	10/10/90	5				
31	iubber	8	55	58	103	11/12/90	5—				
58	rusty	10	35	22	101	10/10/96	5				
58	rusty	10	35	58	103	11/12/9	5				
Duke CS, Fall 2018 CompSci 516: Database Systems 7											

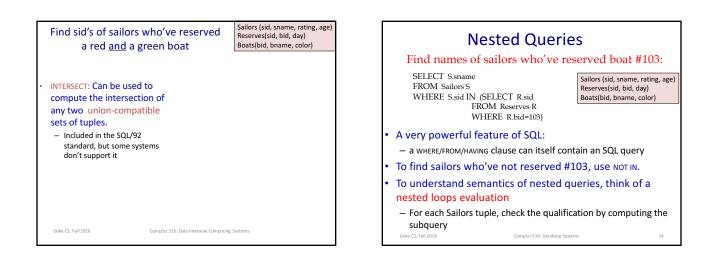
	Natural Join											
	SELECT * sid sname rating age									age		
	FROM Sailors S NATURAL JOIN Reserves R							22	dustin		7	45
								31	lub	ber	8	55
		cial case of				*** ( .:		58	rus	sty	10	35
	Equality condition on ALL common predicates (sid) Duplicate columns are eliminated											
	sid	sname	rating	age	bid	day			sid	bid	day	
	22	dustin	7	45	101	10/10/9	6		22	101	10/10/	96
	22	dustin	7	45	103	11/12/9	6	_	58	103	11/12/	96
	31	lubber	8	55	101	10/10/9	6					
	31	iubber	8	55	103	11/12/9	6					
_	58	rusty	10	35	101	10/10/9	6					
	58	rusty	10	35	103	11/12/9	6					
	Duke CS, Fall 2018 CompSci 516: Database Systems 8											

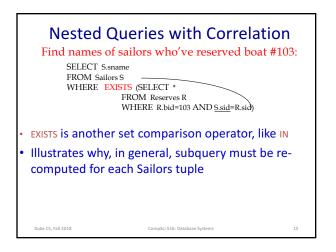


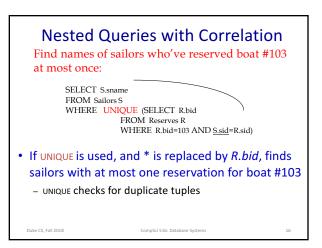
Expressions and Strings           SELECT S.age, age1=S.age-5, 2*S.age AS age2						
FROM Sailors S WHERE S.sname	LIKE 'B_%B'					
<ul> <li>Find triples (of ages of sail for sailors         <ul> <li>whose names begin and end</li> </ul> </li> </ul>	c expressions and string pat fors and two fields defined b d with B and contain at least three ching. `_' stands for any one re arbitrary characters	y expressions) e characters				
Duke CS, Fall 2018	CompSci 516: Database Systems	10				

Find sid's of sailors who've reserved a red <u>or</u> a					
gru	een boat	Sailors (sid, sname, rating, age) Reserves(sid, bid, day) Boats(bid, bname, color)			
Assume a Boats relation					
<ul> <li>UNION: Can be used to compute the union of two union-compatible tuples         <ul> <li>can themselves be the</li> <li>Can themselves be the</li> </ul> </li> </ul>	sets of				
SQL queries • Also available: EXCEPT do we get if we replace by EXCEPT?) Duke CS, Fall 2016	•	Systems			

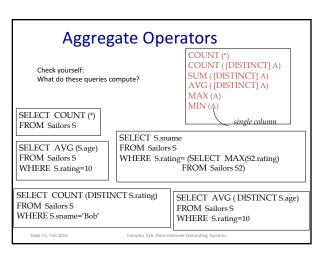
	rs who've reserved a green boat	Sailors (sid, sname, rating, age) Reserves(sid, bid, day) Boats(bid, bname, color)
Duke CS, Fall 2016	CompSci 516: Data Intensive Computin	g Systems

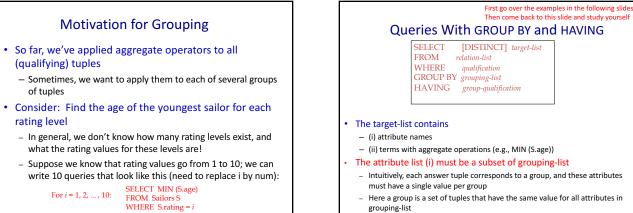






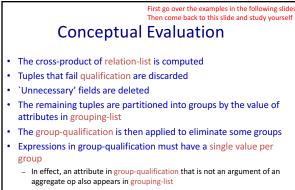






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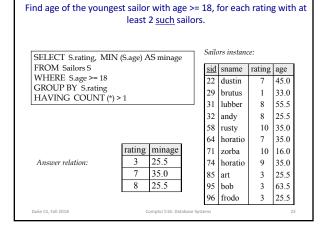
grouping-list CompSci 516: Database System:



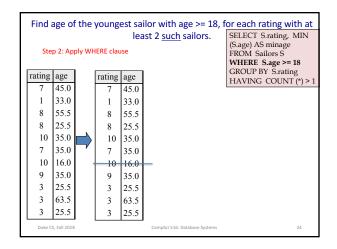
like "...GROUP BY bid, sid HAVING bid = 3"

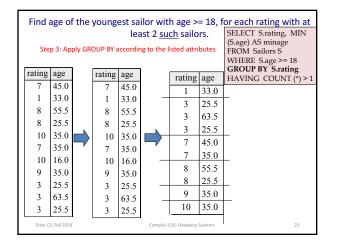
Duke CS, Fall 2018

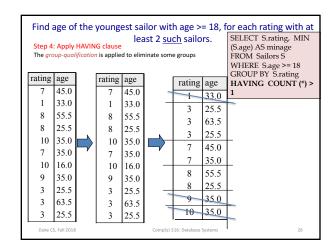
One answer tuple is generated per qualifying group

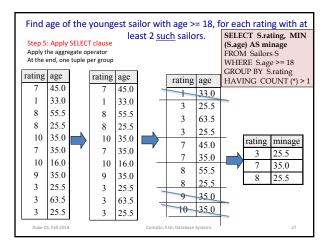


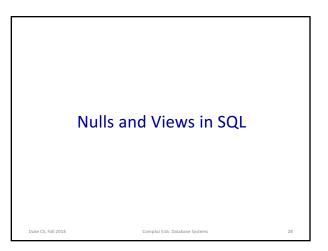
Find age of the youngest sailor with age >= 18, for each rating with at						
		least 2 <u>such</u> sailors.	SELECT S.rating, MIN			
Ste		m the cross product: FROM clause e attributes are omitted for simplicity)	(S.age) AS minage FROM Sailors S WHERE S.age >= 18			
rating	age		GROUP BY S.rating HAVING COUNT (*) > 1			
7	45.0					
1	33.0					
8	55.5					
8	25.5					
10	35.0					
7	35.0					
10	16.0					
9	35.0					
3	25.5					
3	63.5					
3	25.5					
Duke C	S, Fall 2018	CompSci 516: Database Systems	23			

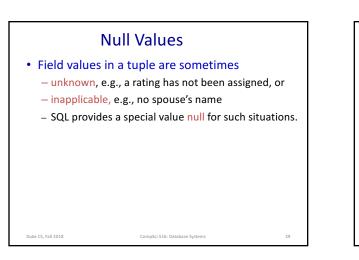


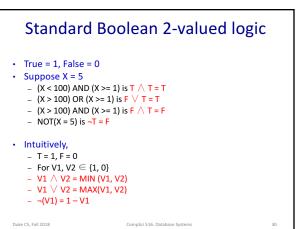










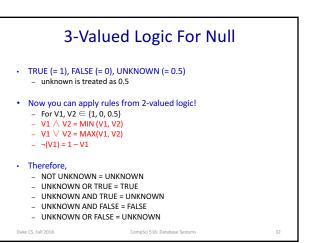


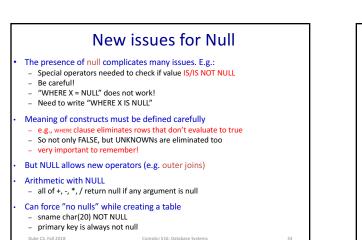
## 2-valued logic does not work for nulls Suppose rating = null, X = 5 Is rating>8 true or false? What about AND, OR and NOT connectives? (rating > 8) AND (X = 5)? What if we have such a condition in the WHERE clause?

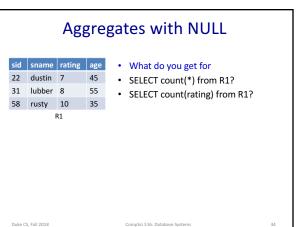
CompSci 516: Database Systems

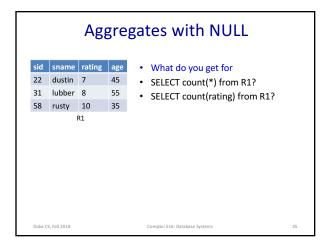
31

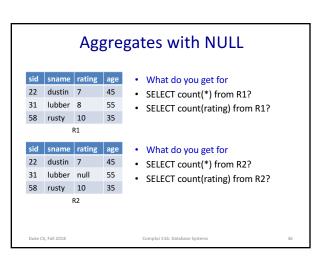
Duke CS, Fall 2018

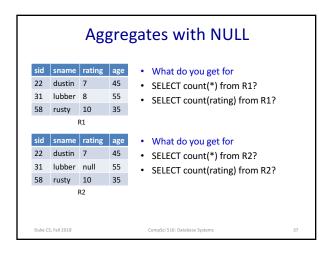


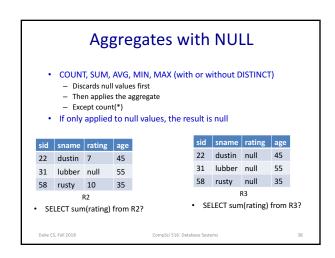


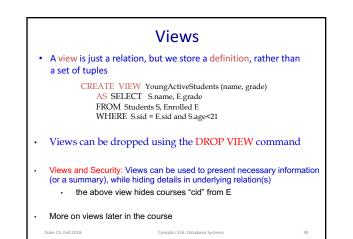




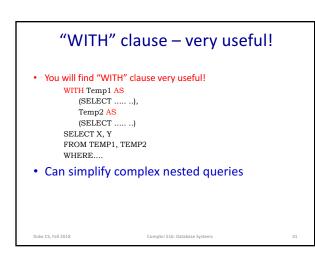


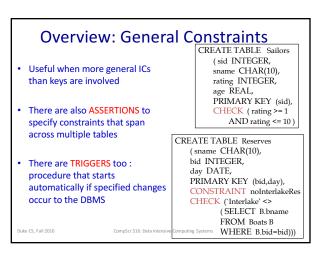


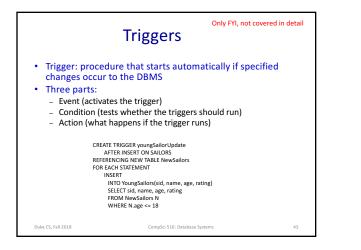


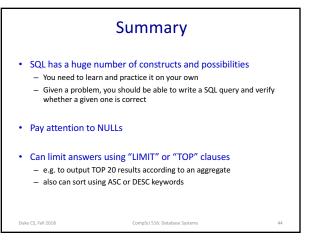


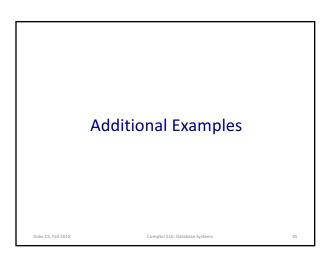


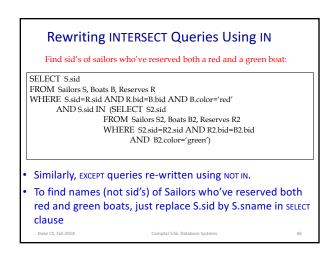


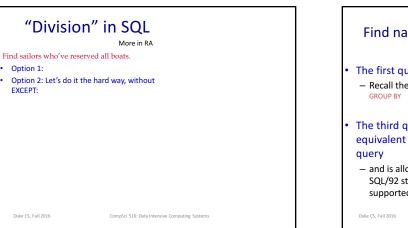


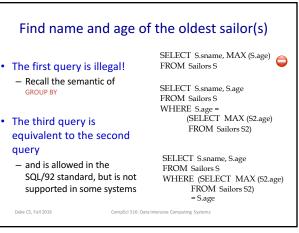












## For each red boat, find the number of reservations for this boat

SELECT B.bid, COUNT (\*) AS scount FROM Sailors S, Boats B, Reserves R WHERE S.sid=R.sid AND R.bid=B.bid AND B.color='red' GROUP BY B.bid

• Grouping over a join of three relations.

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- What do we get if we remove B.color='red' from the WHERE clause and add a HAVING clause with this condition?
- What if we drop Sailors and the condition involving S.sid?

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