

 Aggregate Queries Examples

 SELECT AVG (S.age)

 FROM Sailors S

 WHERE S.rating=10

 SELECT COUNT (DISTINCT S.rating)

 FROM Sailors S

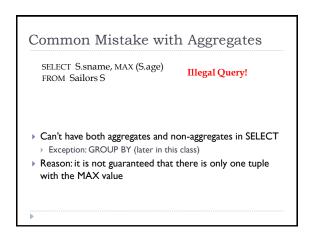
 WHERE S.sname='Bob'

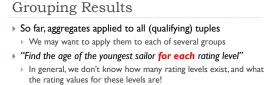
 SELECT S.sname

 FROM Sailors S

 WHERE S.rating= (SELECT MAX(S2.rating)

 FROM Sailors S2)





Suppose we know that rating values go from 1 to 10

...

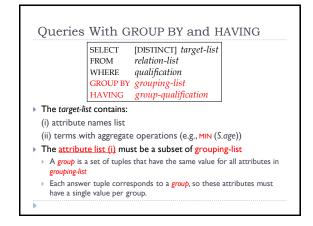
SELECT MIN (S.age) FROM Sailors S

SELECT MIN (S.age) FROM Sailors S WHERE S.rating = 10

How to achieve this?

SELECT **MIN** (S.age) FROM Sailors S WHERE S.rating = 2

WHERE S.rating = 1



Conceptual Evaluation

- Compute cross-product of relation-list Ι.
- 2. Discard tuples that fail *qualification*, 'unnecessary' fields are deleted
- Remaining tuples are partitioned into groups by the value of 3. attributes in grouping-list
- Discard groups that fail group-qualification 4.
- Expressions in group-qualification must have a single value per group!
- An attribute in group-qualification that is not an argument of an aggregate operation must appear in grouping-list (unless EVERY or ANY used)
- Generate single answer tuple per qualifying group 5.

GROUPBY Query Example "Find age of the youngest sailor with age at least Sailors 18, for each rating with at least 2 such sailors sid sname rating age 22 dustin 45.0 29 33.0 brutus 1 31 lubber 8 55.5 SELECT S.rating, MIN (S.age) 25.5 32 andy 8 AS minage 35.0 58 10 rusty FROM Sailors S 35.0 64 horatio 7 WHERE S.age >= 18 71 zorba 10 16.0 GROUP BY S.rating 74 horatio 9 35.0 HAVING COUNT $(\check{*}) > 1$

85

95

96 frodo

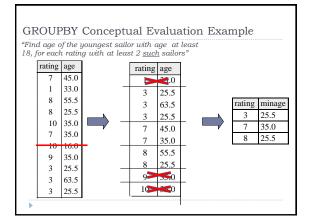
art

bob

3 25.5

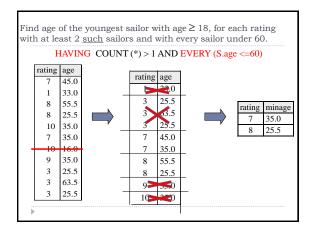
3 63.5

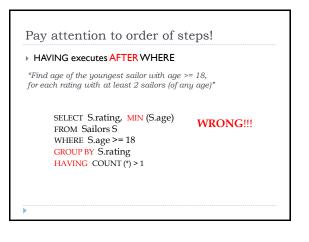
3 25.5

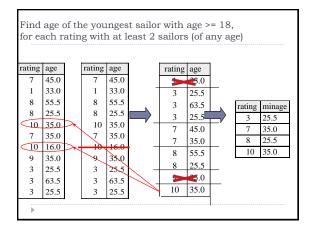


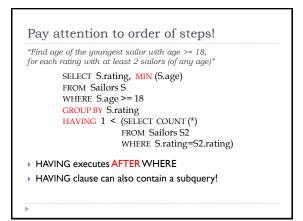
More Group Qualification Functions So far, we have seen group qualification based on a property of the group • E.g., aggregate function computed for entire group

- But recent SQL standard version allow group qualification based on a property of individual records
 - EVERY(condition): TRUE if condition holds for every group tuple
 - ANY(condition): TRUE if condition holds for some group tuple









"Summary of cases" – INFORMAL!

- Can group validation condition be evaluated on "intermediate" relation alone?
- If NO, then we need subquery in HAVING
- If YES, then we do not need subquery, and we have two further cases:
 Group validation condition DOES NOT depend on individual tuples in group, only aggregates and group-by attributes appear in the HAVING clause
 - Group validation DOES depend on individual tuples in group, in which case non-group-by attributes may appear with ANY or EVERY operator
- Note: this is just a guideline for most cases, it is actually possible to have a mix of the above!!!

Aggregates and FROM Subqueries Aggregate operations cannot be nested! "Find rating that has lowest average sailor age" SELECT Strating FROM Sailors S WHERE S.age = (SELECT MIN (AVG (S2.age)) FROM Sailors S2) Correct solution: SELECT Temp.rating, Temp.avgage FROM (SELECT Strating, AVG (S.age) AS avgage FROM Sailors S GROUP BY Strating) Temp WHERE Temp.avgage = (SELECT MIN (Temp.avgage) FROM Temp)