LAB 6 Notes

The Relational Algebra

- Any questions on the project (Discuss)
- We will discuss the java program
- We will continue our discussion on SQL
- We will finish the postgres manual

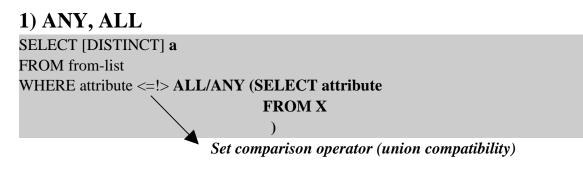
Ch.1: Overview of Database Systems Ch.2: Introduction to Database Design Ch.3: The Relational Model Ch.4: Relational Algebra Ch.5: SQL Ch.8: Storage and Indexing Ch.9: Storing Data: Disks and Files Ch.10: Tree-Structured Indexing Ch.11: Hash-Based Indexing Ch.12: Overview of Query Evaluation Ch.13: External Sorting Ch.14: Evaluation of Relational Operators Ch.15: A Typical Relational Query Optimizer Ch.16: Overview of Transaction Management

Outline

1-4) More on SQL Operators. I will try to emphasize on the most important aspects and then jump into examples

5) Examples on SQL.

6) If time permits we will look at the project manual.



"Find the oldest employee"

We have already seen

SELECT * FROM Employee e WHERE e.age = (SELECT MAX(age) FROM EMPLOYEE); OR SELECT * FROM EMPLOYEE WHERE E.age > ALL (SELECT E2.age FROM EMPLOYEE E2 WHERE E2.ssn!=E.ssn);

* ALL => ALL in the set

* ANY => At least 1 in the set ANY HERE WOULD PRODUCE: Find employees who's age is bigger than AT least somebody's else age.

2) GROUP BY and HAVING CLAUSE

SELECT [DISTINCT] **a**, **b**, **c**...**z**, SUM(A), FROM from-list WHERE qualification GROUP BY **a**, **b**, **c**...**z**, HAVING qualification-on-grouping

Example: Find how many sailors belong to each group that has more than 30 members 1 Chris 20

Sailors(sid, name, rating, age, group)

SELECT COUNT(id) FROM Sailors WHERE group= I i={1,2,3...}

SELECT group, count(*) as c FROM Sailors GROUP BY group, c HAVING c>30

• Everything that appears in GROUP BY is also part of the select clause

Query: Find the age of the youngest sailor who is eligible to vote (older than 18 years) for each group with at least 2 such sailors.

SELECT group, M FROM Sailor WHERE age>18 GROUP BY group HAVING COUNT		1 2 3 4	Chris Chris Chris John	35	1 2 1 2	
Until where result	Until group by	Unti	l Having			

1	Chris	20	1					
2	Chris	35	2					
3	Chris	20	1					
4	John	15	2					

1 20	1	20	1
2 35 1 19	1 2	19 35	

1 19

3) NULLs

unknown or inapplicable.

Student(ssn, name, age, addressed) 1321, "John", null 1421, "John", 15 1521, "John", 10 1621, "John", 15

SELECT AVG(age) FROM Student ∠ 15+10+15+0 /4 = 10

SELECT AVG(age) FROM Student WHERE age IS NOT NULL \checkmark 15 + 10 + 15 /4 = 13,33

Find all student that don't have their age in the system SELECT * FROM Student WHERE AGE IS NULL;

4) Nested Queries in the FROM clause

(Not implemented in many DBMS systems)

// give me a list of salaries (above \$20000) where each salary represents the MAX salary of some particular age.

SELECT TEMP.salary FROM (SELECT E.age, MAX(salary) AS salary FROM EMPLOYEE GROUP BY E.age

) AS TEMP WHERE TEMP.salary>2000;