

SQL

Subqueries

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- We can use a SELECT statement (subquery) instead of a table in another SELECT statement
 - WITH can make it easier
 - RECURSIVE WITH, 11g, gives more power
- We can use a subquery inside IN or EXISTS
- We can use a subquery with >ALL,=ANY etc
- Especially useful for negation queries
- In *Correlated* subqueries, the subquery refers to the outside row; these are harder to optimize

Example - IN

- We can use a SELECT statement instead of a list of values with IN (or NOT IN)
 - IN is a binary operator, so types need to match
 - Example: List names of students *minoring* in the area with code 'CS'
 - SELECT S.Name
 - FROM Student
 - WHERE Id IN (
 - SELECT Student
 - FROM IsMinoring
 - WHERE Area='CS'
 -)

Example - Exists

- EXISTS is a unary predicate, that takes a list of values and says whether it is empty
 - But we can use a subquery
 - Normally leads to *correlated* subqueries, since we refer to the outside table
 - Example:
 - SELECT Name
 - FROM Student S
 - WHERE EXISTS (
 - SELECT *
 - FROM IsMinoring M
 - WHERE S.Id=M.Student AND Area='CS'
 -);

- Name of students who are minoring in 'IT'
- Name of students who are NOT minoring in anything
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Examples - >ALL etc

- For all the comparison operators (=,> etc) we can use ALL or ANY after them, and compare one value with a list
 - =ANY is equivalent to IN
- Example: Name of student(s) who are the oldest
 - SELECT Name
 - FROM Student
 - WHERE Age >=ALL (
 - SELECT Age
 - FROM Student
 -)

You try it

- Name of youngest student(s)
- Name of major with last code alphabetically
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Example - WITH

- Can give a local name to the subquery with the WITH clause
- Example:
 - WITH MinoringInCS AS (SELECT Student FROM IsMinoring WHERE Area='CS')
 - SELECT Name
 - FROM Student
 - WHERE Id IN (SELECT * FROM MinoringInCS);

Subqueries vs JOIN

- JOINS allow you to return data from more than one table
 - OUTER JOINS let you get rows that don't actually match
- When using subqueries, you only get data from only the table(s) mentioned in the main SELECT
- Negation is easier to understand with subqueries (right ? :)
- OUTER JOINS could be used (weirdly) instead of subqueries