Correlated Subqueries

Database Design 2023
Cody Henrichsen

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Correlated Subqueries

- These queries are easy to ID by the way results are limited in the WHERE clause
  - The inner query table(s) field is compared to the matching field of the outer table(s) field
  - This is further reason for good naming conventions!!
- This is the most common subquery for a SELECT clause as it generates a value for each row of the outer and bizarrely that matches the structure of a SELECT
  - Must be SCALAR as it represents a single column in the row of the query

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SELECT Example

```
-- Generate the appropriate count per course
SELECT
    sec.section_id,
    sec.course_no,
    (
        SELECT
            COUNT(*) AS enrolled
        FROM
            enrollment enr
        WHERE
            sec.section_id = enr.section_id
    ) AS num_enrolled
FROM
    section sec
WHERE
    section_id  < 110
;
```

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WHERE Example

```sql
-- Find students who are enrolled in more than three classes
SELECT
    last_name,
    first_name,
    student_id
FROM
    student stu
WHERE
    3 <
    (
        SELECT
            COUNT(*) AS times_enrolled
        FROM
            enrollment enr
        WHERE
            stu.student_id = enr.student_id
    )
;
```

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Exists and Not Exists

- This type of correlated subquery checks to see if a matching row either exists or not on the inner query based on the key or keys connected across the queries
- The SELECT clause of the inner query only has a string literal for the table in the FROM
- The WHERE clause determines if the row exists or not based on the relationship between the inner and outer queries

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EXISTS Example

```sql
-- Students who arent enrolled in classes
SELECT
    stu.first_name,
    stu.last_name
FROM
    student stu
WHERE
    NOT EXISTS
    (
        SELECT
            'X'
        FROM
            enrollment enr
        WHERE
            enr.student_id = stu.student_id
    )
;
```

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