Scalar Subqueries

Database Design 2021
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Definition

- A scalar subquery is a inner query that returns exactly 1 value
- These are most often achieved with an aggregate function
  - AVG, SUM, MIN, MAX
- Results are compared with either the equality or relational operators
  - =, !=, <, >, <=, >=

Why?

- Hard coded values are **BAD**
- Matching calculated values is easy
- Allow for more complex queries over time

Structure

Scalar Subquery Structure

```
SELECT
    fields,
    separated,
    by_commas
FROM
    table
WHERE
    some_field =
    (
        SELECT
            AVG (some_field) -- MAX (other_field)
        FROM
            some_table
    )
```

The subquery is used to replace a hard coded value with a calculated single row response instead. Note that MAX/MIN/SUM could easily be swapped as the selected calculation
This also keeps each query more in line with the KISS principle

Demonstration

- We want to identify the sales with less than the average quantity.
- First we need the query to identify the average quantity
- Then we need to write the query a result that matches that value (for verification)
- Finally we combine the queries together

Sample SQL Code

Inner Query

```
SELECT
    MIN (cou.cost)
FROM
    course cou;
```

Outer Query

```
SELECT
    MIN (cou.cost)
FROM
    course cou;

SELECT
    cou.course_no,
    cou.description
FROM
    course cou
WHERE
    cou.cost = 1095;
```

Combined Query

```
SELECT
    cou.course_no,
    cou.description
FROM
    course cou
WHERE
    cou.cost =
    (
        SELECT
            MIN (cou.cost)
        FROM
            course cou
    );
```

Key Ideas

- Designed to match a single solitary value
- Fits in the WHERE clause easily
- Into the SELECT clause for immediate use
- Easy to combine with AND / OR