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# 21 DAYS SQL CHALLENGE

CHALLENGE STARTS FROM

3RD NOVEMBER 2025

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#SQLWithIDC

The poster features a dark background with glowing green circuit-like lines. In the center is a 3D illustration of a server stack with a glowing green square on top. The text is primarily white and green, with the challenge title in large, bold letters. A QR code is provided for registration, and the hashtag #SQLWithIDC is at the bottom.

## Day 16 (21/11): Subqueries (WHERE clause)

### 🎯 Objective

To understand how to use **subqueries** inside the **WHERE** clause to filter data based on results from another query.

### 🔍 Topics Covered

- What is a subquery?
- Types of subqueries (single-row, multi-row)
- Using subqueries in the **WHERE** clause:
  - WHERE column = (subquery)
  - WHERE column IN (subquery)
  - WHERE column > (subquery)
- Using operators with subqueries:  
IN, NOT IN , ANY, ALL
- Filtering data based on aggregated results (e.g., avg, max, min)

## ★ What is a Subquery?

A **subquery** is a query *inside* another query.

Think of it like:

“First get this value... then use it in the main query.”

Example:

Find customers whose spending is above the average spending.

The average spending comes from a **subquery**.

## ★ Types of Subqueries

### 1. Single-Row Subquery

Returns **only one value** (one row, one column).

```
SELECT * FROM employees  
WHERE salary > (SELECT AVG(salary) FROM employees);
```

The subquery gives one number → average salary.

## 2. Multi-Row Subquery

Returns multiple values.

```
SELECT * FROM orders  
WHERE customer_id IN (SELECT customer_id FROM vip_customers);
```

The subquery returns a list of customer IDs.

## ★ Using Subqueries in the WHERE Clause

### 1. WHERE column = (subquery)

Used when subquery returns **one value**.

```
WHERE salary = (SELECT MAX(salary) FROM employees)
```

## 2. WHERE column IN (subquery)

Used when subquery returns many values.

```
WHERE category_id IN (SELECT id FROM categories)
```

## 3. WHERE column > (subquery)

Used when comparing a value with a single aggregated number.

```
WHERE score > (SELECT AVG(score) FROM tests)
```

## ★ Using Operators With Subqueries

### ✓ IN

Matches **any value** from a list.

### ✓ NOT IN

Excludes values from a list.

### ✓ ANY

Compares with **any one value** from subquery.

**salary > ANY (SELECT salary FROM interns)**  
*salary is greater than at least one intern's salary.*

### ✓ ALL

Compares with **every value** in subquery.

**salary > ALL (SELECT salary FROM interns)**  
*salary is greater than all interns' salaries.*

## ☆ Simple Summary

Concept	Meaning
Subquery	A query inside another query
Single-row	Returns 1 value
Multi-row	Returns multiple values
= (subquery)	Compare with one value
IN (subquery)	Compare with a list
> (subquery)	Compare with one aggregated value
IN, NOT IN	Include/exclude list
ANY, ALL	Compare with multiple values
Aggregate subquery	Use AVG, MAX, MIN in subquery

## Practice Questions:

```
-- Find patients who are in services with above-average staff count.
SELECT
  p.patient_id,
  p.name AS patient_name,
  p.service
FROM patients p
WHERE p.service IN (
  SELECT service
  FROM staff
  GROUP BY service
  HAVING COUNT(staff_id) >
    (
      SELECT AVG(staff_count)
      FROM (
        SELECT COUNT(staff_id) AS staff_count
        FROM staff
        GROUP BY service
      ) t
    )
);
```

patient_id	patient_name	service
PAT-003ce690	Larry Dixon	ICU
PAT-00883d3c	Victor Taylor	ICU
PAT-02ae68da	Corey Whitaker	ICU
PAT-030f2b7d	Chris Velazquez	ICU
PAT-04a8031e	Jake Shaw	ICU
PAT-08591375	Garrett Lin	ICU
PAT-0b69b6d1	Joann Ferguson	ICU
PAT-0c687528	Monica Ellis	ICU
PAT-0ced5480	Samuel Turner	ICU
PAT-0f73df9c	Jennifer Banks	ICU
PAT-104fadfd	Lisa Evans	ICU
PAT-110d5794	Travis Hull	ICU
PAT-12523d2c	Amanda Sullivan	ICU
PAT-128d605f	Mrs. Kristen Re...	ICU
PAT-14da658e	Dennis Marshall	ICU
PAT-14f1c2aa	Elizabeth Sanders	ICU
PAT-15da980a	Kendra Wang ...	ICU
PAT-17ceaafc	Mary Miller	ICU
PAT-1a762a65	Vanessa Hatfield	ICU
PAT-1bc9130a	Michael Miles	ICU
PAT-1cc7c1b5	Adam Vaughan	ICU



## Practice Questions:

```
-- List staff who work in services that had any week with patient satisfaction below 70.
```

```
SELECT
    staff_id,
    staff_name,
    role,
    service
FROM staff
WHERE service IN (
    SELECT
        service
    FROM services_weekly
    WHERE patient_satisfaction < 70
    GROUP BY service
);
```

staff_id	staff_name	role	service
STF-00b6381d	Steve Sanchez	doctor	ICU
STF-00fbd582	John Pierce	nursing_assistant	surgery
STF-0196d344	Denise Jacobs	nurse	ICU
STF-021fdf9f	Sharon Cochran	nursing_assistant	ICU
STF-02ae59ca	Noah Rhodes	doctor	emergency
STF-052894a3	Richard Rodriguez	nurse	ICU
STF-05591498	William Herrera	nurse	ICU
STF-094f410b	Ryan Munoz	nurse	emergency
STF-0aaed714	Rebecca Henderson	doctor	surgery
STF-0b0dfb38	Mike Allen	doctor	ICU
STF-107a58e4	Cristian Santos	doctor	emergency
STF-130577e6	Dylan Miller	nurse	emergency
STF-13f243f8	Paula Moreno	nurse	surgery
STF-15269c02	Sherry Decker	nurse	surgery
STF-15c07995	Anthony Rodriguez	doctor	surgery
STF-177e5df8	Angelica Tucker	nurse	surgery
STF-1881ede3	Aaron Wise	nurse	ICU
STF-1ad309f8	Matthew Foster	nursing_assistant	emergency
STF-1b299895	Christina Walters	nurse	ICU
STF-1bdb5ff4	Deborah Figueroa	nurse	ICU
STF-1ded4330	Joshua Blair	nursing_assistant	surgery

## QUERY EXPLANATION

```
-- Show patients from services where total admitted patients exceed 1000.  
SELECT  
    p.patient_id,  
    p.name AS patient_name,  
    p.service  
FROM patients p  
WHERE p.service IN (  
    SELECT service  
    FROM services_weekly  
    GROUP BY service  
    HAVING SUM(patients_admitted) > 1000  
);
```

patient_id	patient_name	service
PAT-00b64d32	Amber Obrien	general_medicine
PAT-029113eb	Victoria Larson	surgery
PAT-02f2e75d	Thomas Atkins	emergency
PAT-0307a640	Steven Howard	general_medicine
PAT-032160f4	Angela Lin	general_medicine
PAT-03a1bd78	Melissa Mcfarland	emergency
PAT-03ae75aa	Jordan Williams	surgery
PAT-03d0b953	Michelle Davis DVM	emergency
PAT-03f5abbe	Dean Donovan	surgery
PAT-044a304c	George Harper	surgery
PAT-0477a000	Michael Wang	emergency
PAT-04866ac6	Scott Alexander	surgery
PAT-04be60be	Bradley Johnson ...	general_medicine
PAT-06a8ea25	Alexander Gomez	emergency
PAT-06d975bc	Donald Medina	general_medicine
PAT-07a9ee88	Michael Morrison	surgery
PAT-07c275e3	Robert Jackson	emergency
PAT-0812aab1	Bryan Gomez	emergency
PAT-0865f855	Richard Stevens	emergency
PAT-08cfcfe4	William Evans	general_medicine
PAT-092d752e	Diana Hays	emergency

## Daily Challenge:

```
-- Find patients from services that had at least one patient refusal and
-- whose average satisfaction is below the overall hospital average.
-- Show patient_id, name, service, and their satisfaction score.
```

```
SELECT
    p.patient_id,
    p.name AS patient_name,
    p.service,
    p.satisfaction AS patient_satisfaction_score
FROM patients p
WHERE p.service IN (
    SELECT service
    FROM services_weekly
    GROUP BY service
    HAVING
        MAX(patients_refused) > 0
        AND AVG(patient_satisfaction) < (
            SELECT AVG(patient_satisfaction) FROM services_weekly
        )
);
```

patient_id	patient_name	service	patient_satisfaction_score
PAT-029113eb	Victoria Larson	surgery	97
PAT-02f2e75d	Thomas Atkins	emergency	61
PAT-03a1bd78	Melissa Mcfarland	emergency	79
PAT-03ae75aa	Jordan Williams	surgery	97
PAT-03d0b953	Michelle Davis DVM	emergency	88
PAT-03f5abbe	Dean Donovan	surgery	84
PAT-044a304c	George Harper	surgery	89
PAT-0477a000	Michael Wang	emergency	75
PAT-04866ac6	Scott Alexander	surgery	78
PAT-06a8ea25	Alexander Gomez	emergency	63
PAT-07a9ee88	Michael Morrison	surgery	95
PAT-07c275e3	Robert Jackson	emergency	66
PAT-0812aab1	Bryan Gomez	emergency	61
PAT-0865f855	Richard Stevens	emergency	69
PAT-092d752e	Diana Hays	emergency	82
PAT-09484753	Richard Rodriguez	surgery	61
PAT-096760c2	Jeremy Sampson	emergency	84
PAT-0977392c	Jodi Roach	emergency	87
PAT-09edc78a	Adam Jackson	emergency	81
PAT-0a43159b	Gregory Hill	surgery	74
PAT-0a87540a	Alicia Roth	surgery	82