

## Capstone Project 🧑🏻💻

### SQL Murder Mystery: "Who Killed the CEO?"

This project is designed to assess participants' ability to apply the full range of SQL concepts learned throughout the challenge, including joins, subqueries, filters, aggregations, and logical reasoning. It emphasises critical thinking, data-driven investigation, and structured problem-solving.

In this capstone project, participants will take on the role of a lead data analyst investigating the mysterious death of the CEO of TechNova Inc.. The objective is to utilise SQL to analyse multiple datasets — including keycard logs, phone records, alibis, and evidence — to determine who committed the crime, where and when it occurred, and how it happened.

#### Goal: Find the killer

We need to combine **keycard logs**, **alibis**, **calls**, and **evidence** to identify the murderer.

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#### 1. Who accessed the CEO Office around the murder?

```
SELECT kl.*, e.name
FROM keycard_logs kl
JOIN employees e ON kl.employee_id = e.employee_id
WHERE kl.room = 'CEO Office';
```

	log_id	employee_id	room	entry_time	exit_time	name
▶	11	4	CEO Office	2025-10-15 20:50:00	2025-10-15 21:00:00	David Kumar

#### Result → Employee 4 (David Kumar)

Entry: **20:50**

Exit: **21:00**

He is the **only person** who entered the CEO Office that night.

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#### 2. Did the killer lie with a fake alibi?

Employee 4 claimed:

```
SELECT *
FROM alibis
WHERE employee_id = 4;
```

	alibi_id	employee_id	claimed_location	claim_time
▶	2	4	Server Room	2025-10-15 20:50:00
*	NULL	NULL	NULL	NULL

He claimed: **Server Room at 20:50**

But actual logs show:

```
SELECT *  
FROM keycard_logs  
WHERE employee_id = 4;
```

log_id	employee_id	room	entry_time	exit_time
4	4	Server Room	2025-10-15 08:50:00	2025-10-15 09:10:00
11	4	CEO Office	2025-10-15 20:50:00	2025-10-15 21:00:00
NULL	NULL	NULL	NULL	NULL

He was actually in the **CEO Office** at 20:50,  
not in the Server Room → **FAKE ALIBI**

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### 3. Calls before the murder (possible motive / accomplice)

```
SELECT c.*, e.name  
FROM calls c  
JOIN employees e ON c.caller_id = e.employee_id  
WHERE caller_id = 4;
```

call_id	caller_id	receiver_id	call_time	duration_sec	name
1	4	1	2025-10-15 20:55:00	45	David Kumar
5	4	7	2025-10-15 20:40:00	90	David Kumar

David Kumar (ID 4) called:

- Employee 1 at **20:55** (right after entering the CEO Office)
- Employee 7 at **20:40** (CFO)

This might show coordination, but does **not** change murderer identification.

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### 4. Evidence matches David Kumar

```
SELECT *  
FROM evidence  
WHERE room = 'CEO Office';
```

evidence_id	room	description	found_time
1	CEO Office	Fingerprint on desk	2025-10-15 21:05:00
2	CEO Office	Keycard swipe logs mismatch	2025-10-15 21:10:00
NULL	NULL	NULL	NULL

Evidence includes:

- *Fingerprint on desk*
- *Keycard swipe mismatch*

This again matches **the only person who entered** — Employee 4.

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### Final Query

```
SELECT employees.name AS killer
```

```
FROM employees
```

```
WHERE employees.employee_id = (
```

```
-- Employee who accessed the CEO Office during the murder
```

```
SELECT keycard_logs.employee_id
```

```
FROM keycard_logs
```

```
WHERE keycard_logs.room = 'CEO Office'
```

```
-- Employee with fake alibi
```

```
AND keycard_logs.employee_id IN (
```

```
    SELECT alibis.employee_id
```

```
    FROM alibis
```

```
    JOIN keycard_logs AS actual_logs
```

```
        ON alibis.employee_id = actual_logs.employee_id
```

```
        WHERE alibis.claimed_location <> actual_logs.room
```

```
)
```

```
ORDER BY keycard_logs.entry_time
```

```
LIMIT 1
```

```
);
```

killer
David Kumar

**Final Answer: The Killer is → David Kumar (Employee ID 4)**

**Why?**

- Only person in CEO office near murder time

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- **Fake alibi (claimed Server Room, but logs prove otherwise)**
- **Suspicious call minutes before/after murder**
- **Evidence tied to CEO Office**