31 DAYS OF MYSQL

DATA December

31 Days. 31 MySQL Projects. One Skill Level Up

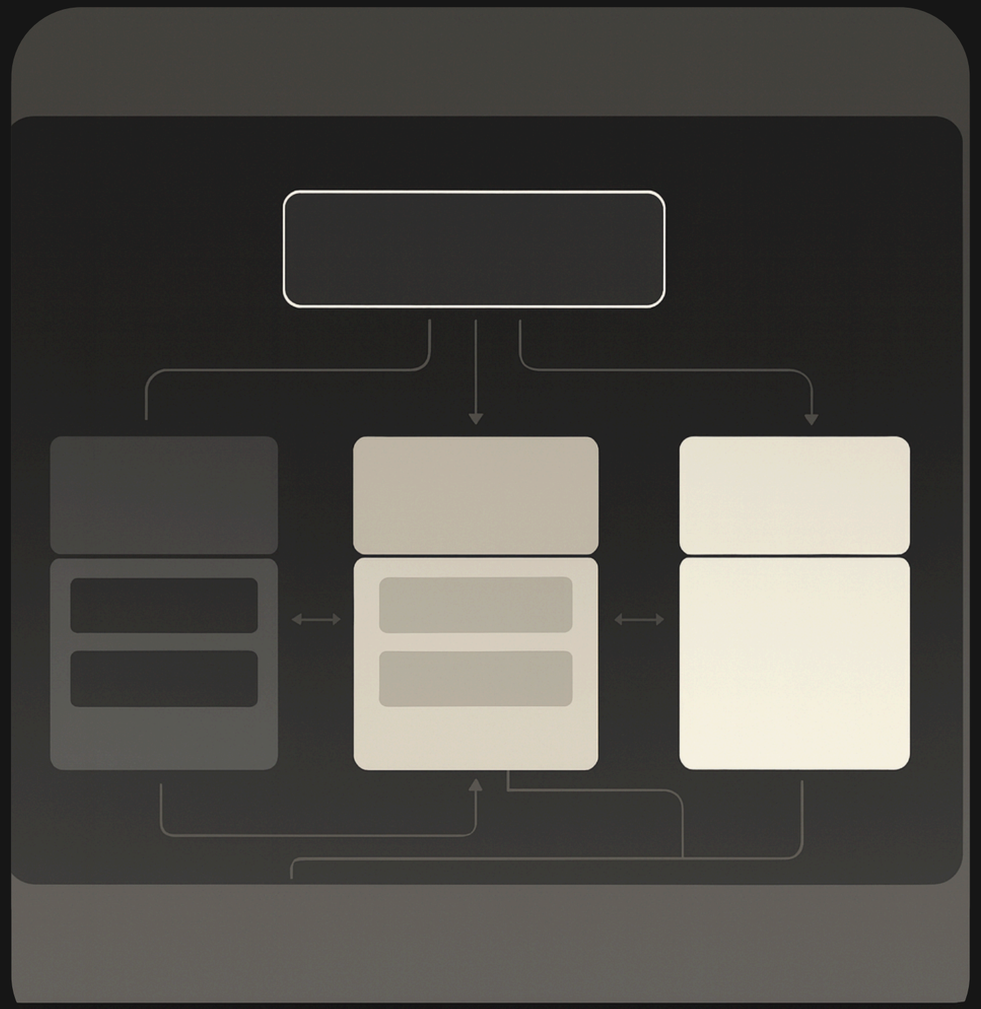
Day 2 — Banking Dataset Project

PROJECT OVERVIEW

This project focused on analyzing a banking-style transactional database containing customers, merchants, and financial transactions. Using SQL, the goal was to uncover patterns around spending behavior, merchant performance, fraud detection, refund patterns, and geographic risk.

DATABASE SCHEMA

accounts



transactions

- txn_id
- account_id
- merchant_id
- amount
- txn_type
- txn_date
- txn_time
- city
- is_fraud

merchants

- account_id
- name
- city
- account_open_date
- account_type
- balance

- account_id
- name
- city
- account_open_ date
- account_type
- balance

customers

- customer_id
- name
- city
- signup_date
- avg_monthly_orders

Query Group 1 : Revenue & Monthly Trends

Q1 : Top 20 Highest-Spending Customers

```
select a.account_id, a.name,
sum(amount) as revenue
from accounts a
join transactions t
on a.account_id = t.account_id
where txn_type = 'debit'
group by a.account_id, a.name
order by revenue desc
limit 20;
```

Q2 : Monthly Transaction Trend (Volume + Total Amount)

```
select month(txn_date) as month,
count(txn_id) as txn_volume,
sum(amount) as total_amount
from transactions
group by month(txn_date)
order by month asc;
```

Query Group 2: Merchant & Fraud Detection Metrics

Query 3 : Top Merchants by Transaction Volume

```
select m.merchant_id, m.merchant_name,
count(t.txn_id) as volume
from merchants m
join transactions t
on m.merchant_id = t.merchant_id
group by m.merchant_id,
m.merchant_name
order by volume desc;
```

Query 5 : Accounts with Unusually High Daily Transaction Count

```
select account_id,
date(txn_date) as txn_day,
count(*) as txn_count
from transactions
group by account_id, date(txn_date)
having txn_count > 10
order by txn_count desc;
```

Query 4 : Suspicious High-Value Transactions (>3× Merchant Avg)

```
with cte as (select merchant_id,
avg(amount) as avg_amt
from transactions
group by merchant_id)
```

```
select t.txn_id, t.merchant_id,
 t.amount as txn_amount, c.avg_amt
from transactions t
join cte c on t.merchant_id = c.merchant_id
where t.amount > 3 * c.avg_amt;
```

Query Group 3: Customer Behavior & Activity

Q6 : Cities with Highest Fraud Rate

```
select city,
(count(case when is_fraud = 1 then 1 end) *
100.0 / count(*)) as fraud_rate
from transactions
group by city
order by fraud_rate desc;
```

Q7 : Customers who Transacted with > 10 Unique Merchants

```
select account_id,
count(distinct merchant_id) as
unique_merchants
from transactions
group by account_id
having unique_merchants > 10;
```

Query Group 4: Location-Based Fraud Detection

1

Q8 : Transactions in a Different City than Home City

```
select a.account_id,a.city as home_city,
t.city as transaction_city
from accounts a
join transactions t
on a.account_id = t.account_id
where a.city <> t.city;
```

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Q9 : Merchants with High Refund Rates

```
select m.merchant_id, m.merchant_name,
(sum(case when t.txn_type = 'refund' then 1 end) * 100.0 /
count(*)) as refund_rate
from transactions t
join merchants m on t.merchant_id = m.merchant_id
group by m.merchant_id, m.merchant_name
order by refund_rate desc;
```

Query Group 5: Refund & Risk Behavior

Query 10 : Accounts with Many Refunds but Few Purchases

```
select account_id,
sum(case when txn_type = 'refund' then 1
end) as refund_count,
sum(case when txn_type = 'debit' then 1
end) as purchase_count
from transactions
group by account_id
having refund_count > 3 and
purchase_count < 5;
```

Query 11 : Night-Time Transactions (>₹5000 between 12AM-5AM)

```
select txn_id, account_id, amount,
txn_date, hour(txn_date) as txn_hour
from transactions
where hour(txn_date) between 0 and 5 and
amount > 5000
order by amount desc;
```

Query Group 6: Merchant Category Risk Analysis

```
select merchant_category,
sum(amount) as total_amount,
avg(amount) as avg_ticket_size,
(sum(case when is_fraud = 1 then 1 end) * 100.0 / count(*)) as
fraud_percentage
from transactions t
join merchants m on t.merchant_id = m.merchant_id
group by merchant_category
order by total_amount desc;
```

Key Skills Used

- Multi-table JOINs for connecting accounts, merchants, and transactions
- Window logic (avg × 3 comparison for anomaly detection)
- Fraud analysis using conditional calculations
- Segmentation logic (high-spenders, high-refund accounts, diversified spenders)
- Geolocation mismatch detection (home city vs transaction city)
- Merchant-level risk scoring (refund %, fraud %, high-value deviations)

CONCLUSION

Day 3 provided hands-on experience with financial transaction analytics, From detecting abnormal refund patterns to identifying high-risk cities and night-time high-value transactions, the analysis reflects the type of metrics used in fraud detection, compliance, and customer risk profiling.

31 DAYS OF MYSQL, DATA DECEMBER

THANK *You!*

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