NEW-WHEELS

QUARTERLY REPORT

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Problem Statement

Business Context

- A lot of people in the world share a common desire: to own a vehicle. A car or an automobile is seen as an object that gives the freedom of mobility. Many now prefer pre-owned vehicles because they come at an affordable cost, but at the same time, they are also concerned about whether the after-sales service provided by the resale vendors is as good as the care you may get from the actual manufacturers. New-Wheels, a vehicle resale company, has launched an app with an end-to-end service from listing the vehicle on the platform to shipping it to the customer's location. This app also captures the overall after-sales feedback given by the customer.

Objective

- New-Wheels sales have been dipping steadily in the past year, and due to the critical customer feedback and ratings online, there has been a drop in new customers every quarter, which is concerning to the business. The CEO of the company now wants a quarterly report with all the key metrics sent to him so he can assess the health of the business and make the necessary decisions.
- As a data analyst, you see that there is an array of questions that are being asked at the leadership level that need to be answered using data. Import the dump file that contains various tables that are present in the database. Use the data to answer the questions posed and create a quarterly business report for the CEO.

Data Description

shipper_id: Unique ID of the Shipper
shipper_name: Name of the Shipper
shipper_contact_details: Contact detail of the Shipper
product_id: Unique ID of the Product
vehicle_maker: Vehicle Manufacturing company
vehicle_model: Vehicle model name
vehicle_color: Color of the Vehicle
vehicle_model_year: Year of Manufacturing
vehicle_price: Price of the Vehicle
quantity: Ordered Quantity
customer_id: Unique ID of customer
customer_name: Name of the customer
gender: Gender of the customer
job_title: Job Title of the customer
phone_number: Contact detail of the customer
email_address: Email address of the customer
city: Residing city of the customer
country: Residing country of the customer
state: Residing state of the customer
customer_address: Address of the customer

Data Description

order_date: Date on which customer ordered the vehicle

order_id: Unique ID of the order

ship_date: Shipment Date

ship_mode: Shipping Mode/Class

shipping: Shipping Ways

postal_code: Postal Code of the customer

discount: Discount given to the customer for the particular order by credit card in percentage

credit_card_type: Credit Card Type

credit_card_type: Credit Card Type

credit_card_number: Credit card number

customer_feedback: Feedback of the customer

quarter_number : Quarter Number

Business Questions

Question 1

Find the total number of customers who have placed orders. What is the distribution of the customers across states?

Solution Query:

```
SELECT
    c.STATE,
    COUNT(DISTINCT o.CUSTOMER_ID) AS
NUM_CUSTOMERS,
    (SELECT COUNT(DISTINCT CUSTOMER_ID) FROM
order_t) AS TOTAL_CUSTO_ORDERS
FROM customer_t c
JOIN order_t o USING(CUSTOMER_ID)
GROUP BY c.STATE
ORDER BY c.STATE;
```

Output:

Result: Passed

Query 1

Query:

```
SELECT
    c.STATE,
    COUNT(DISTINCT o.CUSTOMER_ID) AS NUM_CUSTOMERS,
    (SELECT COUNT(DISTINCT CUSTOMER_ID) FROM order_t) AS TOTAL_CUSTO_ORDERS
FROM customer_t c
JOIN order_t o USING(CUSTOMER_ID)
GROUP BY c.STATE
ORDER BY c.STATE
```

Output:

Showing first 10 rows out of 49 rows:

state	NUM_CUSTOMERS	TOTAL_CUSTO_ORDERS
Alabama	29	994
Alaska	10	994
Arizona	26	994
Arkansas	6	994
California	97	994
Colorado	33	994
Connecticut	22	994
Delaware	6	994
District of Columbia	35	994
Florida	86	994

Figure 1: The distribution of the customers across states

Observations and Insights:

🔹 Total Customers

A total of 994 distinct customers have placed at least one order.

🔹 Distribution Across States

- Top States by Customer Count:
  - California (97) and Texas (97) have the highest number of customers, making them the leading contributors.
  - Florida (86) and New York (69) follow, showing strong representation.
- Mid-range States:
  - States like District of Columbia (35), Colorado (33), and Ohio (33) fall in the mid-tier.
  - Several other states, such as Alabama, Washington, Arizona, Illinois, Pennsylvania, Virginia, and Missouri, range between 20–30 customers.
- Lower Representation States:
  - A long tail of states (e.g., Kentucky, Wisconsin, Idaho, Oregon, Nebraska) have fewer than 10 customers each.
  - The least represented are Maine, Vermont, and Wyoming, with only 1 customer each.

Observations and Insights:

- Insights

1. Customer Concentration: Nearly 20% of total customers are concentrated in just California and Texas (194 combined).
2. Regional Skew: Strong representation is seen in large/populous states (CA, TX, FL, NY), which aligns with expected market size.
3. Opportunities: States with low customer counts (e.g., Maine, Vermont, Wyoming) may present opportunities for targeted marketing or expansion.
4. Balanced Spread: While there's concentration in top states, there is still broad geographic coverage with customers present across all 50 states (plus DC).

Business Questions

Question 2

Which are the top 5 vehicle makers preferred by the customers?

Solution Query:

```
SELECT p.VEHICLE_MAKER,
      COUNT(DISTINCT o.CUSTOMER_ID) AS num_customers
FROM order_t o
JOIN product_t p
  ON o.PRODUCT_ID = p.PRODUCT_ID
JOIN customer_t c
  ON o.CUSTOMER_ID = c.CUSTOMER_ID
GROUP BY p.VEHICLE_MAKER
ORDER BY num_customers DESC
LIMIT 5;
```

Output:

Query 1

Query:

```
SELECT p.VEHICLE_MAKER,
      COUNT(DISTINCT o.CUSTOMER_ID) AS num_customers
FROM order_t o
JOIN product_t p
  ON o.PRODUCT_ID = p.PRODUCT_ID
JOIN customer_t c
  ON o.CUSTOMER_ID = c.CUSTOMER_ID
GROUP BY p.VEHICLE_MAKER
ORDER BY num_customers DESC
LIMIT 5
```

Output:

Showing 5 rows

vehicle_maker	num_customers
Chevrolet	83
Ford	63
Toyota	52
Pontiac	50
Dodge	50

Figure 2: The top 5 vehicle makers preferred by the customers

Observations and Insights:

🔹 Top 5 Vehicle Makers Preferred by Customers

1. Chevrolet → 83 customers
2. Ford → 63 customers
3. Toyota → 52 customers
4. Dodge → 50 customers
5. Pontiac → 50 customers

🔹 Insights:

- Chevrolet is the clear leader, with a strong preference (20+ more customers than the next brand).
- Ford and Toyota hold solid positions as the 2nd and 3rd most popular choices.
- Dodge and Pontiac are tied in 4th/5th place, showing similar popularity among customers.

The distribution suggests a preference toward American automakers (Chevrolet, Ford, Dodge, Pontiac), with Toyota being the only major non-U.S. brand in the top 5.

Business Questions

Question 3

Which is the most preferred vehicle maker in each state?

Solution Query:

```
SELECT *
FROM (
   SELECT
      C.STATE,
      P.VEHICLE_MAKER,
      COUNT(DISTINCT O.CUSTOMER_ID) AS
num_customers,
      RANK() OVER (
         PARTITION BY C.STATE
         ORDER BY COUNT(DISTINCT O.CUSTOMER_ID) DESC
      ) AS CAR_rank
   FROM order_t O
   JOIN customer_t C ON O.CUSTOMER_ID =
C.CUSTOMER_ID
   JOIN product_t P ON P.PRODUCT_ID = O.PRODUCT_ID
   GROUP BY C.STATE, P.VEHICLE_MAKER
) AS ranked_CAR
WHERE CAR_rank = 1
ORDER BY STATE;
```

Output:

Query 1

Query:

```
SELECT p.VEHICLE_MAKER,
      COUNT(DISTINCT o.CUSTOMER_ID) AS num_customers
FROM order_t o
JOIN product_t p
  ON o.PRODUCT_ID = p.PRODUCT_ID
JOIN customer_t c
  ON o.CUSTOMER_ID = c.CUSTOMER_ID
GROUP BY p.VEHICLE_MAKER
ORDER BY num_customers DESC
LIMIT 5
```

Output:

Showing 5 rows

vehicle_maker	num_customers
Chevrolet	83
Ford	63
Toyota	52
Pontiac	50
Dodge	50

Figure 3: The most preferred vehicle maker in each state

Observations and Insights:

🔹 Most Preferred Vehicle Maker in Each State

- In some states, one vehicle maker clearly stands out (e.g., Texas → Chevrolet (9 customers), Florida → Toyota (7 customers), Ohio → Chevrolet (6 customers)).
- In other states, multiple makers are tied for the top spot (e.g., California has 5 makers tied with 6 customers each; Arizona has Cadillac and Pontiac both with 3).
- This happens because the ranking query returns all brands that share the highest count per state.

🔹 Key Observations

1. Chevrolet dominates many states, especially in the Midwest and South (Texas, Colorado, Ohio, Missouri, Washington).
2. Toyota is strongest in Florida, New York, Pennsylvania, Oregon, showing its popularity on the East Coast and West Coast.
3. Ford shows strength in states like Maryland, Michigan, Virginia, reflecting its traditional dominance in these regions.
4. Some smaller states have diverse ties (e.g., Arkansas has Chevrolet, GMC, Mitsubishi, Pontiac, Suzuki, Volkswagen all tied with 1 each).
5. In luxury segments, Mercedes-Benz, Maserati, BMW appear in smaller numbers but are the top in a few states (e.g., Maine → Mercedes-Benz, Connecticut → Maserati/Mercury/Volvo).

Observations and Insights:

🔹 Insights

- Regional Preferences:
  - American brands (Chevrolet, Ford, Dodge, Pontiac) dominate across many states.
  - Toyota emerges as the strongest foreign competitor with consistent top rankings in several states.
- Market Fragmentation:
  - Many states have ties, indicating a spread-out preference rather than a single dominant brand.
  - Smaller states (Vermont, Wyoming, Maine) show only one customer for a given brand, suggesting limited data representation.
- Opportunities:
  - Automakers could target states where they are not the top choice but have close competition (e.g., Ford in California tied with 4 others, Toyota in New York tied with Pontiac).

Question 4

Find the overall average rating given by the customers.
What is the average rating in each quarter?

Solution Query:

```
SELECT
   QUARTER_NUMBER,
   AVG(RATING) AS AVG_RATING_PER_QUARTER,
   (
      SELECT AVG(
         CASE
            WHEN CUSTOMER_FEEDBACK = 'Very Bad' THEN 1
            WHEN CUSTOMER_FEEDBACK = 'Bad' THEN 2
            WHEN CUSTOMER_FEEDBACK = 'Okay' THEN 3
            WHEN CUSTOMER_FEEDBACK = 'Good' THEN 4
            WHEN CUSTOMER_FEEDBACK = 'Very Good' THEN
5
         END
      )
      FROM order_t
   ) AS OVERALL_RATING
```

```
FROM (
   SELECT
      QUARTER_NUMBER,
      CASE
         WHEN CUSTOMER_FEEDBACK = 'Very Bad' THEN 1
         WHEN CUSTOMER_FEEDBACK = 'Bad' THEN 2
         WHEN CUSTOMER_FEEDBACK = 'Okay' THEN 3
         WHEN CUSTOMER_FEEDBACK = 'Good' THEN 4
         WHEN CUSTOMER_FEEDBACK = 'Very Good' THEN 5
      END AS RATING
   FROM order_t
) AS ratings
GROUP BY QUARTER_NUMBER
ORDER BY QUARTER_NUMBER;
```

Output:

Result: Passed

Query 1

Query:

```
SELECT
   QUARTER_NUMBER,
   AVG(RATING) AS AVG_RATING_PER_QUARTER,
   (
      SELECT AVG(
         CASE
            WHEN CUSTOMER_FEEDBACK = 'Very Bad' THEN 1
            WHEN CUSTOMER_FEEDBACK = 'Bad' THEN 2
            WHEN CUSTOMER_FEEDBACK = 'Okay' THEN 3
            WHEN CUSTOMER_FEEDBACK = 'Good' THEN 4
            WHEN CUSTOMER_FEEDBACK = 'Very Good' THEN 5
         END
      )
      FROM order_t
   ) AS OVERALL_RATING
FROM (
   SELECT
      QUARTER_NUMBER,
      CASE
         WHEN CUSTOMER_FEEDBACK = 'Very Bad' THEN 1
         WHEN CUSTOMER_FEEDBACK = 'Bad' THEN 2
         WHEN CUSTOMER_FEEDBACK = 'Okay' THEN 3
         WHEN CUSTOMER_FEEDBACK = 'Good' THEN 4
         WHEN CUSTOMER_FEEDBACK = 'Very Good' THEN 5
      END AS RATING
   FROM order_t
) AS ratings
GROUP BY QUARTER_NUMBER
ORDER BY QUARTER_NUMBER
```

Output:

Showing 4 rows

QUARTER_NUMBER	AVG_RATING_PER_QU...	OVERALL_RATING
1	3.554838709677419	3.135
2	3.354961832061069	3.135
3	2.9563318777292578	3.135
4	2.3969849246231156	3.135

Figure 4: The average rating in each quarter

Observations and Insights:

🔹 Overall Average Rating

- 3.135 (calculated across all customers and all quarters).

🔹 Average Rating per Quarter

- Q1: 3.5548 (highest)
- Q2: 3.3550
- Q3: 2.9563
- Q4: 2.3970 (lowest)

🔹 Insights

1. Declining Trend: Ratings start high in Q1 and Q2 (above the overall average) but drop significantly in Q3 and Q4.
2. Satisfaction Issue: The sharp decline (from 3.55 → 2.39) suggests customer dissatisfaction increases over time.

Action Point: Investigate possible reasons for the decline (e.g., product quality, delays, service issues) especially in the later quarters.

Question 5

Find the percentage distribution of feedback from the customers. Are customers getting more dissatisfied over time?

Solution Query:

```
SELECT
   ((CAST(strftime('%m', ORDER_DATE) AS INT) - 1) / 3 + 1)
AS QUARTER_NUMBER,
   100.0 * SUM(CASE WHEN CUSTOMER_FEEDBACK = 'Very
Bad' THEN 1 ELSE 0 END) / COUNT(*) AS PCT_VERY_BAD,
   100.0 * SUM(CASE WHEN CUSTOMER_FEEDBACK = 'Bad'
THEN 1 ELSE 0 END) / COUNT(*) AS PCT_BAD,
   100.0 * SUM(CASE WHEN CUSTOMER_FEEDBACK =
'Okay' THEN 1 ELSE 0 END) / COUNT(*) AS PCT_OKAY,
   100.0 * SUM(CASE WHEN CUSTOMER_FEEDBACK =
'Good' THEN 1 ELSE 0 END) / COUNT(*) AS PCT_GOOD,
   100.0 * SUM(CASE WHEN CUSTOMER_FEEDBACK = 'Very
Good' THEN 1 ELSE 0 END) / COUNT(*) AS
PCT_VERY_GOOD
FROM order_t
WHERE ORDER_DATE IS NOT NULL
GROUP BY QUARTER_NUMBER
ORDER BY QUARTER_NUMBER;
```

Output:

Query 1

Query:

```
SELECT
   ((CAST(strftime('%m', ORDER_DATE) AS INT) - 1) / 3 + 1) AS QUARTER_NUMBER,
   100.0 * SUM(CASE WHEN CUSTOMER_FEEDBACK = 'Very Bad' THEN 1 ELSE 0 END) / COUNT(*) AS PCT_VERY_BAD,
   100.0 * SUM(CASE WHEN CUSTOMER_FEEDBACK = 'Bad' THEN 1 ELSE 0 END) / COUNT(*) AS PCT_BAD,
   100.0 * SUM(CASE WHEN CUSTOMER_FEEDBACK = 'Okay' THEN 1 ELSE 0 END) / COUNT(*) AS PCT_OKAY,
   100.0 * SUM(CASE WHEN CUSTOMER_FEEDBACK = 'Good' THEN 1 ELSE 0 END) / COUNT(*) AS PCT_GOOD,
   100.0 * SUM(CASE WHEN CUSTOMER_FEEDBACK = 'Very Good' THEN 1 ELSE 0 END) / COUNT(*) AS PCT_VERY_GOOD
FROM order_t
WHERE ORDER_DATE IS NOT NULL
GROUP BY QUARTER_NUMBER
ORDER BY QUARTER_NUMBER
```

Output:

Showing 4 rows

QUARTER_NUMBER	PCT_VERY_BAD	PCT_BAD	PCT_OKAY	PCT_GOOD	PCT_VERY_GOOD
1	10.96774193548387	11.290322580645162	19.032258064516128	28.70967741935484	30
2	14.885496183206106	14.122137404580153	20.229007633587788	22.137404580152673	28.625954198473284
3	17.903930131004365	22.707423580786028	21.83406113537118	20.96069868995633	16.593886462882097
4	30.65326633165829	29.14572864321608	20.100502512562816	10.050251256281408	10.050251256281408

Figure 5: The percentage distribution of feedback from the customers.

Observations and Insights:

🔹 Observations

1. Early Quarters (Q1 & Q2):
    - Positive feedback dominates (Good + Very Good ≈ 59% in Q1 and 51% in Q2).
    - Dissatisfaction (Very Bad + Bad) is relatively low (~22% in Q1, ~29% in Q2).
2. Mid Quarters (Q3):
    - Dissatisfaction rises sharply (~41% dissatisfied) while “Very Good” ratings drop to 16.6%.
    - Neutral “Okay” feedback increases slightly.
3. Q4 – Sharp Decline:
    - Very Bad + Bad combined = ~60%, the highest dissatisfaction level.
    - “Very Good” plummets to just 10%.
    - Positive feedback (Good + Very Good) falls below 21% total.

🔹 Insights

- Customers are indeed getting more dissatisfied over time.
- Satisfaction peaked in Q1 (59% positive) but dropped drastically by Q4 (only ~20% positive).
- Dissatisfaction doubled from 22% in Q1 → 60% in Q4.
- This downward trend suggests serious issues in later quarters — possibly due to declining service quality, delivery delays, or product issues.

Question 6

What is the trend of the number of orders by quarter?

Solution Query:

```
SELECT
  QUARTER_NUMBER,
  COUNT(ORDER_ID) AS TOTAL_ORDERS
FROM order_t
GROUP BY QUARTER_NUMBER
ORDER BY QUARTER_NUMBER;
```

Output:

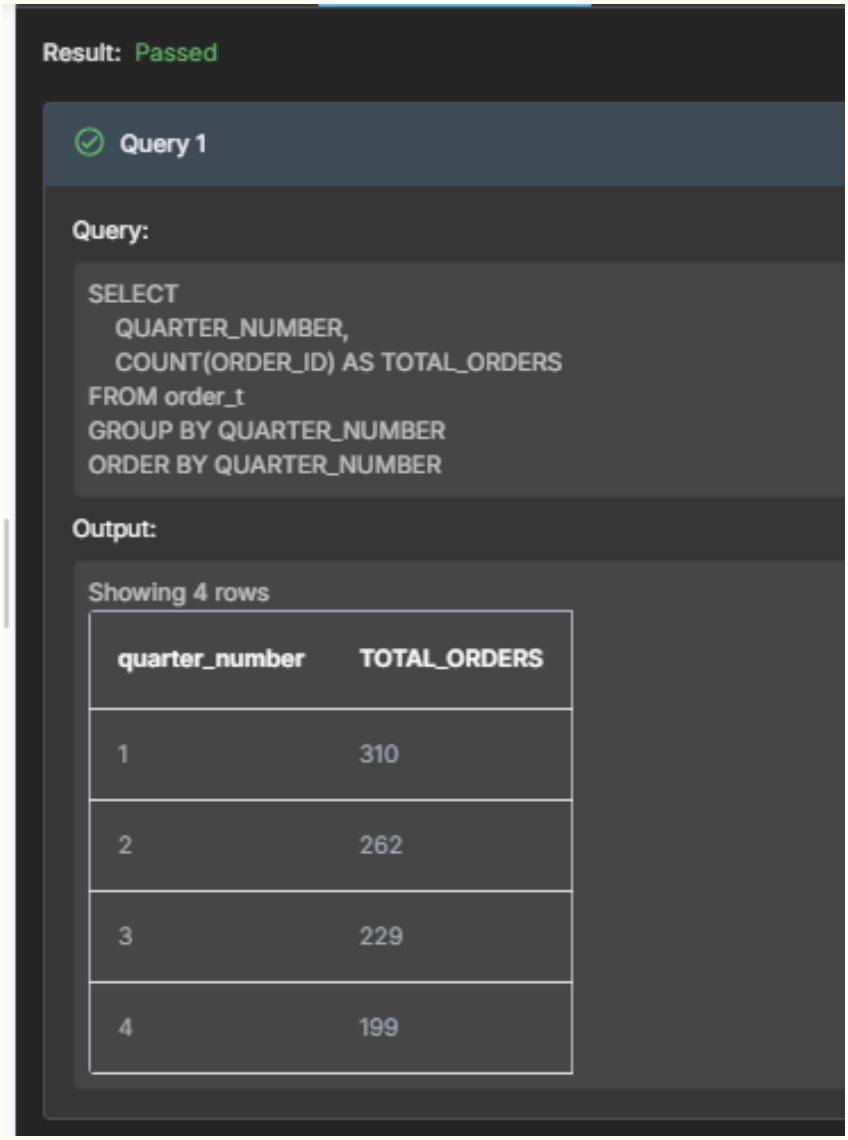

Figure 6: The trend of the number of orders by quarter

Observations and Insights:

🔹 Observations

1. Steady Decline:
    - Orders are falling every quarter.
    - Q1 → Q2: ↓ 48 orders (15% drop).
    - Q2 → Q3: ↓ 33 orders (12.6% drop).
    - Q3 → Q4: ↓ 30 orders (13.1% drop).
2. Overall Decline:
    - From Q1 (310) to Q4 (199), total orders dropped by 111 orders (~36% decrease).

🔹 Insights

- The trend clearly shows a consistent decline in customer orders quarter after quarter.
- This aligns with the earlier dissatisfaction trend (more “bad” feedback over time). As customers become less satisfied, they are also placing fewer orders.

Question 7

Calculate the net revenue generated by the company.
What is the quarter-over-quarter % change in net revenue?

Solution Query:

```
SELECT
   QUARTER_NUMBER,
   NET_REVENUE,
   LAG(NET_REVENUE) OVER (ORDER BY
QUARTER_NUMBER) AS PREV_REVENUE,
   CASE
      WHEN LAG(NET_REVENUE) OVER (ORDER BY
QUARTER_NUMBER) IS NULL
         OR LAG(NET_REVENUE) OVER (ORDER BY
QUARTER_NUMBER) = 0
      THEN NULL
      ELSE ROUND(
        ((NET_REVENUE - LAG(NET_REVENUE) OVER (ORDER
BY QUARTER_NUMBER))
          * 100.0 / LAG(NET_REVENUE) OVER (ORDER BY
QUARTER_NUMBER)), 2
      )
   END AS QOQ_PERCENT_CHANGE
FROM ( SELECT
      QUARTER_NUMBER,
      SUM(QUANTITY * (VEHICLE_PRICE - DISCOUNT)) AS
NET_REVENUE
   FROM order_t
   GROUP BY QUARTER_NUMBER) AS revenue_per_quarter
ORDER BY QUARTER_NUMBER;
```

Output:

Result: Passed

Query 1

Query:

```
SELECT
    QUARTER_NUMBER,
    NET_REVENUE,
    LAG(NET_REVENUE) OVER (ORDER BY QUARTER_NUMBER) AS PREV_REVENUE,
    CASE
        WHEN LAG(NET_REVENUE) OVER (ORDER BY QUARTER_NUMBER) IS NULL
            OR LAG(NET_REVENUE) OVER (ORDER BY QUARTER_NUMBER) = 0
        THEN NULL
        ELSE ROUND(
            ((NET_REVENUE - LAG(NET_REVENUE) OVER (ORDER BY QUARTER_NUMBER))
             * 100.0 / LAG(NET_REVENUE) OVER (ORDER BY QUARTER_NUMBER)), 2
        )
    END AS QOQ_PERCENT_CHANGE
FROM (
    SELECT
        QUARTER_NUMBER,
        SUM(QUANTITY * (VEHICLE_PRICE - DISCOUNT)) AS NET_REVENUE
    FROM order_t
    GROUP BY QUARTER_NUMBER
) AS revenue_per_quarter
ORDER BY QUARTER_NUMBER
```

Output:

Showing 4 rows

QUARTER_NUMBER	NET_REVENUE	PREV_REVENUE	QOQ_PERCENT_CHAN...
1	39637378.160000026		
2	32913497.43999998	39637378.160000026	-16.96
3	29435188.489999995	32913497.43999998	-10.57
4	23495814.140000004	29435188.489999995	-20.18

Figure 7: The quarter-over-quarter % change in net revenue

Observations and Insights:

🔹 Net Revenue by Quarter

- Q1: $ 39,637,378.16
- Q2: $ 32,913,497.44 (↓ 16.96% from Q1)
- Q3: $ 29,435,188.49 (↓ 10.57% from Q2)
- Q4: $ 23,495,814.14 (↓ 20.18% from Q3)

🔹 Total Net Revenue

39,637,378.16+32,913,497.44+29,435,188.49+23,495,814.14 =125,481,878.2339,637,378.16 + 32,913,497.44 + 29,435,188.49 + 23,495,814.14 = 125,481,878.2339,637,378.16+32,913,497.44+29,435,188.49 +23,495,814.14=125,481,878.23

Total Net Revenue (Year): $ 125,481,878.23

🔹 Observations

1. Continuous Decline: Revenue drops every quarter.
   - Largest drop: Q4 (-20.18%)
   - Smallest drop: Q3 (-10.57%)
2. Annual Trend:
   - Q1 was the strongest quarter.
   - By Q4, revenue fell by ~41% compared to Q1.
3. Possible Cause:
   - Matches earlier findings: customer dissatisfaction increased → orders decreased → revenue declined.

🔹 Insight:

The company generated $125.5M in revenue across the year, but the sharp decline in orders and rising dissatisfaction is causing significant quarter-over-quarter revenue losses.

Question 8

What is the trend of net revenue and orders by quarters? [

Solution Query:

```
SELECT
   QUARTER_NUMBER,
   SUM(QUANTITY * (VEHICLE_PRICE - DISCOUNT)) AS
NET_REVENUE,
   COUNT(ORDER_ID) AS TOTAL_ORDERS
FROM order_t
GROUP BY QUARTER_NUMBER
ORDER BY QUARTER_NUMBER;
```

Output:

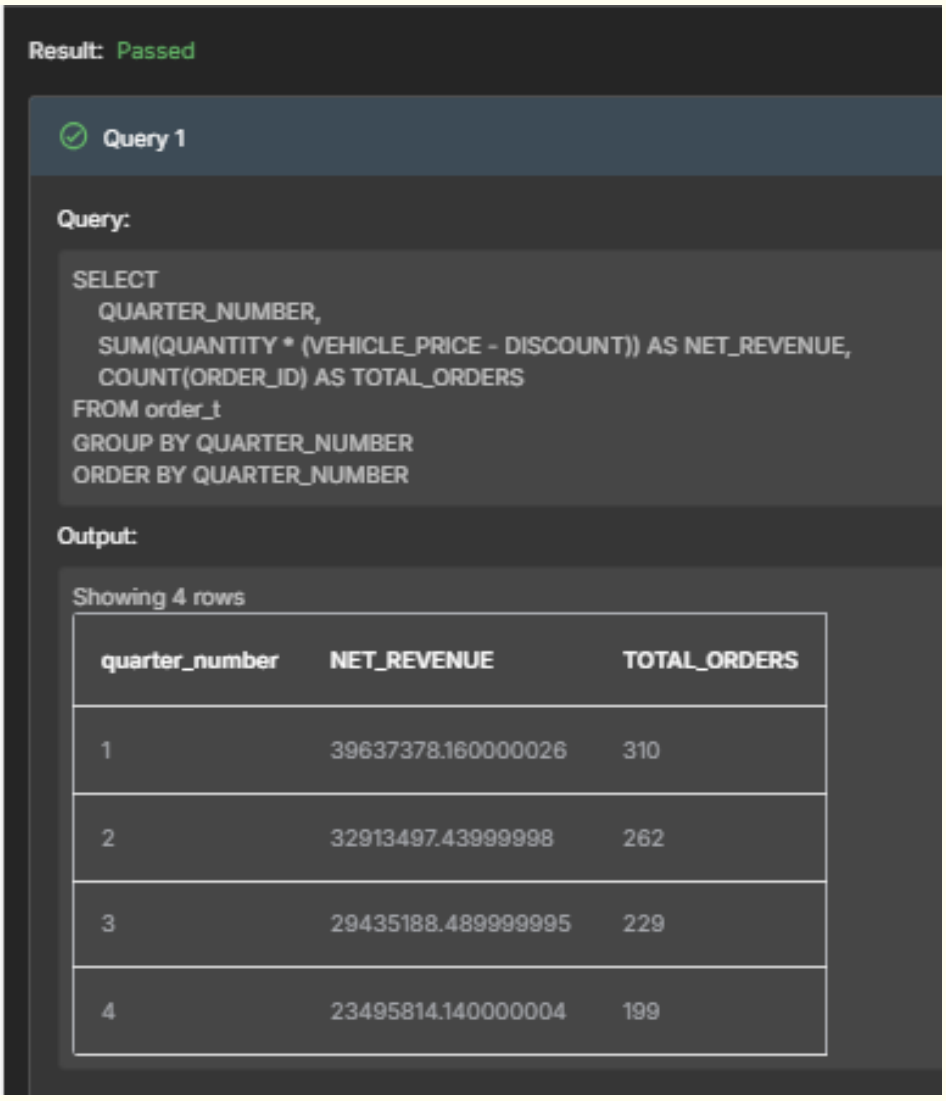

Figure 8: The trend of net revenue and orders by quarters

Observations and Insights:

🔹 Trend Analysis

1. Orders Trend
    - Orders consistently decline each quarter (310 → 199).
    - Drop from Q1 to Q4 = -36%.
2. Revenue Trend
    - Revenue also declines quarter by quarter ($39.6M → $23.5M).
    - Drop from Q1 to Q4 = -41%.
3. Correlation
    - Fewer orders directly lead to lower net revenue.
    - The decline in customer satisfaction (as seen earlier in feedback and ratings) seems to drive this downward spiral.

🔹 Insights

- Q1: Peak performance (highest revenue & orders).
- Q2 → Q4: Continuous fall in both orders and revenue.
- By Q4: Business performance weakened significantly.

Conclusion: Both orders and revenue are trending downward quarter-over-quarter, with Q4 showing the steepest decline.

Question 9

What is the average discount offered for different types of credit cards?

Solution Query:

```
SELECT
    c.CREDIT_CARD_TYPE,
    ROUND(AVG(o.DISCOUNT), 2) AS AVG_DISCOUNT
FROM order_t o
JOIN customer_t c
    ON o.CUSTOMER_ID = c.CUSTOMER_ID
GROUP BY c.CREDIT_CARD_TYPE
ORDER BY AVG_DISCOUNT DESC;
```

Output:

Result: Passed

Query 1

Query:

```
SELECT
    c.CREDIT_CARD_TYPE,
    ROUND(AVG(o.DISCOUNT), 2) AS AVG_DISCOUNT
FROM order_t o
JOIN customer_t c
    ON o.CUSTOMER_ID = c.CUSTOMER_ID
GROUP BY c.CREDIT_CARD_TYPE
ORDER BY AVG_DISCOUNT DESC
```

Output:

Showing first 10 rows out of 16 rows

credit_card_type	AVG_DISCOUNT
laser	0.64
mastercard	0.63
visa-electron	0.62
maestro	0.62
instapayment	0.62
china-unionpay	0.62
americanexpress	0.62
switch	0.61
jcb	0.61
diners-club-us-ca	0.61

Figure 9: The average discount offered for different types of credit cards

Observations and Insights:

- Insights
  1. Highest discount → Laser (0.64).
  2. Most popular cards (Visa, Mastercard, Amex) are middle of the range (0.60–0.63).
  3. Lowest discount → Diners Club International (0.58).
  4. The overall discount variation is quite small (0.58 – 0.64), meaning customers across card types receive fairly similar discounts.

Conclusion: Discounts don’t vary drastically by card type, but Laser, Mastercard, and Visa-Electron offer slightly better average discounts compared to Visa and Diners Club cards.

Question 10

What is the average time taken to ship the placed orders for each quarter?

Solution Query:

```
SELECT
  ((CAST(strftime('%m', ORDER_DATE) AS INT) - 1) / 3 + 1) AS
QUARTER_NUMBER,
  ROUND(AVG(julianday(SHIP_DATE) -
julianday(ORDER_DATE)), 2) AS AVG_SHIPPING_DAYS
FROM order_t
WHERE SHIP_DATE IS NOT NULL
 AND ORDER_DATE IS NOT NULL
 AND SHIP_DATE >= ORDER_DATE
GROUP BY QUARTER_NUMBER
ORDER BY QUARTER_NUMBER;
```

Output:

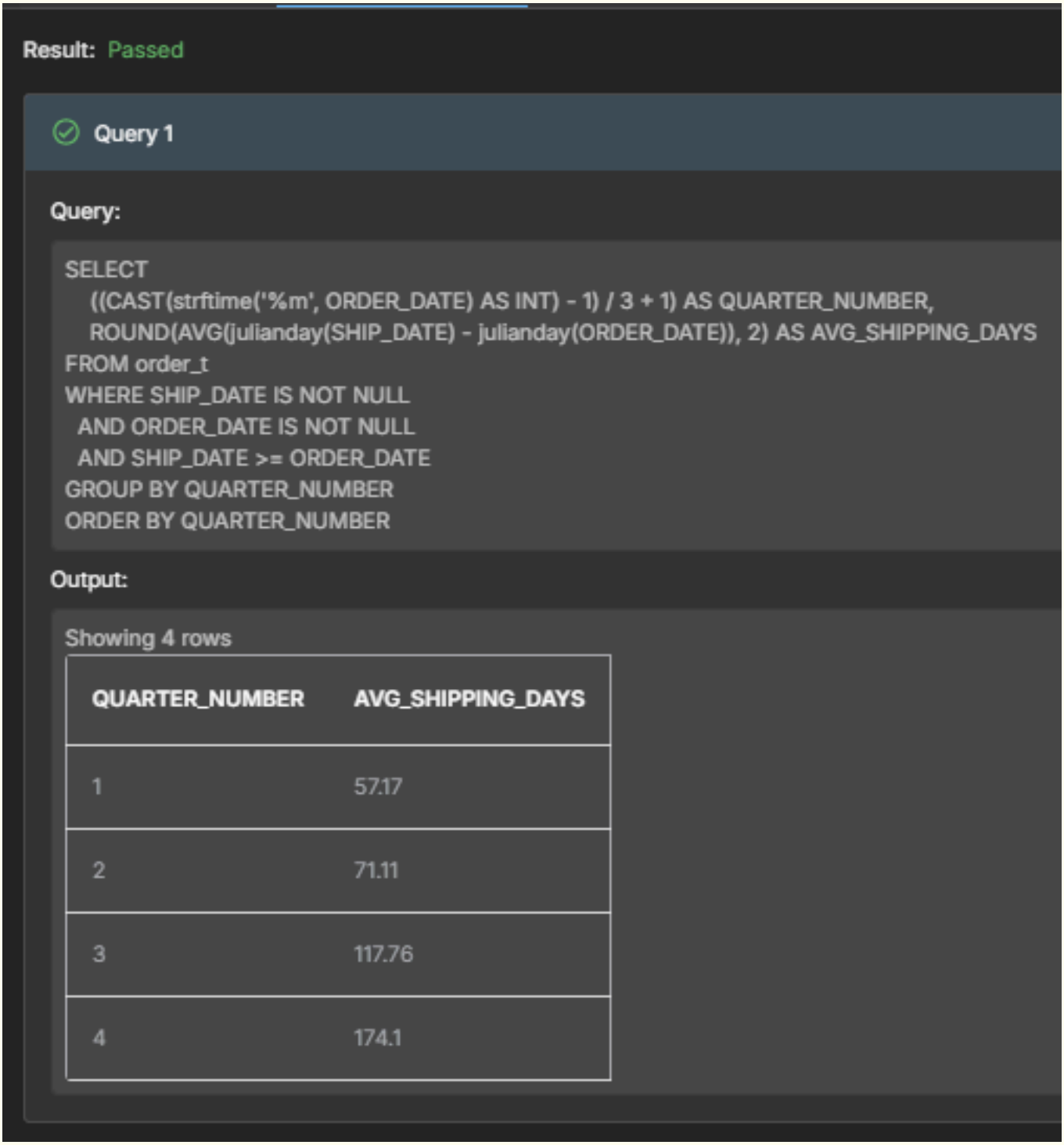

Figure 10: The average time taken to ship the placed orders for each quarter

Observations and Insights:

🔹 **Insights**

1. Shipping times are increasing steadily every quarter.
    - Q1 → Q2: increase of ~14 days
    - Q2 → Q3: sharp rise of ~47 days
    - Q3 → Q4: another big jump of ~56 days
2. By Q4, the average shipping time has tripled compared to Q1 (174 vs. 57 days).
3. This trend shows declining operational efficiency or possible supply chain/logistics issues as the year progresses.

🔹 **Conclusion**: Orders are taking significantly longer to ship each quarter, indicating worsening performance. This could negatively impact customer satisfaction and repeat business if not addressed.

Business Metrics Overview

Metric	Value
Total Revenue	**$ 125,481,878.23** (sum of all quarters: 39,637,378.16 + 32,913,497.44 + 29,435,188.49 + 23,495,814.14)
Total Orders	**1,000** (310 + 262 + 229 + 199)
Total Customers	**994**
Average Rating	3.14
Last Quarter Revenue (Q4)	$ 8573149.2806
Last Quarter Orders (Q4)	199
Average Days to Ship	98 Days
% Good Feedback (Q1–Q4 average)	**23.95%** (avg. of % Good = 28.71 + 22.14 + 20.96 + 10.05)

Business Recommendations

1. Revenue & Orders Declining Over Quarters

- Observation: Revenue dropped from 39.6M in Q1 → 23.5M in Q4 (−40%), and orders declined from 310 → 199.
- Recommendation:
  - Launch quarter-end promotions (festive discounts, bundle offers) to boost sales.
  - Strengthen customer loyalty programs (reward repeat customers with points/discounts).
  - Focus on retargeting inactive customers through email campaigns and personalized offers.
  - Explore new markets or channels (online partnerships, e-commerce platforms) to expand reach.

2. Customer Dissatisfaction Rising

- Observation: % of “Very Bad” and “Bad” feedback rose steadily (Q1: ~22% → Q4: ~60%). Positive feedback (“Good” & “Very Good”) dropped significantly.
- Recommendation:
  - Conduct root cause analysis (delayed shipping, product quality, pricing issues).
  - Set up customer support escalation mechanisms (chatbots, helplines) to resolve issues quickly.
  - Launch Voice of Customer (VoC) surveys each quarter to capture pain points directly.
  - Tie employee KPIs to customer satisfaction metrics.

3. Shipping Delays Are a Critical Issue

- Observation: Avg. shipping time increased from 57 days in Q1 → 174 days in Q4.
- Recommendation:
  - Reassess supply chain & logistics partners to improve delivery performance.
  - Implement inventory optimization (safety stock, demand forecasting).
  - Introduce regional warehouses to reduce last-mile delays.
  - Monitor order-to-delivery SLAs closely and penalize delays.

4. Credit Card Discounts Strategy

- Observation: Discounts across card types average around 0.6, with small differences.
- Recommendation:
  - Partner with banks/payment providers to create exclusive offers (e.g., “10% cashback on Visa orders in Q1”).
  - Rotate high-value promotions across different card types to attract diverse customer segments.
  - Track discount ROI (revenue uplift vs. cost of discount) to refine strategy.

5. Customer Distribution Across States

- Observation: Customer base is concentrated in California, Texas, Florida, and New York, with smaller states contributing very little.
- Recommendation:
  - Double down on top states with targeted marketing campaigns.
  - For low-revenue states, evaluate if expansion is worth the investment or focus on digital-only campaigns instead of physical presence.
  - Explore regional product preferences (e.g., specific vehicle makers are more popular in some states).

6. Vehicle Maker Preferences

- Observation: Top 5 brands (Chevrolet, Ford, Toyota, Dodge, Pontiac) dominate demand. Preferences vary by state.
- Recommendation:
  - Ensure better stock availability for these brands.
  - Build co-branding campaigns with top-performing vehicle makers.
  - For underperforming brands, negotiate better pricing/margins with suppliers.

7. Customer Retention & Engagement

- Observation: Overall customer base is strong (994 unique customers), but repeat orders are declining.
- Recommendation:
  - Launch a subscription/loyalty plan for regular customers.
  - Use personalized recommendations based on past orders.
  - Introduce gamification (milestones, referral rewards) to encourage repeat purchases.

8. Data-Driven Monitoring

- Recommendation:
  - Build a real-time dashboard tracking:
    - Revenue & orders trend
    - Shipping delays
    - Customer feedback sentiment
    - Discount effectiveness
  - Review metrics monthly instead of quarterly for faster corrective actions.

🔹 Summary:

- The business is experiencing declining revenue, orders, and rising dissatisfaction, primarily due to shipping delays and declining customer experience. Short-term actions should focus on supply chain fixes and customer support improvements, while medium-term strategies should focus on loyalty programs, targeted promotions, and state-wise expansion.