SQL

Coded Project

Business Report

DSBA – Course

Created by – Rishabh Gupta

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.
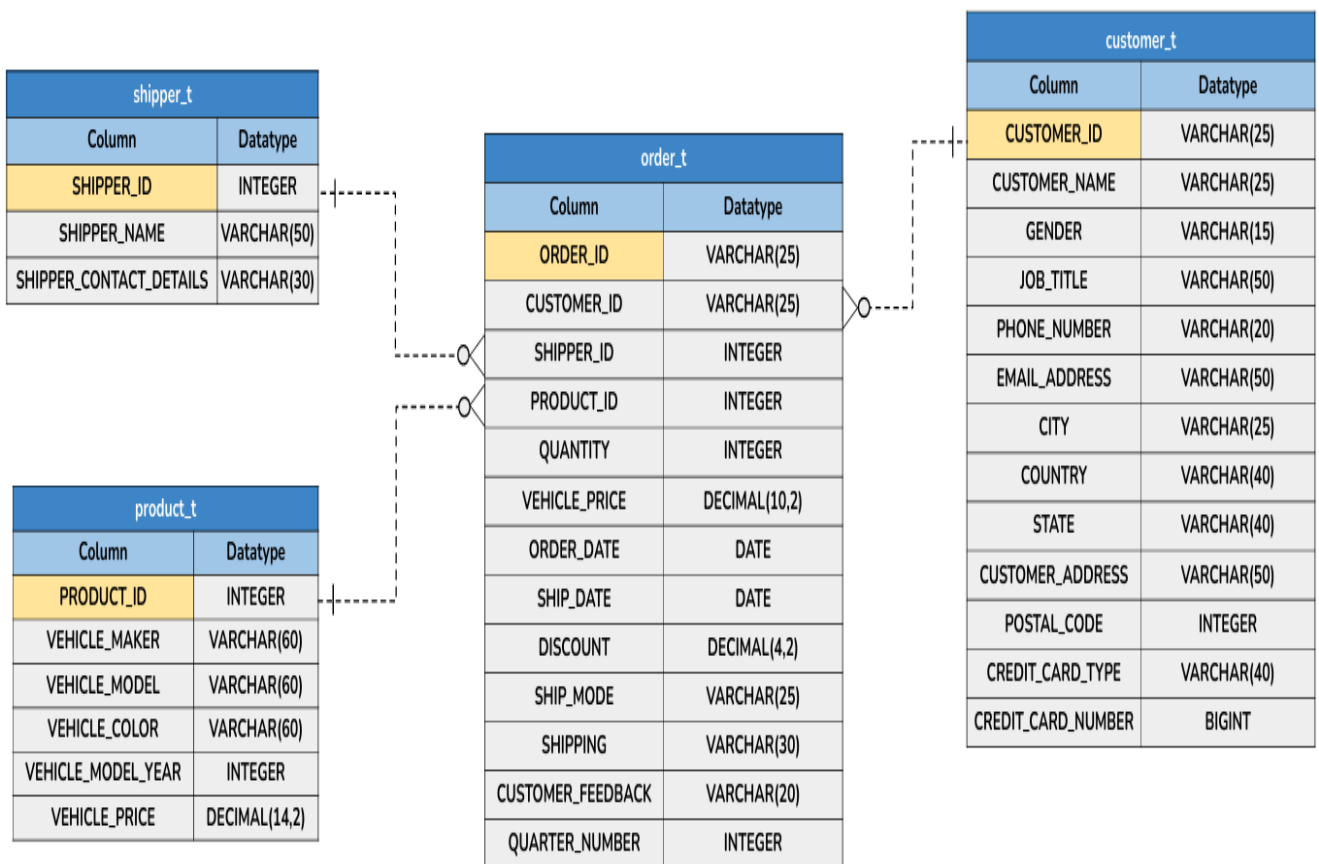
Data Description –

The data provided has

- Attributes on the vehicles New-Wheels sells - What are the make, model, and year? What is the price point?

- Attributes on the customers, such as where they live and payment methods

- Attributes on orders and shipments, such as when the order was shipped and received, what the after-sales feedback was, and so on.

The data dictionary (*New Wheels - Data Dictionary*) and the ER diagram (*New Wheels - ER Diagram*) are provided.

Entity Relationship Diagram -

shipper_t

Column	Datatype
SHIPPER_ID	INTEGER
SHIPPER_NAME	VARCHAR(50)
SHIPPER_CONTACT_DETAILS	VARCHAR(30)

order_t

Column	Datatype
ORDER_ID	VARCHAR(25)
CUSTOMER_ID	VARCHAR(25)
SHIPPER_ID	INTEGER
PRODUCT_ID	INTEGER
QUANTITY	INTEGER
VEHICLE_PRICE	DECIMAL(10,2)
ORDER_DATE	DATE
SHIP_DATE	DATE
DISCOUNT	DECIMAL(4,2)
SHIP_MODE	VARCHAR(25)
SHIPPING	VARCHAR(30)
CUSTOMER_FEEDBACK	VARCHAR(20)
QUARTER_NUMBER	INTEGER

product_t

Column	Datatype
PRODUCT_ID	INTEGER
VEHICLE_MAKER	VARCHAR(60)
VEHICLE_MODEL	VARCHAR(60)
VEHICLE_COLOR	VARCHAR(60)
VEHICLE_MODEL_YEAR	INTEGER
VEHICLE_PRICE	DECIMAL(14,2)

customer_t

Column	Datatype
CUSTOMER_ID	VARCHAR(25)
CUSTOMER_NAME	VARCHAR(25)
GENDER	VARCHAR(15)
JOB_TITLE	VARCHAR(50)
PHONE_NUMBER	VARCHAR(20)
EMAIL_ADDRESS	VARCHAR(50)
CITY	VARCHAR(25)
COUNTRY	VARCHAR(40)
STATE	VARCHAR(40)
CUSTOMER_ADDRESS	VARCHAR(50)
POSTAL_CODE	INTEGER
CREDIT_CARD_TYPE	VARCHAR(40)
CREDIT_CARD_NUMBER	BIGINT

New Wheels Data Dictionary:

1. shipper_id: Unique ID of the Shipper
2. shipper_name: Name of the Shipper
3. shipper_contact_details: Contact detail of the Shipper
4. product_id: Unique ID of the Product
5. vehicle_maker: Vehicle Manufacturing company name
6. vehicle_model: Vehicle model name
7. vehicle_color: Color of the Vehicle
8. vehicle_model_year: Year of Manufacturing
9. vehicle_price: Price of the Vehicle
10. quantity: Ordered Quantity
11. customer_id: Unique ID of the customer
12. customer_name: Name of the customer
13. gender: Gender of the customer
14. job_title: Job Title of the customer
15. phone_number: Contact detail of the customer
16. email_address: Email address of the customer
17. city: Residing city of the customer
18. country: Residing country of the customer
19. state: Residing state of the customer
20. customer_address: Address of the customer
21. order_date: Date on which customer ordered the vehicle
22. order_id: Unique ID of the order
23. ship_date: Shipment Date
24. ship_mode: Shipping Mode/Class
25. shipping: Shipping Ways
26. postal_code: Postal Code of the customer
27. discount: Discount given to the customer for the particular order by credit card in percentage
28. credit_card_type: Credit Card Type
29. credit_card_number: Credit card number
30. customer_feedback: Feedback of the customer
31. quarter_number : Quarter Number

Business Questions –

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

Solution: -

```
SELECT
    COUNT(DISTINCT customer_id) AS total_customers
FROM
    order_t;
-- Find the distribution of customers across states
SELECT
    state,
    COUNT(DISTINCT customer_id) AS customer_count
FROM
    customer_t
GROUP BY
    state
ORDER BY
    customer_count DESC;
```

<u>Output -</u>

Result: Passed

⊘ Query 1

Query:

```
SELECT
    COUNT(DISTINCT customer_id) AS total_customers
FROM
    order_t
```

Output:

Showing 1 rows

total_customers
994

Query 2

```
Query:
SELECT
    state,
    COUNT(DISTINCT customer_id) AS customer_count
FROM
    customer_t
GROUP BY
    state
ORDER BY
    customer_count DESC
```

Output:

Showing first 10 rows out of 49 rows

state	customer_count
Texas	97
California	97
Florida	86
New York	69
District of Columbia	35
Ohio	33
Colorado	33
Alabama	29
Washington	28
Arizona	26

Result Grid | Filter Rows:

state	customer_count
California	97
Texas	97
Florida	86
New York	69
District of Columbia	35
Colorado	33
Ohio	33
Alabama	29
Washington	28
Arizona	26
Illinois	25
Pennsylvania	25
Virginia	24
Missouri	23
Tennessee	23
Connecticut	22
Indiana	21
North Carolina	20
Louisiana	20
Georgia	18
Minnesota	17
Nevada	17

Screenshot form workbench

Observations –

- The query effectively counts the unique distributions of customers in each state, providing valuable insights into the customer distribution.

- There are total of 994 customers and they come across all 49 states.

- Texas and California appear to have the highest concentration of customers based on the initial 10 rows.

5

Question 2: Which are the top 5 vehicle makers preferred by the customers?

Solution: -

```
SELECT
    p.vehicle_maker,
    COUNT(o.order_id) AS total_orders
FROM
    order_t o
JOIN
    product_t p ON o.product_id = p.product_id
GROUP BY
    p.vehicle_maker
ORDER BY
    total_orders DESC
LIMIT 5;
```

Output -

Result: Passed

✓ Query 1

Query:

```
SELECT
    p.vehicle_maker,
    COUNT(o.order_id) AS total_orders
FROM
    order_t o
JOIN
    product_t p ON o.product_id = p.product_id
GROUP BY
    p.vehicle_maker
ORDER BY
    total_orders DESC
LIMIT 5
```

Output:

Showing 5 rows

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

```
1 •   SELECT
2         p.vehicle_maker,
3         COUNT(o.order_id) AS total_orders
4     FROM
5         order_t o
6     JOIN
7         product_t p ON o.product_id = p.product_id
8     GROUP BY
9         p.vehicle_maker
10    ORDER BY
11        total_orders DESC
12    LIMIT 5;
```

Result Grid | Filter Rows: | Export: | Wrap

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

Observations-

- **Market Dominance:** Chevrolet clearly leads in terms of customer preference with the highest number of orders.

- **Ford and Toyota:** These two well-known brands also have a significant market share.

- **Pontiac and Dodge:** While they have a smaller market share compared to the top three, they still have a considerable presence.

- **Customer Preference:** The results suggest that customers have a preference for these specific vehicle makers. This information can be valuable for various business decisions, such as inventory management, marketing strategies, and product development.

Question 3: Which is the most preferred vehicle maker in each state?

Solution: -

WITH StateVehicleRank AS (

 SELECT

c.state, p.vehicle_maker,

COUNT(o.customer_id) AS customer_count,

RANK() OVER (PARTITION BY c.state ORDER BY COUNT(o.customer_id) DESC) AS maker_rank

FROM customer_t c

INNER JOIN order_t o ON c.customer_id = o.customer_id

INNER JOIN product_t p ON o.product_id = p.product_id

GROUP BY p.vehicle_maker, c.state

)

SELECT vehicle_maker, state, customer_count

FROM StateVehicleRank

WHERE maker_rank = 1

ORDER BY customer_count DESC;

Output-

```
1    WITH StateVehicleRank AS (
2     SELECT
3     c.state, p.vehicle_maker,
4     COUNT(o.customer_id) AS customer_count,
5     RANK() OVER (PARTITION BY c.state ORDER BY COUNT(o.customer_id) DESC) AS maker_rank
6
7     FROM customer_t c
8     INNER JOIN order_t o ON c.customer_id = o.customer_id
9     INNER JOIN product_t p ON o.product_id = p.product_id
10
11    GROUP BY p.vehicle_maker, c.state
12    )
13
14    SELECT vehicle_maker, state, customer_count
15    FROM StateVehicleRank
16    WHERE maker_rank = 1
17    ORDER BY customer_count DESC;
```

Test Cases   Run SQL

Result: Passed

⊘ Query 1

vehicle_maker	state	customer_count
Chevrolet	Texas	9
Toyota	Florida	7
Ford	California	6
Dodge	California	6
Audi	California	6
Nissan	California	6
Chevrolet	California	6
Chevrolet	Ohio	6
Dodge	Alabama	5
Chevrolet	Colorado	5
Ford	Maryland	5
Toyota	New York	5
Pontiac	New York	5
Ford	Virginia	5
Chevrolet	Washing...	5
Chevrolet	District o...	4
Mazda	Indiana	4
Chevrolet	Missouri	4
Pontiac	Arizona	3
Cadillac	Arizona	3

vehicle_maker	state	customer_count
Ford	Illinois	3
GMC	Illinois	3
Chevrolet	Illinois	3
Ford	Michigan	3
GMC	Minnesota	3
Pontiac	Nevada	3
Volvo	North C...	3
Toyota	Pennsyl...	3
Mazda	Tennessee	3
Chevrolet	Alaska	2
Chevrolet	Connecti...	2
Mercury	Connecti...	2
Maserati	Connecti...	2
Volvo	Connecti...	2
Mitsubishi	Delaware	2
Dodge	Idaho	2
BMW	Louisiana	2
Nissan	Louisiana	2
Ford	Louisiana	2
Pontiac	Louisiana	2

vehicle_maker	state	customer_count
Ford	Louisiana	2
Pontiac	Louisiana	2
Kia	Louisiana	2
Dodge	Massach...	2
Chevrolet	Massach...	2
Mercedes-Benz	New Jer...	2
Hyundai	New Jer...	2
Dodge	New Me...	2
Toyota	Oklahoma	2
Ferrari	Oklahoma	2
Mazda	Oklahoma	2
Toyota	Oregon	2
Mercedes-Benz	West Vir...	2
Suzuki	Arkansas	1
Chevrolet	Arkansas	1
Pontiac	Arkansas	1
Volkswagen	Arkansas	1
Mitsubishi	Arkansas	1
GMC	Arkansas	1
Ford	Hawaii	1

Screenshot results from workbench

Observations –

- Total of 143 results row for preferred vehicle make in each state.

- **Chevrolet's Market Leadership:** Chevrolet's consistent presence as the top choice in multiple states suggests a strong brand image and customer loyalty.

- **Regional Preferences:** The variation in preferred brands across states indicates that factors like regional demographics, economic conditions, and cultural preferences can influence customer choices.

- **Competitive Market:** The presence of multiple brands in the top positions in several states highlights the competitive landscape and the need for vehicle manufacturers to differentiate themselves to attract customers.

<mark>Question 4:</mark> Find the overall average rating given by the customers. What is the average rating in each quarter?

Solution: -

```
WITH feedback_numeric AS (

SELECT

o.quarter_number,

CASE

WHEN o.customer_feedback = 'Very Bad' THEN 1

WHEN o.customer_feedback = 'Bad' THEN 2

WHEN o.customer_feedback = 'Okay' THEN 3

WHEN o.customer_feedback = 'Good' THEN 4

WHEN o.customer_feedback = 'Very Good' THEN 5

ELSE NULL

END AS rating

FROM

order_t o

WHERE

o.customer_feedback IS NOT NULL

)

-- Overall average rating

SELECT

'Overall' AS category,

AVG(rating) AS average_rating

FROM

feedback_numeric

UNION ALL

-- Average rating per quarter

SELECT

quarter_number AS category,

AVG(rating) AS average_rating

FROM

feedback_numeric

GROUP BY

quarter_number;
```

Output -

Screenshot results from workbench

Observations -

- **Overall Positive Sentiment:** The overall average rating of 3.1350 suggests a generally positive sentiment among customers.
- **Quarter-to-Quarter Variation:** There is a noticeable variation in average ratings across the quarters. Quarter 1 has the highest average rating, while Quarter 4 has the lowest. This could indicate factors like seasonal trends, product launches, or changes in customer expectations.
- **Potential for Improvement:** The lower average ratings in Quarter 4 suggest an area for improvement. Analyzing customer feedback and identifying the reasons for lower ratings in this quarter could help businesses address potential issues and enhance customer satisfaction.

Question 5: Find the percentage distribution of feedback from the customers. Are customers getting more dissatisfied over time?

Solution: -

```
WITH feedback_distribution AS (

  SELECT

    quarter_number,

    COUNT(*) AS total_feedback,

    SUM(CASE WHEN customer_feedback = 'Very Bad' THEN 1 ELSE 0 END) AS very_bad_count,

    SUM(CASE WHEN customer_feedback = 'Bad' THEN 1 ELSE 0 END) AS bad_count,

    SUM(CASE WHEN customer_feedback = 'Okay' THEN 1 ELSE 0 END) AS okay_count,

    SUM(CASE WHEN customer_feedback = 'Good' THEN 1 ELSE 0 END) AS good_count,

    SUM(CASE WHEN customer_feedback = 'Very Good' THEN 1 ELSE 0 END) AS very_good_count

  FROM

    order_t

  WHERE

    customer_feedback IS NOT NULL

  GROUP BY

    quarter_number

)

SELECT

  quarter_number,

  (very_bad_count / total_feedback) * 100 AS very_bad_percentage,

  (bad_count / total_feedback) * 100 AS bad_percentage,

  (okay_count / total_feedback) * 100 AS okay_percentage,

  (good_count / total_feedback) * 100 AS good_percentage,

  (very_good_count / total_feedback) * 100 AS very_good_percentage

FROM

  feedback_distribution

ORDER BY

  quarter_number;
```

Output -

```
1    WITH feedback_distribution AS (
2        SELECT
3            quarter_number,
4            COUNT(*) AS total_feedback,
5            SUM(CASE WHEN customer_feedback = 'Very Bad' THEN 1 ELSE 0 END) AS very_bad_count,
6            SUM(CASE WHEN customer_feedback = 'Bad' THEN 1 ELSE 0 END) AS bad_count,
7            SUM(CASE WHEN customer_feedback = 'Okay' THEN 1 ELSE 0 END) AS okay_count,
8            SUM(CASE WHEN customer_feedback = 'Good' THEN 1 ELSE 0 END) AS good_count,
9            SUM(CASE WHEN customer_feedback = 'Very Good' THEN 1 ELSE 0 END) AS very_good_count
10       FROM
11           order_t
12       WHERE
13           customer_feedback IS NOT NULL
14       GROUP BY
15           quarter_number
16   )
17   SELECT
18       quarter_number,
19       (very_bad_count / total_feedback) * 100 AS very_bad_percentage,
20       (bad_count / total_feedback) * 100 AS bad_percentage,
21       (okay_count / total_feedback) * 100 AS okay_percentage,
22       (good_count / total_feedback) * 100 AS good_percentage,
23       (very_good_count / total_feedback) * 100 AS very_good_percentage
24   FROM
```

Test Cases	**Run SQL**

Result: Passed

⊘ Query 1

quarter_number	very_bad_percentage	bad_percentage	okay_percentage	good_percentage	very_good_percentage
1	10.9677	11.2903	19.0323	28.7097	30.0000
2	14.8855	14.1221	20.2290	22.1374	28.6260
3	17.9039	22.7074	21.8341	20.9607	16.5939
4	30.6533	29.1457	20.1005	10.0503	10.0503

Screenshot results from workbench

Observations -

1. **Trend of Dissatisfaction:**
   - Looking at the "Very Bad" and "Bad" percentages, there seems to be a slight increasing trend from Quarter 1 to Quarter 4.
   - In Quarter 1, the combined percentage of "Very Bad" and "Bad" feedback is around 22.26%.
   - This increases to 29.80% in Quarter 4.
   - This could suggest a potential increase in customer dissatisfaction over time.

2. **Decreasing Positive Feedback:**
   - The percentages of "Good" and "Very Good" feedback also show a decreasing trend.
   - In Quarter 1, the combined percentage of "Good" and "Very Good" is 58.71%.
   - This decreases to 20.10% in Quarter 4.
   - This further supports the observation of declining customer satisfaction.
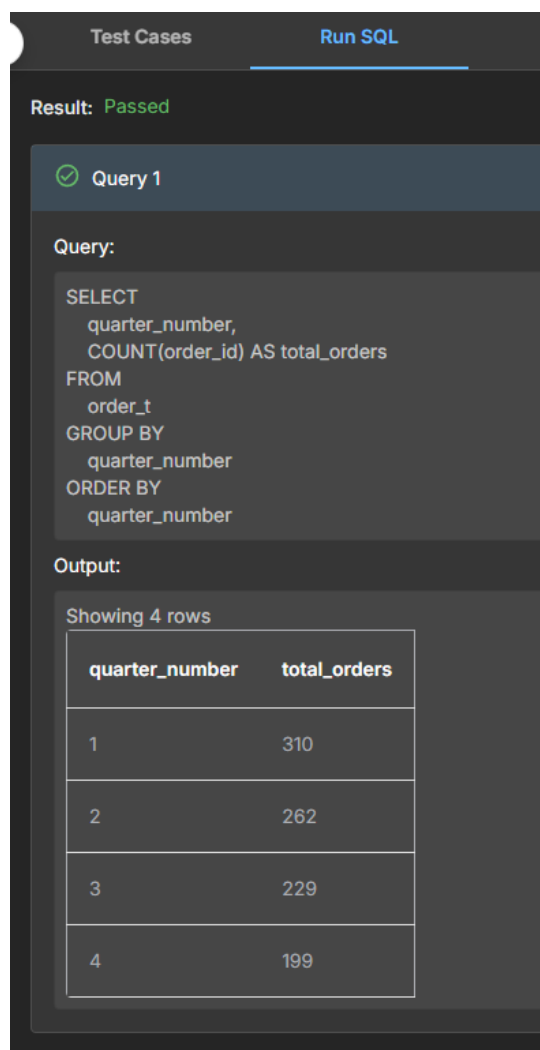
3. **"Okay" Feedback:**
   - The percentage of "Okay" feedback remains relatively stable across the quarters, fluctuating between 19.03% and 21.83%.

Solution: -

> *SELECT*
>
> > *quarter_number,*
> >
> > *COUNT(order_id) AS total_orders*
>
> *FROM*
>
> > *order_t*
>
> *GROUP BY*
>
> > *quarter_number*
>
> *ORDER BY*
>
> > *quarter_number;*

Output -

```
Test Cases                    Run SQL

Result: Passed

  ⊘  Query 1

Query:

SELECT
   quarter_number,
   COUNT(order_id) AS total_orders
FROM
   order_t
GROUP BY
   quarter_number
ORDER BY
   quarter_number

Output:

Showing 4 rows
```

quarter_number	total_orders
1	310
2	262
3	229
4	199

Observations -

• Decreasing Trend: The number of orders appears to be decreasing from Quarter 1 to Quarter 4.

• Quarter 1 has the highest number of orders with 310.

• This number gradually decreases to 262 in Quarter 2, 229 in Quarter 3, and finally 199 in Quarter 4.

Question 7: Calculate the net revenue generated by the company. What is the quarter-over-quarter % change in net revenue?

Solution: -

```
WITH revenue_per_quarter AS (

  SELECT

    o.quarter_number,

    SUM(p.vehicle_price * o.quantity * (1 - o.discount / 100)) AS net_revenue

  FROM

    order_t o

  JOIN

    product_t p ON o.product_id = p.product_id

  GROUP BY

    o.quarter_number

)

SELECT

  quarter_number,

  net_revenue,

  LAG(net_revenue) OVER (ORDER BY quarter_number) AS previous_quarter_revenue,

  -- Calculate the quarter-over-quarter percentage change

  CASE

    WHEN LAG(net_revenue) OVER (ORDER BY quarter_number) IS NOT NULL THEN

      (net_revenue - LAG(net_revenue) OVER (ORDER BY quarter_number)) / LAG(net_revenue)
OVER (ORDER BY quarter_number) * 100

    ELSE

      NULL

  END AS quarter_over_quarter_percentage_change

FROM

  revenue_per_quarter

ORDER BY

  quarter_number;
```

Output -

```
1   WITH revenue_per_quarter AS (
2       SELECT
3           o.quarter_number,
4           SUM(p.vehicle_price * o.quantity * (1 - o.discount / 100)) AS net_revenue
5       FROM
6           order_t o
7       JOIN
8           product_t p ON o.product_id = p.product_id
9       GROUP BY
10          o.quarter_number
11  )
12  SELECT
13      quarter_number,
14      net_revenue,
15      LAG(net_revenue) OVER (ORDER BY quarter_number) AS previous_quarter_revenue,
16      -- Calculate the quarter-over-quarter percentage change
17      CASE
18          WHEN LAG(net_revenue) OVER (ORDER BY quarter_number) IS NOT NULL THEN
19              (net_revenue - LAG(net_revenue) OVER (ORDER BY quarter_number)) / LAG(net_revenue) OVER (ORDER BY quarter_numb
20          ELSE
21              NULL
22      END AS quarter_over_quarter_percentage_change
23  FROM
24      revenue_per_quarter
25  ORDER BY
26      quarter_number;
```

▷ Run   ✓= Test

Test Cases   **Run SQL**   ⌄

Result: Passed

⊘ Query 1   ⌄

quarter_number	net_revenue	previous_quarter_revenue	quarter_over_quarter_percentage_change
1	39421580.15929600000000	NULL	NULL
2	32715830.39237633800000	39421580.15929600000000	-17.010352552644644882
3	29229896.19364900000000	32715830.39237633800000	-10.655190948598552899
4	23346779.51435220000000	29229896.19364900000000	-20.127052933479350268

Result Grid | ▦ Filter Rows: | Export: ▦ | Wrap Cell Content: 𝓐

Screenshot results from workbench

Observations –
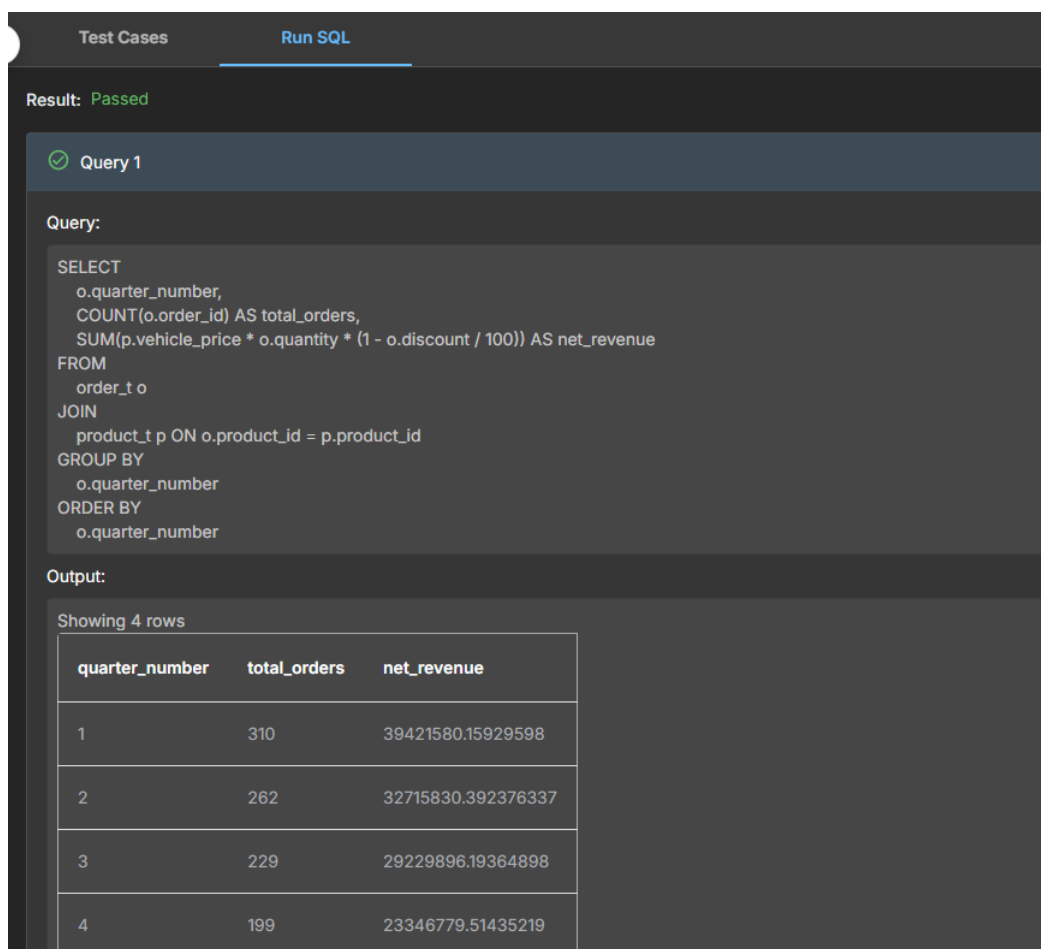
- Total Net Revenue (for visible quarters): 39,421,580.16 + 32,715,830.39 + 29,229,896.19 + 23,346,779.51 = 124,714,086.25

- **Decreasing Trend:** The net revenue shows a consistent decline from Quarter 1 to Quarter 4.

- **Significant Drops:** The percentage change indicates substantial drops in revenue between consecutive quarters.

- **Potential Concerns:** The decreasing trend in net revenue suggests potential issues that need to be investigated.

16

Question 8: What is the trend of net revenue and orders by quarters?

Solution: -

SELECT

   o.quarter_number,

   COUNT(o.order_id) AS total_orders,

   SUM(p.vehicle_price * o.quantity * (1 - o.discount / 100)) AS net_revenue

FROM

   order_t o

JOIN

   product_t p ON o.product_id = p.product_id

GROUP BY

   o.quarter_number

ORDER BY

   o.quarter_number;

Output-

Observations –
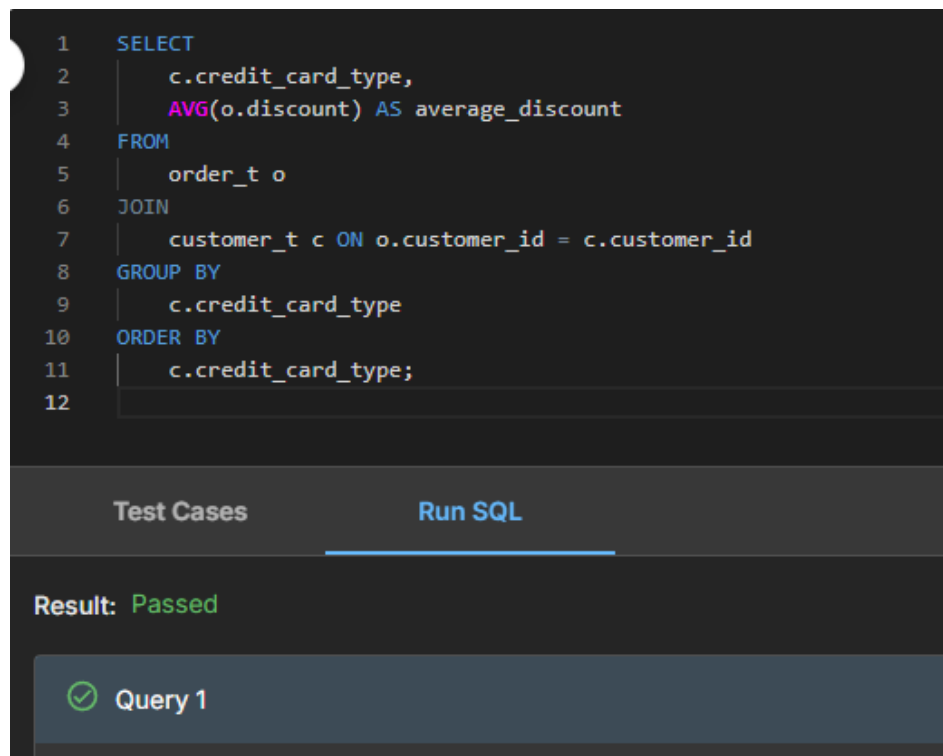
- **Decreasing Trend in Orders:** The number of orders shows a consistent decline from Quarter 1 to Quarter 4. Quarter 1 has the highest number of orders with 310, which decreases to 262 in Quarter 2, 229 in Quarter 3, and finally 199 in Quarter 4.

- **Decreasing Trend in Net Revenue:** Similar to the order trend, the net revenue also shows a consistent decline from Quarter 1 to Quarter 4.

- Quarter 1 has the highest net revenue of 39,421,590.15929598.

- This decreases to 32,715,830.392376337 in Quarter 2, 29,229,898.19364898 in Quarter 3, and finally 23,346,779.51435219 in Quarter 4.

Question 9: What is the average discount offered for different types of credit cards?

Solution: -

SELECT

   c.credit_card_type,

   AVG(o.discount) AS average_discount

FROM

   order_t o

JOIN

   customer_t c ON o.customer_id = c.customer_id

GROUP BY

   c.credit_card_type

ORDER BY

   c.credit_card_type;

Output-

```
1   SELECT
2       c.credit_card_type,
3       AVG(o.discount) AS average_discount
4   FROM
5       order_t o
6   JOIN
7       customer_t c ON o.customer_id = c.customer_id
8   GROUP BY
9       c.credit_card_type
10  ORDER BY
11      c.credit_card_type;
12
```

Test Cases   **Run SQL**

Result: Passed

✓ Query 1

credit_card_type	average_discount
americanexpress	0.616327
bankcard	0.609545
china-unionpay	0.622174
diners-club-carte-blanche	0.614490
diners-club-enroute	0.599792
diners-club-international	0.584000
diners-club-us-ca	0.614615
instapayment	0.620625
jcb	0.607382
laser	0.643846
maestro	0.624219
mastercard	0.629500
solo	0.585000
switch	0.610233
visa	0.600833
visa-electron	0.623469

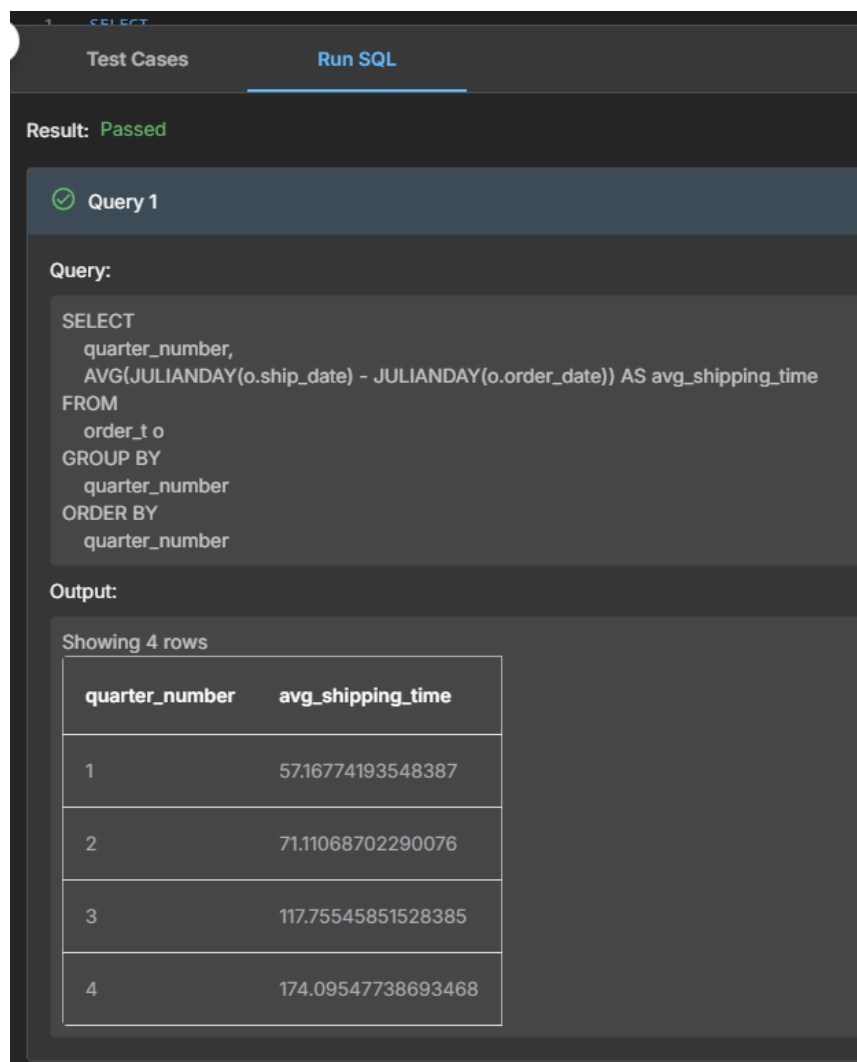Screenshot results from workbench

Observations

- **Average Discount:** The table clearly shows the average discount offered for each credit card type.

- **Variation Across Cards:** There is a variation in the average discount offered for different credit card types. Some cards like "laser" and "maestro" have higher average discounts compared to others.

- **Highest Average Discount:** "laser" has the highest average discount at 0.643846.

- **Lower Average Discounts:** "diners-club-international" and "solo" have comparatively lower average discounts.

Question 10: What is the average time taken to ship the placed orders for each quarter?

Solution: - We have used JULIANDAY function here.

SELECT

   quarter_number,

   AVG(JULIANDAY(o.ship_date) - JULIANDAY(o.order_date)) AS avg_shipping_time

FROM

   order_t o

GROUP BY

   quarter_number

ORDER BY

   quarter_number;

Output-

Observations –

- **Increasing Shipping Time:** The average shipping time appears to increase significantly from Quarter 1 to Quarter 4.

- Quarter 1 has the shortest average shipping time at 57.16774193548387 days.

- This gradually increases to 71.11068702290076 days in Quarter 2, 117.75545851528385 days in Quarter 3, and reaches a high of 174.09547738693468 days in Quarter 4.

Business Metric Overview –

Total Revenue	Total Orders	Total Customers	Average Rating
124714086.25967353800000	1000	994	3.135
Last Quarter Revenue	Last quarter Orders	Average Days to Ship	% Good Feedback
23346779.51435219	199	97.9	0

Query-

```
1   SELECT
2       -- Total Revenue
3       SUM(o.quantity * p.vehicle_price * (1 - o.discount / 100)) AS total_revenue,
4
5       -- Total Orders
6       COUNT(o.order_id) AS total_orders,
7
8       -- Total Customers
9       COUNT(DISTINCT o.customer_id) AS total_customers,
10
11      -- Average Rating (assuming feedback is mapped to numeric values)
12      AVG(CASE
13          WHEN o.customer_feedback = 'Very Bad' THEN 1
14          WHEN o.customer_feedback = 'Bad' THEN 2
15          WHEN o.customer_feedback = 'Okay' THEN 3
16          WHEN o.customer_feedback = 'Good' THEN 4
17          WHEN o.customer_feedback = 'Very Good' THEN 5
18          ELSE NULL
19      END) AS avg_rating,
20
21      -- Last Quarter Revenue
22      SUM(CASE
23          WHEN o.quarter_number = (SELECT MAX(quarter_number) FROM order_t) THEN o.quantity * p.vehicle_price * (1 - o.disco
24          ELSE 0
25      END) AS last_quarter_revenue,
26
27      -- Last Quarter Orders
28      COUNT(CASE
29          WHEN o.quarter_number = (SELECT MAX(quarter_number) FROM order_t) THEN o.order_id
30          ELSE NULL
31      END) AS last_quarter_orders,
```

▷ Run   ≒ Test

Test Cases   Run SQL   ⌄

Result: Passed

⊘ Query 1   ⌄

Output:

Showing 1 rows

total_revenue	total_orders	total_customers	avg_rating	last_quarter_revenue	last_quarter_order
124714086.25967374	1000	994	3.135	23346779.51435219	199

Insights and Business Recommendations –

1. **Address Customer Dissatisfaction:**

   o **Product & Service Quality:** Improve product quality, service delivery, and customer support. Implement quality assurance processes and proactive customer support (live chat, email, etc.).

   o **Competitive Analysis:** Analyze competitors to identify areas where your business can improve (pricing, service, features).

   o **Economic Sensitivity:** Offer flexible payment options and discounts during economic downturns. Provide lower-priced options without compromising quality.

2. **Boost Revenue:**

   o **Address Declining Revenue:** Reevaluate marketing and pricing strategies to align with customer demand and seasonal trends. Implement targeted promotions and customer segmentation.

   o **Focus on High-Performing Quarters:** Replicate successful strategies from Quarter 1 (pricing, promotions, product selection) in other quarters.

   o **Address Shipping Delays:** Optimize logistics, improve inventory management, and use faster shipping options. Consider offering expedited shipping for high-value orders.

3. **Improve Customer Satisfaction through Feedback:**

   o **Focus on Positive Feedback:** Investigate reasons for declining feedback, conduct post-purchase surveys, and improve the customer journey.

   o **Improve Feedback Systems:** Implement automated follow-ups and offer incentives (e.g., discounts) for positive reviews.

4. **Maximize Credit Card Discounts:**

   o **Target Specific Cardholders:** Tailor marketing to customers using high-discount cards like "laser" and segment promotions based on credit card types.

   o **Evaluate Discount Strategy:** Test different discount levels for various card types to maintain competitiveness and profitability.

5. **Leverage Regional Preferences:**

   o **Focus on Regional Preferences:** Tailor marketing to emphasize popular brands (e.g., Chevrolet) in each state. Increase inventory in regions with high demand to avoid stock-outs.

6. **Long-Term Product Development Strategy:**

   o **New Product Launches:** Invest in R&D based on customer feedback and regional preferences to ensure competitiveness and meet market demands.

By addressing these key areas, businesses can enhance customer satisfaction, improve revenue, optimize shipping, and create a more resilient and growth-driven business model.