BUSINESS REPORT ON

“SQL : NEW WHEELS”

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CHAPTER 1

NEW WHEELS

1.1 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.

1.2 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.

1.3 DATA DESCRIPTION

The data provided is of various customers of a bank and their financial attributes like credit limit, the total number of credit cards the customer has, and different channels through which customers have contacted the bank for any queries (including visiting the bank, online, and through a call center).

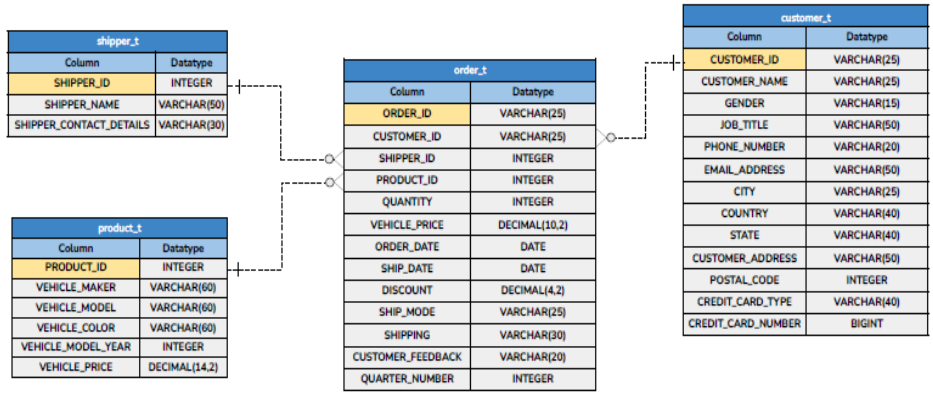
1.4 DATA DICTIONARY

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.
- 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 name
- 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 the 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
- 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_number: Credit card number
- customer_feedback: Feedback of the customer
- quarter_number : Quarter Number

Entity-Relationship Diagram



CHAPTER 2

NEW WHEELS BUSINESS QUESTIONS

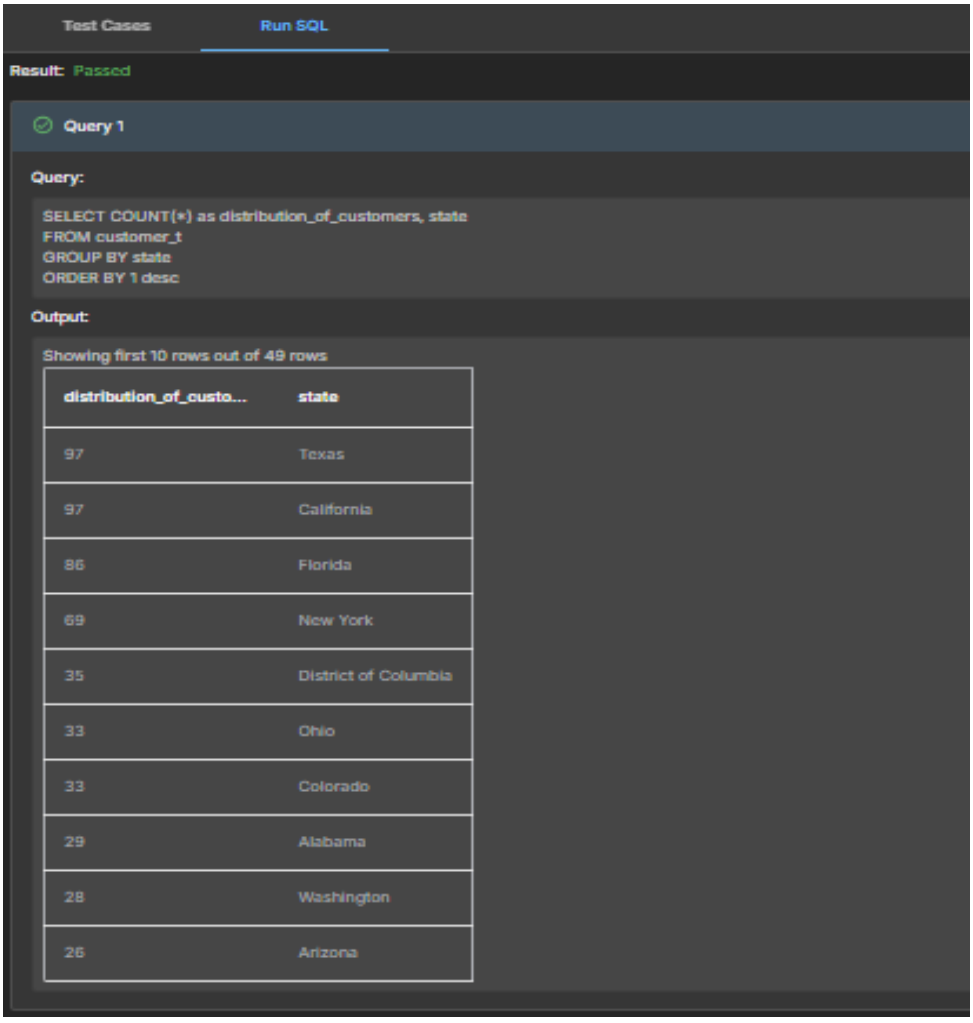
Question 1:

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

SOLUTION QUERY:

```
SELECT COUNT(*) as distribution_of_customers, state
FROM customer_t
GROUP BY state
ORDER BY 1 desc;
```

OUTPUT:



Observations:

- It is observed that most of the customers who have placed orders are from Texas and California(97) followed by Florida(86) and New York(69).

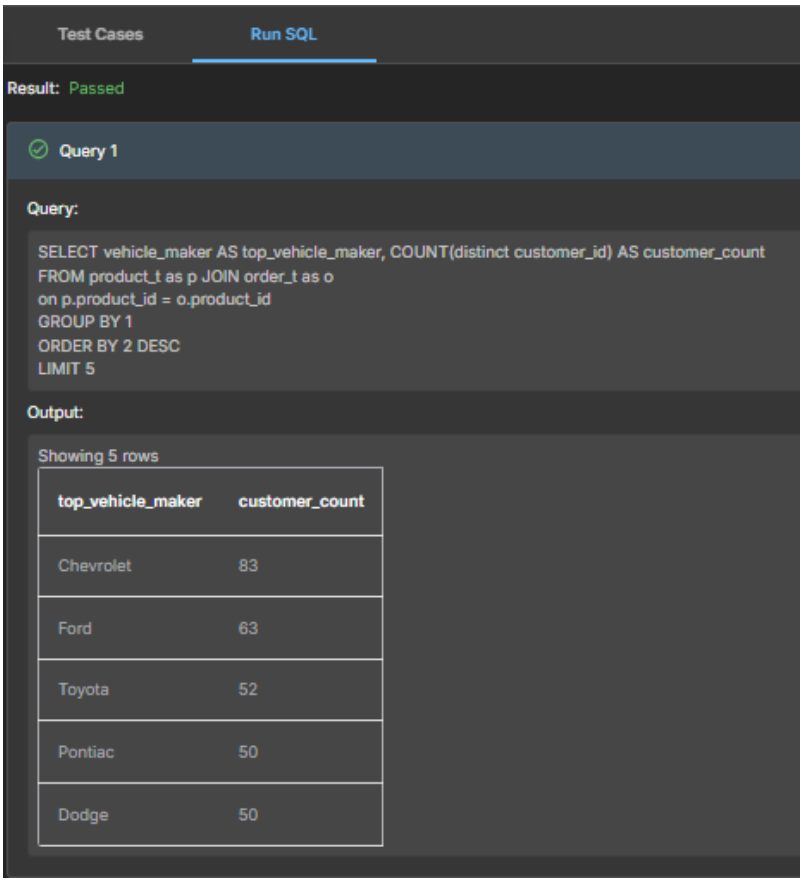
Question 2:

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

SOLUTION QUERY:

```
SELECT vehicle_maker AS top_vehicle_maker, COUNT(distinct customer_id) AS
customer_count
FROM product_t as p JOIN order_t as o
on p.product_id = o.product_id
GROUP BY 1
ORDER BY 2 DESC
LIMIT 5;
```

OUTPUT:



Observations:

- It is observed that top 5 vehicle makers preferred by customers in descending order are Chevrolet, Ford, Toyota, Pontiac and Dodge.

Question 3:

Which is the most preferred vehicle maker in each state?

SOLUTION QUERY:

```
SELECT DISTINCT state, vehicle_maker,total_customers, rank_no from (
SELECT PT.vehicle_maker,
CT.state,
COUNT(OT.customer_id) AS total_customers,
RANK() OVER (PARTITION BY CT.state ORDER BY SUM(DISTINCT OT.customer_id) desc)
AS rank_no
FROM product_t PT
JOIN order_t OT
ON PT.product_id = OT.product_id
JOIN customer_t CT
ON OT.customer_id = CT.customer_id
GROUP BY CT.state, PT.vehicle_maker
Order by CT.state, PT.vehicle_maker
)
WHERE rank_no = 1
order by total_customers desc;
```

OUTPUT:

Result: Passed

Query 1

Query:

```
SELECT DISTINCT state, vehicle_maker,total_customers, rank_no from (
SELECT PT.vehicle_maker,
CT.state,
COUNT(OT.customer_id) AS total_customers,
RANK() OVER(PARTITION BY CT.state ORDER BY SUM(DISTINCT OT.customer_id) desc) AS rank_no
FROM product_t PT
JOIN order_t OT
ON PT.product_id = OT.product_id
JOIN customer_t CT
ON OT.customer_id = CT.customer_id
GROUP BY CT.state, PT.vehicle_maker
Order by CT.state, PT.vehicle_maker
)
WHERE rank_no = 1
order by total_customers desc
```

Output:

Showing first 10 rows out of 49 rows

state	vehicle_maker	total_customers	rank_no
Texas	Chevrolet	9	1
California	Audi	6	1
Florida	Mazda	6	1
Ohio	Chevrolet	6	1
Alabama	Dodge	5	1
Colorado	Chevrolet	5	1
Maryland	Ford	5	1
Virginia	Ford	5	1
Washington	Chevrolet	5	1
District of Columbia	Chevrolet	4	1

Observations:

- It is observed that Texas is the top selling state for the vehicle maker Chevrolet.

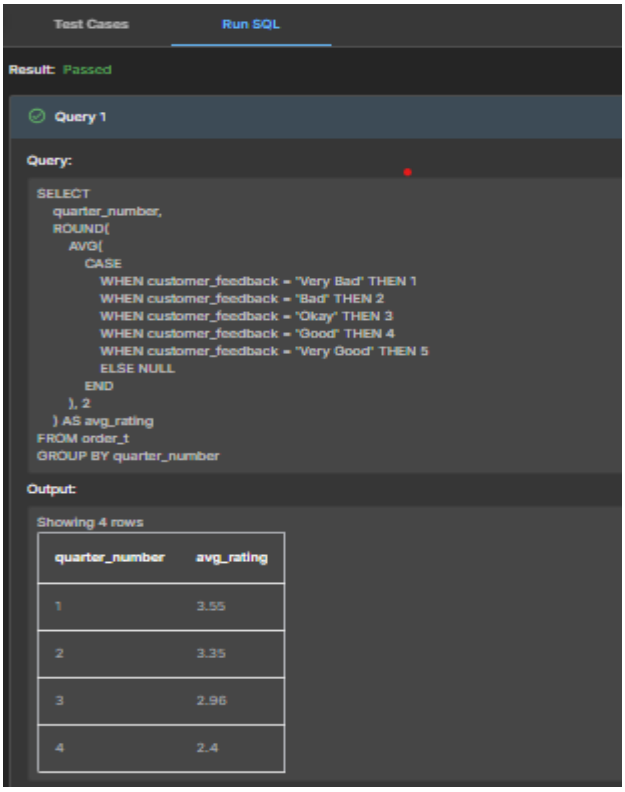
Question 4:

Find the overall average rating given by the customers. What is the average rating in each quarter?
Consider the following mapping for ratings:
“Very Bad”: 1, “Bad”: 2, “Okay”: 3, “Good”: 4, “Very Good”: 5

SOLUTION QUERY:

```
SELECT
   quarter_number,
   ROUND(
      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
            ELSE NULL
         END
      ), 2
   ) AS avg_rating
FROM order_t
GROUP BY quarter_number;
```

OUTPUT:



Observations:

- The average rating for quarter 1 was found to be highest at 3.55, followed by quarter 2(3.35), quarter 3(2.96) and quarter 4(2.4).

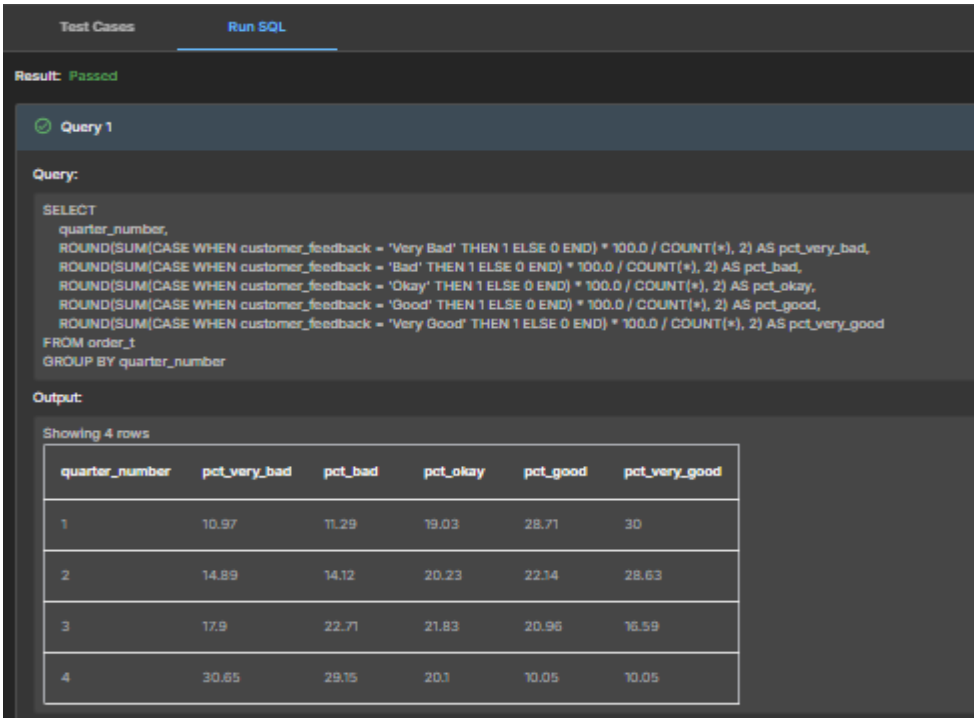
Question 5:

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

SOLUTION QUERY:

```
SELECT
   quarter_number,
   ROUND(SUM(CASE WHEN customer_feedback = 'Very Bad' THEN 1 ELSE 0 END) * 100.0 / COUNT(*), 2) AS pct_very_bad,
   ROUND(SUM(CASE WHEN customer_feedback = 'Bad' THEN 1 ELSE 0 END) * 100.0 / COUNT(*), 2) AS pct_bad,
   ROUND(SUM(CASE WHEN customer_feedback = 'Okay' THEN 1 ELSE 0 END) * 100.0 / COUNT(*), 2) AS pct_okay,
   ROUND(SUM(CASE WHEN customer_feedback = 'Good' THEN 1 ELSE 0 END) * 100.0 / COUNT(*), 2) AS pct_good,
   ROUND(SUM(CASE WHEN customer_feedback = 'Very Good' THEN 1 ELSE 0 END) * 100.0 / COUNT(*), 2) AS pct_very_good
FROM order_t
GROUP BY quarter_number;
```

OUTPUT:



Observations:

- Quarter 1 has highest positive feedback (30%) followed by Quarter 2, 3, 4.
- As the quarter ends(quarter 4) it is observed that the percentage of customers dissatisfied are large(30.65%).

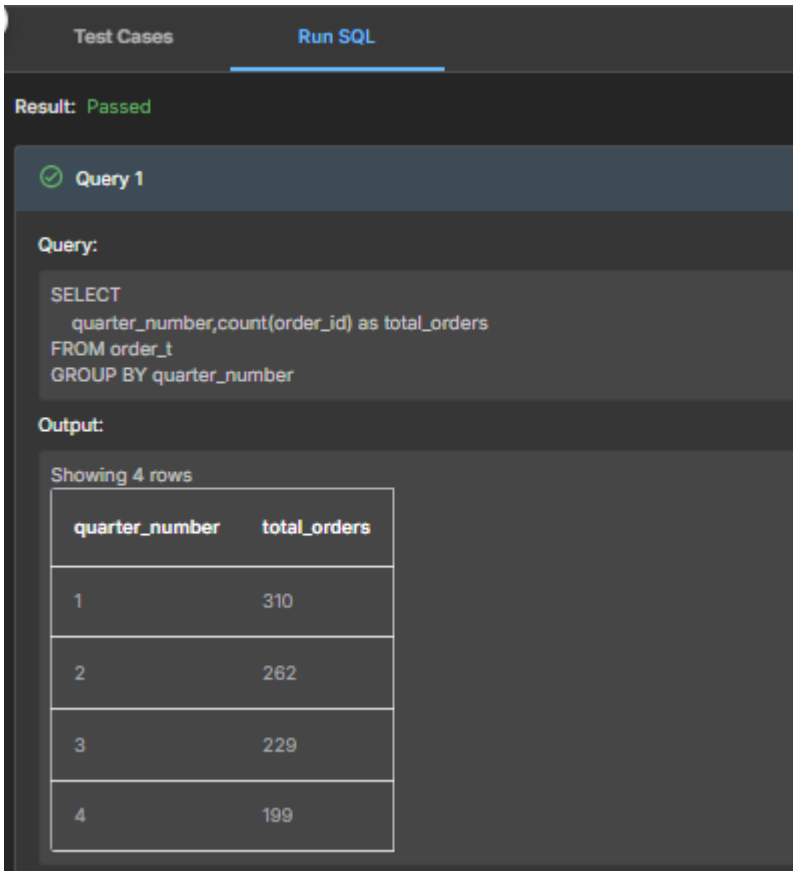
Question 6:

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;
```

OUTPUT:



Observations:

- The trend seems to decrease, observed that Quarter 1 has the highest orders (310) followed by quarter 2(262), quarter 3(229) and quarter 4(199).

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,
   a.revenue,
   LAG(a.revenue, 1, 0) OVER (ORDER BY quarter_number) AS prev_q_revenue,
   ROUND(
      CASE
         WHEN LAG(a.revenue, 1, 0) OVER (ORDER BY quarter_number) = 0 THEN NULL
         ELSE
            (a.revenue - LAG(a.revenue, 1, 0) OVER (ORDER BY quarter_number)) * 100.0 /
            LAG(a.revenue, 1, 0) OVER (ORDER BY quarter_number)
      END,
      2
   ) AS qoq
FROM (
   SELECT
      quarter_number,
      ROUND(SUM(quantity * (vehicle_price - (vehicle_price * discount))),2) AS revenue
   FROM order_t
   GROUP BY quarter_number
) AS a
ORDER BY quarter_number;
```

OUTPUT:

Observations:

- It can be observed that QOQ has reduced over the quarters.
- QOQ from 2nd to 3rd quarter has the highest impact of 32.32% drop in revenue. Also the QOQ from 1st to 2nd has given 27.2% drop in revenue.

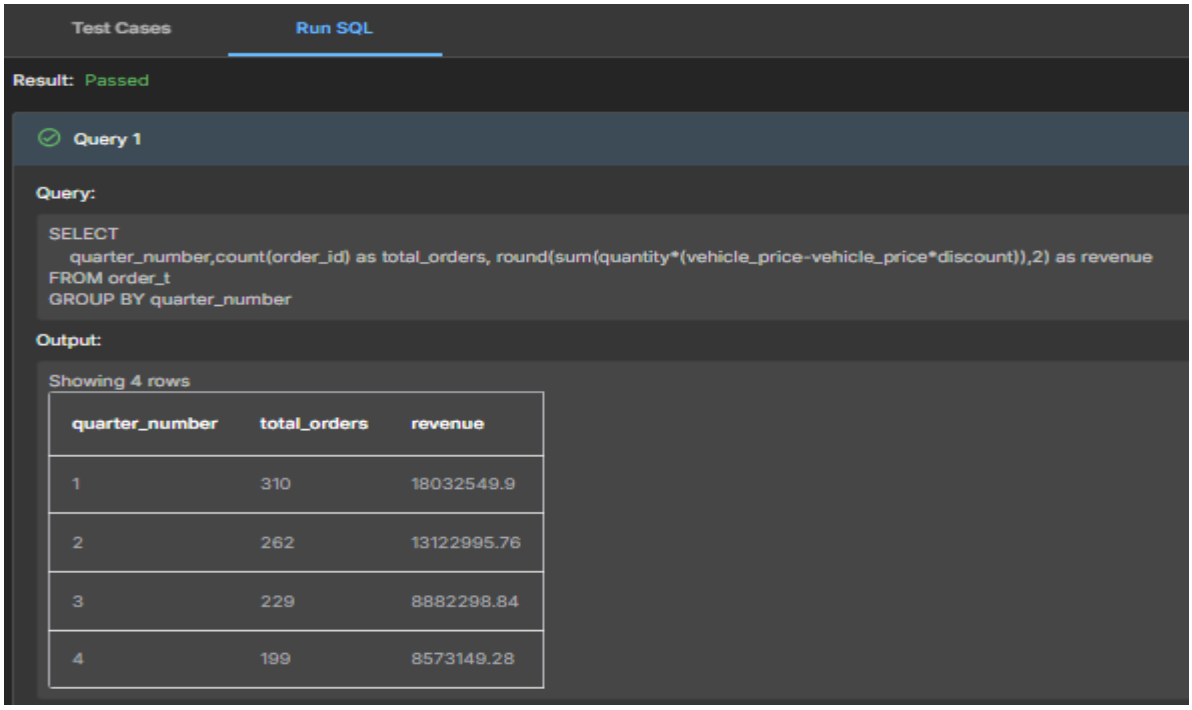
Question 8:

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

SOLUTION QUERY:

```
SELECT
   quarter_number,count(order_id) as total_orders, round(sum(quantity*(vehicle_price -
vehicle_price*discount)),2) as revenue
FROM order_t
GROUP BY quarter_number;
```

OUTPUT:



Observations:

- In the 1st quarter the net revenue is the highest (sum amount 18032549.9) against 310 orders.
- In the last quartile the net revenue is the lowest (sum amount 8573149.28) against 199 orders.

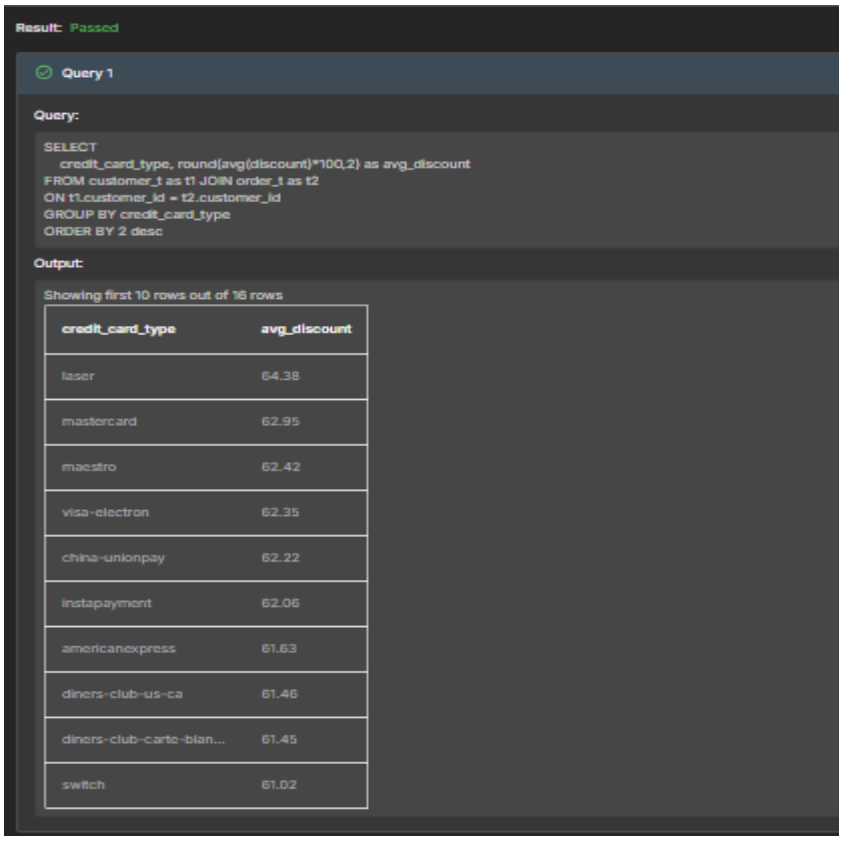
Question 9:

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

SOLUTION QUERY:

```
SELECT
   credit_card_type, round(avg(discount)*100,2) as avg_discount
FROM customer_t as t1 JOIN order_t as t2
ON t1.customer_id = t2.customer_id
GROUP BY credit_card_type
ORDER BY 2 desc;
```

OUTPUT:



Observations:

- The average discount offered by Laser was found to be highest (64.38%) followed by mastercard (62.95%).
- The average discount offered by switch was found to be lowest (61.02%).

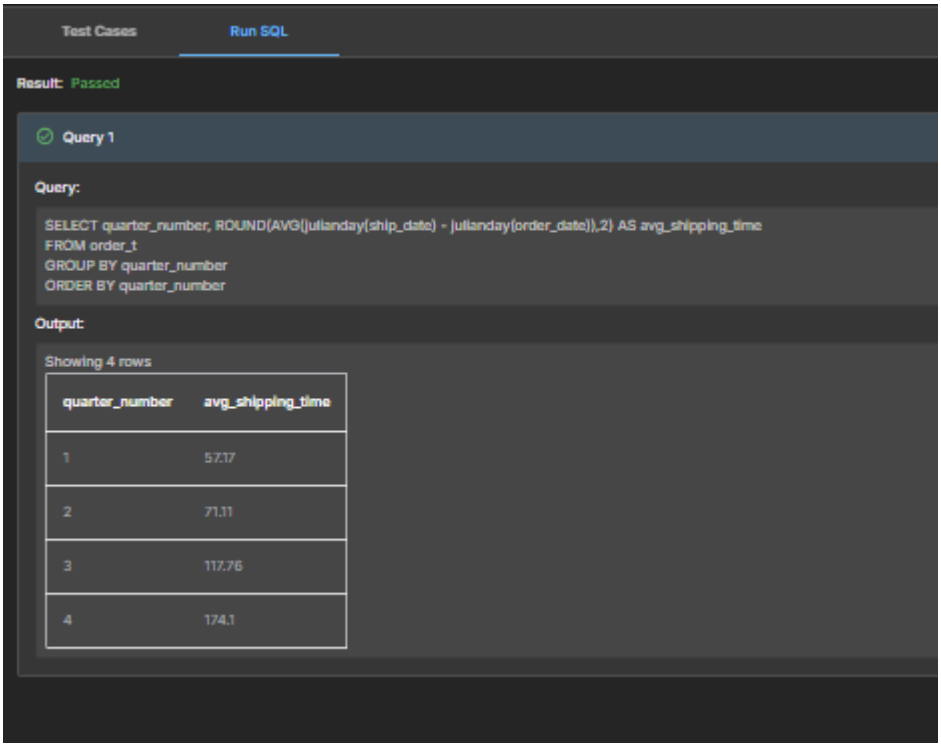
Question 10:

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

SOLUTION QUERY:

```
SELECT quarter_number, ROUND(AVG(julianday(ship_date) - julianday(order_date)),2) AS
avg_shipping_time
FROM order_t
GROUP BY quarter_number
ORDER BY quarter_number;
```

OUTPUT:



Observations:

- Lowest average shipping time taken (57.16 days) in 1st quarter and the highest being in the last quarter (175.09 days).

CHAPTER 3

INSIGHTS AND RECOMMENDATIONS

OVERVIEW OF BUSINESS METRICS

TOTAL REVENUE	TOTAL ORDERS	TOTAL CUSTOMERS	AVERAGE RATING
48610993.78	1000	994	3.14
LAST QUARTER REVENUE	**LAST QUARTER ORDER**	**AVERAGE DAYS TO SHIP**	**%GOOD FEEDBACK**
8573149.28	199	97.96	21.5

BUSINESS RECOMMENDATIONS

- It is observed that the customer satisfaction is declining throughout the year, hence it is important to take customer feedback possibly through surveys to understand and analyse the same to improve the customer satisfaction. Also campaign and marketing campaigns can be launched to target the declining sales based on the analysis from the customer feedback.
- Chevrolet and Ford are observed to be most preferred cars, hence it is advised to continue prioritizing the same in the particular states where they are most sold. However more focus like customer engagement and attractive incentives/discounts can be offered for the vehicle brands like Audi, Mazda to further increase market share.
- There is a need to reduce the shipping time by working on improving the supply chain process which can increase customer satisfaction and engagement.
- The revenue and the orders are observed to be declining throughout the year. Hence it is advised to conduct an analysis of the same to understand the issues leading to the decrease of the same.
- Loyalty programs, engagement through social media and focus on after sales service can greatly enhance customer experience and further improve the rating and orders.