

# New Wheels Project Introduction to SQL

#### **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 aftersales 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.

### **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(DISTINCT (customer_name)) AS `Total customer`

FROM

customer_t;
```

#### SELECT

state,

count(customer\_id) AS `Total customer`

**FROM** 

customer\_t

**GROUP BY** 

**STATE** 

**ORDER BY** 

`total customer` DESC;

#### **Output:**

	state	Total customer	
1	California	97	
2	Texas	97	
3	Florida	86	
4	New York	69	
5	District of Columbia	35	
6	Colorado	33	
7	Ohio	33	



#### Observations and Insights:

#### • High Customer Concentration States:

- California (97) and Texas (97) have the highest customer numbers, likely indicating these states have:
  - o Large populations.
  - o High economic activity or demand.
  - Well-established markets or customer bases.

#### • Significant Contributors:

- Florida (86) is a close third, demonstrating its prominence as a key region for customer activity.
- New York (69), while slightly lower, still stands out as a major contributor, likely due to its economic and cultural significance.

#### • Mid-Range Customer Numbers:

- States like **District of Columbia (35)**, **Colorado (33)**, **Ohio (33)**, and **Alabama (29)** form a mid-tier group, contributing significantly but not at the scale of the top states.
- These numbers could indicate moderate population density or market demand in these regions.

#### • Low-Activity States:

- Many states fall below 20 customers, such as Georgia (18), Michigan (17), Nevada (17), and Minnesota (17), suggesting:
  - o Lower population or market saturation.
  - o Potential for growth in customer acquisition.

#### • Minimal Customer Numbers:

- Several states have extremely low numbers:
  - o Maine (1), Wyoming (1), and Vermont (1) highlight areas with minimal customer presence.
  - o This could be due to low population, rural characteristics, or lack of focus on these regions.

#### • Regional Observations:

- Western Region: Dominated by California (97), while states like Nevada (17) and Arizona (26) have moderate representation.
- Southern Region: Shows diversity, with high counts in Florida (86) and moderate numbers in Alabama (29), but lower activity in states like Mississippi (2).
- Midwestern Region: States like Ohio (33) and Illinois (25) show moderate customer numbers, but smaller states like Iowa (11) and Nebraska (7) contribute less.
- Northeastern Region: New York (69) stands out, but states like Vermont (1) and New Hampshire (3) have minimal numbers.

#### • Potential Opportunities:



- States with moderate numbers (20–35 customers) like Alabama, Colorado, and Ohio could represent growing markets with untapped potential.
- States with minimal numbers could be targeted for customer acquisition campaigns or research to understand barriers to growth.

#### • High Disparity:

- The gap between the highest (97) and lowest (1) customer numbers is significant, indicating uneven customer distribution.
- Strategies to balance this disparity could include focused marketing or improving accessibility in underperforming regions.

#### • Correlation with Population:

• High customer numbers in states like California and Texas align with their large populations, while low numbers in states like Vermont and Wyoming correspond to their smaller populations.

#### • District of Columbia's Significance:

• Despite being a small area, **District of Columbia (35)** has a relatively high number of customers, likely due to its urban density and economic importance.



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



```
WITH
      customer_preference_t AS (
            SELECT
                  p.vehicle_maker AS `Vehicle Maker`,
                  ROUND(
                        COUNT(o.customer_id) * 100.0 / (
                              SELECT
                                    COUNT(*)
                              FROM
                                    order_t
                        ),
                        2
                  ) AS 'Customer preference(%)'
            FROM
                  order_t o
                  INNER JOIN product_t p ON o.product_id = p.product_id
            GROUP BY
                  p.vehicle_maker
SELECT
      RANK() OVER (
            ORDER BY
                  `Customer preference(%)` DESC
```

) AS 'Rank'



**FROM** 

customer\_preference\_t

ORDER BY

`Customer preference(%)` DESC

LIMIT

5;

#### **Output:**

	Vehicle Maker	Customer preference(%)	Rank
1	Chevrolet	8.30	1
2	Ford	6.30	2
3	Toyota	5.20	3
4	Dodge	5.00	4
5	Pontiac	5.00	4

#### **Observations and Insights:**

- 1. Chevrolet Leads Customer Preference
  - Chevrolet has the highest customer preference percentage at 8.30%.
  - This indicates Chevrolet's strong market presence or brand loyalty among customers.
- 2. Close Competition in the Middle
  - Ford (6.30%) and Toyota (5.20%) are in the second and third positions, respectively.
  - The relatively small gap between them suggests a competitive marketplace among mid-tier customer preferences.
- 3. Pontiac and Dodge Share Equal Preference
  - Pontiac (5.00%) and Dodge (5.00%) are tied in fourth place.
  - This tie may indicate a shared niche market or similar appeal to a specific customer segment.
- 4. Narrow Range Across Top Makers
  - The range of customer preference percentages (from 8.30% to 5.00%) is relatively narrow.
  - This indicates no single dominant player and a fairly balanced competition among the top brands.

#### 5. Market Share of Top Makers



- The total customer preference of these top 5 makers adds up to **29.80%**.
- This means the remaining 70.20% of customer preference is distributed among other vehicle makers, indicating a diverse and fragmented market.

#### 6. Chevrolet's Significant Lead

- Chevrolet's preference is **2 percentage points higher** than Ford, the second-ranked maker. This lead suggests:
  - o Strong brand presence.
  - o Better alignment with customer preferences, such as affordability, features, or availability.

#### 7. Mid-Tier Position of Toyota

• Toyota's position at **5.20%** reflects its consistency in appealing to a broad customer base, likely due to its reputation for reliability and value.

#### 8. Insights for Pontiac and Dodge

- Both brands may cater to niche audiences or have similar selling points that resonate with specific customer demographics.
- Opportunities could exist to differentiate further and increase market share.

#### 9. Opportunities for Growth

- The top 5 makers, while leading, do not dominate the market entirely. For instance:
  - o **Brands outside the top 5 hold over 70% of the customer preference share**, indicating room for smaller brands to grow.
  - o Larger brands could explore untapped customer segments or regions to increase their share.

#### 10. Competitive Landscape

- The close percentages reflect an intensely competitive market where:
  - o Customer preferences may shift based on pricing, marketing, or innovation.
  - o Maintaining a lead will require consistent improvement and customer engagement.

#### Strategic Recommendations:

- 1. **Chevrolet**: Leverage its leading position to expand its market further. Focus on maintaining quality and customer satisfaction.
- 2. Ford and Toyota: Invest in marketing and innovation to close the gap with Chevrolet.
- 3. **Pontiac and Dodge**: Identify unique selling points and target niche markets to break the tie and differentiate.
- 4. **Other Brands**: Explore opportunities in regions or customer segments where top brands are not dominant.



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

#### state?

```
SELECT
      state,
      group_concat(
            vehicle maker
            ORDER BY
                  vehicle_maker ASC
      ) AS 'Prefrred vehicle makers'
FROM
            SELECT
                  c.state,
                  p.vehicle_maker,
                  count(c.customer_id) AS total_users,
                  RANK() OVER (
                         PARTITION BY
                               c.\state\
                         ORDER BY
                               count(c.customer_id) DESC
                  ) AS POSITION
            FROM
                  customer_t c
                  INNER JOIN order_t o ON c.customer_id = o.customer_id
                  INNER JOIN product_t p ON p.product_id = o.product_id
```

**GROUP BY** 



c.state,

p.vehicle\_maker

**ORDER BY** 

total users DESC

) AS Product\_city\_Rank\_t

WHERE

POSITION = 1

**GROUP BY** 

STATE,

total\_users

**ORDER BY** 

total\_users DESC;

#### **Output:**

state	Prefrred vehicle makers
Texas	Chevrolet
Florida	Toyota
Ohio	Chevrolet
California	Audi, Chevrolet, Dodge, Ford, Nissan
Alabama	Dodge
Colorado	Chevrolet
Washington	Chevrolet
	Texas Florida Ohio California Alabama Colorado

#### **Observations and Insights:**

- **Dominance of Chevrolet**: Chevrolet is the most preferred vehicle maker in numerous states, including Texas, Colorado, and Missouri. This suggests a significant brand presence and strong consumer loyalty, positioning Chevrolet as a leading choice among American drivers.
- **Diversity of Preferences**: States like California and North Carolina display a broad spectrum of preferred vehicle makers, indicating a more diverse consumer base. California stands out with multiple brands, reflecting a competitive automotive market where consumer choices are influenced by varying tastes and lifestyle factors.

### • Regional Preferences:



- Southern States: In states such as Alabama, Georgia, and Mississippi, brands like Dodge and Toyota are frequently preferred. This may highlight regional trends where specific brands resonate more with the cultural and economic dynamics of the South.
- **Northeastern States**: Brands like Ford and Hyundai appear more prominently in states like New Jersey and New York, suggesting different market dynamics compared to the Southern states, possibly driven by economic conditions and urban consumer preferences.
- Luxury and Specialty Brands: The preference for luxury brands like Maserati and Mercedes-Benz in states such as Connecticut and New Jersey may reflect the higher income demographics and distinct consumer demands in these areas, showcasing the influence of wealth on automotive choices.
- Limited Choices in Some States: States like Wyoming, with only Buick, and Mississippi, with a limited selection of Dodge and Toyota, indicate either a reduced market presence or a more concentrated consumer base. This could reflect fewer options available to consumers in these regions, potentially limiting their preferences.
- Emerging Trends: The absence of electric vehicle brands like Tesla in the data suggests a gap in the market. This may indicate potential growth opportunities for electric vehicles as consumer preferences shift towards sustainability and environmentally friendly options in the future.
- Influence of Geography: The data illustrates how geographical factors influence vehicle preferences. States with unique cultural or economic backgrounds tend to favor specific brands, reflecting regional characteristics that drive consumer behavior.



# 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:** 

#### 4.1 overall avg rating:

```
WITH
     feedback_score_t AS (
           SELECT
                 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 AS feedback_score
           FROM
                 order t
SELECT
     round(avg(feedback_score), 2) AS 'Overall Rating (average)',
     CASE
           WHEN ROUND(AVG(feedback_score)) = 1 THEN 'Very Bad'
           WHEN ROUND(AVG(feedback_score)) = 2 THEN 'Bad'
           WHEN ROUND(AVG(feedback_score)) = 3 THEN 'Okay'
```



```
WHEN ROUND(AVG(feedback_score)) = 4 THEN 'Good'

WHEN ROUND(AVG(feedback_score)) = 5 THEN 'Very Good'

ELSE NULL

END AS 'Overall Feedback'

FROM
```

### 4.2 average rating in each quarter

feedback\_score\_t;

```
WITH feedback_score_t AS (
 SELECT *.
    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 AS feedback_score
 FROM order_t
SELECT
 quarter_number as 'Quarter', ROUND(AVG(feedback_score),2) as 'Avg Rating'
FROM
 feedback_score_t
GROUP BY
 quarter_number
ORDER BY
```



#### Output:

				Quarter	Avg Rating
			1	1	3.55
			2	2	3.35
	Overall Rating (average)	Overall Feedback	3	3	2.96
1	3.14	0kay	4	4	2.40

#### **Observations and Insights:**

#### 1. Overall Feedback Trends:

- Quarter 1 has received the highest rating with "Good," indicating customer satisfaction during this period. This may reflect a positive experience, successful promotions, or higher-quality products/services.
- Quarter 2 and Quarter 3 both received "Okay" feedback, showing an average performance. This could indicate room for improvement in service quality or customer engagement during these quarters.
- Quarter 4 stands out with the lowest rating of "Bad," signalling dissatisfaction or issues during this period that need attention.

#### 2. Seasonal or Operational Impact:

- The decline from "Good" in Quarter 1 to "Okay" in subsequent quarters and finally to "Bad" in Quarter 4 suggests a potential operational or seasonal impact. For example:
  - o If Quarter 4 coincides with high demand (e.g., holidays), operational bottlenecks might have impacted customer satisfaction.
  - o Changes in staffing, product availability, or service quality might also contribute to this trend.

#### 3. Actionable Insights:

- **Identify Success Factors**: Analyze what contributed to the "Good" rating in Quarter 1 and consider replicating those strategies in other quarters.
- Address Issues in Quarter 4: Investigate root causes for the "Bad" rating in Quarter 4. Focus on resolving customer complaints, optimizing operations, or addressing service gaps during this period.
- **Enhance Consistency**: The "Okay" feedback in Quarters 2 and 3 suggests mediocrity. Implement initiatives to elevate these quarters' performance to "Good" or higher.

#### 4. Customer Sentiment Analysis:

• The ratings reflect fluctuating customer sentiment throughout the year. Consistency in service quality and customer experience is key to maintaining or improving satisfaction.

#### 5. Strategic Opportunities:



- Use predictive analysis: Examine historical data to predict and prepare for similar trends in future quarters.
- Focus on retention strategies: Addressing Quarter 4 feedback is crucial to prevent potential loss of customer loyalty or revenue.



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

```
SELECT
      customer_feedback AS `Customer Feedback`,
      round(
            ((count(*)) * 100) / (
                  SELECT
                         count(*)
                  FROM
                         order_t
            ),
            2
      ) AS 'Feedback Distribution(%)'
FROM
      order_t
GROUP BY
      `Customer Feedback`
ORDER BY
      `Feedback Distribution(%)` DESC
```

```
WITH
feedback_score_t AS (
SELECT

*,
CASE

WHEN customer_feedback = 'Bad' THEN 2
WHEN customer_feedback = 'Very Bad' THEN 1
WHEN customer_feedback = 'okay' THEN 3
WHEN customer_feedback = 'Good' THEN 4
WHEN customer_feedback = 'very good' THEN 5
```

### Great Learning

# ELSE NULL END AS feedback\_score

**FROM** 

order\_t ) SELECT

o.quarter\_number AS `Quarter`,

round(avg(o.feedback\_score), 2) AS `Quarterly Rating(Avg)`

**FROM** 

feedback\_score\_t o

**GROUP BY** 

o.quarter\_number

**ORDER BY** 

quarter\_number ASC

#### **Output:**

Customer Feedback	Feedback Distribution(%)		Quarter	Quarterly Rating(Avg)
Very Good	22.60	1	1	3.55
Good	21.50		1	
0kay	20.20	2	2	3.35
Bad	18.20	3	3	2.96
Very Bad	17.50	4	4	2.40

#### **Observations and Insights:**

• Yes, customers getting more dissatisfied over time.

#### • Seasonal Decline in Satisfaction:

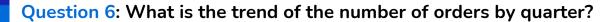
The declining average feedback across quarters correlates with the significant percentage of negative feedback. Operational challenges in later quarters might have exacerbated customer dissatisfaction.

#### Mixed Sentiment Distribution:

While a large portion of feedback is positive, the substantial percentage of "Bad" and "Very Bad" feedback suggests underlying issues with product or service quality that need to be addressed.

#### Focus Areas:

**Quarter 4** requires immediate attention to identify and resolve root causes of dissatisfaction. Initiatives to improve service consistency throughout the year could help sustain the positive momentum from Quarter 1.





```
WITH
      quarterly_orders_t AS (
            SELECT
                  o.quarter_number AS `Quarter`,
                  round(
                         (count(order_id)) * 100 / (
                               SELECT
                                     count(*)
                               FROM
                                     order_t
                         ),
                         2
                  ) AS 'Quarterly Order Distribution (%)'
            FROM
                  order_t o
            GROUP BY
                  o.quarter_number
            ORDER BY
                  quarter_number DESC
SELECT
            `Quarterly Order Distribution (%)` - lag(`Quarterly Order Distribution (%)`) OVER (
                  ORDER BY
```

'Quarter'



```
) AS `% Order trend`
FROM
quarterly_orders_t
```

#### **Output:**

	Quarter	Quarterly Order Distribution (%)	% Order trend
L	1	31.00	NULL
	2	26.20	-4.80
	3	22.90	-3.30
	4	19.90	-3.00

#### **Observations and Insights:**

- Strong Start in Quarter 1: Quarter 1 accounts for 31.00% of total orders, the highest among all quarters, likely driven by New Year promotions or strong customer engagement.
- Steady Decline Throughout the Year: A consistent drop in order percentages is observed, with Quarter 4 at the lowest (19.90%). This may reflect reduced customer engagement, operational challenges, or seasonal shifts.
- Seasonal and Strategic Opportunities:
  - Quarter 4 presents an opportunity for improvement through targeted campaigns, discounts, or loyalty rewards to boost engagement.
  - Leveraging successful strategies from Quarter 1 could help stabilize order volumes across all quarters.
- Actionable Insights: Addressing the decline in later quarters and understanding customer behavior can improve year-round order distribution and sustain customer interest.



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

```
SELECT
round(sum(((o.vehicle_price - ((o.discount * o.vehicle_price) /100 )) * o.quantity)), 2) AS `Net revenue`
FROM
order_t o;
```

```
WITH
      revenue_data AS (
            SELECT
                  o.quarter_number,
                  round(sum(((o.vehicle_price - ((o.discount * vehicle_price)/100)) * o.quantity)), 2)
AS 'Revenue'
            FROM
                  order_t o
            GROUP BY
                  quarter_number
            ORDER BY
                  'Revenue' DESC
SELECT
      quarter_number AS `Quarter`,
      `Revenue`,
      round(
                  `Revenue` - lag(`Revenue`) OVER (
                        ORDER BY
                               quarter_number
            ) * 100 / `Revenue`,
      ) AS 'performance(%)'
FROM
      revenue_data;
```



			Quarter	Revenue	performance(%)
		1	1	39421580.16	NULL
		_ 2	2	32715830.34	-20.50
	Net revenue	3	3	29229896.19	-11.93
1	124714086.32	4	4	23346779.63	-25.20

#### **Observations and Insights:**

- Revenue Decline Across Quarters:
- Q1 generates the highest revenue at 39,421,580.16, which then consistently declines each quarter.
- The steepest revenue drop occurs in **Q4**, with a decline of **-25.20%** compared to Q3, indicating a significant performance drop.
- Gradual Decline in Performance:
- The percentage drop in revenue between Q2 and Q3 is -11.93%, showing a slower decline compared to the sharper -20.50% drop from Q1 to Q2.
- Despite these smaller declines in the middle quarters, the overall trend suggests a difficulty in sustaining high revenue levels post-Q1.
- Q1 as the Peak Revenue Quarter:
- With the highest revenue, Q1 is a clear peak in the business cycle, potentially benefiting from strong demand, new product launches, or seasonal factors.
- Consistent Underperformance in Later Quarters:
- Revenue consistently declines post-Q1, reflecting potential challenges such as reduced customer engagement, pricing issues, or weaker marketing efforts in later quarters.

#### **Recommendations:**

- Enhance Customer Retention:
- Implement loyalty programs to encourage repeat purchases and stabilize revenue across quarters.
- Diversify Revenue Streams:
- Explore subscription models or new product categories to reduce dependency on seasonal or initial-quarter spikes.
- Boost Q2–Q4 Campaigns:
- Increase marketing and promotional efforts to offset the post-Q1 decline, focusing on targeted offers for high-value customers.
- Analyze Q4 Performance:
- Investigate specific factors contributing to the significant revenue drop in Q4, such as operational challenges, customer churn, or competition.
- Incentivize High-Value Orders:
- Focus on upselling and cross-selling strategies to drive higher revenue per order in declining quarters.



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

```
WITH
      quarterly_orders_t AS (
            SELECT
                  o.quarter_number AS `Quarter`,
                  ROUND(
                         COUNT(o.order_id) * 100 / (
                               SELECT
                                     COUNT(*)
                               FROM
                                     order_t
                         ),
                         2
                  ) AS '% Orders per Quarter',
                  SUM((o.vehicle_price - (o.discount * o.vehicle_price)) * o.quantity) AS `Current
Quarter Revenue'
            FROM
                  order_t o
            GROUP BY
                  o.quarter_number
            ORDER BY
                  o.quarter_number ASC
      ),
      quarterly_revenue_t AS (
```





```
`Quarter`,
                   '% Orders per Quarter',
                  round('Current Quarter Revenue' * 100 / sum('Current Quarter Revenue')
OVER (), 2) AS '% Quarter revenue'
            FROM
                  quarterly_orders_t
SELECT
            `% Orders per Quarter` - lag(`% Orders per Quarter`) OVER (
                  ORDER BY
                         `Quarter`
      ) AS '% Quarterly Orders Trend',
            `% Quarter revenue` - lag(`% Quarter revenue`) OVER (
                  ORDER BY
                         `Quarter`
      ) AS '% Quarterly Revenue Trends'
FROM
      quarterly_revenue_t;
```



#### **Output:**

	Quarter	% Orders per Quarter	% Quarter revenue	% Quarterly Orders Trend	% Quarterly Revenue Trends
L	1	31.00	37.10	NULL	NULL
2	2	26.20	27.00	-4.80	-10.10
3	3	22.90	18.27	-3.30	-8.73
1	4	19.90	17.64	-3.00	-0.63

#### **Observations and Insights:**

#### • Declining Order Percentage Across Quarters:

- o Q1 has the highest share of orders at 31.00%, which steadily declines to 19.90% in Q4.
- The order trend percentage shows consistent negative growth, with the steepest drop (-4.80%) occurring in **Q2**, followed by smaller but persistent declines in subsequent quarters.

#### • Revenue Decline Mirrors Order Trends:

- o Revenue follows a similar pattern, starting at 37.10% in Q1 and dropping to 17.64% by Q4.
- The most significant revenue decrease occurs between **Q1** and **Q2** (-10.10%), while the decline slows in later quarters, with Q4 experiencing a marginal drop (-0.63%).

#### • Order-Revenue Relationship:

- The decline in revenue closely aligns with the decline in orders, indicating that revenue is strongly dependent on the volume of orders.
- However, the revenue drop in Q4 (-0.63%) is disproportionately smaller than the drop in orders (-3.00%), suggesting potential improvement in average revenue per order or fewer discounts applied.

#### • Quarterly Patterns Suggest Challenges in Retention:

• The steady decline across all metrics could indicate challenges in retaining customers, seasonal demand variations, or lack of effective promotional strategies to sustain order volumes.

#### • Q1 as a Strong Performer:

Q1 is the strongest quarter in terms of both orders and revenue, accounting for 31.00% of orders and 37.10% of revenue. This could be due to strong initial campaigns, product launches, or seasonal factors.

#### • Q4 Revenue Stabilization:

O Despite declining orders, revenue appears to stabilize in Q4, hinting at possible pricing adjustments, higher-value orders, or targeted marketing strategies during the end of the year.

#### **Recommendations:**

#### • Boost Customer Engagement:

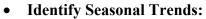
o Introduce loyalty programs and personalized offers to retain customers and increase repeat orders.

#### • Strengthen Q2–Q4 Marketing Campaigns:

 Analyze Q1's success factors and replicate them in later quarters with campaigns aimed at driving both new and repeat customers.

#### Upsell and Cross-Sell:

o Focus on increasing revenue per order in Q3 and Q4 by upselling premium products or bundling.





• Investigate external factors or seasonal variations contributing to Q1's performance to better strategize for other quarters.

#### • Revenue Diversification:

o Explore revenue streams that are less dependent on high order volumes, such as subscription models or premium services.



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

#### **Solution Query:**

SELECT				
c.credit_card_type as `Credit Card Type`,				
avg(o.discount) AS `Discount (Avg)`				
FROM				
order_t o				
INNER JOIN customer_t c ON c.customer_id = o.customer_id				
GROUP BY				
c.credit_card_type				
ORDER BY				
avg(o.discount) DESC;				

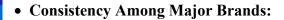
#### Output:

	Credit Card Type	Discount (Avg)
1	laser	0.643846
2	mastercard	0.629500
3	maestro	0.624219
4	visa-electron	0.623469
5	china-unionpay	0.622174
6	instapayment	0.620625
7	americanexpress	0.616327

#### **Observations and Insights:**

#### • Top Payment Methods:

- Laser (0.6438) ranks as the highest payment method, indicating a strong preference among users or high acceptance rates in transactions.
- **Mastercard** (0.6295) and **Maestro** (0.6242) follow closely, suggesting these are also widely trusted and frequently used payment options.





• Major brands like **Visa** (0.6008) and **American Express** (0.6163) are present in the list, highlighting their sustained relevance in the market, albeit with slightly lower scores than the top contenders.

#### • Diversity in Payment Options:

• A range of payment methods is represented, including less common options like **Diners Club** cards (various types) and **JCB**. This indicates a diverse landscape where consumers have multiple choices, catering to various preferences.

#### • Lower Scores for Some Cards:

• Payment methods such as **Solo** (0.5850) and **Diners Club International** (0.5840) score significantly lower than the top contenders, suggesting limited usage or acceptance in the market.

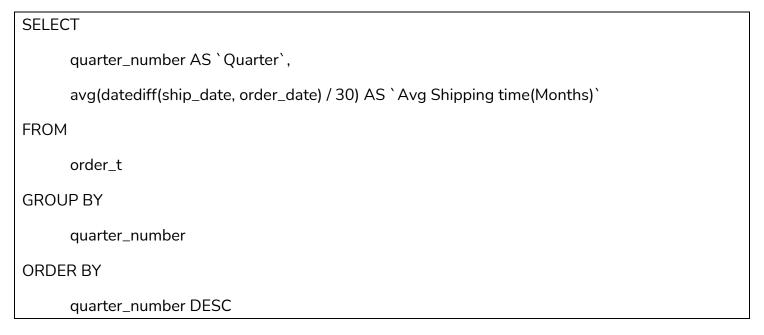
#### • Potential for Improvement:

• The lower scores for some brands may indicate opportunities for improvement in user adoption or market penetration. Strategies could focus on enhancing visibility, acceptance, or features of these payment methods to boost their performance.



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

#### **Solution Query:**



#### Output:

	Quarter	Avg Shipping time(Months)
1	4	5.80318090
2	3	3.92519607
3	2	2.37036565
4	1	1.90559516

#### **Observations and Insights:**

#### • Increasing Shipping Times:

• Average shipping time shows a clear upward trend across the quarters, increasing from 1.91 days in Q1 to 5.80 days in Q4. This significant rise indicates potential issues in logistics or fulfillment as the year progresses.

#### • Sharp Increase in Early Quarters:

• The most notable increase occurs between Q1 and Q2, where shipping time nearly **doubles** from **1.91 days to 2.37 days**. This could suggest operational challenges or increased demand that the system struggled to meet.

#### • Implications for Customer Satisfaction:



• Longer shipping times can negatively impact customer satisfaction and retention, particularly in Q4, where the average shipping time exceeds **5 days**. This could lead to customer frustration and loss of sales.

#### • Need for Operational Review:

• The rising trend in shipping times necessitates an operational review to identify bottlenecks or inefficiencies in the shipping process. Addressing these issues could help reduce shipping times and enhance service levels.

#### • Seasonal Demand Considerations:

• The increase in average shipping time, especially in Q4, may be influenced by seasonal factors such as holiday demand. Understanding these patterns can help in resource allocation and planning for peak periods.

### **Business Metrics Overview**



Total Revenue	Total Orders	Total Customers	Average Rating
124714086.32	1000	994	3.14
Last Quarter Revenue	Last quarter Orders	Average Days to Ship	% Good Feedback
23346779.63	199	97.9640	21.50

### **Business Recommendations**

#### • Enhance Customer Engagement:

• Implement loyalty programs to encourage repeat purchases. Consider strategies such as personalized marketing, targeted promotions, and follow-up communications to improve customer retention.

#### • Improve Customer Satisfaction:

• Conduct customer surveys to identify specific areas of dissatisfaction. Focus on addressing these issues, whether they pertain to product quality, customer service, or delivery experiences.

#### • Optimize Shipping Processes:

• The high average shipping time is a major concern. Review and optimize logistics operations to reduce shipping times. Explore partnerships with reliable carriers or invest in better inventory management systems to enhance delivery efficiency.

#### • Increase Positive Feedback:

• Encourage customers to leave positive reviews by following up after purchases and offering incentives (e.g., discounts on future purchases). Actively address negative feedback to improve the overall customer experience.

#### • Monitor Key Metrics:

• Establish regular monitoring of key performance indicators (KPIs) such as customer acquisition cost, customer lifetime value, and return rates. This data can guide strategic decisions and help track progress.

#### • Invest in Quality Control:

• Focus on quality assurance processes to ensure products meet customer expectations. Implementing stricter quality control measures can lead to improved ratings and increased customer satisfaction.

#### • Diversify Product Offerings:



• Consider expanding the product range to attract new customers and encourage existing customers to purchase more. Research market trends to identify potential new offerings that align with customer preferences.

#### • Use Data Analytics:

• Leverage data analytics tools to gain insights into customer behaviour and purchasing patterns. Understanding these trends can help tailor marketing efforts and improve sales strategies.