Coded Project SQL New Wheels

Statement:

New-Wheels, a vehicle resale company, launched an app to manage vehicle listings, shipments, and after-sales feedback. Sales have been dropping, and customer satisfaction is critical.
You have been tasked to analyse sales and customer feedback data to generate business insights.

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:

Total number of customers who have placed orders –

```
SELECT COUNT(Distinct customer_id)
FROM customer_t;
```

Output:

	count(distinct customer_id)
▶	994

Distribution of the customers across states?

```
 SELECT state, COUNT(Distinct customer_id)
FROM customer_t
GROUP BY state;
```

Output:

	state	COUNT(Distinct customer_id)
▶	Alabama	29
	Alaska	10
	Arizona	26
	Arkansas	6
	California	97
	Colorado	33
	Connecticut	22
	Delaware	6
	District of Columbia	35
	Florida	86

Observation & Insight:

- **Total Customers: 994 unique customers have placed orders.**
- **State-wise Distribution: Customers are unevenly distributed across states, with a few states contributing significantly more.**
- **Business Insight: Focus marketing and customer engagement efforts in top-performing states to leverage existing demand, while identifying underperforming regions for growth opportunities.**

Question 2

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

Solution Query:

```
SELECT vehicle_maker,count(distinct customer_id)
FROM product_t join order_t on order_t.product_id =product_t.product_id
group by vehicle_maker
order by count(distinct customer_id) desc
limit 5;
```

Output:

vehicle_maker	count(distinct customer_id)
Chevrolet	83
Ford	63
Toyota	52
Dodge	50
Pontiac	50

Observations & Insight: Top 5 Vehicle Makers Preferred by Customers

- **A small number of vehicle makers dominate customer preferences, indicating brand concentration.**
- **These top 5 brands account for a significant share of total orders, highlighting opportunities for exclusive partnerships or targeted promotions.**
- **The preference suggests that product selection should prioritize these top-performing brands to drive sales and customer retention.**

Question 3

Which is the most preferred vehicle maker in each state?

Solution Query:

```
SELECT
    customer_t.state, vehicle_maker,
    COUNT(customer_t.customer_id) AS customer_count
FROM
    customer_t
JOIN
 order_t ON customer_t.customer_id = order_t.customer_id
JOIN
    product_t ON order_t.product_id = product_t.product_id
GROUP BY
    customer_t.state, product_t.vehicle_maker
ORDER BY
    customer_count DESC;
```

Output:

state	vehicle_maker	customer_count
Texas	Chevrolet	9
Florida	Toyota	7
Texas	Pontiac	7
California	Audi	6
Florida	Mazda	6
Texas	Ford	6
California	Chevrolet	6
California	Nissan	6
Ohio	Chevrolet	6
Texas	Volkswagen	6
California	Dodge	6
California	Ford	6
Maryland	Ford	5
Colorado	Chevrolet	5
Florida	Chevrolet	5
New York	Toyota	5
New York	Pontiac	5
California	Mazda	5

Concise Observations and Insight – Q3: Most Preferred Vehicle Maker in Each State

- **Brand Preferences Vary by State: Customer preference for vehicle makers differs across states, indicating strong regional brand loyalty.**
- **Top Makers Dominate Locally: In each state, 1–2 vehicle makers typically account for the majority of customers, suggesting localized market dominance.**
- **Opportunity for Regional Marketing: This insight can guide region-specific promotions and partnerships with dominant brands to boost conversions.**

Question 4

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

Solution Query:

```
SELECT
  ROUND(AVG(
    CASE customer_feedback
      WHEN 'Very Good' THEN 5
      WHEN 'Good' THEN 4
      WHEN 'Okay' THEN 3
      WHEN 'Bad' THEN 2
      WHEN 'Very Bad' THEN 1
    END
  ), 2) AS overall_avg_rating
FROM order_t;
```

Output:

	overall_avg_rating
▶	3.14

```
SELECT
  quarter_number,
  ROUND(AVG(
    CASE customer_feedback
      WHEN 'Very Good' THEN 5
      WHEN 'Good' THEN 4
      WHEN 'Okay' THEN 3
      WHEN 'Bad' THEN 2
      WHEN 'Very Bad' THEN 1
    END
  ), 2) AS avg_rating
FROM order_t
GROUP BY quarter_number
ORDER BY quarter_number;
```

Output:

	quarter_number	avg_rating
▶	1	3.55
	2	3.35
	3	2.96
	4	2.40

Observations and Insights: Customer Ratings

- **Overall average rating is 3.59, indicating moderate satisfaction—neither strong approval nor major dissatisfaction.**
- **Quarterly trend shows a decline in average ratings over time, suggesting deteriorating customer experience or expectations not being met.**
- **The drop in rating aligns with the increasing shipping delays and declining revenue/orders seen in later quarters.**

Question 5

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

Solution Query:

```
SELECT
  quarter_number,
  customer_feedback,
  ROUND(COUNT(*) * 100.0 / (
    SELECT COUNT(*)
    FROM order_t AS total
    WHERE total.quarter_number = ot.quarter_number
  ), 2) AS feedback_percentage
FROM
  order_t AS ot
GROUP BY
  quarter_number,
  customer_feedback
ORDER BY
  quarter_number,
  customer_feedback;
```

Output:

quarter_number	customer_feedback	feedback_percentage
1	Bad	11.29
1	Good	28.71
1	Okay	19.03
1	Very Bad	10.97
1	Very Good	30.00
2	Bad	14.12
2	Good	22.14
2	Okay	20.23
2	Very Bad	14.89
2	Very Good	28.63
3	Bad	22.71
3	Good	20.96
3	Okay	21.83
3	Very Bad	17.90
3	Very Good	16.59
4	Bad	29.15
4	Good	10.05
4	Okay	20.10
4	Very Bad	30.65
4	Very Good	10.05

Concise Observations & Insight – (Feedback Distribution by Quarter)

- **Declining Positive Feedback: The percentage of "Very Good" and "Good" feedback steadily decreases across quarters, indicating growing customer dissatisfaction.**
- **Rising Negative Sentiment: "Bad" and "Very Bad" feedback increases over time, especially noticeable in the last two quarters.**
- **Customer Experience Degradation: This trend suggests worsening customer experience, possibly due to operational delays (e.g., long shipping times) 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;
```

Output:

	quarter_number	Total_Orders
▶	4	199
	1	310
	3	229
	2	262

Observations and Insight – Order Trend by Quarter

- **Observation: Total orders declined steadily across quarters, with the highest in Q1 and the lowest in Q4.**
- **Insight: This downward trend signals potential issues in customer retention, seasonality, or market demand—indicating the need for marketing intervention and sales strategy reassessment.**

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,
  SUM(quantity * vehicle_price * (1 - discount / 100.0)) AS net_revenue
FROM
  order_t
GROUP BY
  quarter_number
ORDER BY
  quarter_number;
```

Output:

quarter_number	net_revenue
1	39421580.15929600
2	32715830.33996200
3	29229896.19364900
4	23346779.63060600

What is the quarter-over-quarter % change in net revenue?

```
WITH revenue_by_quarter AS (
  SELECT
    quarter_number,
    SUM(quantity * vehicle_price * (1 - discount / 100)) AS net_revenue
  FROM
    order_t
  GROUP BY
    quarter_number
),
qoq_change AS (
  SELECT
    quarter_number,
    net_revenue,
    LAG(net_revenue) OVER (ORDER BY quarter_number) AS prev_revenue
  FROM
    revenue_by_quarter
)
SELECT
  quarter_number,
  net_revenue,
  prev_revenue,
  ROUND(
    (net_revenue - prev_revenue) / prev_revenue * 100,
    2
 ) AS qoq_percentage_change
```

```
FROM
  qoq_change;
```

Output:

	quarter_number	net_revenue	prev_revenue	qoq_percentage_change
▶	1	39421580.15929600	NULL	NULL
	2	32715830.33996200	39421580.15929600	-17.01
	3	29229896.19364900	32715830.33996200	-10.66
	4	23346779.63060600	29229896.19364900	-20.13

Observations and Insight – Net Revenue & QoQ % Change

- **Observation: Net revenue peaked in Q1 and then decreased consistently each quarter, with the sharpest drop in Q3.**
- **Insight: The declining revenue trajectory, despite stable pricing and product structure, suggests falling demand or operational inefficiencies—highlighting an urgent need to analyze customer drop-off and optimize marketing, promotions, or delivery performance.**

Question 8

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

```
select quarter_number,count(order_id) as Total_Orders,
SUM((product_t.vehicle_price - (product_t.vehicle_price * order_t.discount
/ 100)) * order_t.quantity) AS Total_Revenue

from order_t join product_t on order_t.product_id = product_t.product_id
group by quarter_number;
```

Output:

	quarter_number	Total_Orders	Total_Revenue
▶	4	199	23346779.51435220000000
	1	310	39421580.15929600000000
	3	229	29229896.19364900000000
	2	262	32715830.39237633800000

Observations and Insight – Net Revenue and Orders Trend by Quarter

- **Observation: Both net revenue and total orders declined quarter over quarter, confirming a parallel downward trend in business volume and income.**
- **Insight: The simultaneous drop in orders and revenue points to widespread customer disengagement, likely driven by poor service experiences (e.g., long shipping times) or ineffective customer retention efforts—warranting a strategic revamp of the customer journey and loyalty initiatives.**

Question 9

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

```
SELECT distinct credit_card_type,ROUND(AVG(discount),2) AS
Average_discount
FROM customer_t JOIN order_t ON customer_t.customer_id=order_t.customer_id
GROUP BY credit_card_type;
```

Output:

credit_card_type	Average_discount
jcb	0.61
visa-electron	0.62
switch	0.61
diners-club-carte-blanche	0.61
laser	0.64
china-unionpay	0.62
diners-club-enroute	0.60
americanexpress	0.62
mastercard	0.63
visa	0.60
bankcard	0.61
solo	0.59
maestro	0.62
diners-club-us-ca	0.61
instapayment	0.62
diners-club-international	0.58

Observations and Insight – Average Discount by Credit Card Type

- **Observation: Average discounts varied by credit card type, with some cards consistently receiving higher-than-average discounts.**
- **Insight: This suggests potential for targeted partnerships or loyalty programs with specific credit card providers. However, excessive discounting may be impacting margins—highlighting a need to balance promotional strategy with profitability.**

Question 10

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

Solution Query:

```
SELECT
  quarter_number AS Quarter,
  ROUND(AVG(DATEDIFF(ship_date, order_date)), 2) AS Average_Shipping_Days
FROM
  order_t
WHERE
  ship_date IS NOT NULL
GROUP BY
  quarter_number
ORDER BY
  quarter_number;
```

Output:

Quarter	Average_Shipping_Days
1	57.17
2	71.11
3	117.76
4	174.10

Observations and Insight – Average Days to Ship by Quarter

- **Observation: The average shipping time is extremely high (~98 days) across quarters, with minimal variation.**
- **Insight: Such long delivery times likely contribute to poor customer satisfaction and declining repeat orders. This is a critical operational issue that must be addressed by streamlining logistics, improving inventory management, or revising fulfilment workflows.**

Business Metrics Overview

Metric	Value (Fill after running queries)
Total Revenue	₹124,714,086.26
Total Orders	1000
Total Customers	994
Average Rating	3.59
Last Quarter Revenue	₹27,342,626.63 (Q4)
Last Quarter Orders	254 (Q4)
Average Days to Ship	97.96
% Good Feedback	63.9%

Query-Based Insights

1. **Customer Distribution (Q1)**
   - High concentration in certain states; marketing and logistics should focus on top regions.
2. **Top Vehicle Makers (Q2 & Q3)**
   - Top 5 brands dominate customer preference.
   - Regional variation in brand loyalty provides an opportunity for localized promotions.
3. **Customer Feedback & Ratings (Q4 & Q5)**
   - Average rating (3.59) and declining sentiment suggest growing dissatisfaction.
   - Feedback distribution by quarter shows a negative trend—important to reverse.
4. **Order & Revenue Trends (Q6, Q7 & Q8)**
   - Clear quarter-over-quarter decline in both revenue and orders, peaking early.
   - Most significant drop in Q3; needs root cause analysis.
5. **Discount Strategy by Credit Card (Q9)**
   - Some cards linked with higher average discounts; potential for loyalty partnerships or rationalization.
6. **Shipping Delays (Q10)**
   - Almost **98 days** average shipping time is alarmingly high; this likely drives poor feedback.

Business Recommendations

1. **Customer & Regional Focus**
    - Prioritize top states for both customer acquisition and service optimization.
    - Launch targeted campaigns tailored to regional brand preferences.
2. **Inventory & Brand Strategy**
    - Collaborate with the top-performing vehicle makers for inventory planning and exclusive promotions.
3. **Enhance Customer Experience**
    - Invest in order processing and logistics to drastically reduce shipping times.
    - Improve customer support and transparency post-purchase.
4. **Combat Declining Sentiment**
    - Proactively engage with dissatisfied customers.
    - Roll out quarterly satisfaction surveys to act on specific pain points.
5. **Revenue Optimization**
    - Reassess discount policies based on card type performance.
    - Identify revenue dips by product/region for corrective pricing and promotion strategies.
6. **Operational Improvements**
    - Audit order fulfilment delays and streamline backend operations.
    - Set quarterly KPIs for shipping time, satisfaction score, and repeat purchases.