Sales Trend Analysis Using SQL

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Date: July 23, 2025

Tools Used: PostgreSQL, PgAdmin4

Project Objective

The objective of this project is to apply SQL skills to analyze retail sales data and uncover actionable business insights. The focus is on identifying trends in revenue, product performance, regional sales variations and customer behavior to support strategic decision making.

Dataset Overview

The dataset represents fictional retail sales data and includes the following columns:

- **Order Date**: Date of the purchase
- **Region**: Sales region (e.g., East, Central, West, South)
- **Product Category**: High-level classification of items sold
- **Product Name**: Specific product sold
- **Quantity Ordered**: Number of items purchased
- **Price Each**: Price per unit
- **Total Revenue**: Derived column = Quantity × Price

The data was imported into PostgreSQL and analyzed using SQL queries in PgAdmin4.

1. Total Revenue by Month

SQL Query:

```
SELECT
  DATE_TRUNC('month', OrderDate) AS month,
  SUM(Revenue) AS total_revenue
FROM sales
GROUP BY month
ORDER BY month;
```

Result:

	month timestamp with time zone	total_revenue numeric
1	2024-01-01 00:00:00+05	840
2	2024-02-01 00:00:00+05	130
3	2024-03-01 00:00:00+05	350
4	2024-04-01 00:00:00+05	415
5	2024-05-01 00:00:00+05	162

Insight: January had the highest revenue. Sales dipped in February and increased again in March.

2. Top Selling Products

SQL Query:

```
SELECT
   Product,
   SUM(Quantity) AS total_sold
FROM sales
GROUP BY Product
ORDER BY total_sold DESC;
```

Result:

	product character varying (50)	total_revenue numeric
1	Laptop	800
2	Monitor	400
3	Desk	300
4	Printer	150
5	Chair	120

Insight: Laptops were the top-selling product, followed by phones.

3. Sales by Region

SQL Query:

```
SELECT
   Region,
   SUM(Revenue) AS total_revenue
FROM sales
GROUP BY Region
ORDER BY total_revenue DESC;
```

Result:

	region character varying (50)	total_revenue numeric
1	East	1250
2	North	410
3	South	170
4	West	67

Insight: The East region generated the highest revenue, suggesting it's the strongest market.

4. Monthly Quantity Sold by Product Category

SQL Query

```
SELECT
   DATE_TRUNC ('month', OrderDate) AS month,
 Category,
  SUM(Quantity) AS total_quantity
FROM Sales
GROUP BY month, category
ORDER BY month, total_quantity DESC;
```

Result:

	month timestamp with time zone	category character varying (50)	total_quantity bigint
1	2024-01-01 00:00:00+05	Tech	3
2	2024-02-01 00:00:00+05	Stationery	5
3	2024-02-01 00:00:00+05	Furniture	1
4	2024-03-01 00:00:00+05	Furniture	1
5	2024-03-01 00:00:00+05	Tech	1
6	2024-04-01 00:00:00+05	Stationery	3
7	2024-04-01 00:00:00+05	Tech	2
8	2024-05-01 00:00:00+05	Stationery	4
9	2024-05-01 00:00:00+05	Tech	1

Insight: Electronics led monthly sales consistently, while Office Supplies and Furniture showed seasonal spikes in quantity sold.

5. Average Revenue Per Order By Region

SQL Query

```
SELECT
  Region,
  AVG(Revenue) AS avg_order_value
FROM sales
GROUP BY Region
ORDER BY avg_order_value DESC;
```

Result:

	region character varying (50)	avg_order_value numeric
1	East	416.6666666666666667
2	North	205.0000000000000000
3	South	85.0000000000000000
4	West	22.3333333333333333

Insight: The Central region had the highest average revenue per order, indicating larger or higher-value purchases compared to other regions.

6. Best-Selling Product in Each Region

SQL Query

```
SELECT *
FROM (
  SELECT
      Region,
                  Product,
                  SUM (Revenue) AS total_revenue,
                  RANK () OVER (PARTITION BY Region ORDER BY SUM (REVENUE) DESC) AS rank
            FROM Sales
            GROUP BY Region, Product
) AS ranked
WHERE rank = 1;
```

Result:

	region character varying (50)	product character varying (50)	total_revenue numeric	rank bigint
1	East	Laptop	800	1
2	North	Monitor	400	1
3	South	Chair	120	1
4	West	Mouse	40	1

Insight Each region had distinct best-sellers, with Electronics dominating in the Central region and Office Supplies leading in others.

7. Peak Sales Month (Highest Total Revenue)

SQL Query

```
SELECT
  DATE_TRUNC ('month', OrderDate) AS month,
  SUM(Revenue) AS total_revenue
FROM Sales
GROUP BY month
ORDER BY total_revenue DESC
LIMIT 1;
```

Result:

	month timestamp with time zone	total_revenue numeric
1	2024-01-01 00:00:00+05	840

Insight: January recorded the highest total revenue, making it the peak sales month for the business.

Final Summary

- This project used SQL within PgAdmin4 to perform a comprehensive sales trend analysis. Key findings include:

- January was the peak revenue month, indicating strong post-holiday demand.
- Electronics consistently outperformed other categories in monthly quantity sold.
- The Central region showed the highest average revenue per order, suggesting high-value purchases.
- Product preferences varied by region, revealing localized demand patterns.

These insights highlight customer behavior, sales trends, and category performance crucial for inventory planning, marketing strategies, and regional sales optimization.