

Retail Analysis SQL Project

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Scenario:

You're an analyst at a retail chain tasked with delivering strategic insights using advanced SQL techniques.

This project leverages five datasets: Product, Customer, Sales, Inventory, and Promotion.

Schema:

1. Product(ProductID, ProductName, Category, Brand, Price, Cost)
2. Customer(CustomerID, Name, Age, Gender, Location, LoyaltyTier)
3. Sales(SaleID, Date, CustomerID, ProductID, Quantity, TotalPrice)
4. Inventory(ProductID, StockLevel, ReorderLevel)
5. Promotion(PromoID, ProductID, DiscountPercent, StartDate, EndDate)

1. Top 3 Best-Selling Products (by quantity):

```
WITH ProductSales AS (  
    SELECT ProductID, SUM(Quantity) AS TotalQty  
    FROM Sales  
    GROUP BY ProductID  
)  
SELECT p.ProductName, ps.TotalQty  
FROM ProductSales ps  
JOIN Product p ON ps.ProductID = p.ProductID  
ORDER BY ps.TotalQty DESC  
FETCH FIRST 3 ROWS ONLY;
```

2. Customer Lifetime Value (CLV):

```
SELECT c.CustomerID, c.Name, SUM(s.TotalPrice) AS CLV  
FROM Customer c  
JOIN Sales s ON c.CustomerID = s.CustomerID  
GROUP BY c.CustomerID, c.Name
```

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ORDER BY CLV DESC;

3. Products with Low Inventory:

```
SELECT p.ProductName, i.StockLevel
FROM Inventory i
JOIN Product p ON i.ProductID = p.ProductID
WHERE i.StockLevel <= i.ReorderLevel;
```

4. Average Spend by Loyalty Tier (Window Function):

```
SELECT c.LoyaltyTier, AVG(s.TotalPrice) OVER(PARTITION BY c.LoyaltyTier) AS AvgSpend
FROM Customer c
JOIN Sales s ON c.CustomerID = s.CustomerID;
```

5. Products on Promotion with Sales During Promo Period (Subquery):

```
SELECT DISTINCT p.ProductName
FROM Promotion pr
JOIN Product p ON pr.ProductID = p.ProductID
WHERE EXISTS (
    SELECT 1
    FROM Sales s
    WHERE s.ProductID = pr.ProductID
    AND s.Date BETWEEN pr.StartDate AND pr.EndDate
);
```

6. Profit Per Product:

```
SELECT p.ProductName, SUM(s.TotalPrice - (p.Cost * s.Quantity)) AS Profit
FROM Sales s
JOIN Product p ON s.ProductID = p.ProductID
GROUP BY p.ProductName
```

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ORDER BY Profit DESC;

7. Most Popular Category by Revenue:

```
SELECT p.Category, SUM(s.TotalPrice) AS Revenue
FROM Sales s
JOIN Product p ON s.ProductID = p.ProductID
GROUP BY p.Category
ORDER BY Revenue DESC
FETCH FIRST 1 ROW ONLY;
```

8. Age Group Wise Sales Summary (CTE + CASE):

```
WITH AgeGroup AS (
    SELECT CustomerID,
           CASE
               WHEN Age < 25 THEN 'Under 25'
               WHEN Age BETWEEN 25 AND 40 THEN '25-40'
               ELSE 'Above 40'
           END AS AgeBracket
    FROM Customer
)
SELECT a.AgeBracket, SUM(s.TotalPrice) AS TotalSpent
FROM AgeGroup a
JOIN Sales s ON a.CustomerID = s.CustomerID
GROUP BY a.AgeBracket;
```

9. Repeat Customers (More than 1 Purchase):

```
SELECT c.CustomerID, c.Name, COUNT(s.SaleID) AS Purchases
FROM Customer c
JOIN Sales s ON c.CustomerID = s.CustomerID
```

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GROUP BY c.CustomerID, c.Name

HAVING COUNT(s.SaleID) > 1;

10. Sales Before and After Promotion Period (Window Analysis):

WITH PromoSales AS (

SELECT s.ProductID, s.Date, s.TotalPrice,

CASE

WHEN s.Date < pr.StartDate THEN 'Before'

WHEN s.Date BETWEEN pr.StartDate AND pr.EndDate THEN 'During'

ELSE 'After'

END AS PromoPhase

FROM Sales s

JOIN Promotion pr ON s.ProductID = pr.ProductID

)

SELECT ProductID, PromoPhase, SUM(TotalPrice) AS Revenue

FROM PromoSales

GROUP BY ProductID, PromoPhase

ORDER BY ProductID, PromoPhase;

Conclusion:

This analysis showcases Ajay Priyakar M's expertise in advanced SQL, including:

- CTEs for modular query design
- Window functions for aggregated insights
- Subqueries for conditional logic
- Joins across normalized retail schema

Key Business Insights:

- iPhone 14 and Galaxy S22 are top performers.
- Customers in the 25-40 age range contribute the most revenue.
- Certain loyalty tiers drive higher sales, suggesting targeted campaigns.

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- Inventory levels can be proactively managed using automated reorder alerts.

These insights support strategic decisions for sales, marketing, and inventory planning.