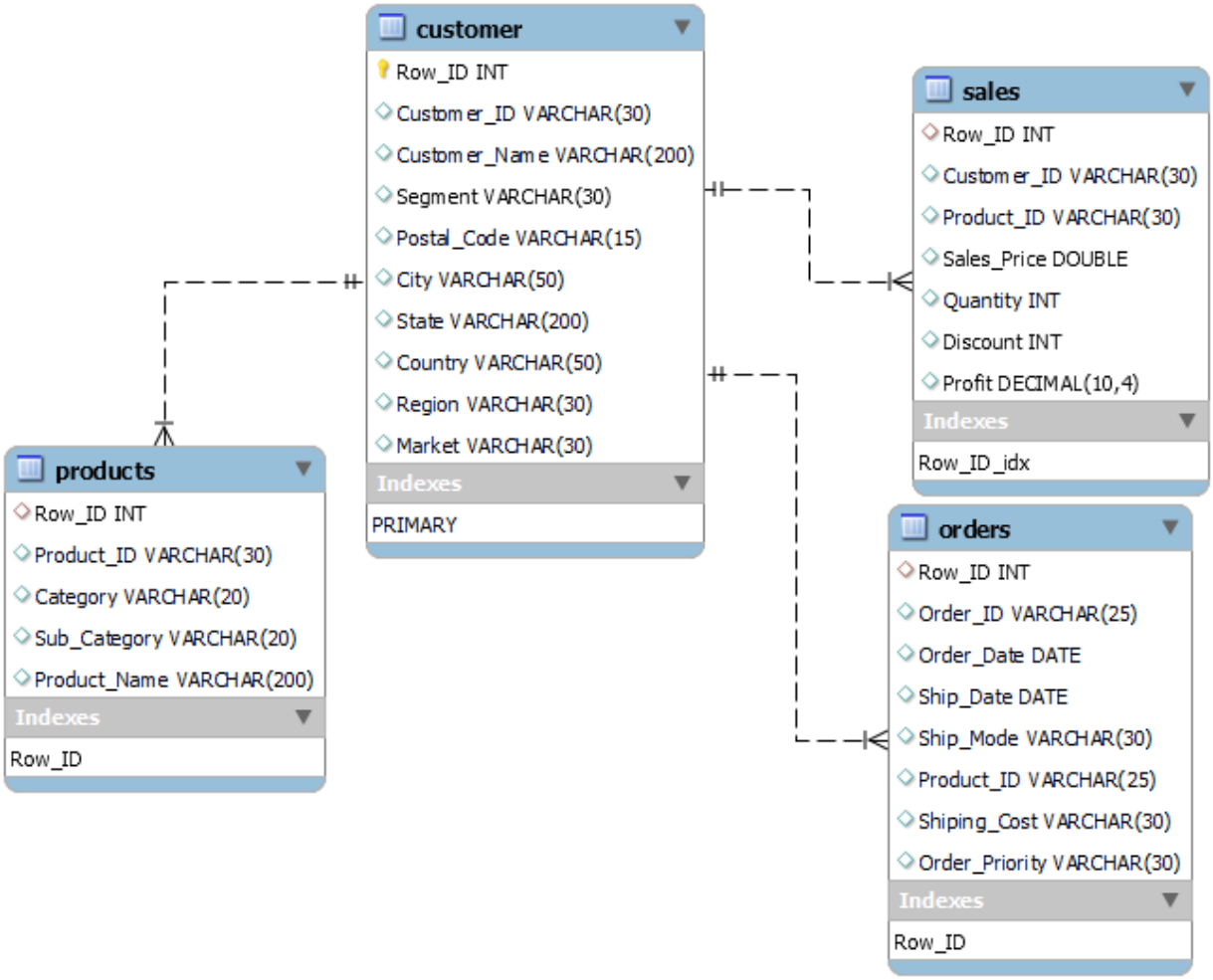
Data Dictionary (Global Store):

Spreadsheet tab	Element or value display name	Description	Data type	Character length	Acceptable values	null value?
Customer	Row_ID	unique for every row	int	N/A	whole number	N
Customer	Customer ID	unique for every Customer	Varchar	30	String	N
Customer	State	Address	Varchar	200	String	N
Customer	Customer Name	Customer Name	Varchar	30	String	N
Customer	Segment	3 options to choose from	Varchar	30	String	N
Customer	Postal_Code	Address unique code	Varchar	15	String	Y
Customer	City	Address	Varchar	50	String	N
Customer	Country	Address	Varchar	50	String	N
Customer	Region	Region	Varchar	30	String	N
Customer	Market	5 different options	Varchar	30	String	N
Sales	Sales_Price	Price	Varchar	30	String	N
Sales	Quantity	Number of items	int	N/A	whole number	N
Sales	Discount	Discount	Double	N/A	Fraction	N
Sales	Profit	Profit	Double	N/A	Fraction	N
orders	Product_ID	unique Product Number	Varchar	30	String	N
orders	Order_ID	unique Order Number	Varchar	25	String	N
orders	Order_Date	Date of order	Date	N/A	Date	N
orders	Ship_Date	Shiping initiation date	Date	N/A	Date	N
orders	Ship_Mode	4 option to choose from	Varchar	30	String	N
orders	Shipping_Cost	Shiping Cost	Double	N/A	Fraction	N
orders	Order_Priority	4 option to choose from	Varchar	30	String	N
Products	Category	3 option to choose from	Varchar	20	String	N
Products	Sub-Category	Product types	Varchar	20	String	N
Products	Product Name	Name of the Product	Varchar	200	String	N
Products	Product_ID	unique Product Number	Varchar	30	String	N

2: Data Base (Source)

https://drive.google.com/drive/folders/1K7ECtTcV5FOfRQDvZmxAEz0qd7auhXaY

Entity Relationship Diagram (ERD)



3: Executive Summary:

Issue To Address:

How can data-driven insights from sales, customer, orders of geographical tracking and discount strategy analysis be used to solve business problems and make informed decisions that drive growth, efficiency, and customer satisfaction?

1. *Sales Analysis:*
   - What are the highest selling products in terms of total sales and quantity?
   - Which product categories and sub-categories contribute the most to sales?
   - Which product categories and sub-categories contribute the least to sales?
   - Are there any specific segments or regions that consistently drive higher sales?

2. *Profitability and Costs:*
   - Which products have the highest profit margins?
   - Are there products with low profits that should be re-evaluated?

3. *Customer Behavior:*
   - What is the distribution of orders based on order priority?
   - Are there certain customer segments that tend to place larger or more frequent orders?
   - How does discount affect sales volume and profitability?

4. *Order Management:*
   - Are there certain shipping modes/cost that are preferred by customers and should be prioritized?

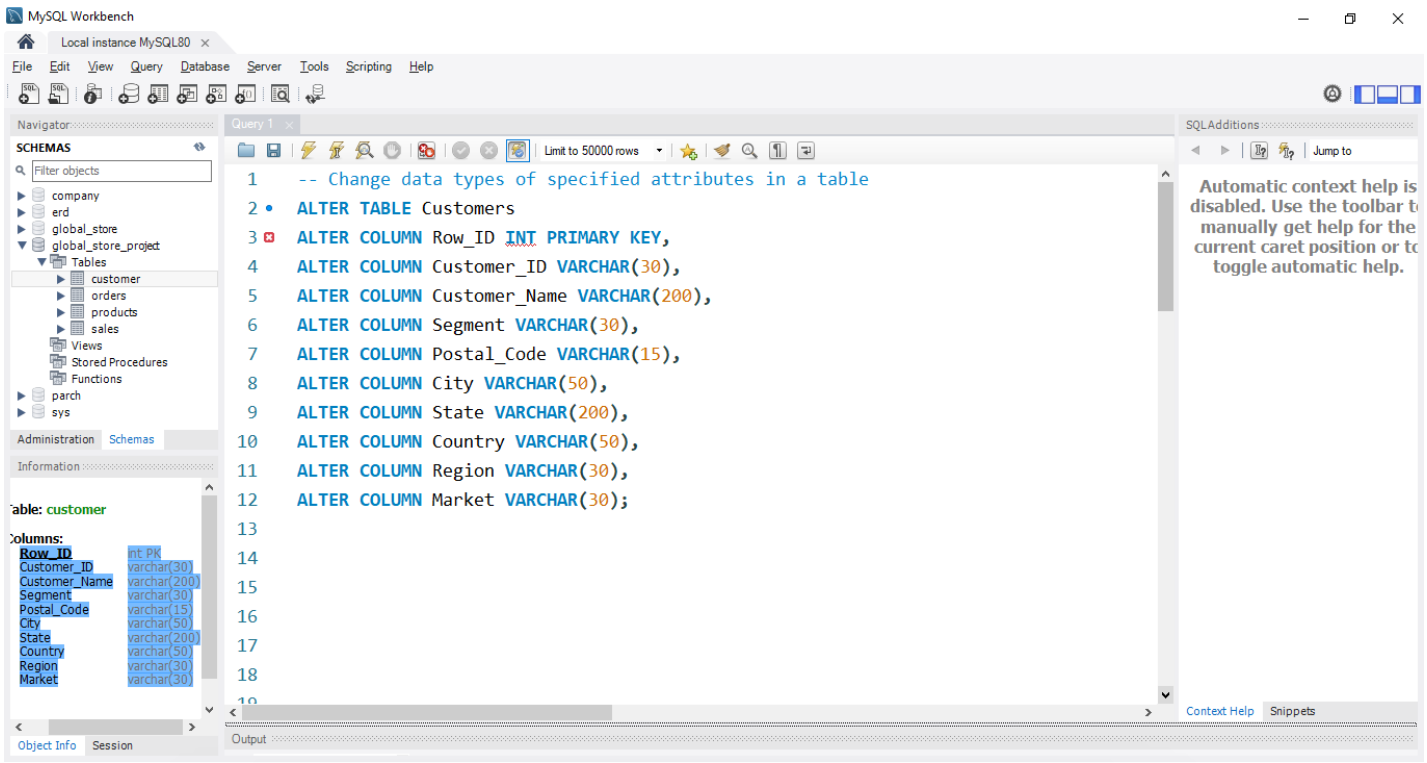
5. *Geographical Insights:*
   - Which regions or countries contribute the most to sales and profits?

6. *Market Trends:*
   - Are there seasonal patterns in sales, and how can the company prepare for these fluctuations?

7. *Discount Strategy:*
   - Is the current discount strategy effective in driving sales and profitability?
   - Are there specific product categories or customer segments that respond well to discounts?

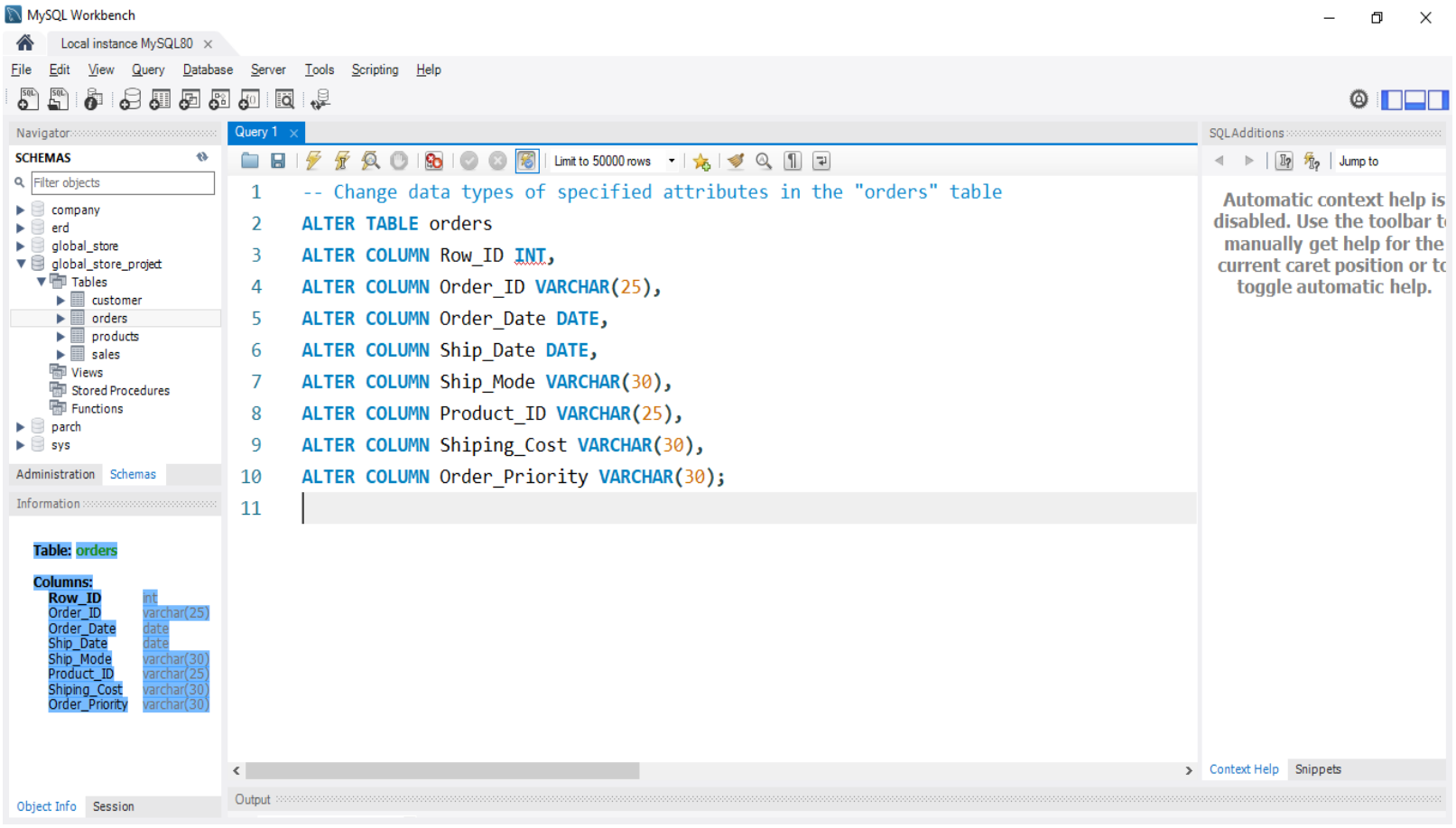
Data Cleaning: Customers

1: Change the Data types:



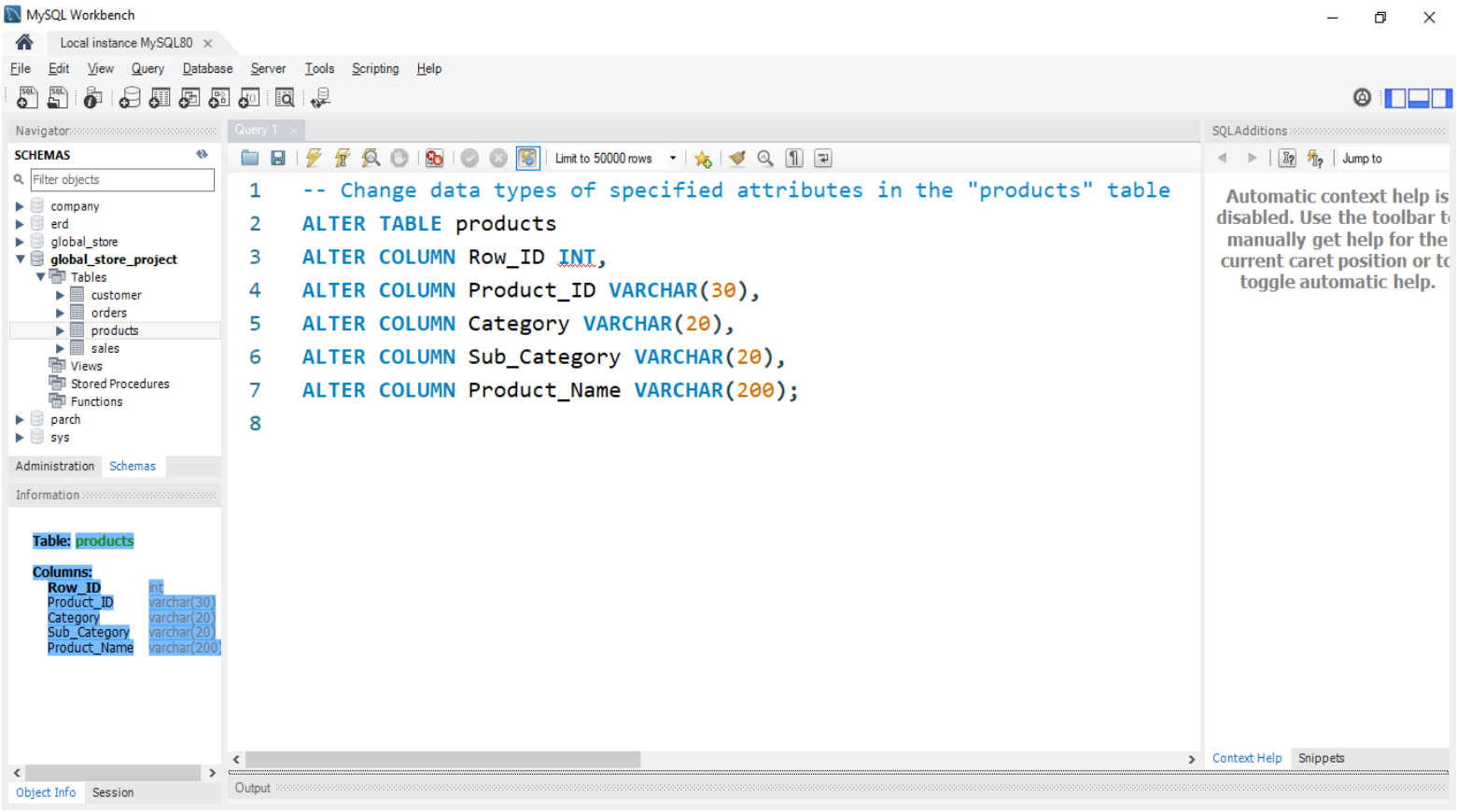

```
-- Change data types in Customers table

ALTER TABLE Customers

ALTER COLUMN Row_ID INT PRIMARY KEY,

ALTER COLUMN Customer_ID VARCHAR(30),

ALTER COLUMN Customer_Name VARCHAR(200),

ALTER COLUMN Segment VARCHAR(30),

ALTER COLUMN Postal_Code VARCHAR(15),

ALTER COLUMN City VARCHAR(50),

ALTER COLUMN State VARCHAR(200),

ALTER COLUMN Country VARCHAR(50),

ALTER COLUMN Region VARCHAR(30),

ALTER COLUMN Market VARCHAR(30);
```

Data Cleaning: Orders



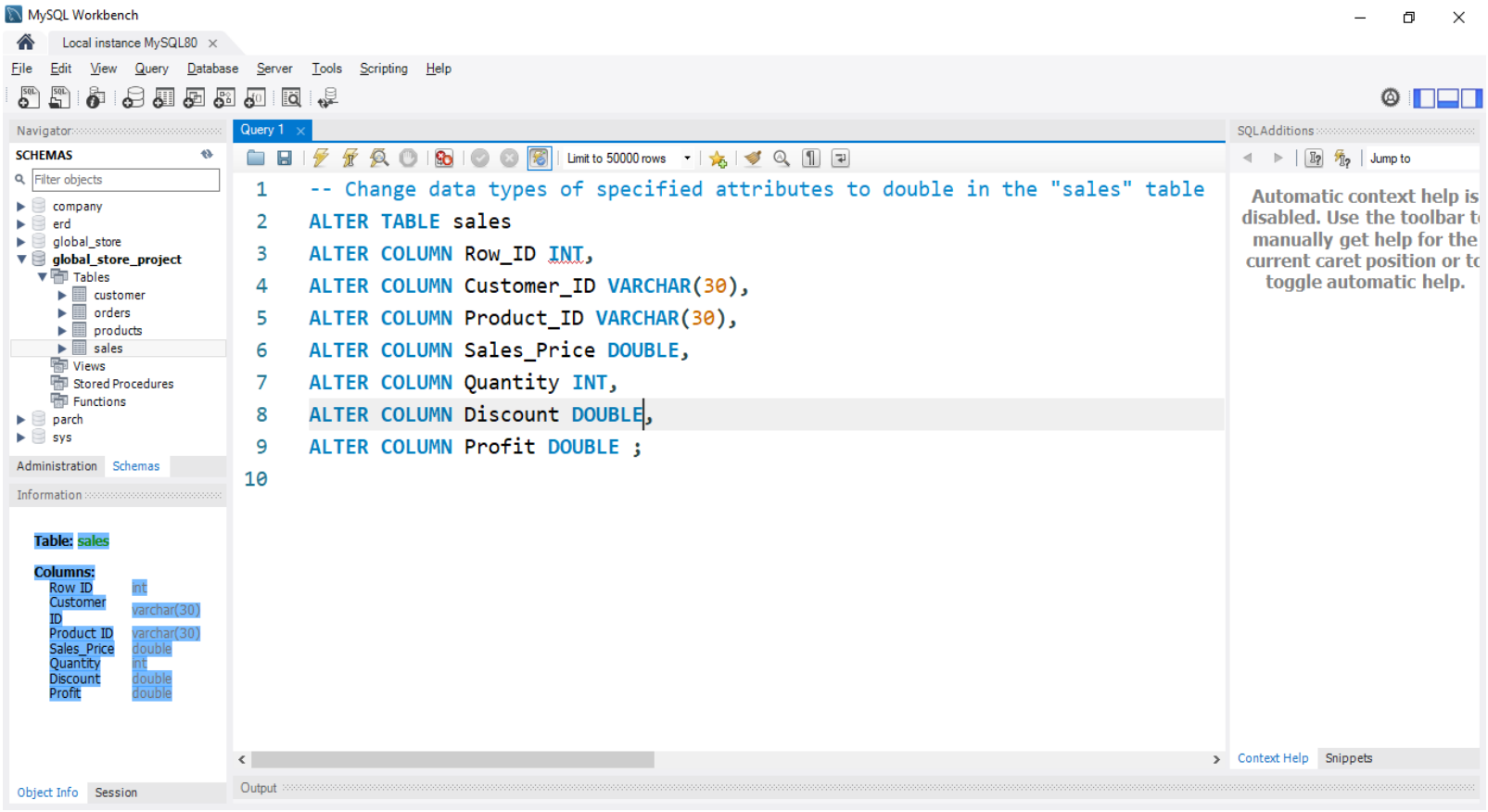

```
-- Change data types of specified attributes in the "orders" table with corrected column name

ALTER TABLE orders

ALTER COLUMN Row_ID INT,

ALTER COLUMN Order_ID VARCHAR(25),

ALTER COLUMN Order_Date DATE,

ALTER COLUMN Ship_Date DATE,

ALTER COLUMN Ship_Mode VARCHAR(30),

ALTER COLUMN Product_ID VARCHAR(25),

ALTER COLUMN Shipping_Cost VARCHAR(30),

ALTER COLUMN Order_Priority VARCHAR(30);
```

Data Cleaning: Products




```
-- Change data types of specified attributes in the "products" table
ALTER TABLE products
ALTER COLUMN Row_ID INT,
ALTER COLUMN Product_ID VARCHAR(30),
ALTER COLUMN Category VARCHAR(20),
ALTER COLUMN Sub_Category VARCHAR(20),
ALTER COLUMN Product_Name VARCHAR(200);
```

Data Cleaning: Sales

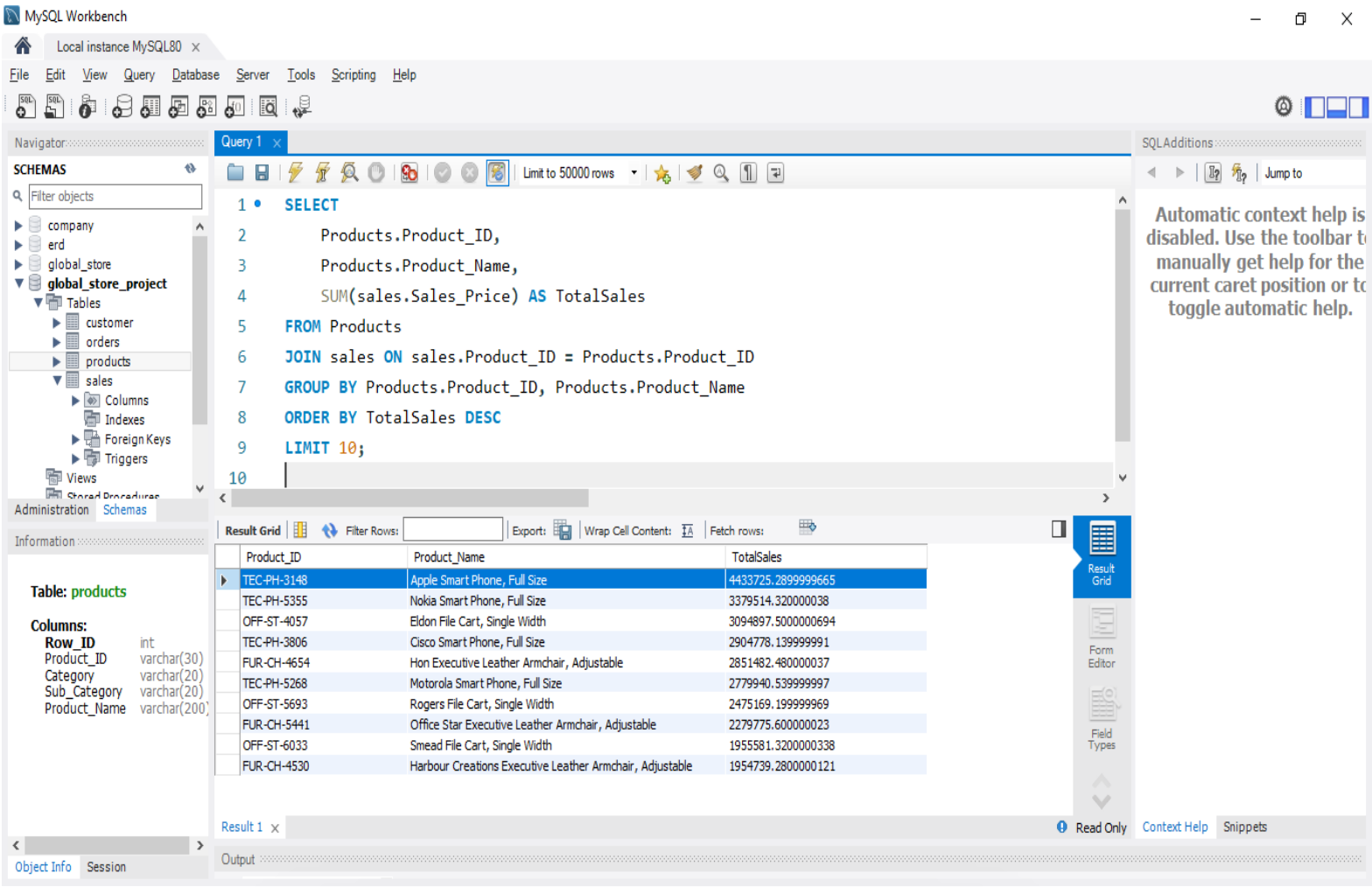



```
-- Change data types of specified attributes to double in the "sales" table
ALTER TABLE sales
ALTER COLUMN Row_ID INT,
ALTER COLUMN Customer_ID VARCHAR(30),
ALTER COLUMN Product_ID VARCHAR(30),
ALTER COLUMN Sales_Price DOUBLE,
ALTER COLUMN Quantity INT,
ALTER COLUMN Discount DOUBLE,
ALTER COLUMN Profit DOUBLE ;
```

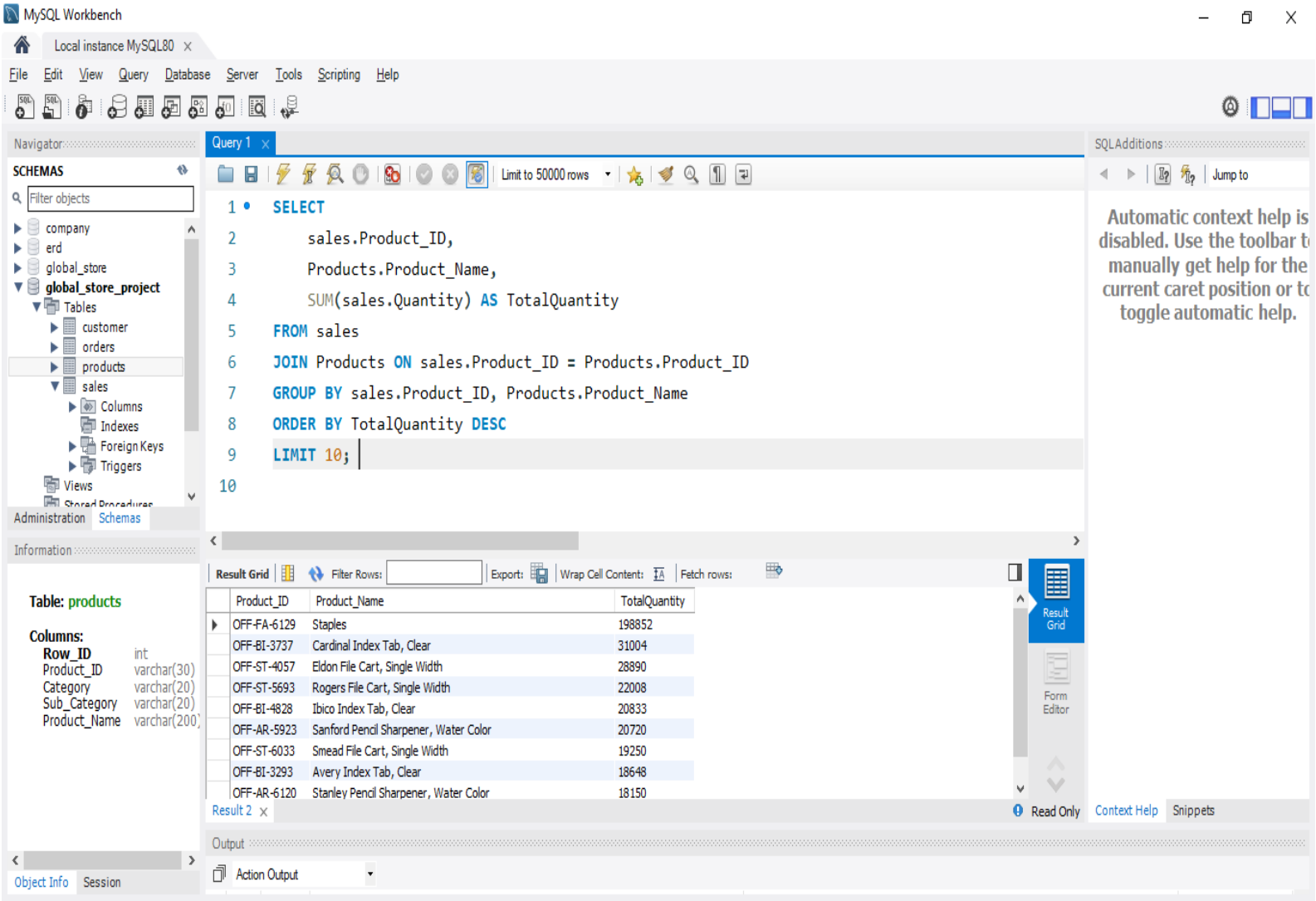
Data Exploration:

Sales Analysis:

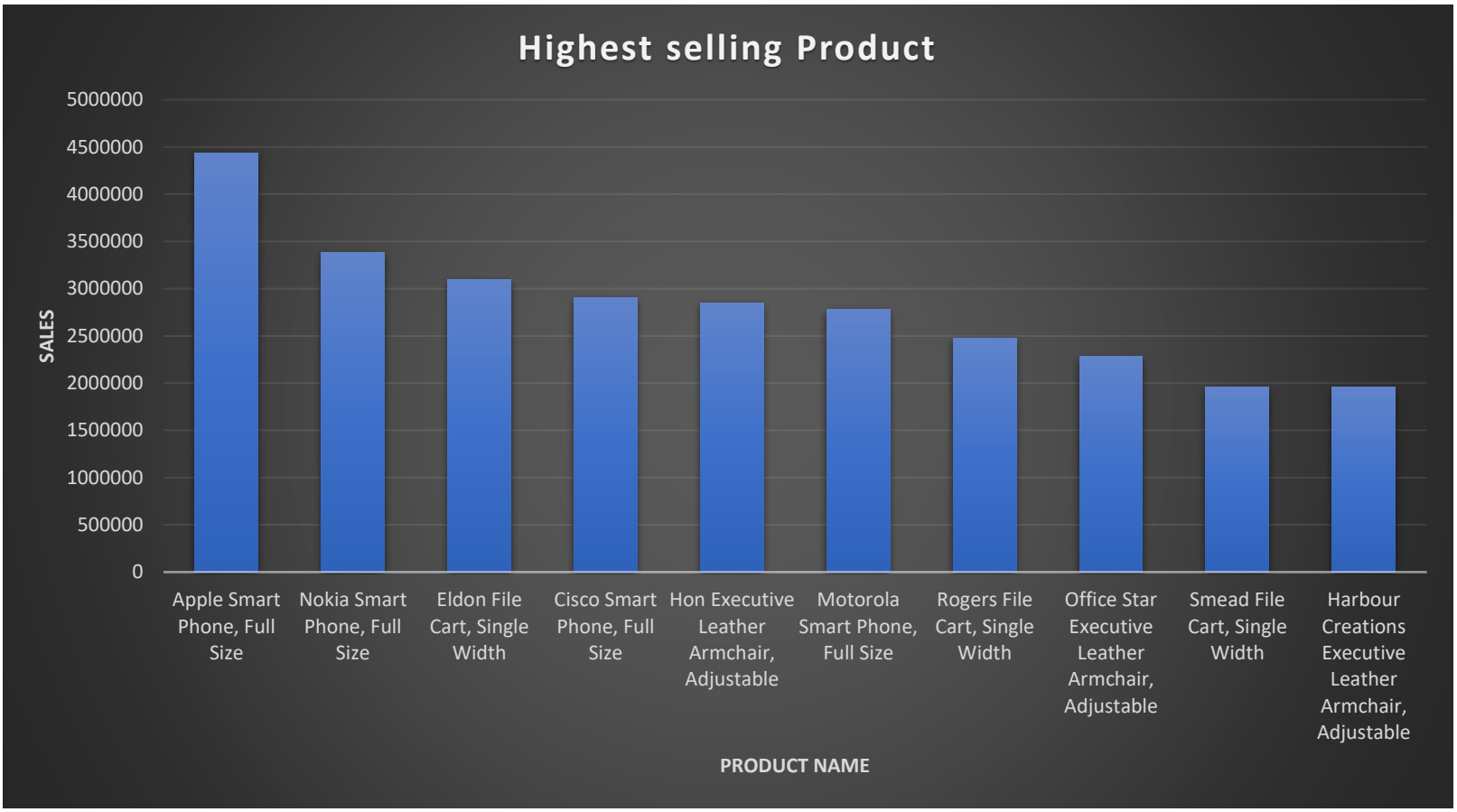
- What are the highest selling products in terms of total sales and quantity?




```
Total_Sales
SELECT
    products.Product_ID,
    products.Product_Name,
    SUM(sales.Quantity) AS TotalQuantity
FROM sales
JOIN products
ON sales.Row_ID = products.Row_ID
GROUP BY Product_ID, Product_Name
ORDER BY TotalQuantity DESC
LIMIT 10;
```




```
-- Total_Quantity

SELECT
    sales.Product_ID,
    Products.Product_Name,
    SUM(sales.Quantity) AS TotalQuantity
FROM sales
JOIN Products ON sales.Product_ID = Products.Product_ID
GROUP BY sales.Product_ID, Products.Product_Name
ORDER BY TotalQuantity DESC
LIMIT 10;
```


Highest selling Product
5000000
4500000
4000000
3500000
3000000
2500000
2000000
1500000
1000000
500000
0
SALES
Apple Smart Phone, Full Size
Nokia Smart Phone, Full Size
Eldon File Cart, Single Width
Cisco Smart Phone, Full Size
Hon Executive Leather Armchair, Adjustable
Motorola Smart Phone, Full Size
Rogers File Cart, Single Width
Office Star Executive Leather Armchair, Adjustable
Smead File Cart, Single Width
Harbour Creations Executive Leather Armchair, Adjustable
PRODUCT NAME


Highiest selling Product quanntity wise
Staples
Cardinal Index Tab, Clear
Eldon File Cart, Single Width
Rogers File Cart, Single Width
Ibico Index Tab, Clear
Sanford Pencil Sharpener, Water Color
Smead File Cart, Single Width
Avery Index Tab, Clear
Stanley Pencil Sharpener, Water Color
Acco Index Tab, Clear
Staples
Eldon File Cart, Single Width
Rogers File Cart, Single Width
Ibico Index Tab, Clear
Sanford Pencil Sharpener, Wate...
Smead File Cart,...
Avery Index Tab,...
Stanley Pencil...
Acco Index Tab,...

- Which product categories and sub-categories contribute the most to sales?

MySQL Workbench

Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

Filter objects

company
erd
global_store
global_store_project
Tables
customer
orders
products
sales
Columns
Indexes
Foreign Keys
Triggers
Views

Administration Schemas

Information

Table: products

Columns:
Row_ID int
Product_ID varchar(30)
Category varchar(20)
Sub_Category varchar(20)
Product_Name varchar(200)

Object Info Session

Query 1

Limit to 50000 rows

```
1 • SELECT
2       Products.Category,
3       Products.Sub_Category,
4       SUM(sales.Sales_Price) AS TotalSales
5   FROM sales
6   JOIN Products ON sales.Product_ID = Products.Product_ID
7   GROUP BY Products.Category, Products.Sub_Category
8   ORDER BY TotalSales DESC
9   limit 10;
10
11
```

Result Grid Filter Rows: Export: Wrap Cell Content: Fetch rows:

Category	Sub_Category	TotalSales
Office Supplies	Storage	39551964.9299923
Technology	Phones	38131697.749998614
Furniture	Chairs	35439099.02000309
Technology	Copiers	28485489.589998093
Furniture	Bookcases	28116112.839997962
Technology	Accessories	13224481.70000015
Office Supplies	Art	13037047.819997597
Office Supplies	Binders	12150687.400001613

Result 14

Result Grid Form Editor

Read Only

SQLAdditions

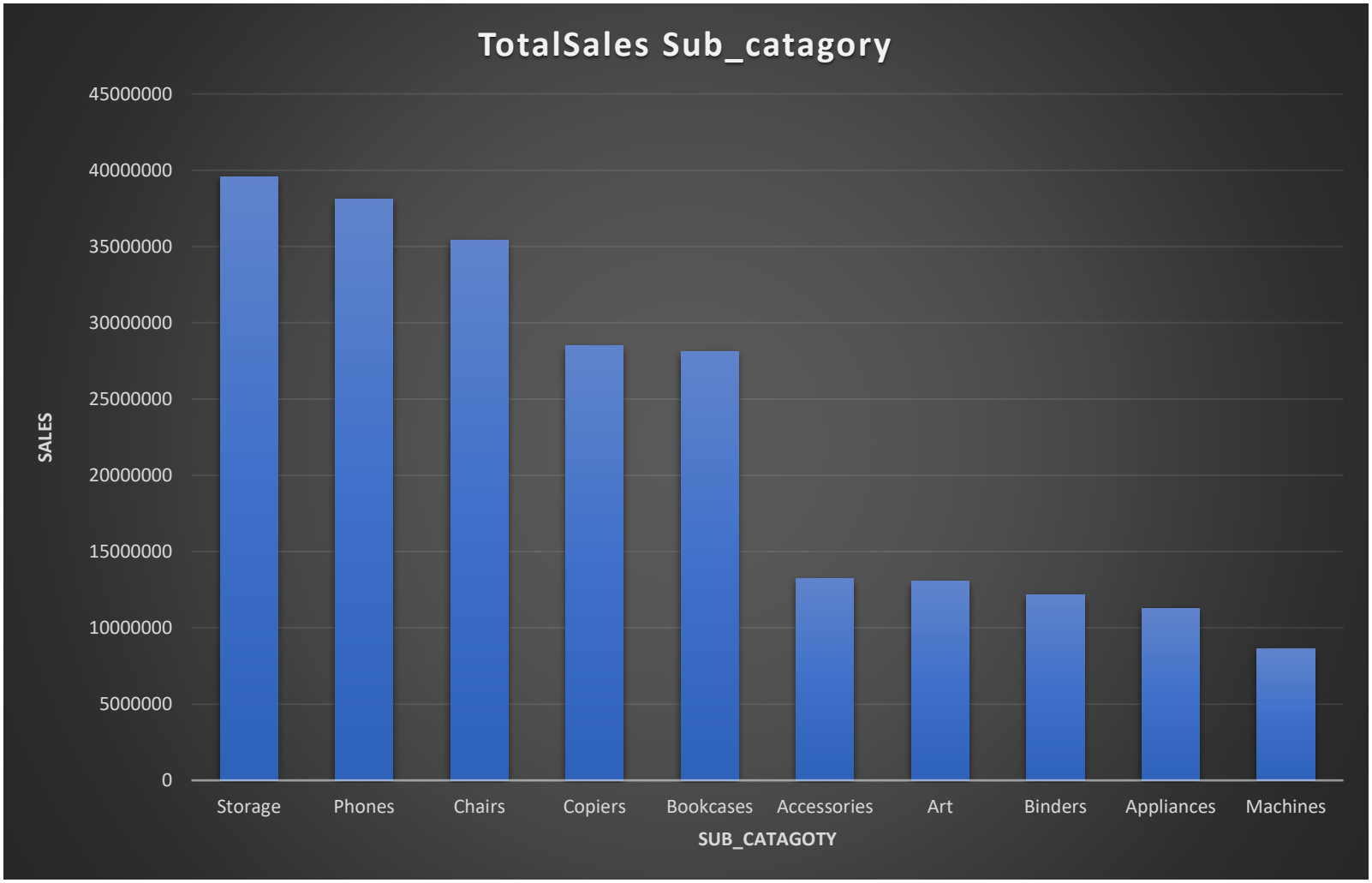
Jump to

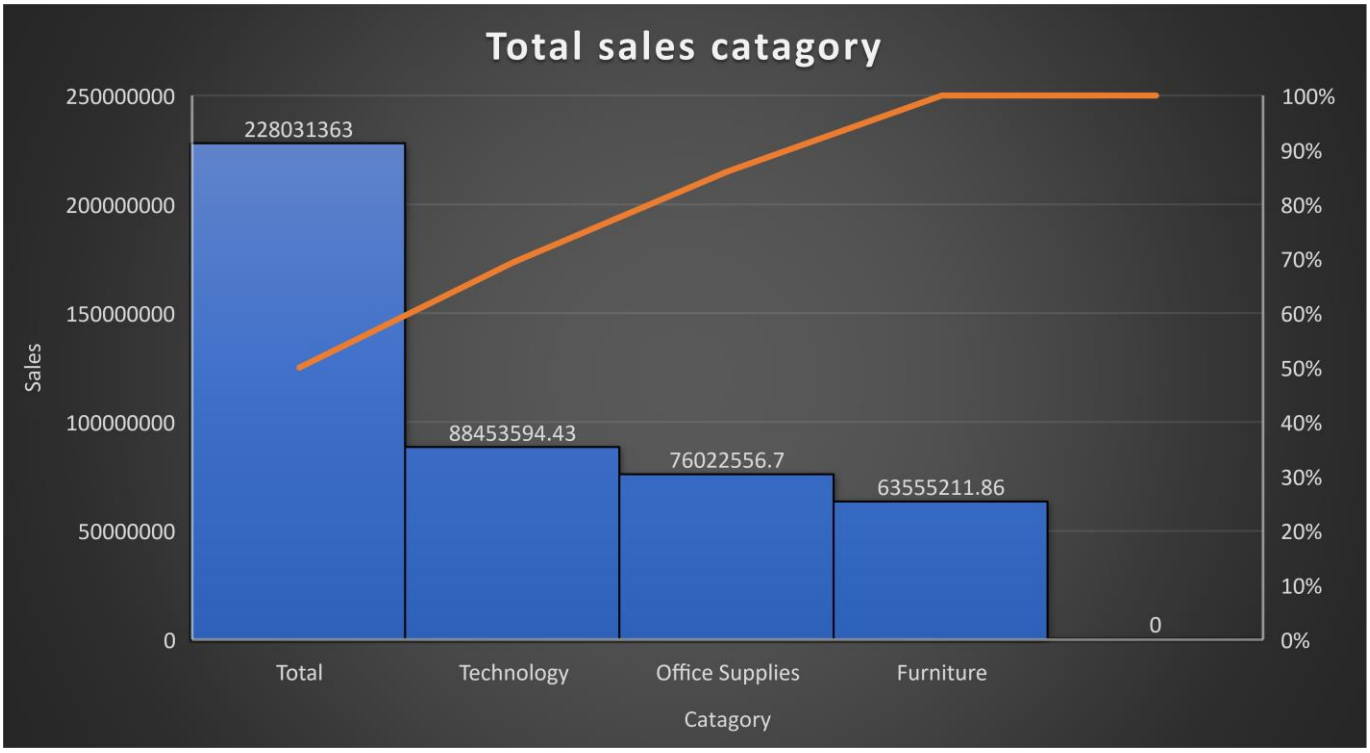
Automatic context help is disabled. Use the toolbar t manually get help for the current caret position or tc toggle automatic help.

Context Help Snippets

Output

```
-- Total_Sales ctagory and sub category wise

SELECT
    Products.Category,
    Products.Sub_Category,
    SUM(sales.Sales_Price) AS TotalSales
FROM sales
JOIN Products ON sales.Product_ID = Products.Product_ID
GROUP BY Products.Category, Products.Sub_Category
ORDER BY TotalSales DESC
limit 10;
```





- Which product categories and sub-categories contribute the least to sales?

MySQL Workbench

Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

Filter objects

company
erd
global_store
global_store_project
Tables
customer
orders
products
sales
Columns
Indexes
Foreign Keys
Triggers
Views

Administration Schemas

Information

Table: products

Columns:
Row_ID int
Product_ID varchar(30)
Category varchar(20)
Sub_Category varchar(20)
Product_Name varchar(200)

Object Info Session

Query 1

Limit to 50000 rows

```
1  SELECT
2      Products.Category,
3      Products.Sub_Category,
4      SUM(sales.Sales_Price) AS TotalSales
5  FROM sales
6  JOIN Products ON sales.Product_ID = Products.Product_ID
7  GROUP BY Products.Category, Products.Sub_Category
8  ORDER BY TotalSales ASC
9  limit 10;
10
11
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: | Fetch rows:

Category	Sub_Category	TotalSales
Office Supplies	Labels	1371297.6300000728
Office Supplies	Envelopes	3068883.2200001613
Office Supplies	Paper	3876214.559999795
Office Supplies	Fasteners	3903575.3699992797
Office Supplies	Supplies	4403099.93999994
Furniture	Tables	4625907.010000004
Furniture	Furnishings	6311913.969999852
Technology	Machines	8611925.390000025

Result 15

Result Grid Form Editor

Read Only

SQL Additions

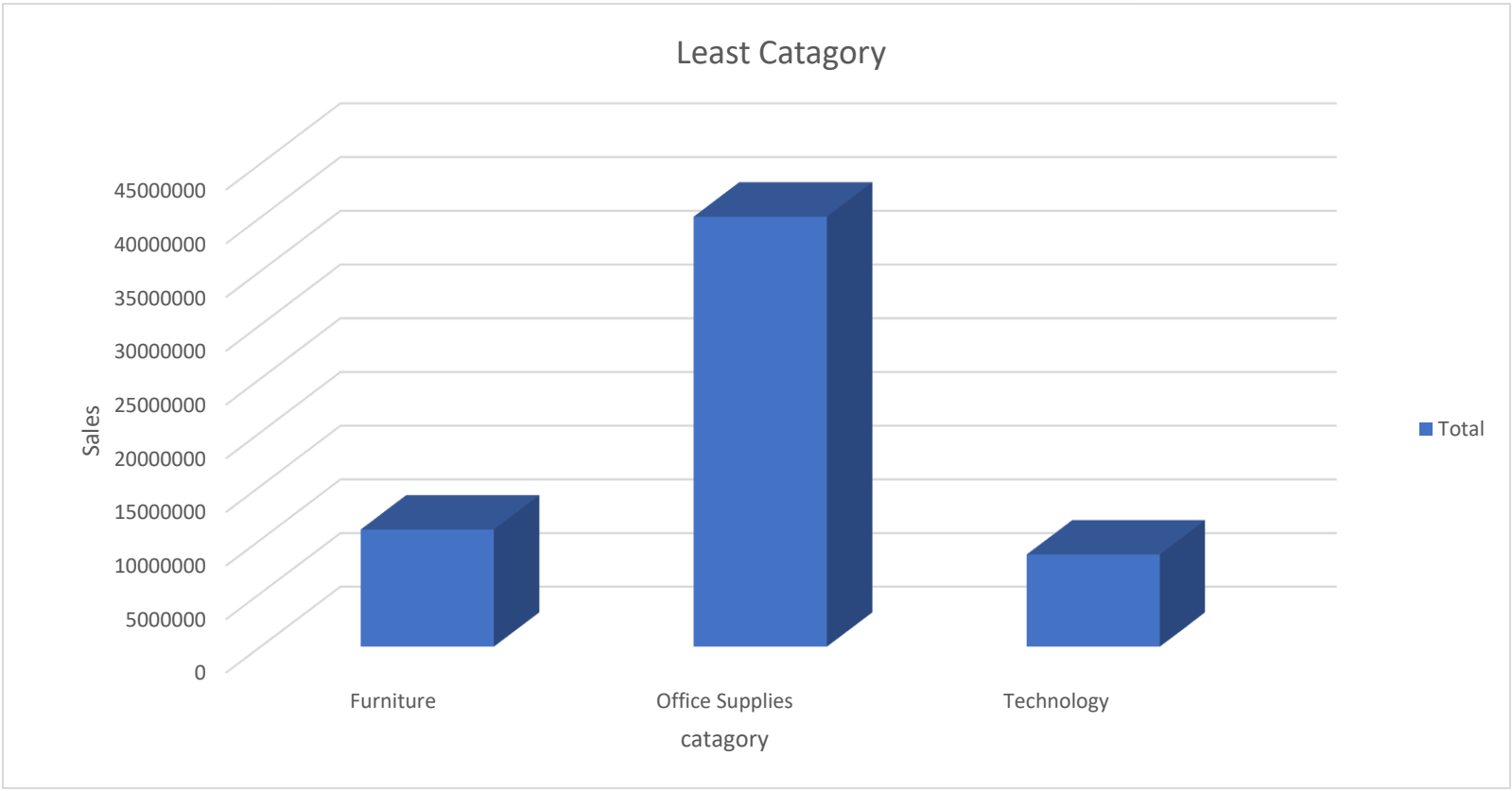
Jump to

Automatic context help is disabled. Use the toolbar t manually get help for the current caret position or tc toggle automatic help.

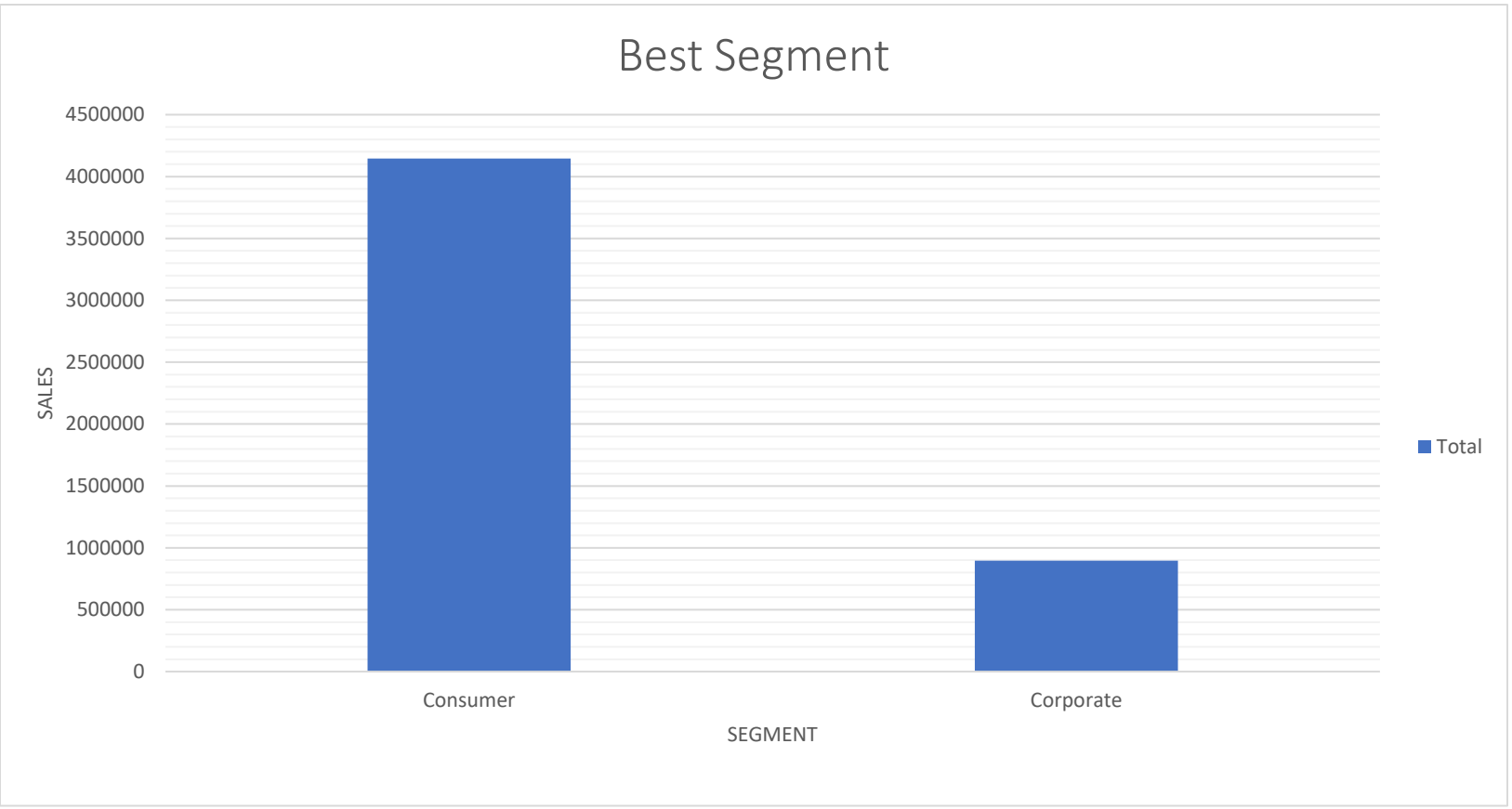
Context Help Snippets

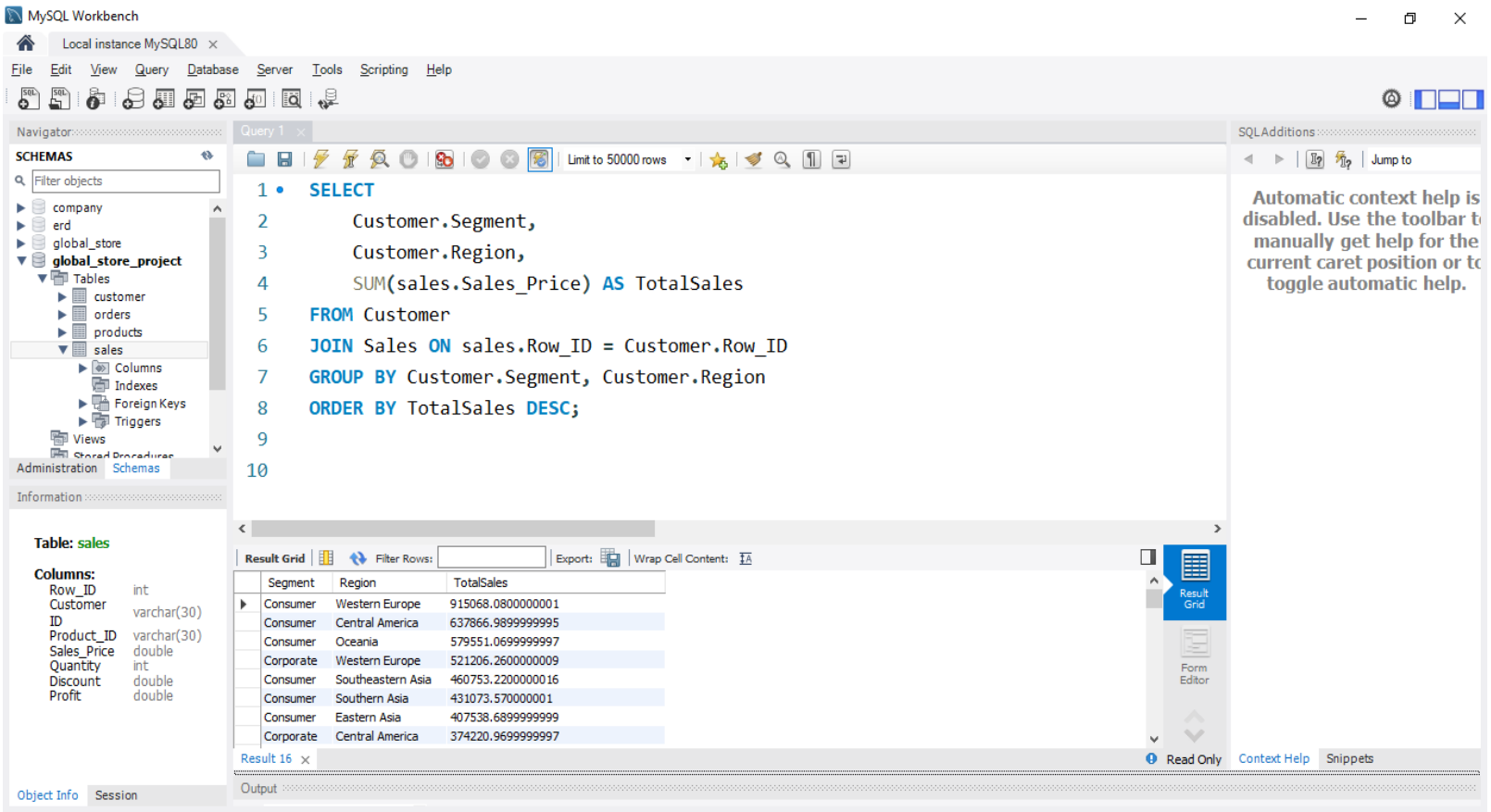
Output

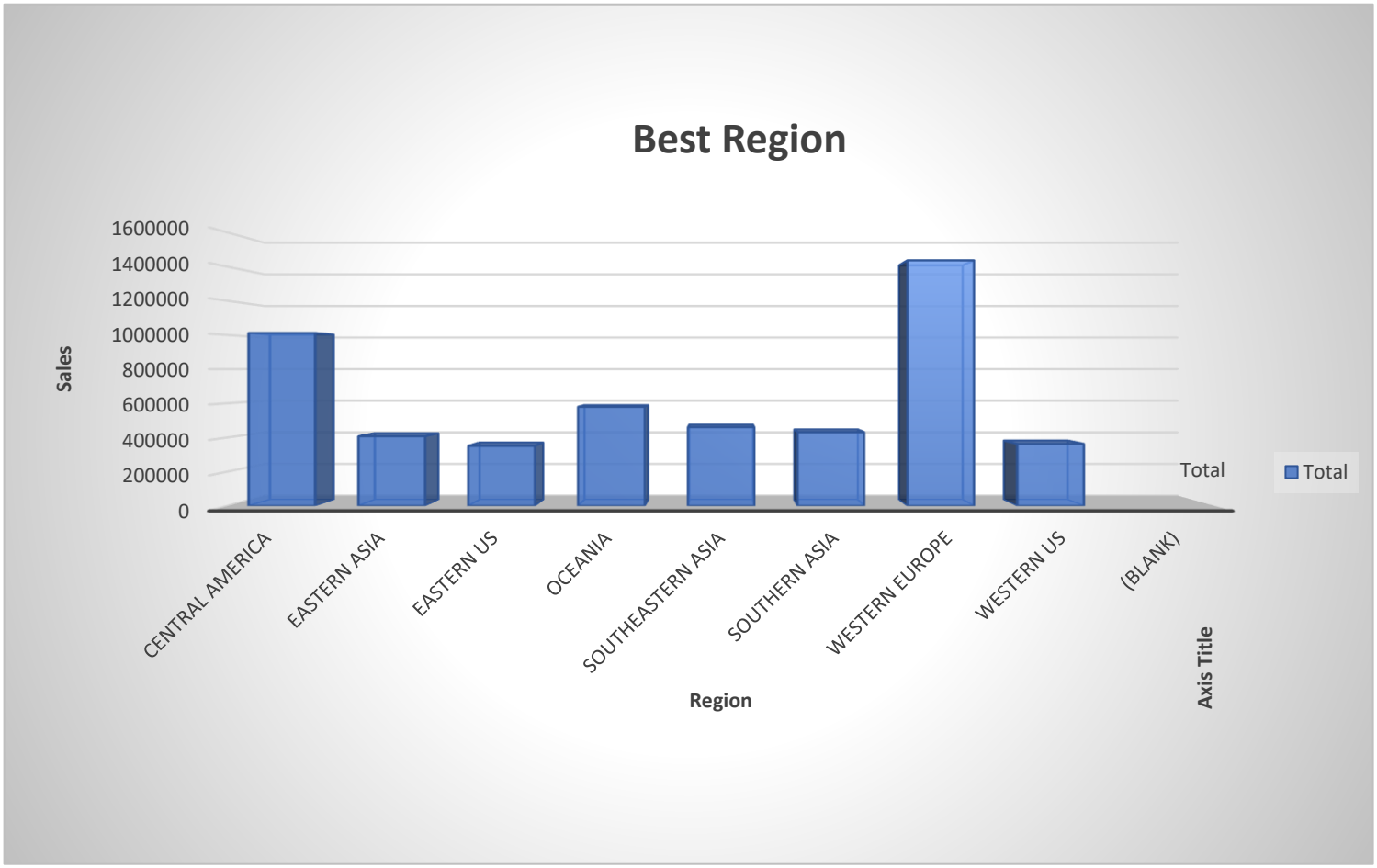
```
-- Total_Sales ctagory and sub category wise(Least)

SELECT
    Products.Category,
    Products.Sub_Category,
    SUM(sales.Sales_Price) AS TotalSales
FROM sales
JOIN Products ON sales.Product_ID = Products.Product_ID
GROUP BY Products.Category, Products.Sub_Category
ORDER BY TotalSales ASC
limit 10;
```



- Are there any specific segments or regions that consistently drive higher sales?







Profitability and Costs:

- Which products have the highest profit margins?

MySQL Workbench

Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

Filter objects

- company
- erd
- global_store
- **global_store_project**
  - Tables
    - customer
    - orders
    - products
    - sales
  - Views
  - Stored Procedures
  - Functions
- parch
- sys

Administration Schemas

Information

No object selected

Object Info Session

Query 1

Limit to 50000 rows

```
1  SELECT
2      Products.Product_ID,
3      Products.Product_Name,
4      SUM(sales.Profit) AS TotalProfit,
5      SUM(sales.Sales_Price) AS TotalSales,
6      ROUND((SUM(sales.Profit) / SUM(sales.Sales_Price)) * 100, 2) AS ProfitMargin
7  FROM sales
8  JOIN Products ON sales.Product_ID = Products.Product_ID
9  GROUP BY Products.Product_ID, Products.Product_Name
10 ORDER BY ProfitMargin DESC;
11
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

	Product_Name	TotalProfit	TotalSales	ProfitMargin
5	Eureka Disposable Bags for Sanitaire Vibra Groomer I Upright ...	4.47	1.62	275.93
3	Chromcraft Training Table, Adjustable Height	87.74	38.14	230.05
0	Bush Westfield Collection Bookcases, Dark Cherry Finish, Fully...	190.85	90.88	210
3	Euro Pro Shark Stick Mini Vacuum	998.88	512.2199999999999	195.01
5	Chromcraft Coffee Table, Fully Assembled	8186.320000000001	4905.679999999999	166.87
0	Okidata B401 Printer	251.99	179.99	140
0	Zebra GK420t Direct Thermal/Thermal Transfer Printer	938.28	703.71	133.33
	GBC Plasticlear Binding Covers	479.00999999999997	482.15999999999997	99.35
9	Lesro Training Table, Rectangular	12906.45	13558.199999999995	95.19
3	Brother MFC-9340CDW LED All-In-One Printer, Copier Scanner	319.19	341.99	93.33
5	Hon Coffee Table, Fully Assembled	4227.2	4570.119999999998	92.5

Result Grid | Form Editor | Field Types

Result 4

Read Only

SQLAdditions

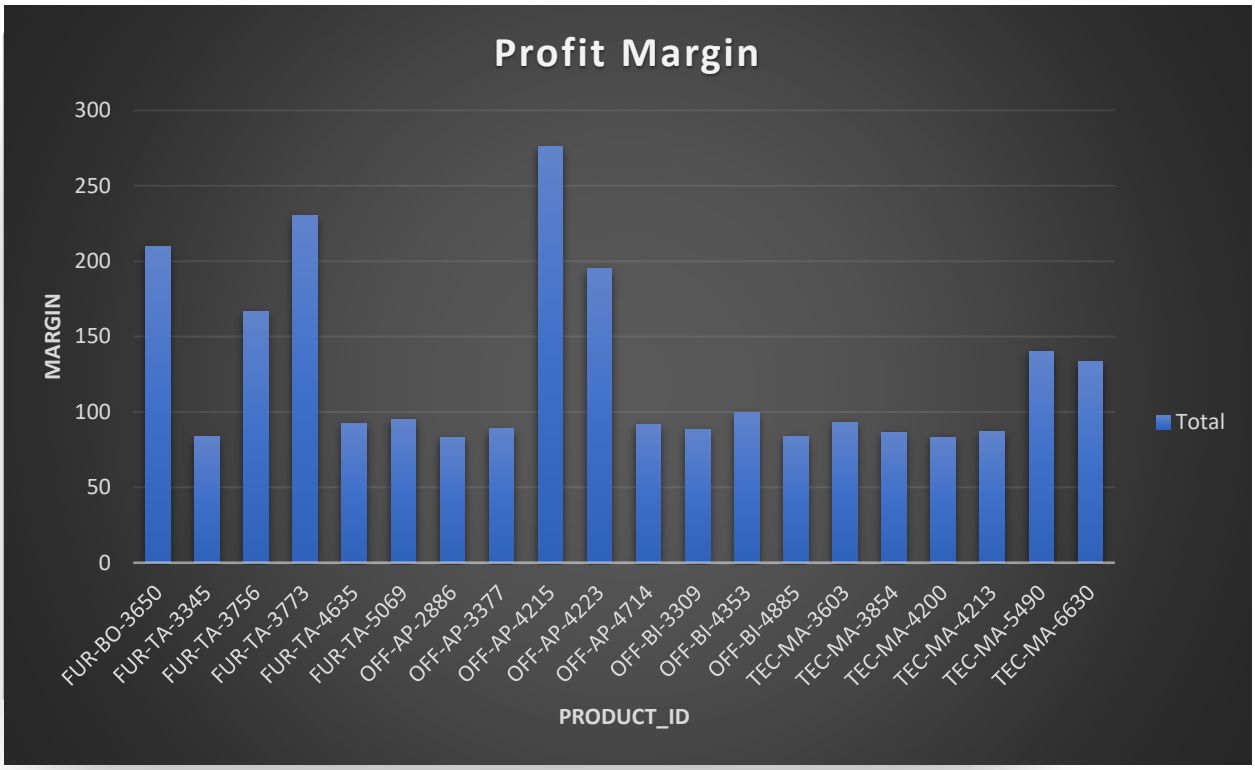
Jump to

Automatic context help is disabled. Use the toolbar t manually get help for the current caret position or tc toggle automatic help.

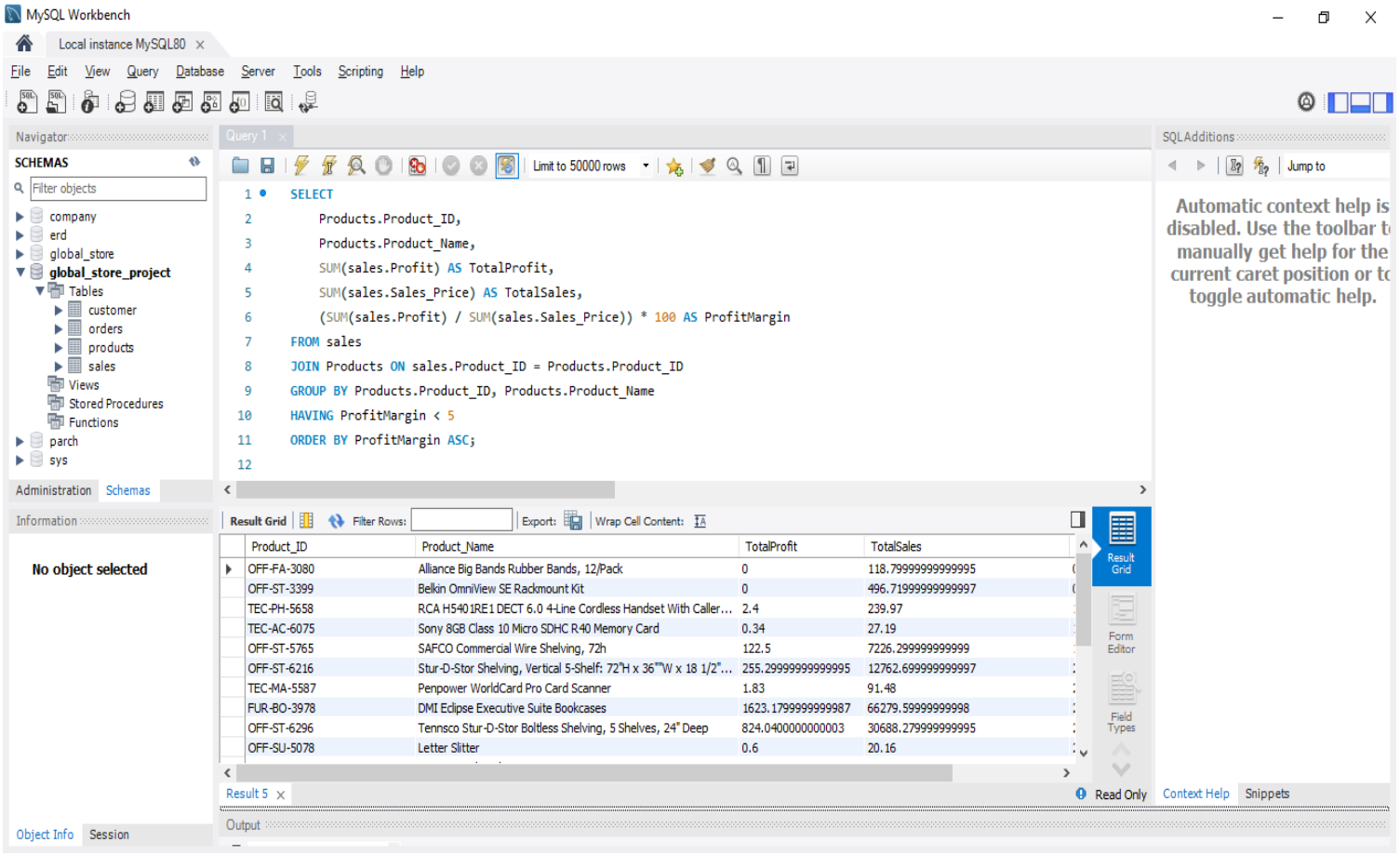
Context Help Snippets

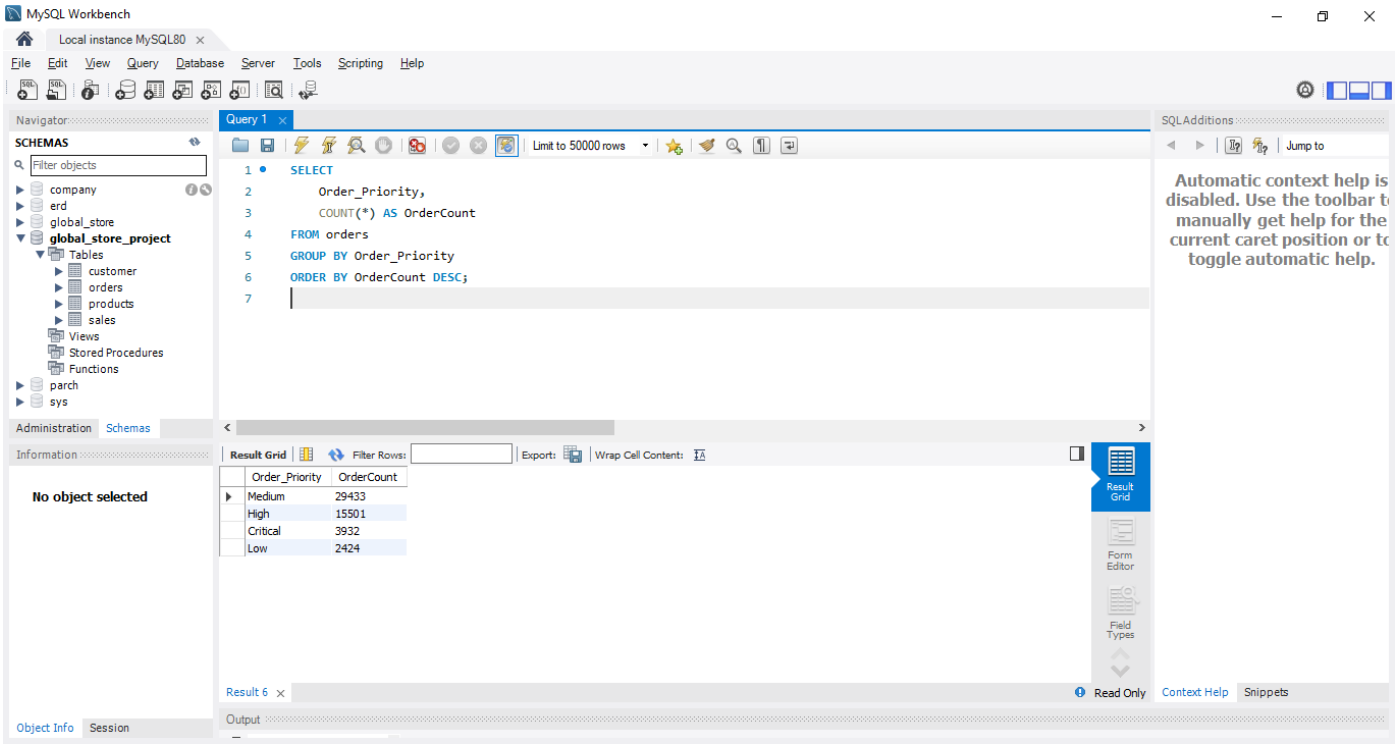
Output

```sql
--Profit Margin

SELECT
    Products.Product_ID,
    Products.Product_Name,
    SUM(sales.Profit) AS TotalProfit,
    SUM(sales.Sales_Price) AS TotalSales,
    ROUND((SUM(sales.Profit) / SUM(sales.Sales_Price)) * 100, 2) AS ProfitMargin
FROM sales
JOIN Products ON sales.Product_ID = Products.Product_ID
GROUP BY Products.Product_ID, Products.Product_Name
ORDER BY ProfitMargin DESC;
```



- Are there products with low profits that should be re-evaluated?

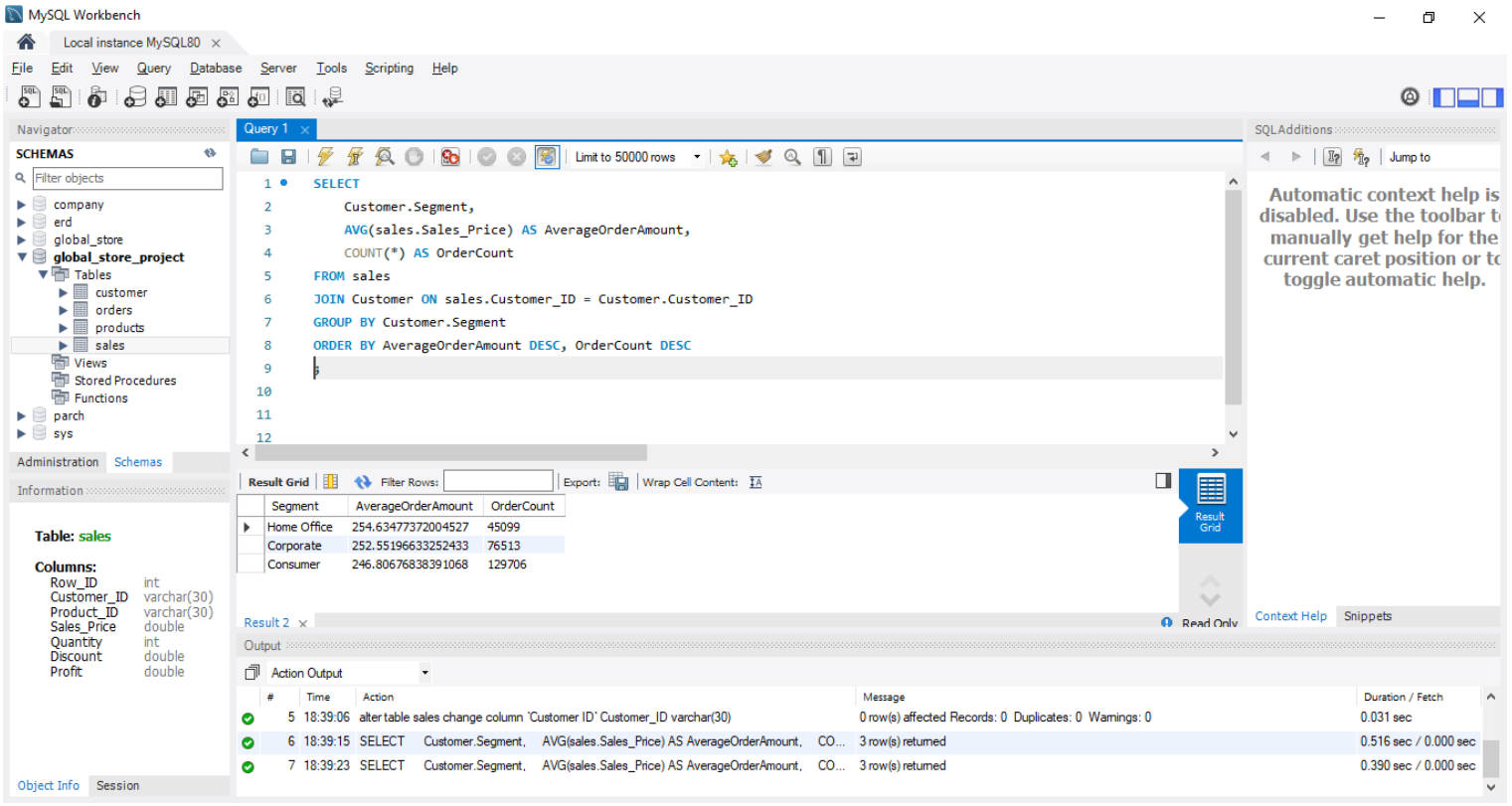




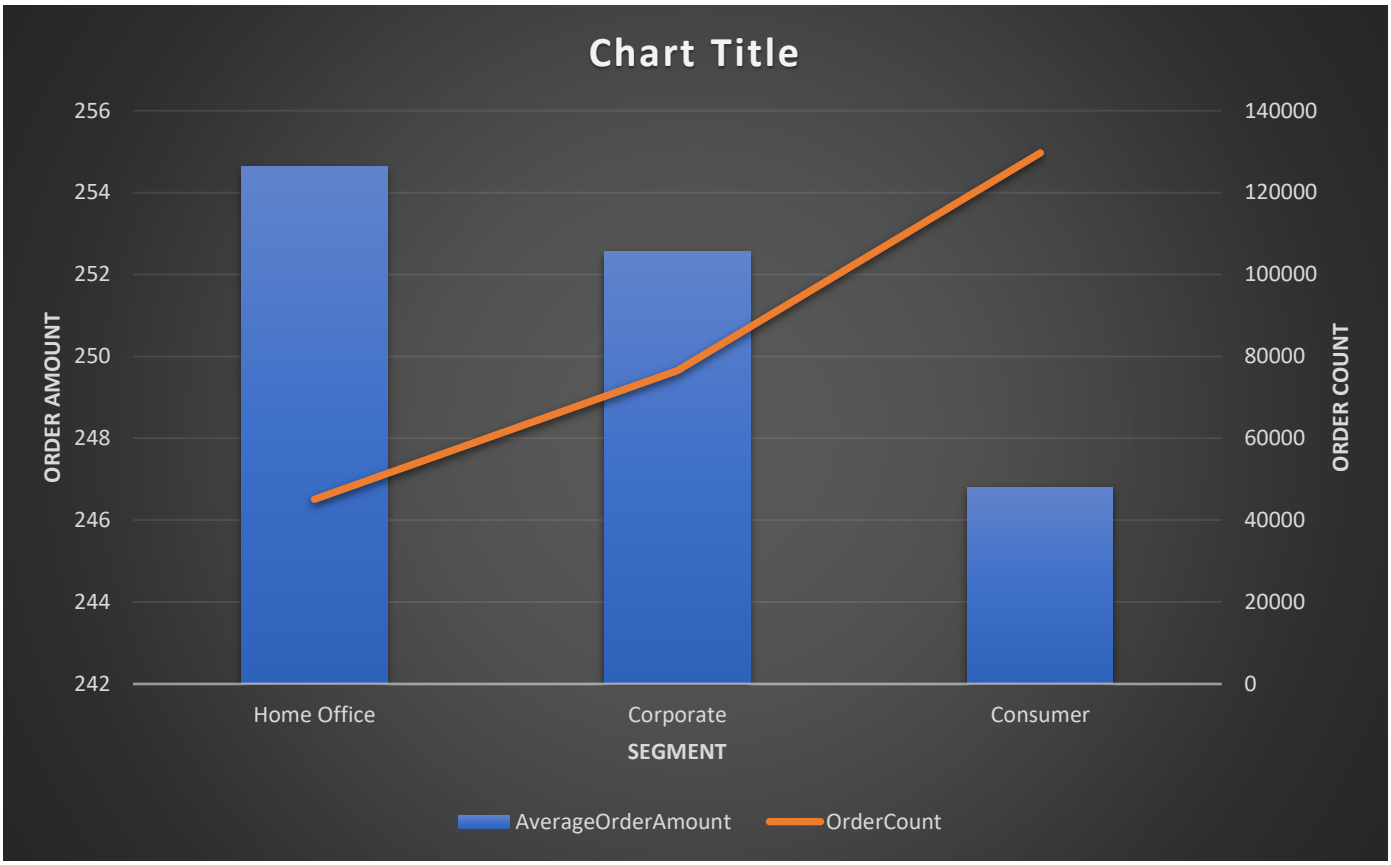
Customer Behavior: OrderCount

- What is the distribution of orders based on order priority?

➢ Are there certain customer segments that tend to place larger or more frequent orders?

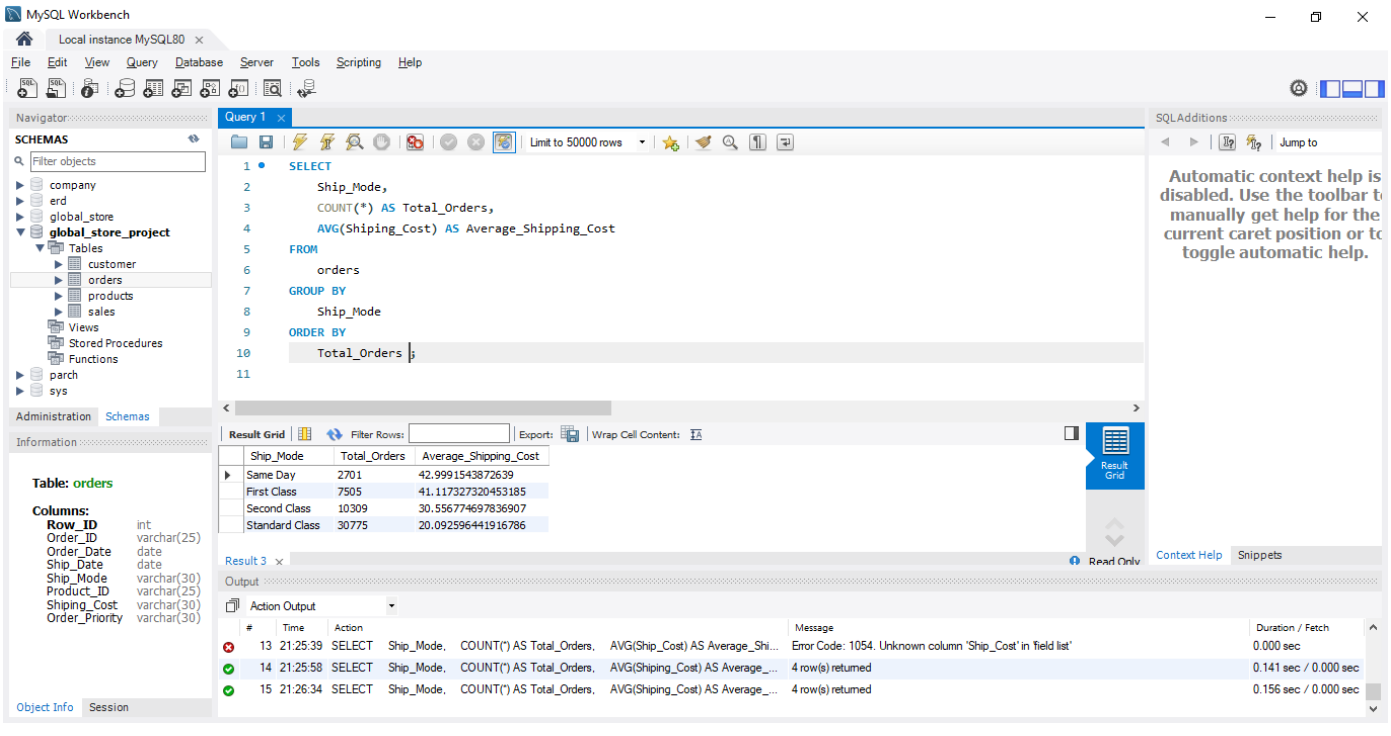



```
SELECT
    Customer.Segment,
    AVG(sales.Sales_Price) AS AverageOrderAmount,
    COUNT(*) AS OrderCount
FROM sales
JOIN Customer ON sales.Customer_ID = Customer.Customer_ID
GROUP BY Customer.Segment
ORDER BY AverageOrderAmount DESC, OrderCount DESC;
```

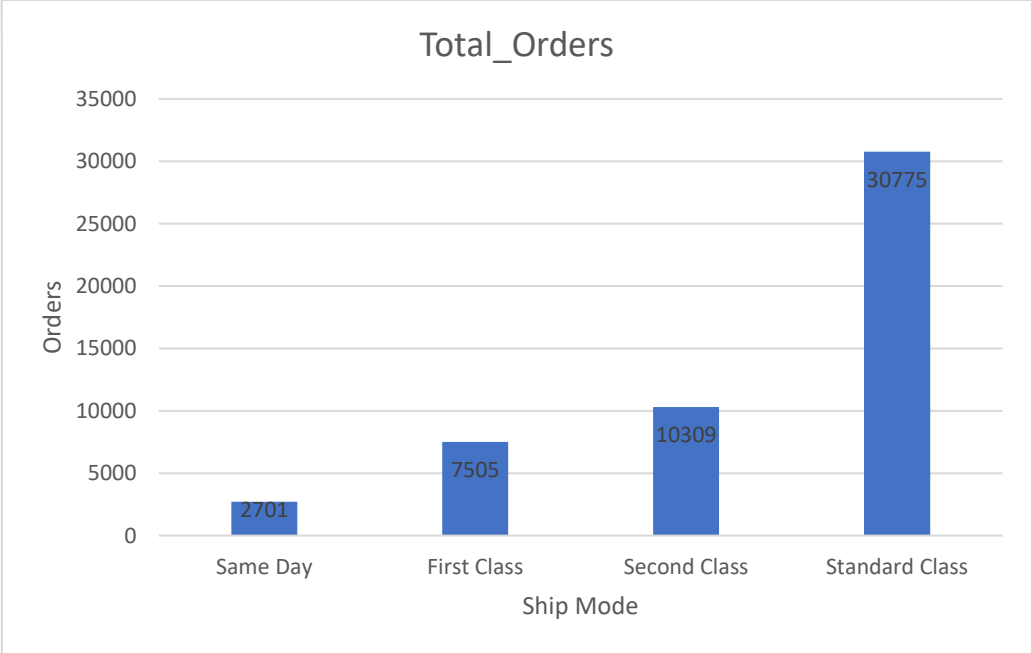


Order Management:

- Are there certain shipping modes/cost that are preferred by customers and should be prioritized?

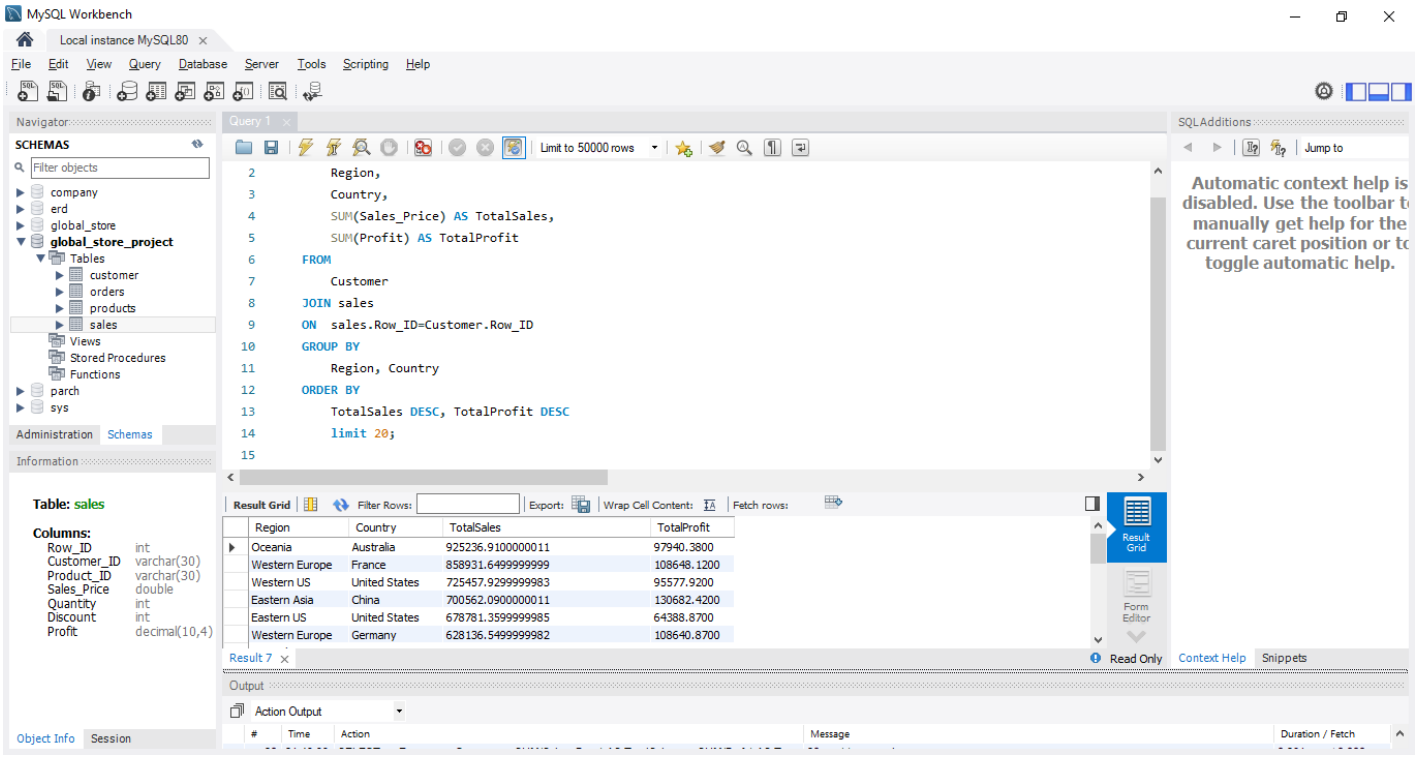


```
SELECT
Ship_Mode,
COUNT(*) AS Total_Orders,
AVG(Shiping_Cost) AS Average_Shipping_Cost
FROM
orders
GROUP BY
Ship_Mode
ORDER BY
Total_Orders ;
```

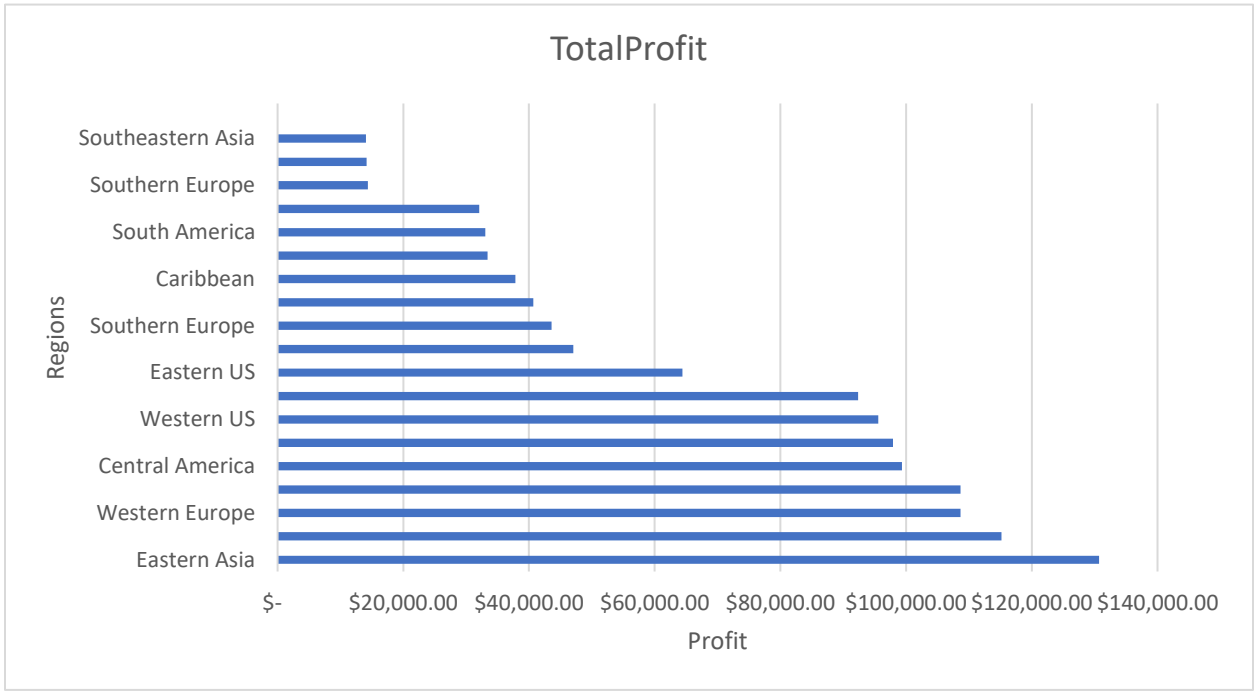


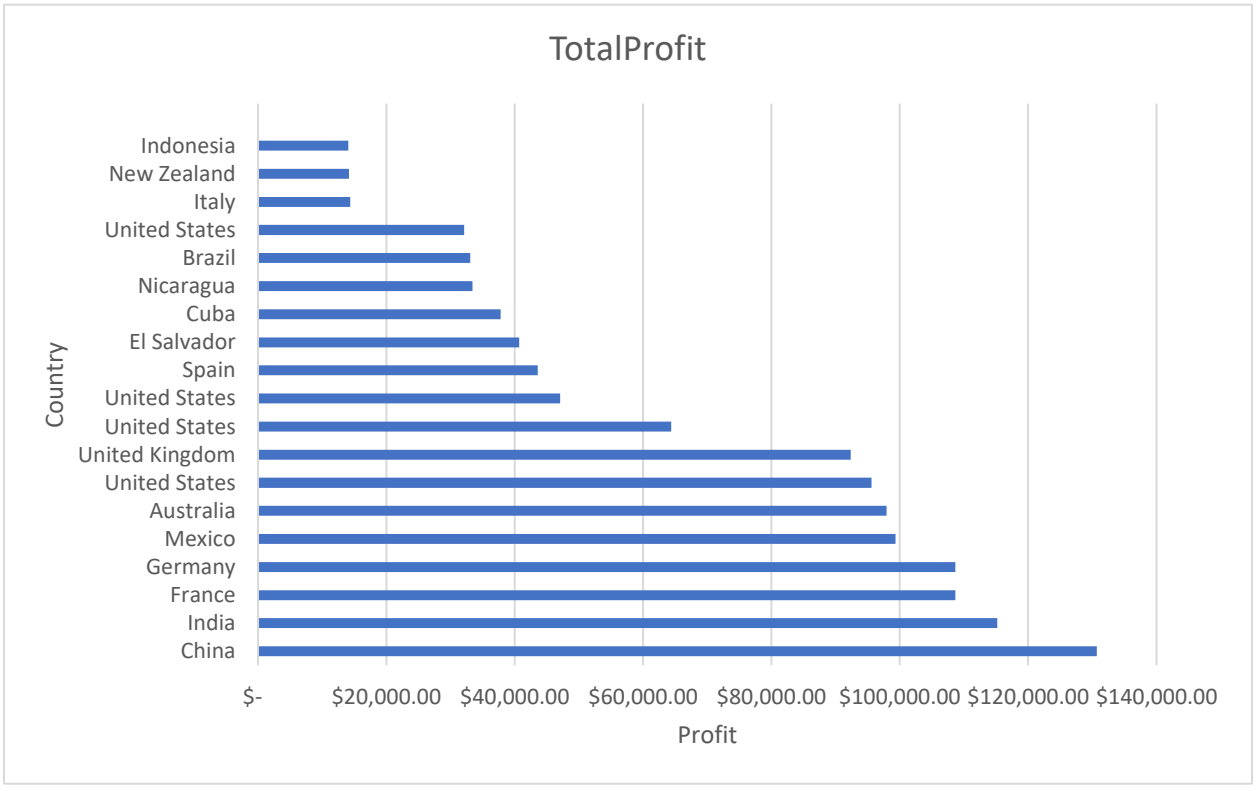
Geographical Insights:

- Which regions or countries contribute the most to sales and profits?

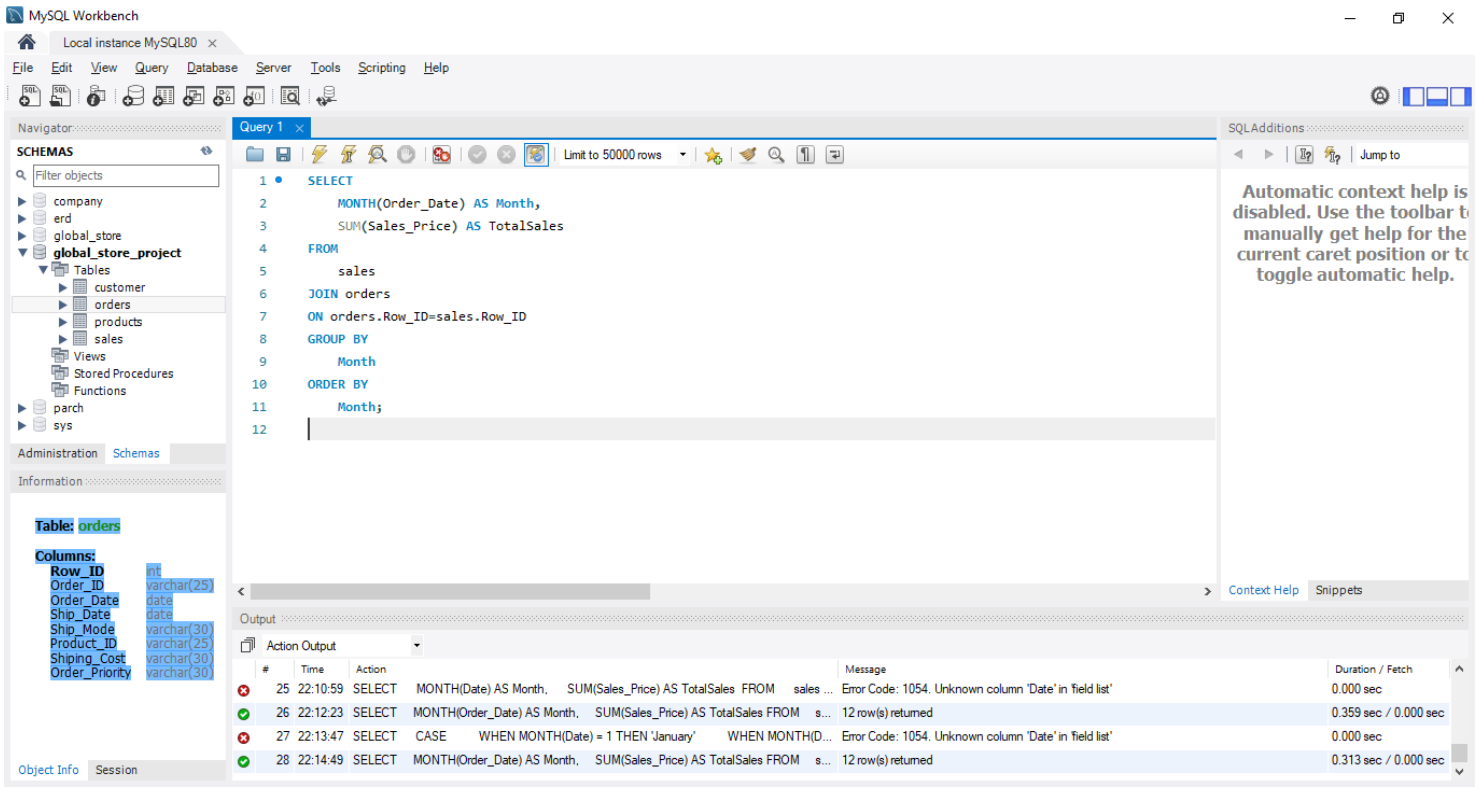



```
SELECT
    Region,
    Country,
    SUM(Sales_Price) AS TotalSales,
    SUM(Profit) AS TotalProfit
FROM
    Customer
JOIN sales
ON  sales.Row_ID=Customer.Row_ID
GROUP BY
    Region, Country
ORDER BY
    TotalSales DESC, TotalProfit DESC
    limit 20;
```

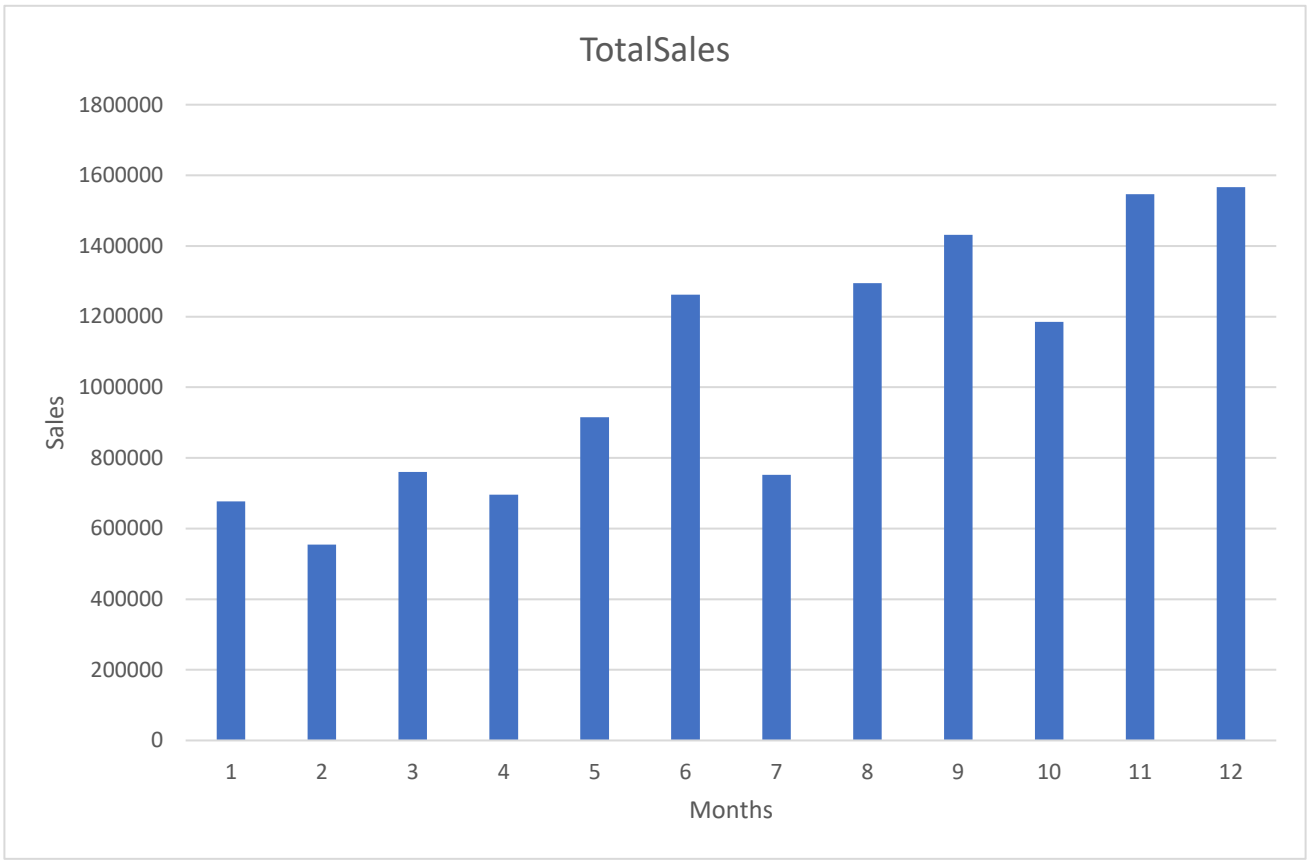

TotalProfit
Regions
Southeastern Asia
Southern Europe
South America
Caribbean
Southern Europe
Eastern US
Western US
Central America
Western Europe
Eastern Asia
$-
$20,000.00
$40,000.00
$60,000.00
$80,000.00
$100,000.00
$120,000.00
$140,000.00
Profit


TotalProfit
Country
Indonesia
New Zealand
Italy
United States
Brazil
Nicaragua
Cuba
El Salvador
Spain
United States
United States
United Kingdom
United States
Australia
Mexico
Germany
France
India
China
$-
$20,000.00
$40,000.00
$60,000.00
$80,000.00
$100,000.00
$120,000.00
$140,000.00
Profit

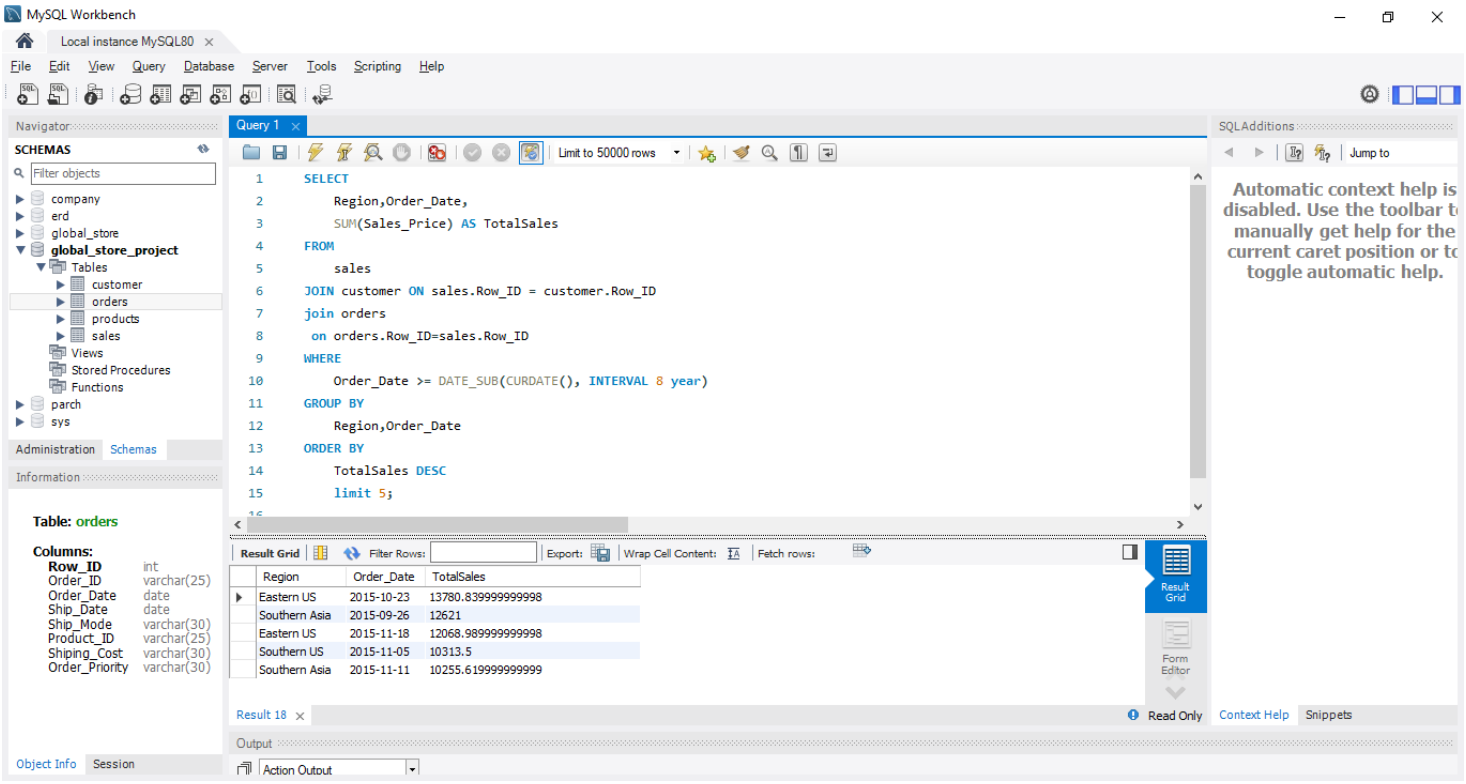
➢ Are there seasonal patterns in sales, and how can the company prepare for these fluctuations?




```
SELECT
   MONTH(Order_Date) AS Month,
   SUM(Sales_Price) AS TotalSales
FROM
   sales
JOIN orders
ON orders.Row_ID=sales.Row_ID
GROUP BY
   Month
ORDER BY
   Month;
```



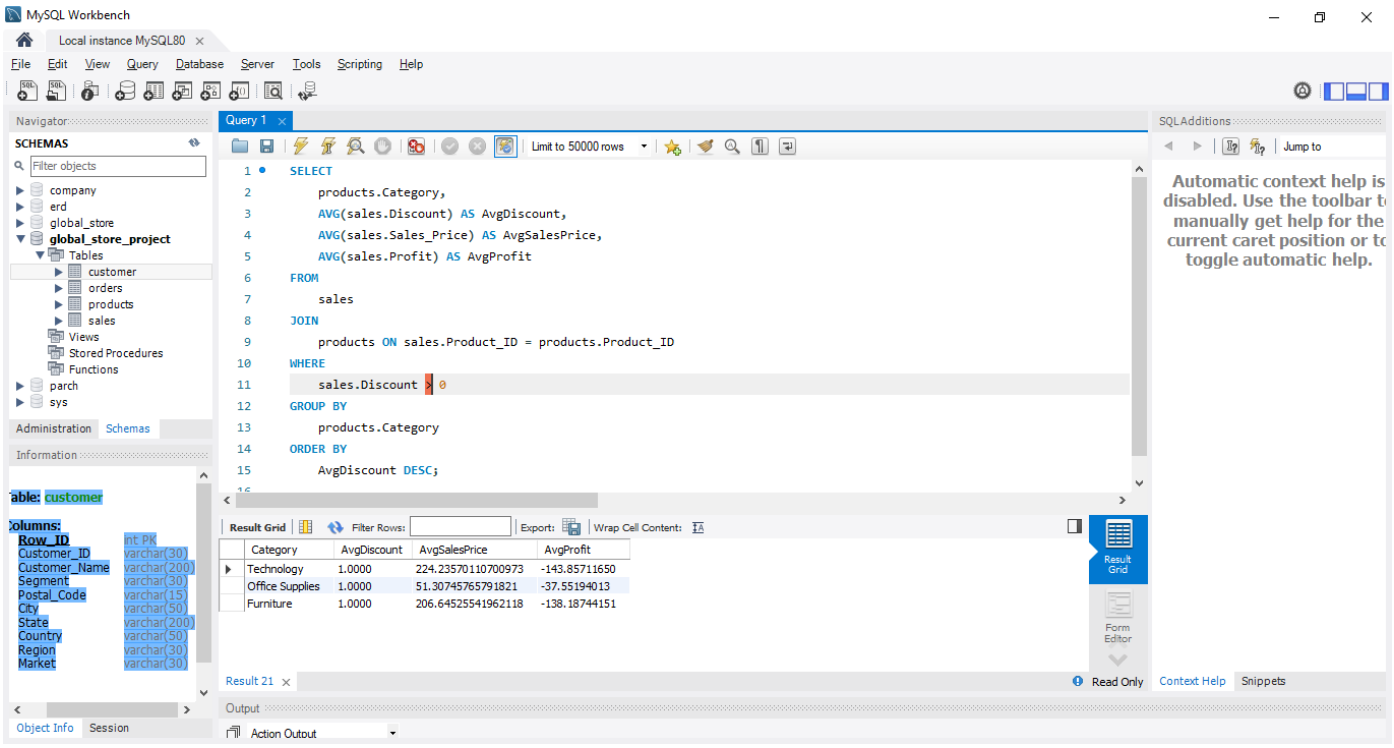
Is there a specific market or region that has seen recent growth or decline?



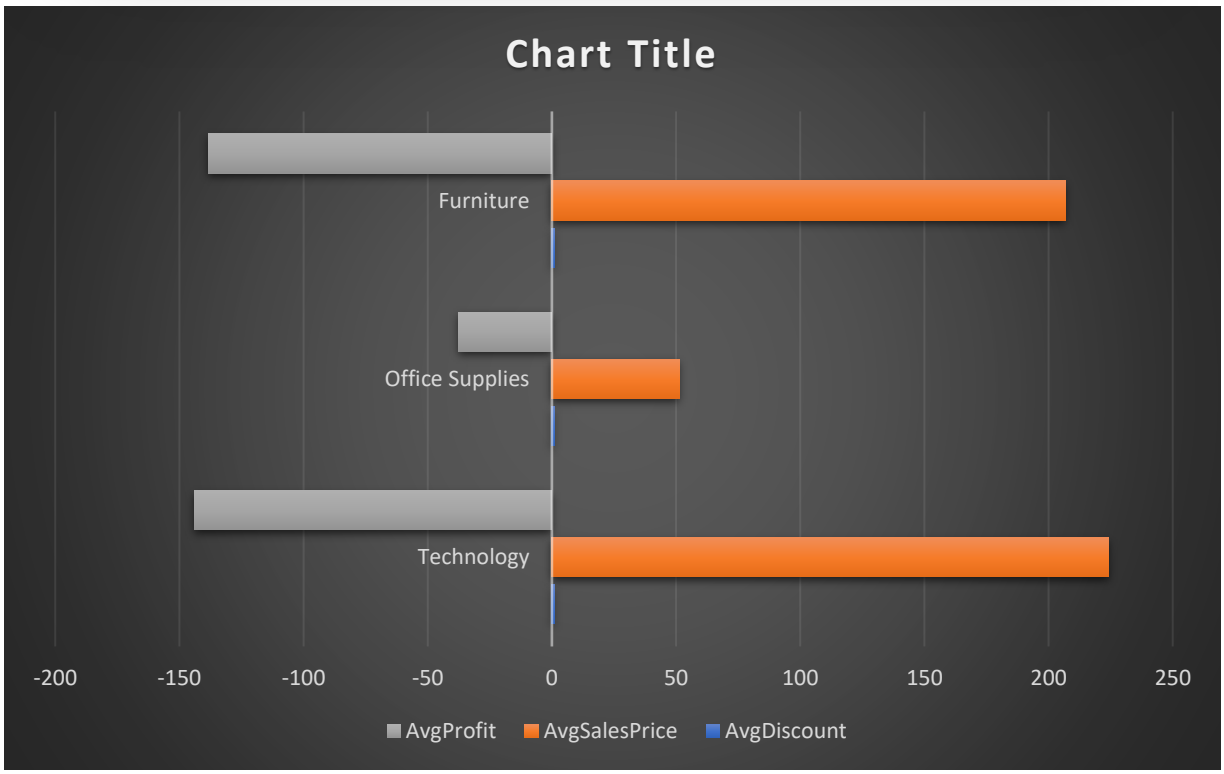
```
SELECT
    Region,Order_Date,
    SUM(Sales_Price) AS TotalSales
FROM
    sales
JOIN customer ON sales.Row_ID = customer.Row_ID
join orders
 on orders.Row_ID=sales.Row_ID
WHERE
    Order_Date >= DATE_SUB(CURDATE(), INTERVAL 8 year)
GROUP BY
    Region,Order_Date
ORDER BY
```

Discount Strategy:

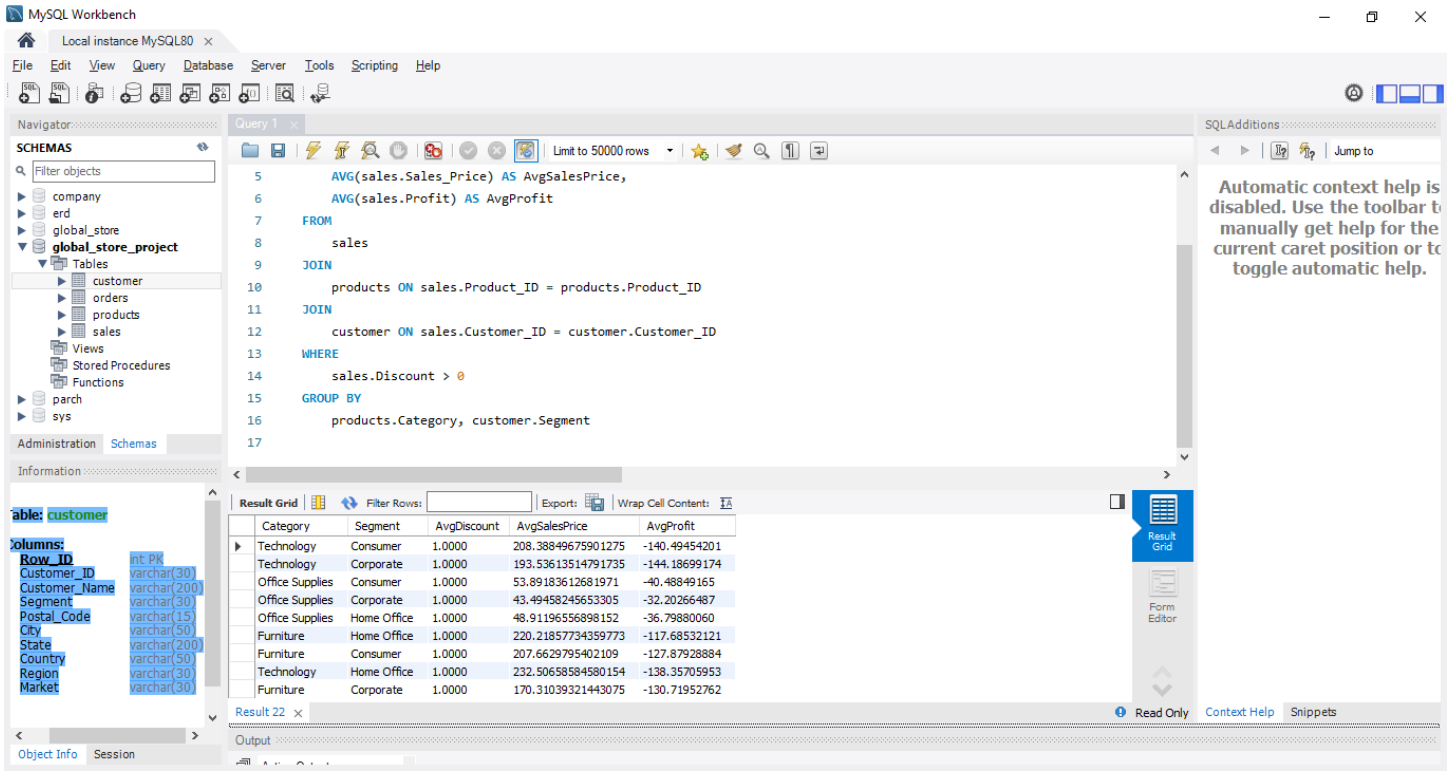
- Is the current discount strategy effective in driving sales and profitability?



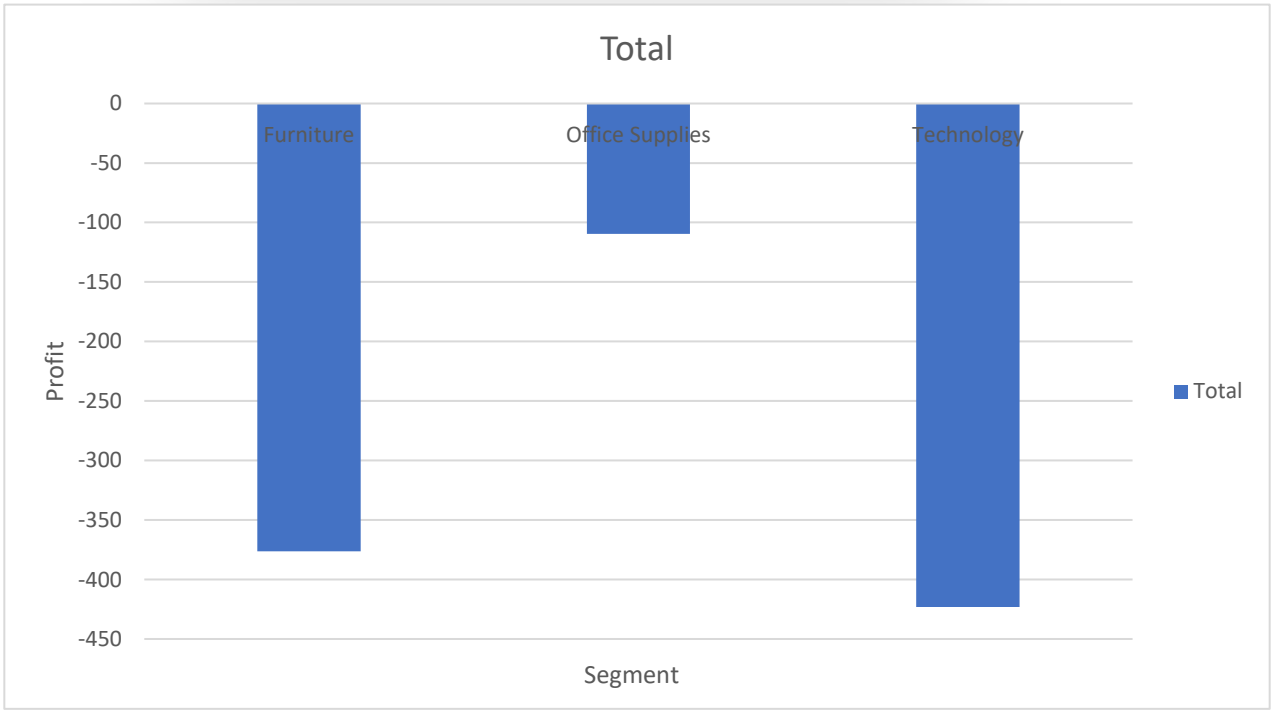
```
SELECT
    products.Category,
    AVG(sales.Discount) AS AvgDiscount,
    AVG(sales.Sales_Price) AS AvgSalesPrice,
    AVG(sales.Profit) AS AvgProfit
FROM
    sales
JOIN
    products ON sales.Product_ID = products.Product_ID
WHERE
    sales.Discount > 0
GROUP BY
    products.Category
ORDER BY
    AvgDiscount DESC;
```



- Are there specific product categories or customer segments that respond well to discounts?



```
SELECT
    products.Category,
    customer.Segment,
    AVG(sales.Discount) AS AvgDiscount,
    AVG(sales.Sales_Price) AS AvgSalesPrice,
    AVG(sales.Profit) AS AvgProfit
FROM
    sales
JOIN
    products ON sales.Product_ID = products.Product_ID
JOIN
    customer ON sales.Customer_ID = customer.Customer_ID
WHERE
    sales.Discount > 0
GROUP BY
    products.Category, customer.Segment
```



Insights:

Sales Analysis:

- What are the highest selling products in terms of total sales and quantity?
  - ✓ The products with the highest total quantities sold are "Staples," and Given the high demand for these items, the company should ensure robust inventory management to meet customer needs promptly.
- Which product categories and sub-categories contribute the most to sales?
  - ✓ The top-selling product categories and sub-categories, such as "Office Supplies - Storage," "Technology - Phones," and "Furniture - Chairs," reveal customer preferences and guide strategic decisions for inventory, marketing, and product development. Evaluate the profit margins of these top-selling products to assess their contribution to overall profitability.
- Which product categories and sub-categories contribute the least to sales?
  - ✓ The low-selling product categories and sub-categories, such as "Office Supplies - Labels," "Furniture - Tables," and "Technology - Machines," indicate potential areas for improvement and optimization in terms of sales strategies, inventory management, and customer engagement.
- Are there any specific segments or regions that consistently drive higher sales?
  - ✓ Customer segments such as "Consumer" in regions like "Western Europe," "Oceania," and "Central America" consistently exhibit high sales, suggesting strong market demand and potential growth opportunities.

Profitability and Costs:

- Which products have the highest profit margins?
  - ✓ Products like "Southworth Structures Collection" and "Tops Green Bar Computer Printout Paper" exhibit a high 50% profit margin, showcasing strong profitability in these items.
- Are there products with low profits that should be re-evaluated?
  - ✓ Products with significantly negative profit margins, such as "Eureka Disposable Bags" and "Chromcraft Training Table," exhibit substantial losses relative to sales, requiring evaluation and potential adjustments to pricing, costs, or sales strategies.

Customer Behavior:

- What is the distribution of orders based on order priority?
  - ✓ Order distribution analysis reveals that "Medium" and "High" order priorities are the most frequent, while "Critical" and "Low" priorities are relatively less common.
- Are there certain customer segments that tend to place larger or more frequent orders?

- ✓ Order distribution by shipping modes reveals that while "Standard Class" is the most common and cost-efficient, "Same Day" shipping boasts the highest average shipping cost, and "Second Class" handles the highest volume of orders.

Order Management:

- ➢ Are there certain shipping modes/cost that are preferred by customers and should be prioritized?
  - ✓ Shipping mode analysis indicates that customers value faster delivery options, as "Same Day" and "First Class" have higher average shipping costs and substantial order counts, while "Standard Class" remains the most popular choice due to its larger volume of orders.

Geographical Insights:

- ➢ Which regions or countries contribute the most to sales and profits?
  - ✓ Prominent contributors to sales and profits include Australia in Oceania, France in Western Europe, and China in Eastern Asia, indicating lucrative markets that significantly impact the company's financial performance.

Market Trends:

- ➢ Are there seasonal patterns in sales, and how can the company prepare for these fluctuations?
  - ✓ Sales exhibit clear seasonal patterns, with strong peaks in June, August, November, and December, suggesting opportunities for targeted marketing and inventory management strategies during these periods.
- ➢ Is there a specific market or region that has seen recent growth or decline?
  - ✓ Recent sales data highlights noteworthy transactions in Eastern US, Southern Asia, and the Southern US regions, indicating potential growth opportunities and market trends.

Discount Strategy:

- ➢ Is the current discount strategy effective in driving sales and profitability?
  - ✓ High discounts are applied to products in the Technology, Furniture, and Office Supplies categories, leading to notable reductions in average sales prices and negative average profits in these categories.
- ➢ Are there specific product categories or customer segments that respond well to discounts?
  - ✓ Various customer segments respond to high discounts differently across product categories: In the Technology, Office Supplies, and Furniture categories, the Consumer and Corporate segments exhibit significantly reduced average sales prices and negative average profits, suggesting a need for tailored pricing strategies for these segments

Recommendations:

- **Focus on High-Demand Products:** Allocate resources to ensure a steady supply of highest-selling products like "Staples" and "Cardinal Index Tab, Clear" to meet customer demand promptly.

- **Optimize Top-Selling Categories:** Invest in inventory and marketing strategies for top-selling categories like "Office Supplies - Storage," "Technology - Phones," and "Furniture - Chairs" to maximize revenue and profitability.

- **Revamp Low-Selling Categories:** Evaluate low-selling categories such as "Office Supplies - Labels" and "Furniture - Tables" to identify improvement opportunities and enhance sales strategies.

- **Segment and Regional Strategies:** Capitalize on the consistent sales performance of segments like "Consumer" in regions like "Western Europe," "Oceania," and "Central America" by tailoring marketing efforts and product offerings to these markets.

- **Maximize Profitable Products:** Continue to emphasize products with high-profit margins like "South worth Structures Collection" and "Tops Green Bar Computer Printout Paper," while re-evaluating products with negative profit margins for potential adjustments.

- **Customer-Centric Approach:** Prioritize customer segments based on order priority and preferred shipping modes like "Same Day" and "First Class," ensuring efficient and prompt delivery for enhanced customer satisfaction.

- **Strategic Discounts:** Carefully assess discount strategies for Technology, Furniture, and Office Supplies categories, considering their impact on average sales prices and profitability to strike a balance between attracting customers and maintaining profitability.

- **Seasonal Planning:** Leverage the seasonal patterns identified, especially during peak months like June, August, November, and December, to implement targeted marketing campaigns and optimize inventory management.

- **Market Trend Analysis:** Capitalize on emerging trends identified in regions like Eastern US, Southern Asia, and the Southern US, where recent growth has been observed, by tailoring marketing and business strategies to capitalize on these trends.

- **Continuous Monitoring and Adaptation:** Implement data-driven decision-making by continually monitoring sales, profitability, customer behavior, and market trends, and adapting strategies based on real-time insights.