

# **IBM COGNOS ANALYTICS**

## **ASSIGNMENT-03**

ALLU DIWAKAR  
21BCE9213  
diwakar.21bce9213@vitapstudent.ac.in

**1. Upload the dataset to MySQL and integrate with Tableau, delete the unnecessary columns, explore and visualize the dataset using Tableau.**

- **Title:**

*Exploratory Data Analysis and Visualization of Supermarket Sales Data with MySQL and Tableau.*

- **Abstract:**

*This project involves the integration of a historical sales dataset from a supermarket into MySQL and the subsequent exploration and visualization of the data using Tableau. The dataset contains various attributes related to sales transactions, such as branch information, customer type, product categories, prices, and more. Unnecessary columns will be removed to streamline the dataset. Through Tableau, we will create insightful visualizations to gain a comprehensive understanding of the sales trends and customer behaviour within the supermarket.*

- **Materials and methods:**

- *Dataset Selection: A historical sales dataset from a supermarket is chosen for analysis.*
- *MySQL Integration: The dataset is uploaded and integrated into a MySQL database.*
- *Column Selection: Unnecessary columns are identified and removed to optimize the dataset.*
- *Tableau Integration: MySQL is connected to Tableau for data visualization.*
- *Data Exploration: Exploratory data analysis techniques are applied to understand the dataset.*
- *Visualization: Various visualizations are created using Tableau to gain insights into sales trends and customer behaviour.*

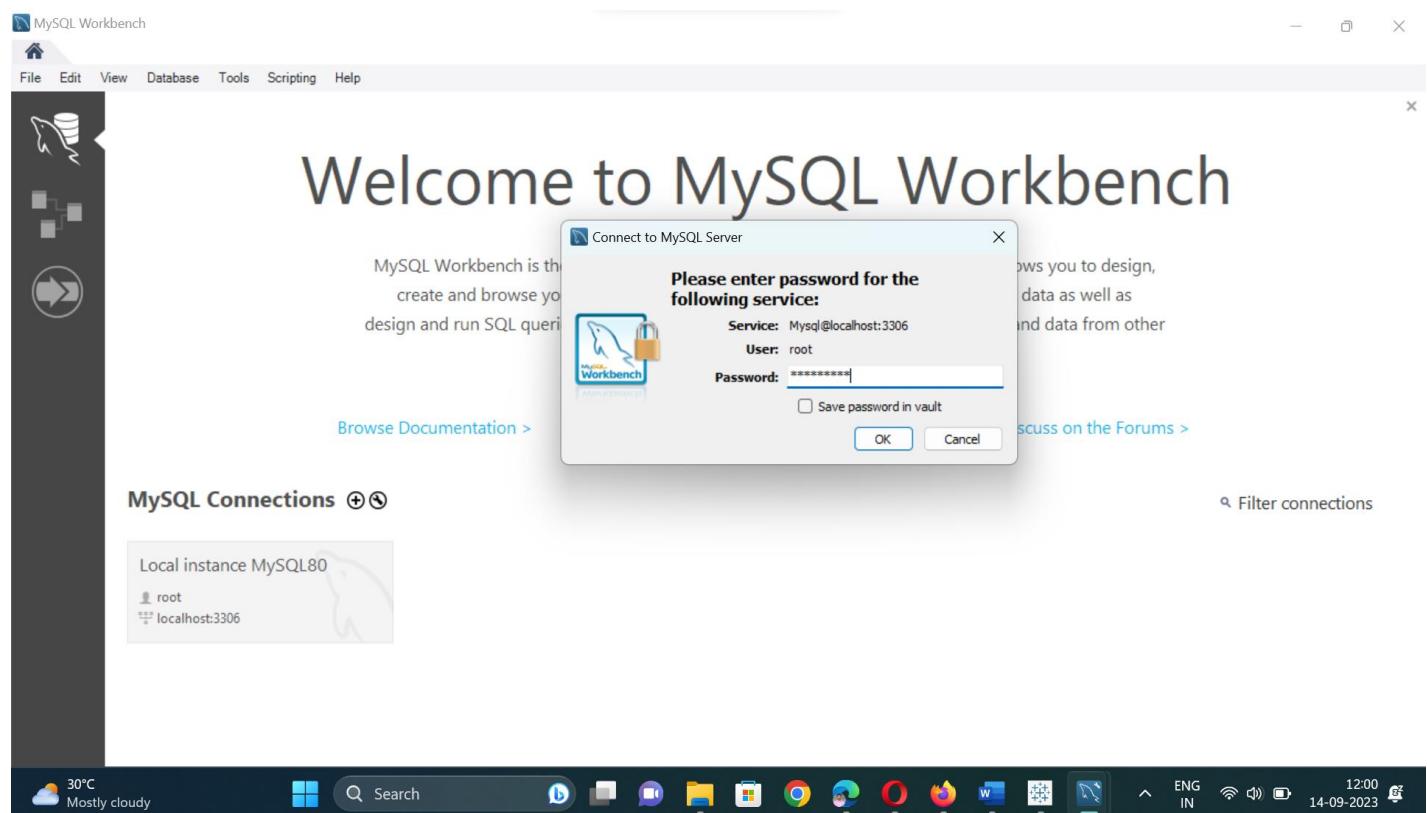
- ***Introduction:***

With the rapid growth of supermarkets in densely populated cities, understanding sales trends and customer behaviour is crucial for staying competitive. This project aims to leverage MySQL and Tableau to streamline the analysis of a historical sales dataset. By integrating the data, removing unnecessary columns, and creating insightful visualizations, we seek to uncover valuable insights that can inform decision-making and improve overall business strategies.

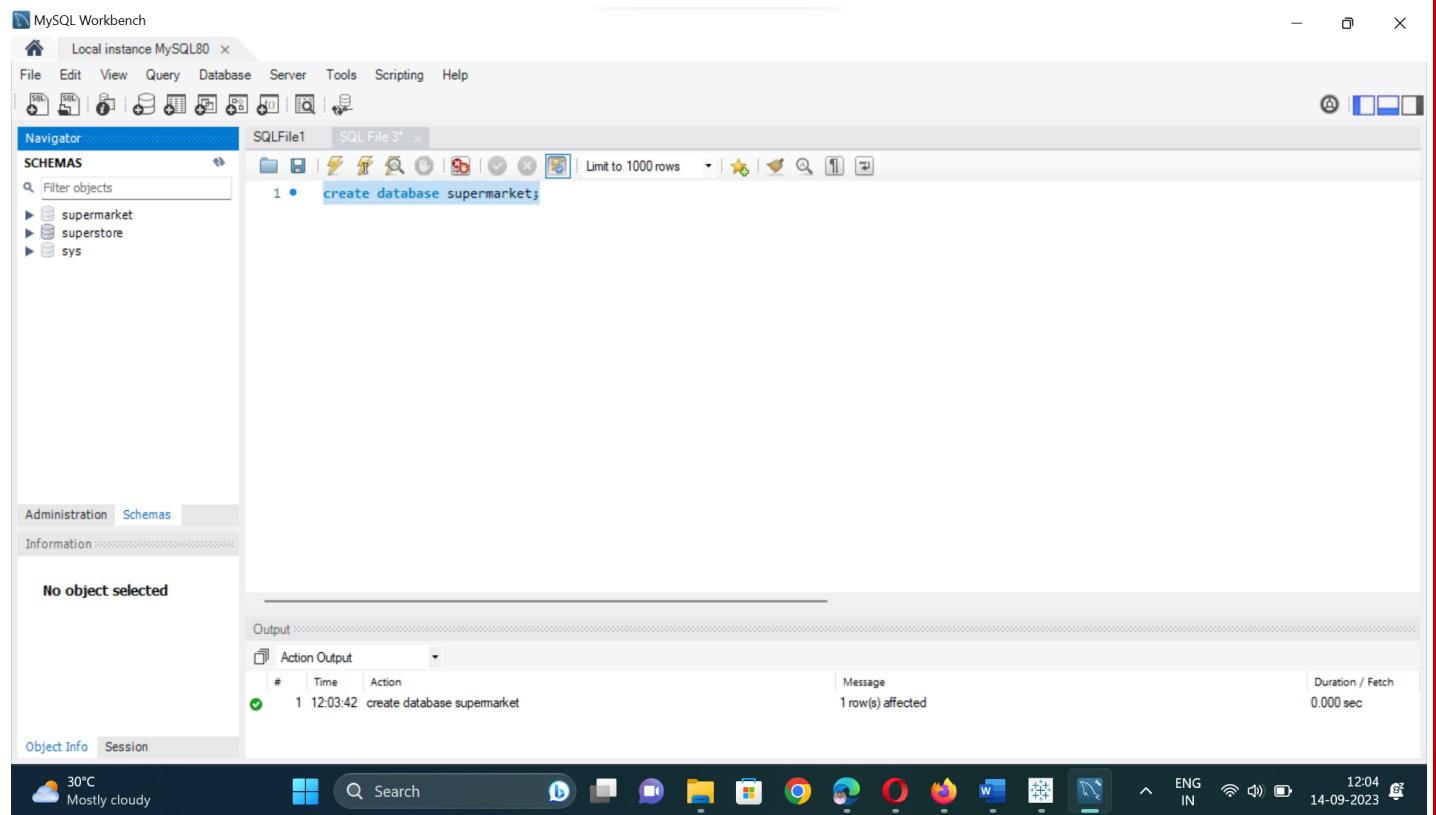
- ***Implementation:***

➤ ***MySQL Integration:***

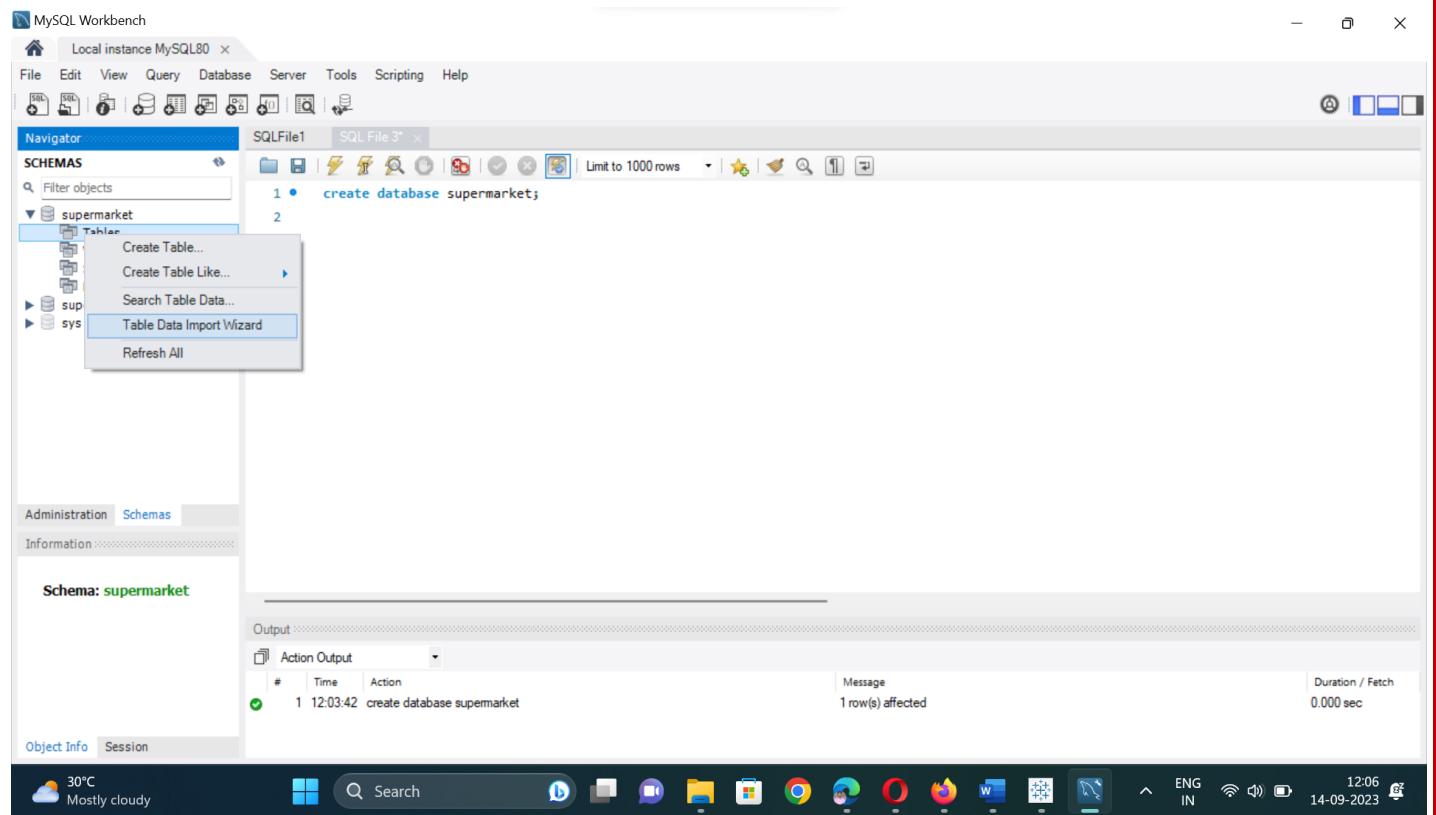
**I. open MySQL Workbench:**

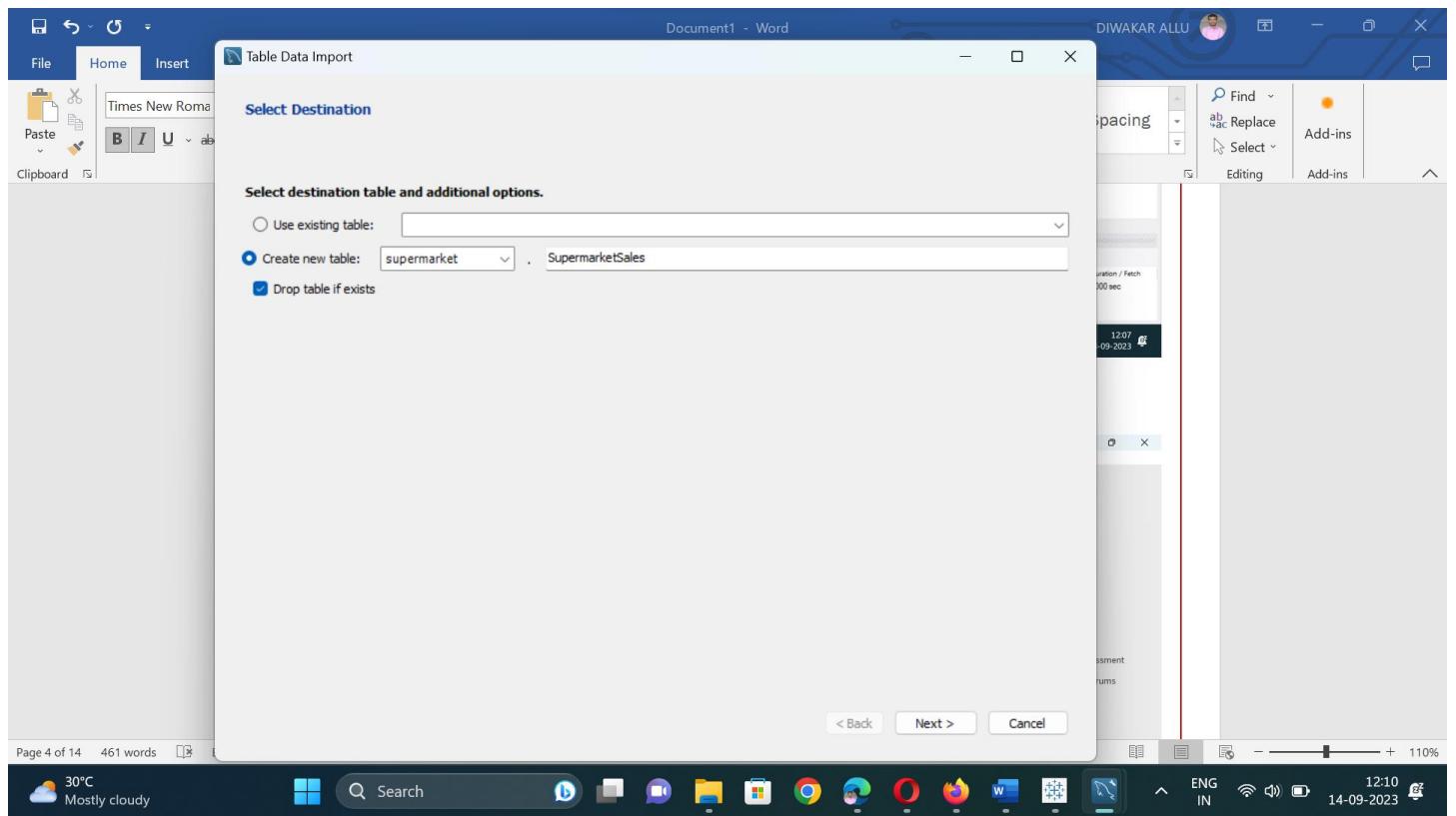
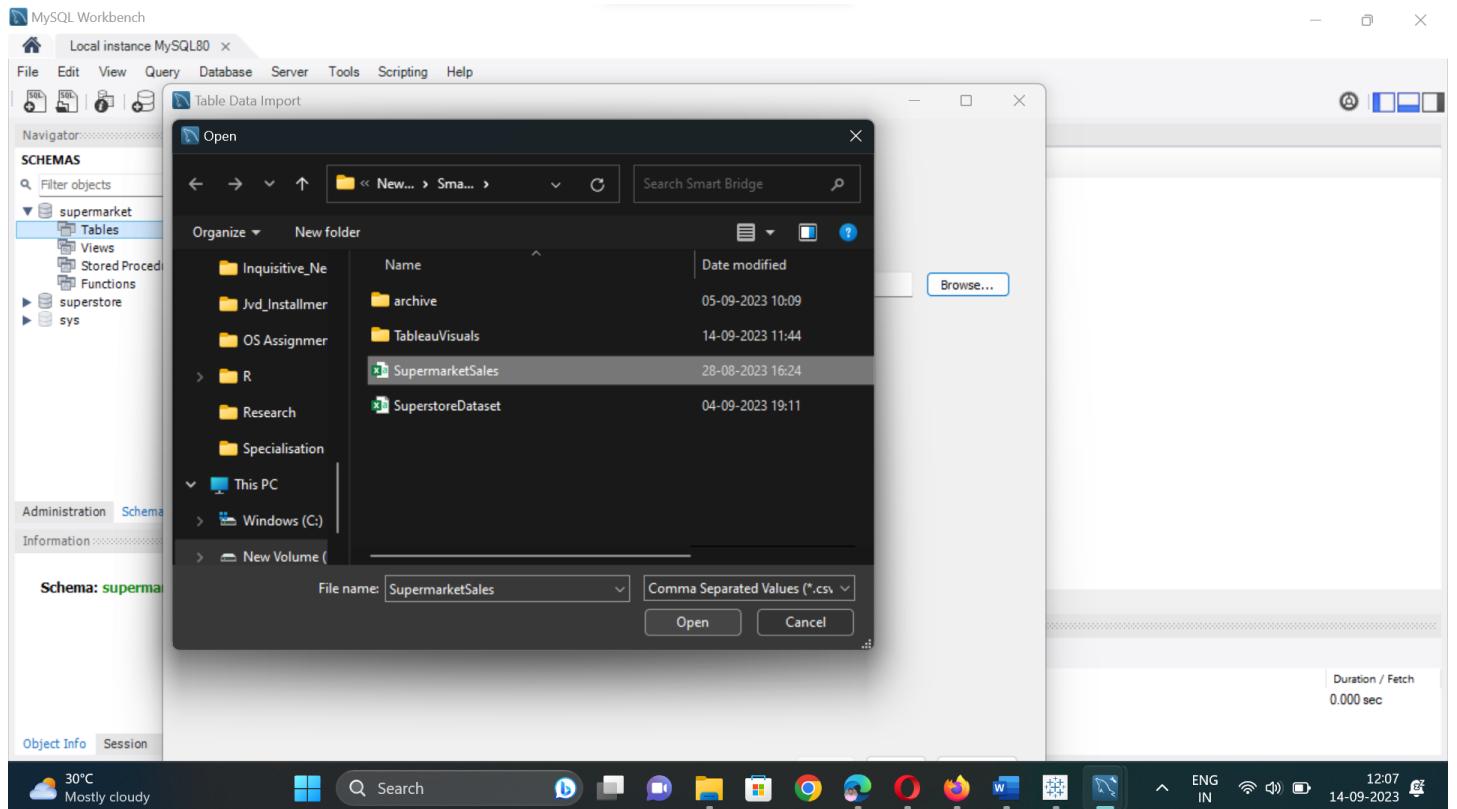


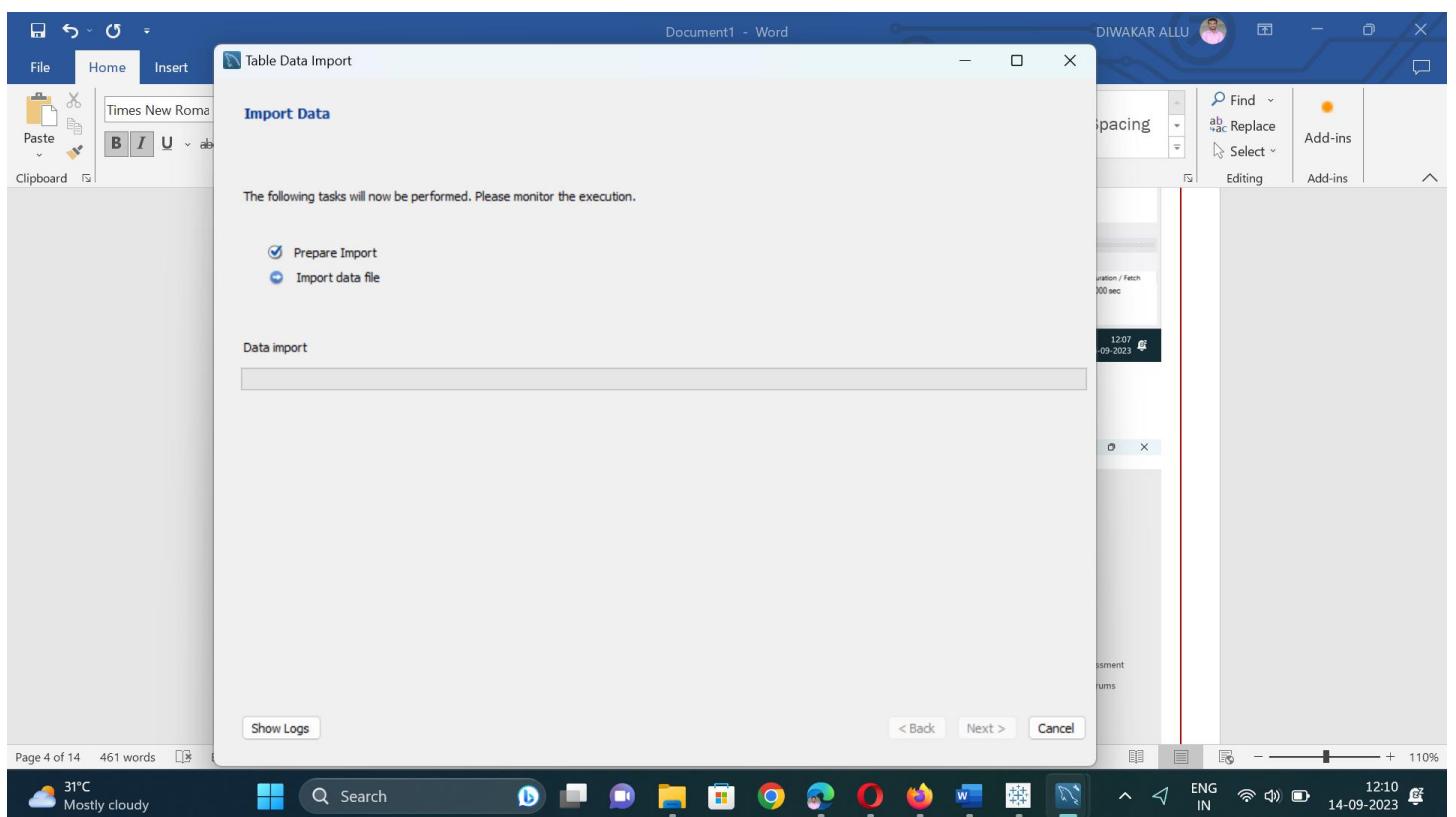
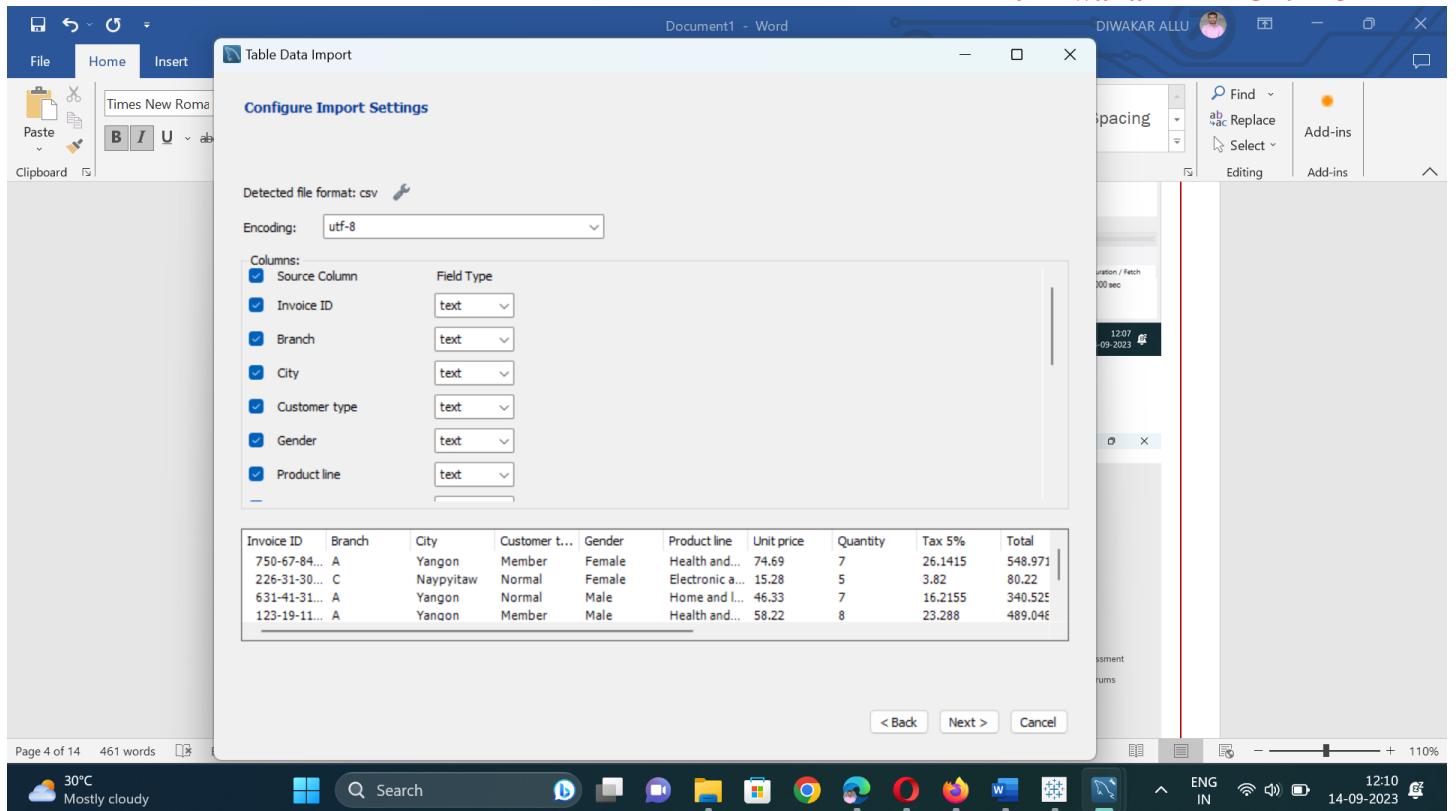
## 2.create a schema:

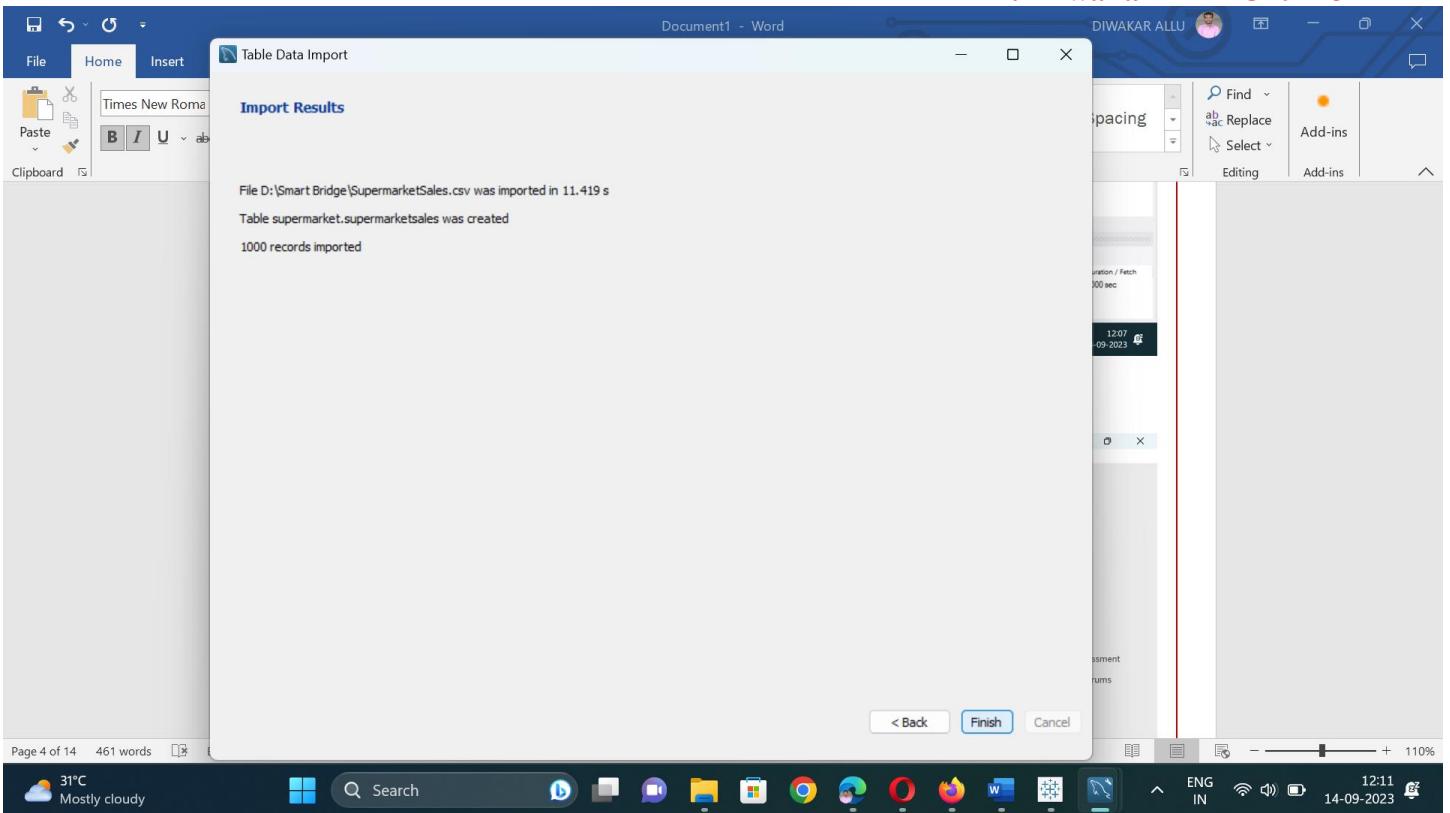


## 3. Import the data from local data set:









#### 4. preprocess the data using SQL commands:

```

1 • create database supermarket;
2
3 • use supermarket;
4 • select * from supermarketsales;

```

Invoice ID	Branch	City	Customer type	Gender	Product line	Unit price	Quantity	Tax %	Total	Date	Time	Payment	cogs	gross	pero
750-67-8428	A	Yangon	Member	Female	Health and beauty	74.69	7	26.1415	548.9715	1/5/2019	13:08	Ewallet	522.83	4.761	
226-31-3081	C	Naypyitaw	Normal	Female	Electronic accessories	15.28	5	3.82	80.22	3/8/2019	10:29	Cash	76.4	4.761	
631-41-3108	A	Yangon	Normal	Male	Home and lifestyle	46.33	7	16.2155	340.5255	3/3/2019	13:23	Credit card	324.31	4.761	
123-19-1176	A	Yangon	Member	Male	Health and beauty	58.22	8	23.288	489.048	1/27/2019	20:33	Ewallet	465.76	4.761	
373-73-7910	A	Yangon	Normal	Male	Sports and travel	86.31	7	30.2085	634.3785	2/8/2019	10:37	Ewallet	604.17	4.761	

Action Output

#	Time	Action	Message	Duration / Fetch
8	12:18:12	use supermarket	0 row(s) affected	0.000 sec
9	12:18:21	select * from supermarketsales LIMIT 0, 1000	1000 row(s) returned	0.000 sec / 0.015 sec

MySQL Workbench

Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator Schemas

**supermarket**

- Tables
  - supermarketsales

SCHEMAS

Administration Schemas

Information

Table: **supermarketsales**

Columns:

Invoice ID	text
Branch	text
City	text
Customer	text
type	text
Gender	text
Product line	text

Object Info Session

SQLFile1 SupermarketSalesMySQLAssignment

```

12 • select count(distinct('Branch')) from supermarketsales;
13
14 /* Total No of Transactions in different city*/
15 • select City,count('Invoice ID') as Total_Transactions
   from supermarketsales
   group by City
   order by Total_Transactions;
16
17
18
19
20

```

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

City	Total_Transactions
Naypyitaw	328
Mandalay	332
Yangon	340

Result 11 x

Action Output

#	Time	Action	Message	Duration / Fetch
20	12:36:34	select City,count('Invoice ID') as Total_order from supermarketsales group by City or...	3 row(s) returned	0.000 sec / 0.000 sec
21	12:37:21	select City,count('Invoice ID') as Total_Transactions from supermarketsales group b...	3 row(s) returned	0.016 sec / 0.000 sec

Output

31°C Mostly cloudy

Search

12:37 IN 14-09-2023

MySQL Workbench

Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator Schemas

**supermarket**

- Tables
  - supermarketsales

SCHEMAS

Administration - Server Status supermarket.supermarketsales

Information

Table: **supermarketsales**

Columns:

Invoice ID	text
Branch	text
City	text
Customer	text
type	text
Gender	text
Product line	text
Unit price	double
Quantity	int
Tax 5%	double

Object Info Session

SQLFile1 SupermarketSalesMySQLAssignment

```

19
20 /* Month extraction from date*/
21 • ALTER TABLE supermarketsales
   ADD COLUMN Month INT;
22
23
24 • UPDATE supermarketsales
   SET Month = MONTH(Date);
25
26
27 • ALTER TABLE supermarketsales
   DROP COLUMN `Invoice ID`;
28
29
30
31

```

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

Branch	City	gross income	cogs
A	Yangon	8.2005	164.01
B	Mandalay	4.03	80.6
C	Naypyitaw	21.51	430.2
B	Mandalay	13.197	263.94
B	Mandalay	3.32	66.4
A	Yangon	8.64	172.8
A	Yangon	13.2945	265.89
A	Yangon	21.036	420.72

supermarketsales 14 x

27°

Search

20:01 ENG IN 14-09-2023

The screenshot shows the MySQL Workbench interface. On the left, the Navigator pane displays the database schema, including tables like `supermarketsales` and its columns such as `Row ID`, `Order ID`, and `Ship Date`. The central area contains a SQL editor window with the following DDL statements:

```

25 SET Month = MONTH(Date);
26
27 • ALTER TABLE supermarketsales
DROP COLUMN `Invoice ID`;
28
29
30 • alter table supermarketsales add profit int;
31 • update supermarketsales set profit =(`gross income` - `cogs`);
32
33 • alter table supermarketsales add profitMargin int;
34 • update supermarketsales set profitMargin =(`profit` / `Total`);
35

```

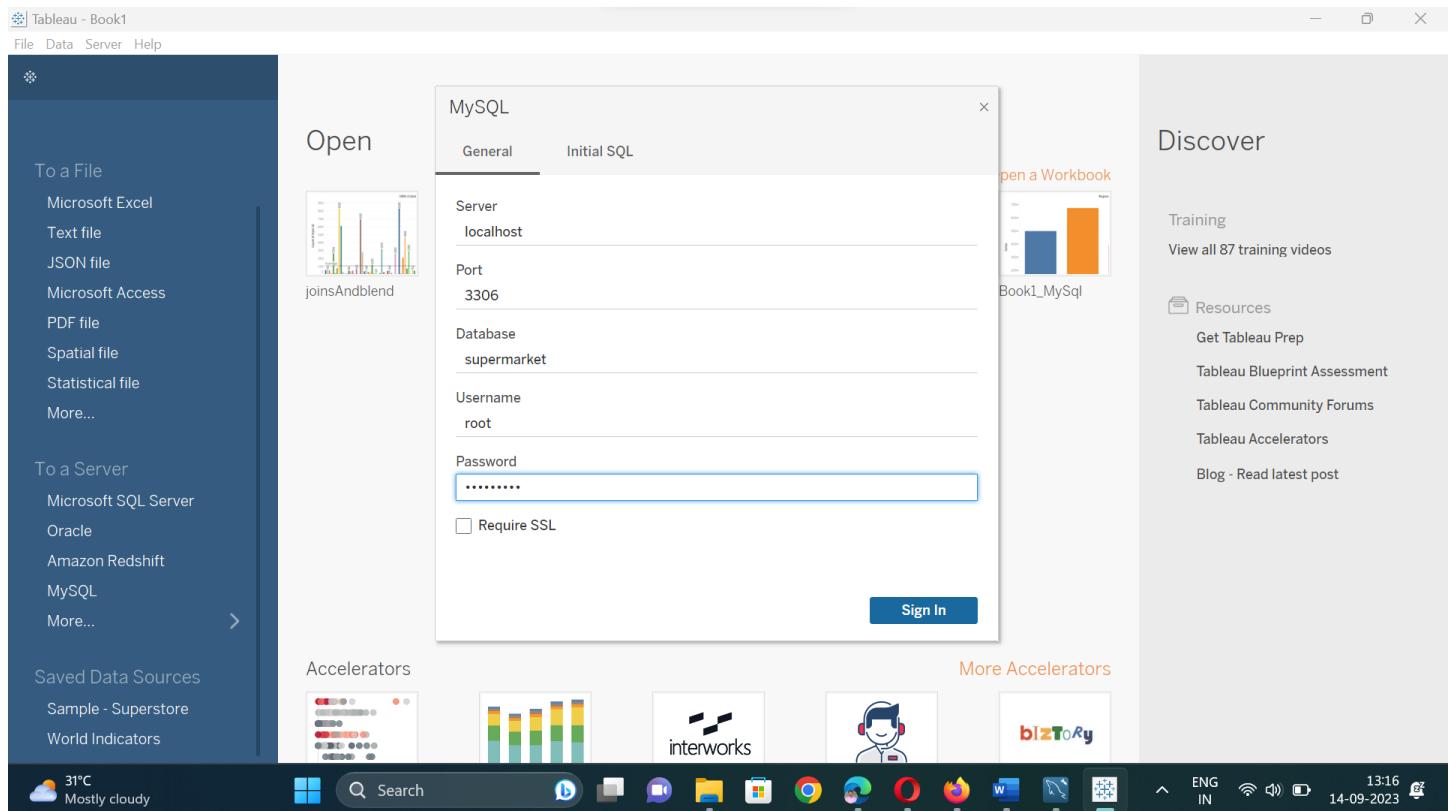
Below the SQL editor is a Result Grid showing data from the `supermarketsales` table. The columns include: Month, City, Customer type, Gender, Product line, Unit price, Quantity, Tax %, Total, Date, Time, Payment, cogs, and gross margin percentage. The data consists of 15 rows from Yangon and Mandalay.

## ➤ Tableau Integration:

### 1. Open Tableau Desktop

The screenshot shows the Tableau Desktop interface. The left sidebar includes sections for "Connect" (Search for Data, Tableau Server, To a File, To a Server), "Open" (with thumbnails for "joinsAndblend", "superstore", "13Sep2023", "Extract\_Filter", and "Book1\_MySQL"), "Discover" (Training, Resources, Accelerators), and "More Accelerators". The bottom navigation bar shows the system tray with weather, search, and taskbar icons.

## 2. select MySQL in Connect to a Server option



The screenshot shows the Tableau desktop application with the 'supermarketsales' data source selected in the Connections pane. The pane also lists 'localhost MySQL' and 'supermarket'. The 'supermarketsales' table is selected, showing its 17 fields and 1000 rows. A preview of the data is shown in a grid format. The preview table has columns: Name, Type, Field Name, Physical Table, and Remote Fi... (partially visible). The data rows show various values for Invoice ID, Branch, City, Customer type, and Gender. The system tray at the bottom shows the date and time as 14-09-2023, 13:16.

Name	Type	Field Name	Physical Table	Remote Fi...
supermarketsales				
Invoice ID	Abc	supermarketsales	supermarketsales	supermarketsales
750-67-8428	A	Branch	City	Customer type
226-31-3081	C		Yangon	Member
631-41-3108	A		Naypyitaw	Female
123-19-1176	A		Yangon	Normal
				Male

The screenshot shows the Tableau Data Source interface. On the left, the 'Tables' pane lists various dimensions and measures. In the center, the 'Sheet 1' canvas is empty with placeholder text 'Drop field here'. The top navigation bar includes 'File', 'Data', 'Worksheet', 'Dashboard', 'Story', 'Analysis', 'Map', 'Format', 'Server', 'Window', and 'Help'. The bottom taskbar shows system icons like weather, search, and browser.

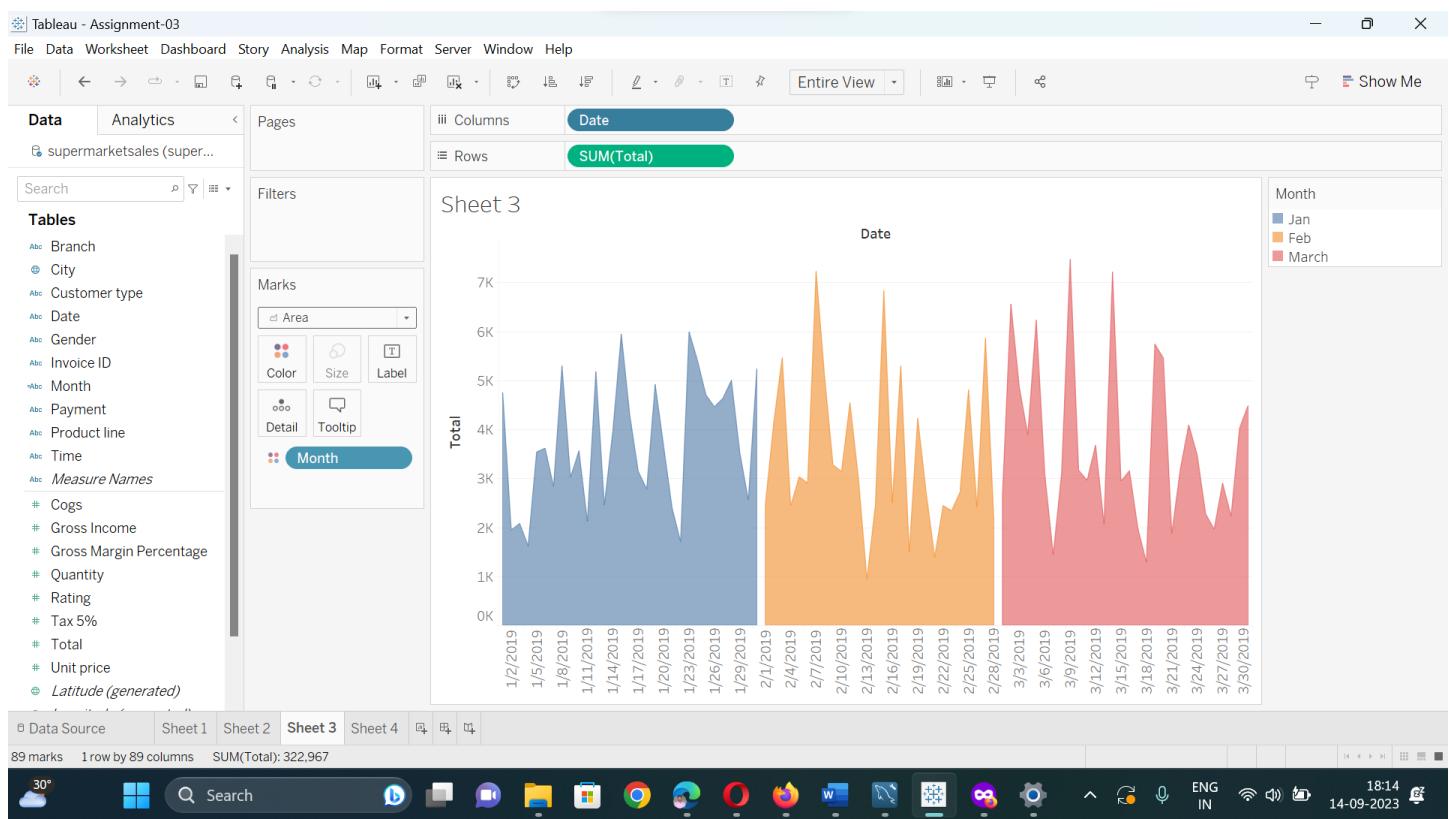
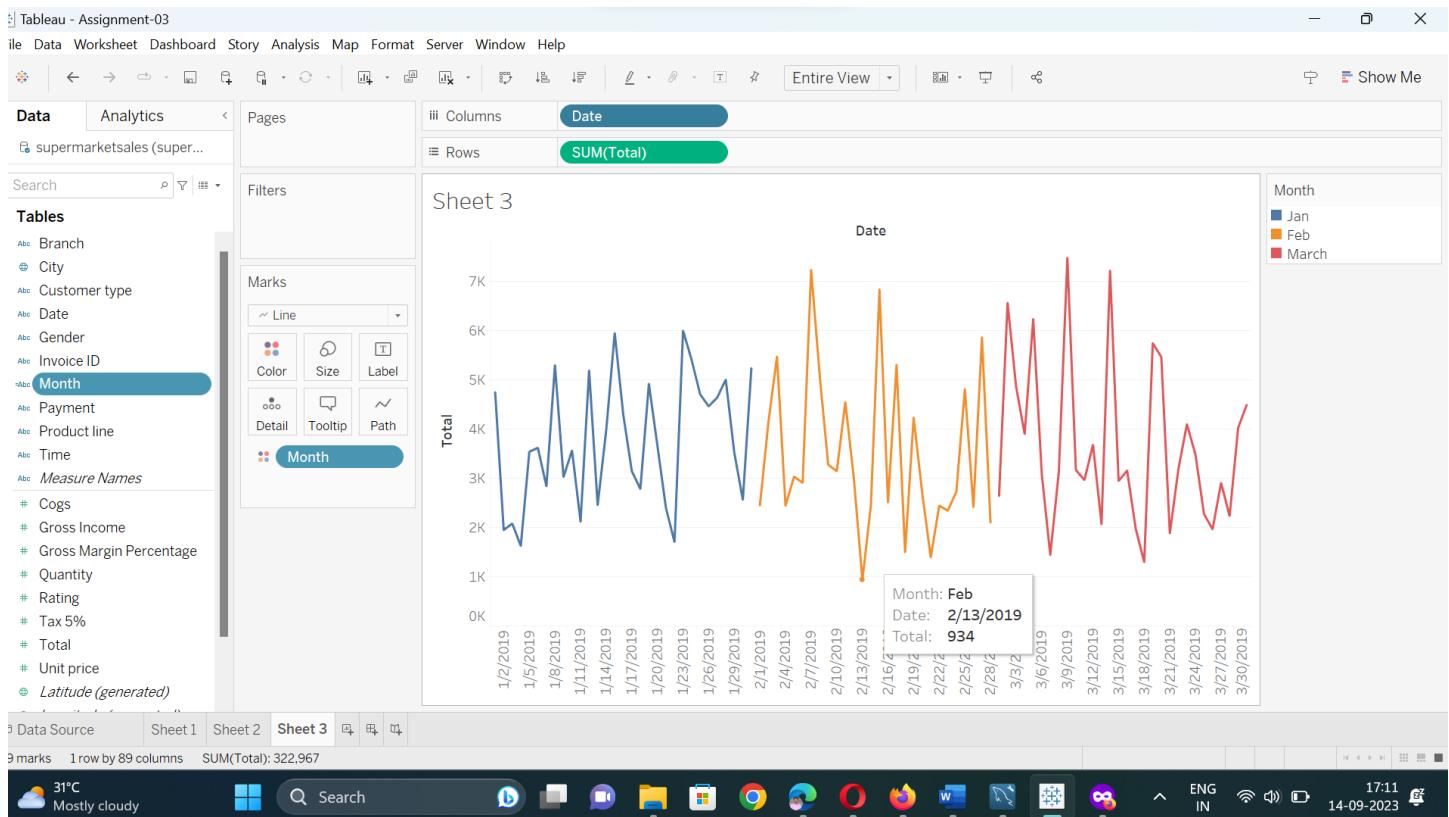
## ➤ Data Exploration and Visualization:

**1. Which product categories are the most popular among customers and Which product categories generate the highest revenue?**

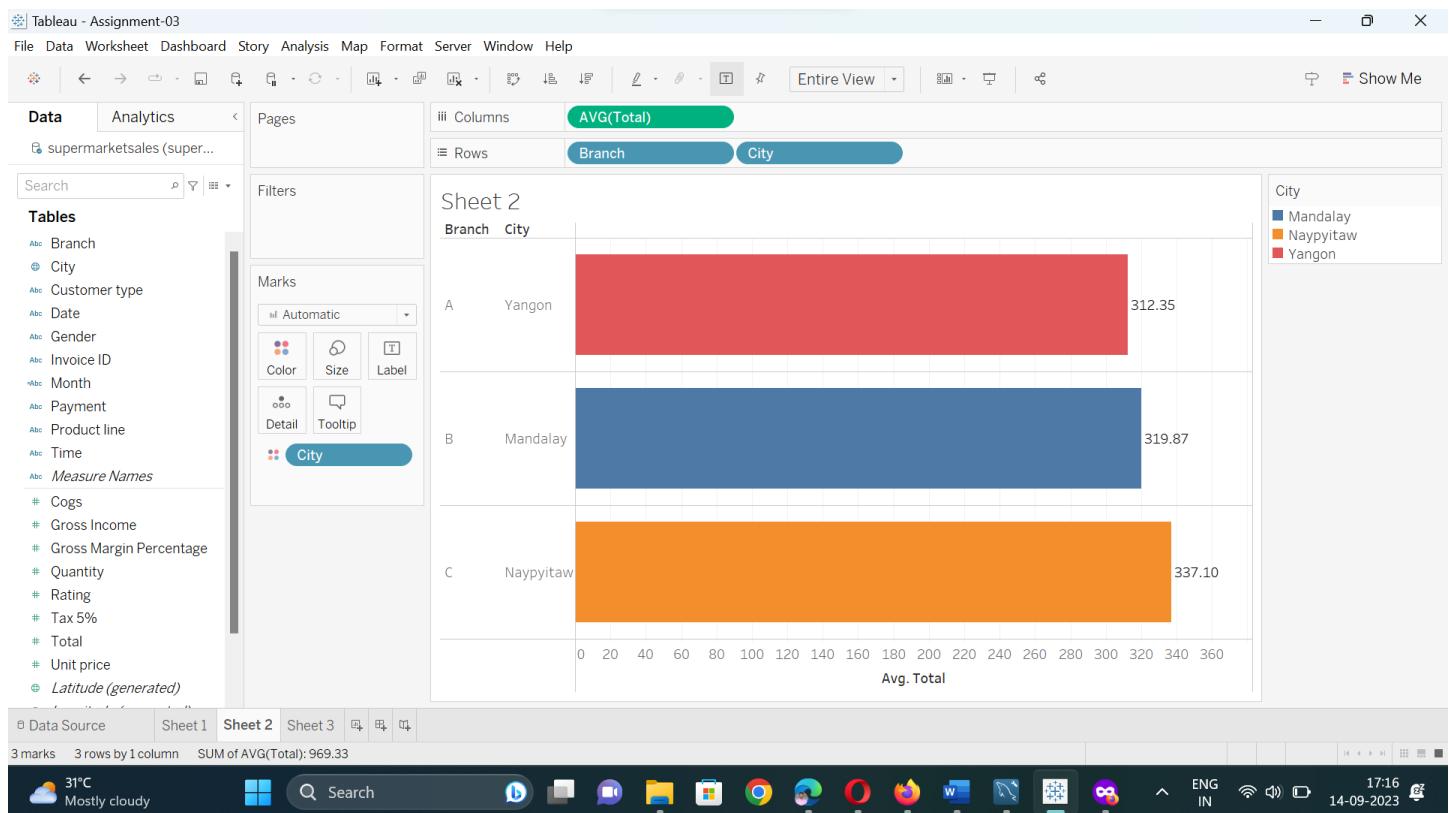
The screenshot shows a bar chart visualization in Tableau. The y-axis is labeled 'Quantity' and ranges from 0 to 1000. The x-axis categories are 'Electronic accesso...', 'Fashion accessori...', 'Food and beverage...', 'Health and beauty...', 'Home and lifestyle...', and 'Sports and travel...'. The bars represent the sum of quantity for each category. A tooltip for the first bar (Electronic accessories) shows a value of 971. The legend on the right identifies the categories: Electronic accessories (blue), Fashion accessories (orange), Food and beverages (red), Health and beauty (teal), Home and lifestyle (green), and Sports and travel (yellow). The top navigation bar includes 'File', 'Data', 'Worksheet', 'Dashboard', 'Story', 'Analysis', 'Map', 'Format', 'Server', 'Window', and 'Help'. The bottom taskbar shows system icons like weather, search, and browser.

Product line	Quantity
Electronic accessories	971
Fashion accessories	902
Food and beverages	952
Health and beauty	854
Home and lifestyle	911
Sports and travel	920

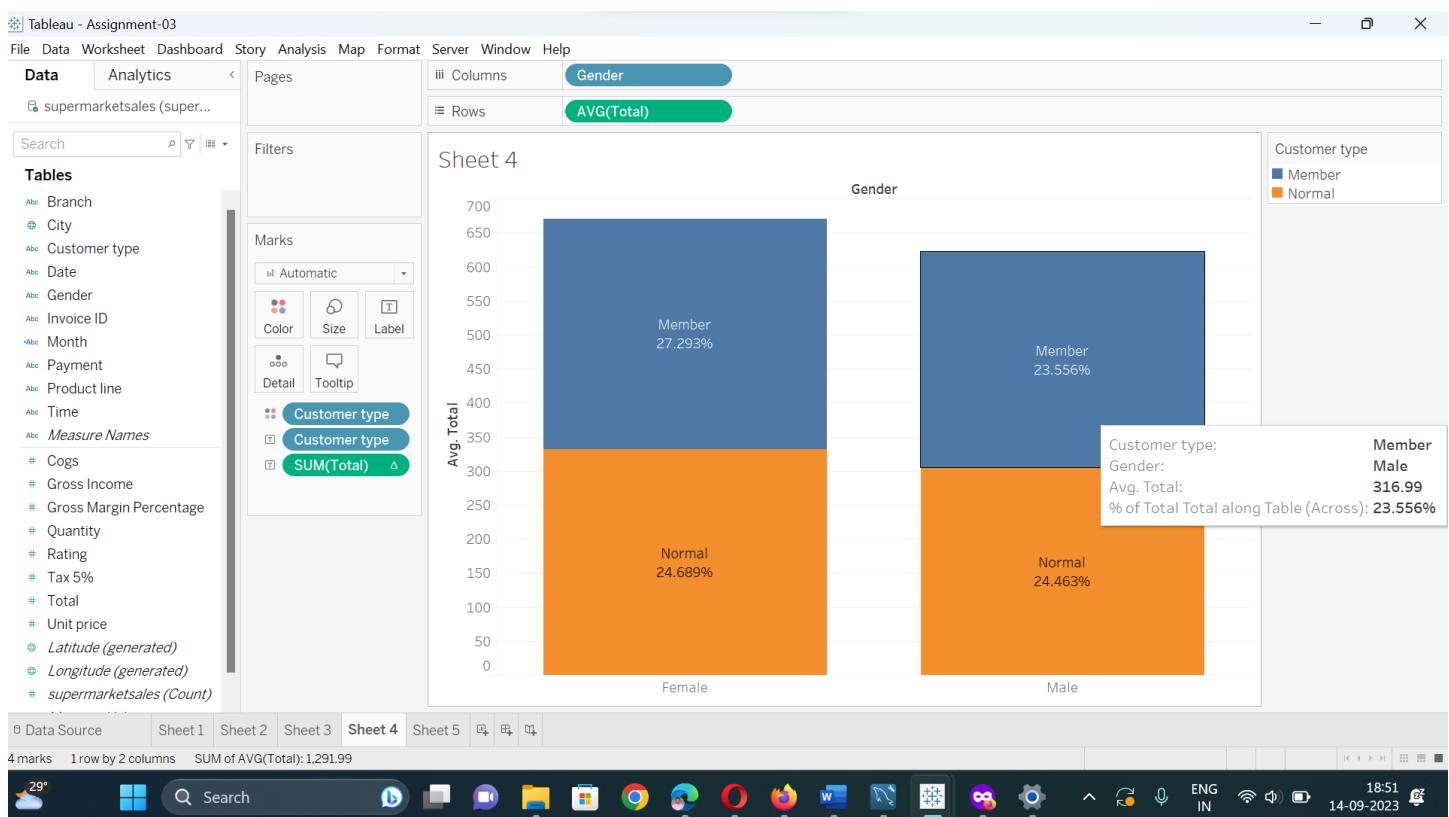
## 2. What are the sales trends over time, and are there any notable patterns or spikes?



### 3. How do sales vary by city and branch?



### 4. Compare how member and non-member customers contribute to total sales, broken down by gender.



## Profit Analysis and Insights in Supermarket Sales Data: A Visual Exploration

Calculate Profit:

Create a calculated field named "Profit" by subtracting COGS from Total Sales. i.e.,  $\text{Profit} = \text{Total} - \text{COGS}$

Calculate Profit Margin:

Create a calculated field named "Profit Margin" by dividing Profit by Total Sales ( $\text{Total} = \text{Gross income} + \text{Tax}$ ) i.e.,  $\text{Profit Margin} = \text{Profit} / \text{Total Sales}$

The screenshot shows the Tableau interface with the following details:

- Top Bar:** Shows the title "Tableau - Assignment-03" and standard window controls.
- Left Panel (Data View):**
  - Tables:** Branch, City, Customer type, Date, Gender, Invoice ID, Month, Payment, Product line, Time.
  - Measure Names:** Cogs, Gross Income, Gross Margin Percentage, Profit (highlighted in green), Profit Margin, Quantity, Rating, Tax 5%, Total.
- Middle Panel (Sheet 7):**
  - Columns:** Profit
  - Rows:** [Total] - [Cogs]
  - Marks:** Automatic, Color, Size, Text, Detail, Tooltip.
  - Feedback:** "The calculation is valid." and "2 Dependencies" with "Apply" and "OK" buttons.
- Bottom Bar:** Shows tabs for Data Source, Sheet 1, Sheet 2, Sheet 3, Sheet 4, Sheet 5, Sheet 6, Sheet 7, and other system icons like taskbar icons and network status.

Tableau - Assignment-03

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Entire View Show Me

Data Analytics

supermarketsales (super...)

Search

Tables

- Date
- Gender
- Invoice ID
- Month
- Payment
- Product line
- Time
- Measure Names**
- Cogs
- Gross Income
- Gross Margin Percentage
- Profit
- Quantity
- Rating
- Tax 5%
- Total
- Unit price
- Latitude (generated)
- Longitude (generated)
- supermarketsales (Count)

Pages Columns Rows

Filters

Marks Automatic

Color Size Text Detail Tooltip

Sheet 6

Drop field here

Profit Margin

[Profit]/[Total]

The calculation is valid.

Apply OK

Data Source Sheet 1 Sheet 2 Sheet 3 Sheet 4 Sheet 5 Sheet 6

27° Search ENG IN 19:59 14-09-2023

MySQL Workbench

Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

superstore

Tables

superdata

Columns Row ID Order ID Order Date Ship Date Skin Mode

Administration Schemas

Information

Payment text  
cogs double  
gross margin percentage double  
gross income double  
Rating double

SQLFile1 SupermarketSalesMySQLAssign... Administration - Server Status supermarket.supermarketsales

```

25 SET Month = MONTH(Date);
26
27 • ALTER TABLE supermarketsales
28   DROP COLUMN `Invoice ID`;
29
30 • alter table supermarketsales add profit int;
31 • update supermarketsales set profit =(`gross income` - `cogs`);
32
33 • alter table supermarketsales add profitMargin int;
34 • update supermarketsales set profitMargin =(`profit` / `Total`);
35

```

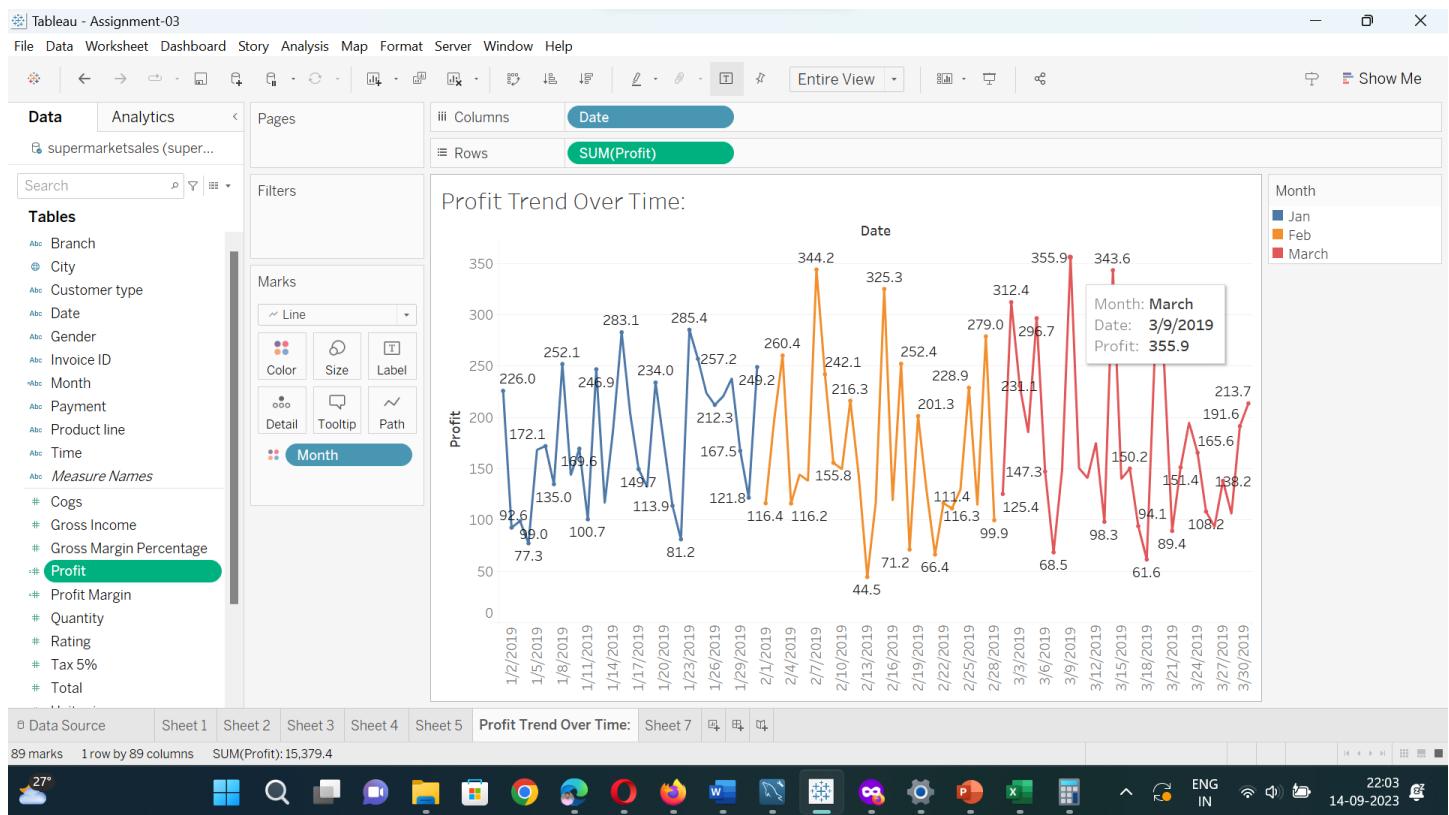
Result Grid Filter Rows: Export: Wrap Cell Content: Fetch rows:

id	City	Customer type	Gender	Product line	Unit price	Quantity	Tax 5%	Total	Date	Time	Payment	cogs	gross margin percentage
1	Yangon	Member	Female	Health and beauty	74.69	7	26.1415	548.9715	1/5/2019	13:08	Ewallet	522.83	4.761904762
2	Naypyitaw	Normal	Female	Electronic accessories	15.28	5	3.82	80.22	3/8/2019	10:29	Cash	76.4	4.761904762
3	Yangon	Normal	Male	Home and lifestyle	46.33	7	16.2155	340.5255	3/3/2019	13:23	Credit card	324.31	4.761904762
4	Yangon	Member	Male	Health and beauty	58.22	8	23.288	489.048	1/27/2019	20:33	Ewallet	465.76	4.761904762
5	Yangon	Normal	Male	Sports and travel	86.31	7	30.2085	634.3785	2/8/2019	10:37	Ewallet	604.17	4.761904762
6	Naypyitaw	Normal	Male	Electronic accessories	85.39	7	29.8865	627.6165	3/25/2019	18:30	Ewallet	597.73	4.761904762
7	Yangon	Member	Female	Electronic accessories	68.84	6	20.652	433.692	2/25/2019	14:36	Ewallet	413.04	4.761904762
8	Naypyitaw	Normal	Female	Home and lifestyle	73.56	10	36.78	772.38	2/24/2019	11:38	Ewallet	735.6	4.761904762
9	Yangon	Member	Female	Health and beauty	36.26	2	3.626	76.146	1/10/2019	17:15	Credit card	72.52	4.761904762
10	Mandalay	Member	Female	Food and beverages	54.84	3	8.226	172.746	2/20/2019	13:27	Credit card	164.52	4.761904762

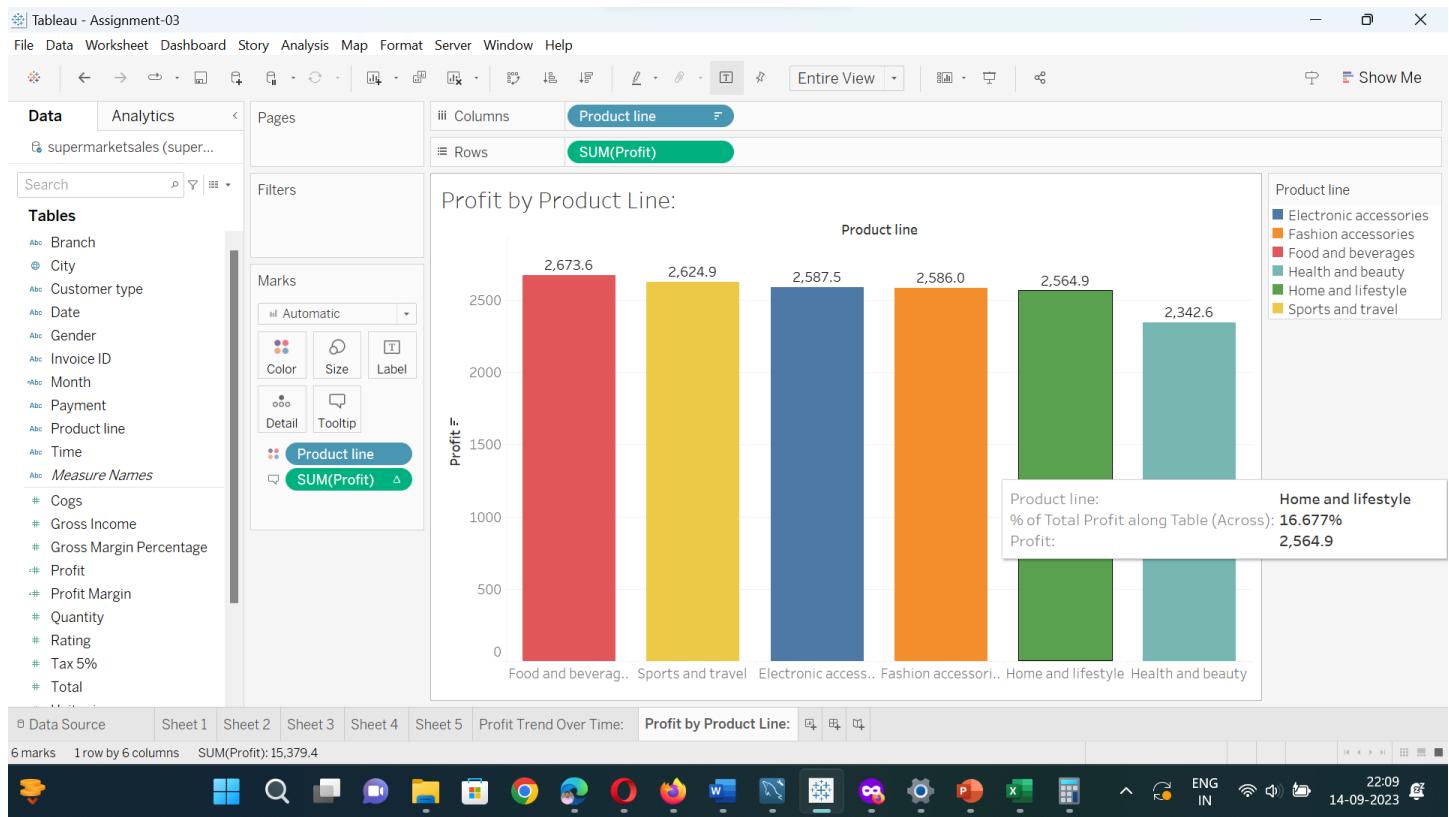
Object Info Session supermarketsales 16

27° Search ENG IN 20:13 14-09-2023

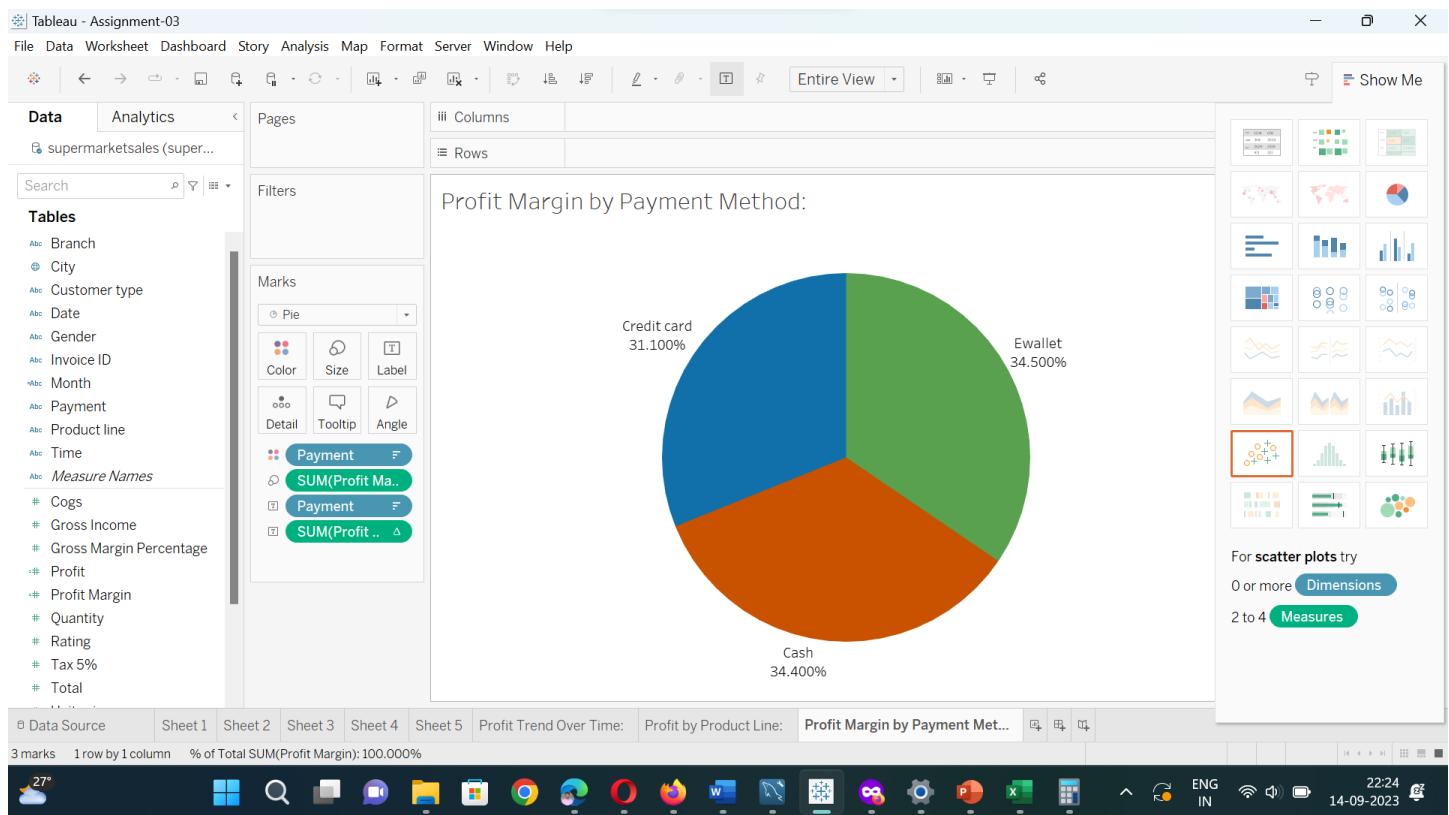
## Profit Trend Over Time: To Analyze how profit varies over time and identify trends.



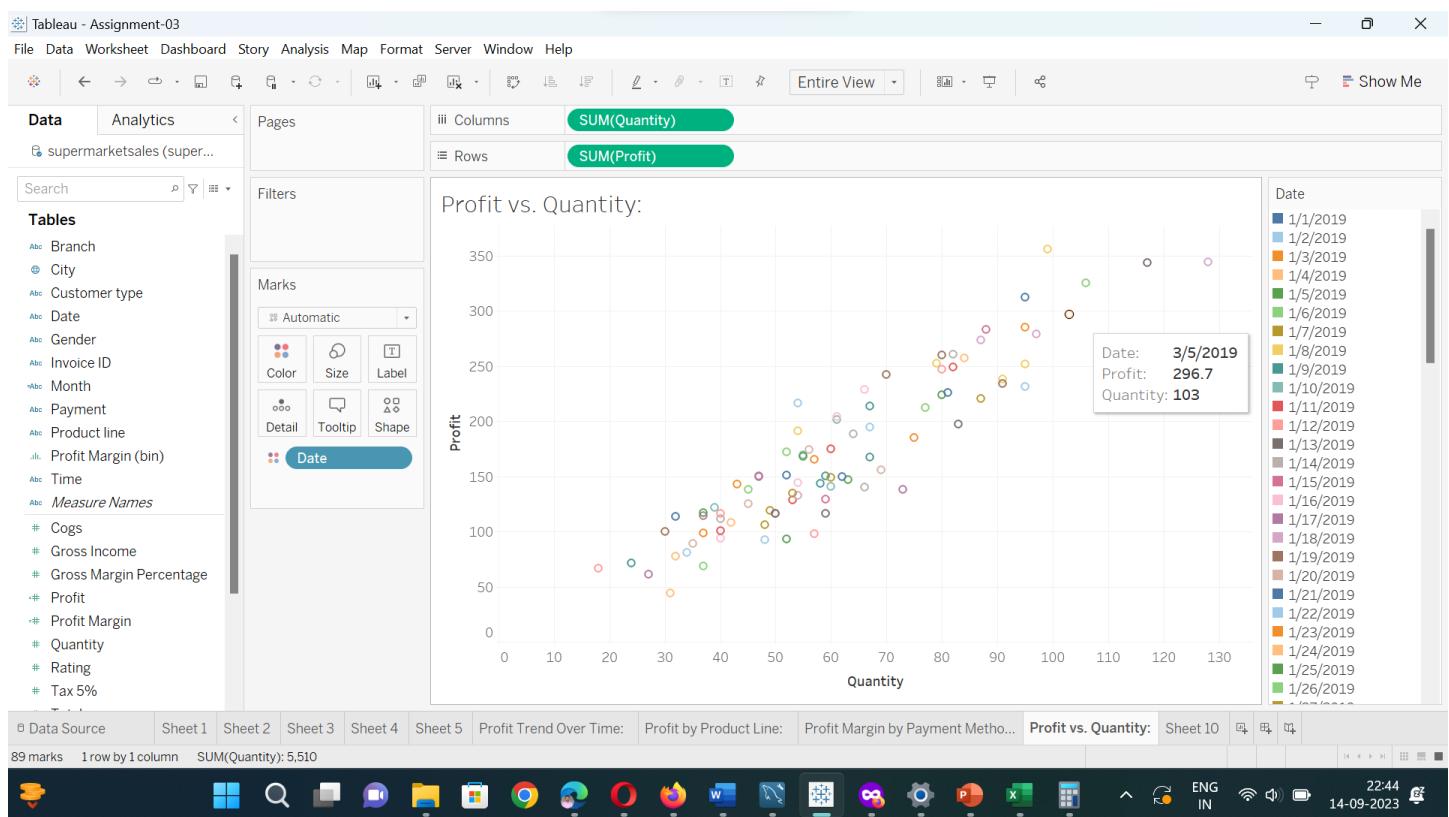
## Profit by Product Line: To Determine which product lines are most profitable.



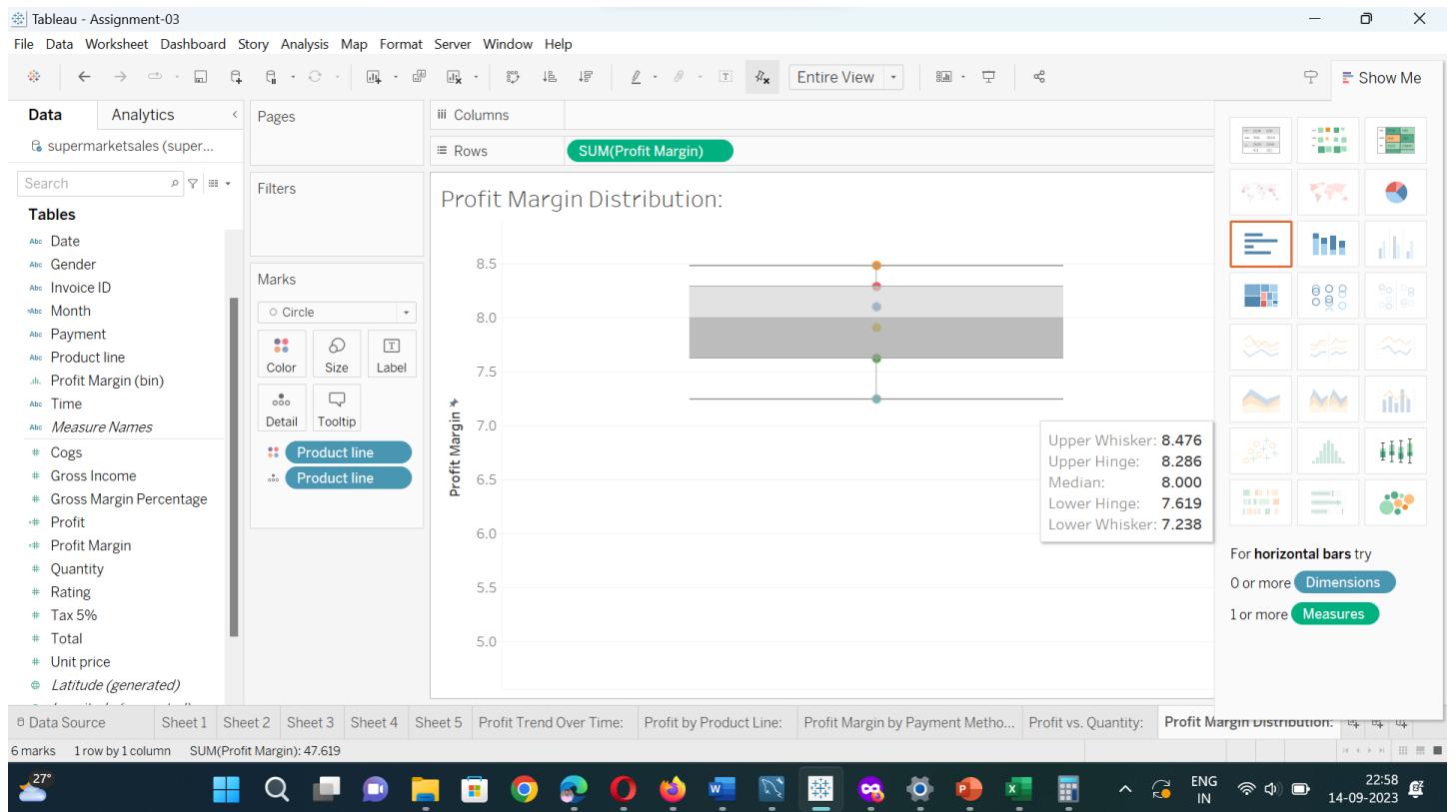
## Profit Margin by Payment Method: To Understand how profit margin varies by payment method.



## Profit vs. Quantity: To Explore the relationship between the quantity of products sold and profit.



**Profit Margin Distribution:** To understand the distribution of profit margins across different product lines.



- **Results.**

The project results in a streamlined dataset optimized for analysis. Through Tableau visualizations, we gain insights into sales trends across branches, customer segmentation, popular product categories, and more. These insights can inform strategic decisions, marketing efforts, and inventory management to enhance the supermarket's competitive edge in the market.

- **References:**

[https://help.tableau.com/current/pro/desktop/en-us/buildexamples\\_scatter.htm](https://help.tableau.com/current/pro/desktop/en-us/buildexamples_scatter.htm)

