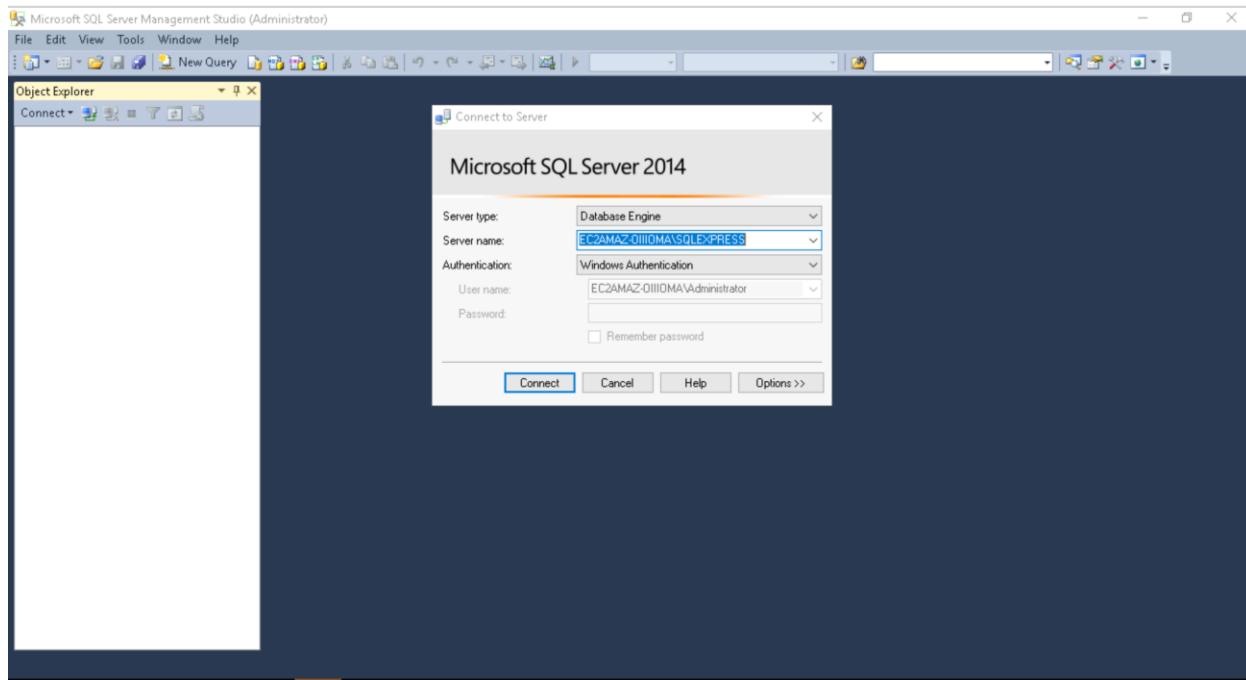


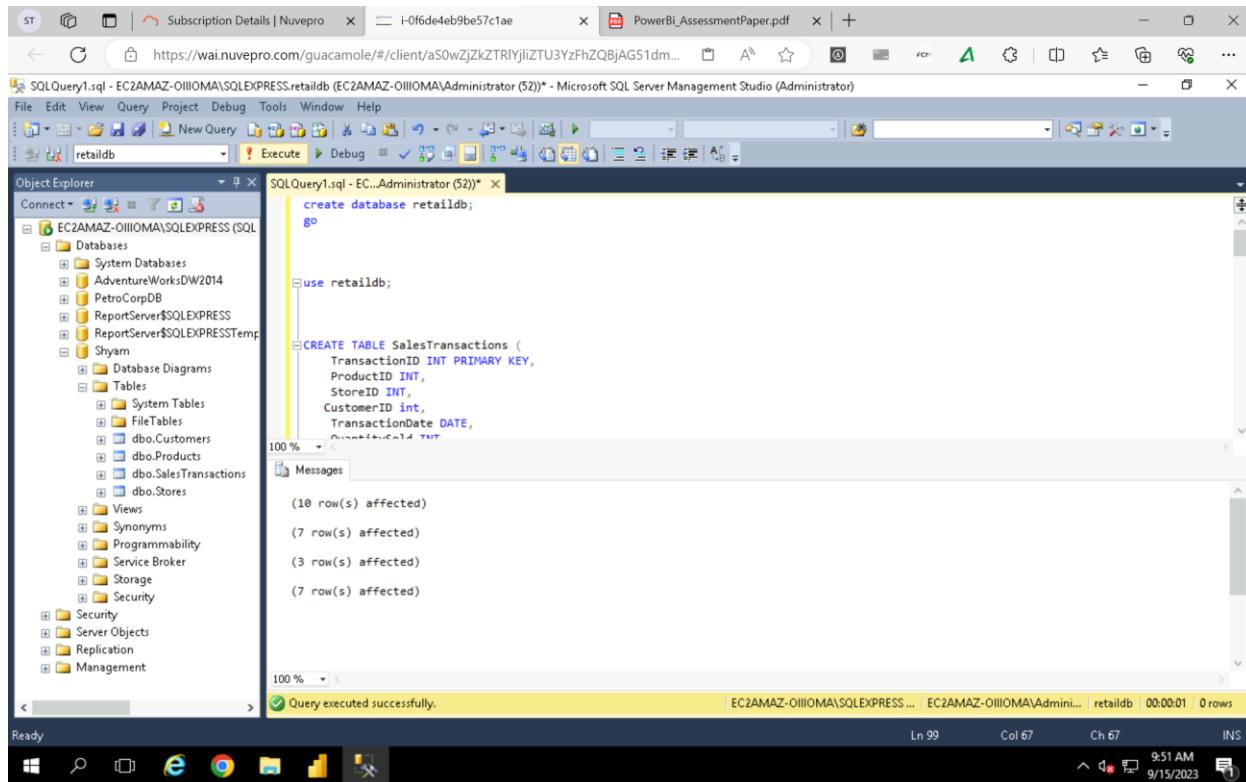
# Sales Performance Analysis with Power BI

## Data Loading

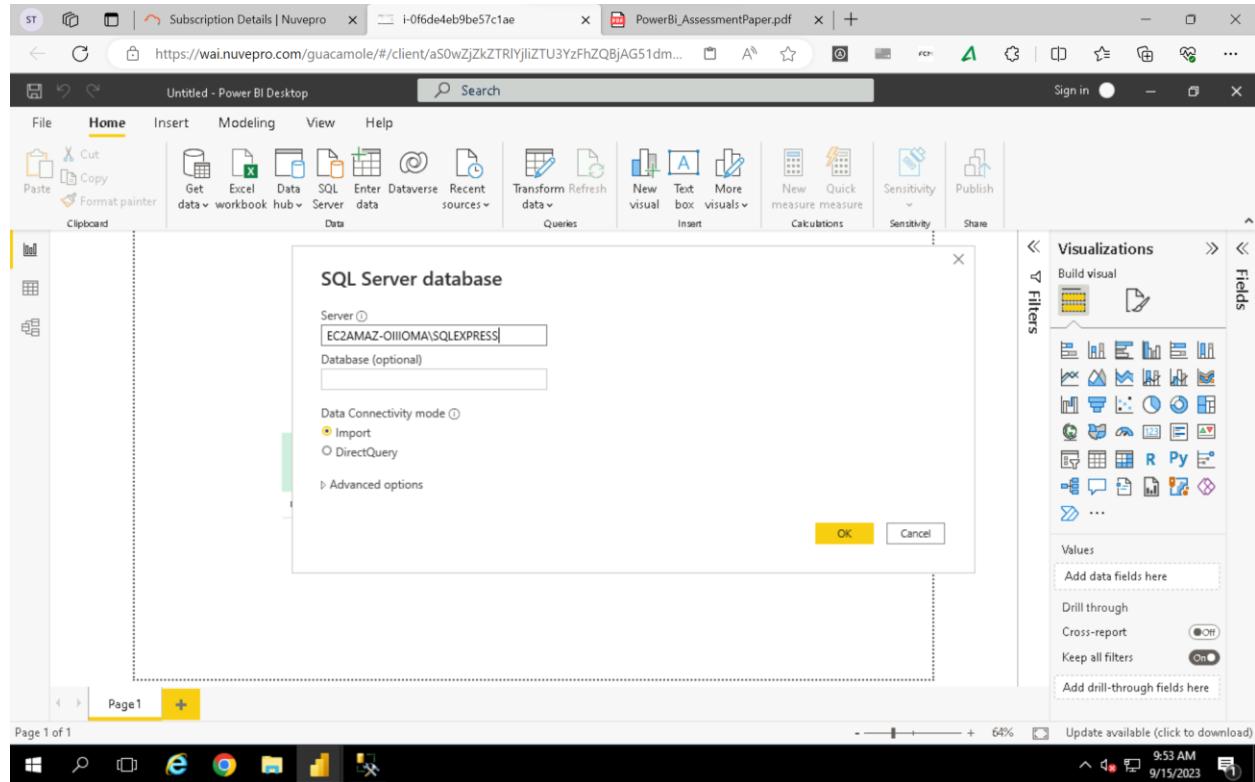
### Connecting to SQL Server



### Pasting Queries



## Open Power BI – Import from SQL Server



## Selecting database and all tables applicable

The screenshot shows the Guacamole interface with the 'Navigator' tab selected. On the left, there's a tree view of databases: EC2AMAZ-0IIOMAISQLEXPRESS [6], AdventureWorksDW2014, PetroCorpDB, ReportServer\$SQLEXPRESS, ReportServer\$SQLEXPRESSTempDB, retaildb [4] (which contains Customers, Products, SalesTransactions, and Stores), and Shyam. The 'Stores' table under retaildb is currently selected. In the center, a table titled 'Stores' is displayed with the following data:

StoreID	StoreName	Location	StoreManager
1	Downtown	New York	John Smith
2	Uptown	Los Angeles	Jane Doe
3	Suburbia	Chicago	Mike Johnson

On the right, there's a 'Visualizations' pane with various chart and report icons. Below it are sections for 'Fields', 'Values', and 'Drill-through'.

The screenshot shows the Power BI Desktop interface with the 'Table tools' ribbon selected. Under the 'Structure' tab, a table named 'Customers' is being previewed. The table has columns: CustomerID, CustomerName, Email, and Phone. The data looks like this:

CustomerID	CustomerName	Email	Phone
2002	Customer A	customerA@email.com	(123) 456-7890
2002	Customer B	customerB@email.com	(234) 567-8901
2003	Customer C	customerC@email.com	(345) 678-9012
2004	Customer D	customerD@email.com	(456) 789-0123
2005	Customer E	customerE@email.com	(567) 890-1234
2006	Customer F	customerF@email.com	(678) 901-2345
2007	Customer G	customerG@email.com	(789) 012-3456

On the right, a 'Fields' pane lists the tables: Customers, Products, SalesTransactions, and Stores. The 'Customers' table is highlighted. At the bottom, there's a note: 'Update available (click to download)'.

## Data Transformation

### Merge Tables

**Merge**

Select a table and matching columns to create a merged table.

SalesTransactions

TransactionID	ProductID	StoreID	CustomerID	TransactionDate	QuantitySold	Revenue
1	101	1	1001	1/5/2023	50	500
2	102	2	1002	1/10/2023	40	600
3	103	1	1003	2/15/2023	30	300
4	104	3	1004	3/20/2023	60	900
5	101	2	1001	4/25/2023	70	700

Products

ProductID	ProductName	Category	Price
101	Laptop XYZ	Electronics	800
102	T-Shirt Blue	Clothing	15
103	Smartphone ABC	Electronics	400
104	Sofa Set	Furniture	1200
105	Tablet PQR	Electronics	300

Join Kind: Left Outer (all from first, matching from second)

Use fuzzy matching to perform the merge

Fuzzy matching options

The selection matches 10 of 10 rows from the first table.

**OK** **Cancel**

PREVIEW DOWNLOADED AT 9:53 AM

10:06 AM 9/15/2023

**Merge**

Select a table and matching columns to create a merged table.

SalesTransactions

CustomerID	TransactionDate	QuantitySold	Revenue
1001	1/5/2023	50	500
1002	1/10/2023	40	600
1003	2/15/2023	30	300
1004	3/20/2023	60	900
1001	4/25/2023	70	700
1002	5/30/2023	80	1200
1005	6/5/2023	90	1500
1006	7/10/2023	100	1800
1007	8/15/2023	110	2000
1005	9/20/2023	120	2200

Products

ProductID	ProductName	Category	Price
101	Laptop XYZ	Electronics	800
102	T-Shirt Blue	Clothing	15
103	Smartphone ABC	Electronics	400
104	Sofa Set	Furniture	1200
105	Tablet PQR	Electronics	300

Search Columns to Expand

Expand  Aggregate

(Select All Columns)

ProductID

ProductName

Category

Price

Use original column name as prefix

**OK** **Cancel**

PREVIEW DOWNLOADED AT 9:53 AM

10:06 AM 9/15/2023

## Clean Tables – Removing Revenue Column From Sales Transaction Table

The screenshot shows the Microsoft Power Query Editor interface. The ribbon at the top includes File, Home, Transform, Add Column, View, Tools, and Help. The Home tab is selected. The toolbar below has various icons for managing data sources, queries, and columns. The main area displays a table titled "SalesTransactions" with columns: CustomerID, TransactionDate, QuantitySold, and Revenue. The "Revenue" column is highlighted with a yellow selection bar. A context menu is open over this column, listing options like Copy, Remove, Remove Other Columns, Duplicate Column, and Add Column From Examples... The "Remove" option is currently selected. To the right of the table, the "Properties" pane shows the name "SalesTransactions" and the "Applied Steps" pane lists the steps taken to transform the data, including "Expanded Products". The status bar at the bottom indicates "PREVIEW DOWNLOADED AT 10:07 AM" and shows the date "9/15/2023".

CustomerID	TransactionDate	QuantitySold	Revenue
1001	1/5/2023	50	
1002	1/10/2023	40	
1003	2/15/2023	30	
1004	3/20/2023	60	
1001	4/25/2023	70	
1002	5/30/2023	45	
1005	6/5/2023	55	
1006	7/10/2023	38	
1007	8/15/2023	42	
1005	9/20/2023	68	

## Creating Calculated Column – Revenue

The screenshot shows the Power Query Editor interface. In the 'Queries [4]' pane, 'SalesTransactions' is selected. A new column 'Revenue' is being created under the 'Add Column' tab. The formula is set to `= [Price] * [QuantitySold]`. The 'Available columns' pane lists 'TransactionID', 'ProductID', 'StoreID', 'CustomerID', 'TransactionDate', 'QuantitySold', and 'Price'. The 'APPLIED STEPS' pane shows the step 'Removed Columns' has been removed. The preview pane at the bottom shows the original 7 columns and the new 8 columns including 'Revenue'.

The screenshot shows the Power Query Editor interface after the calculated column 'Revenue' has been added. The 'Queries [4]' pane now shows 8 columns. The preview pane at the bottom shows the updated 8 columns, including the newly added 'Revenue' column. The 'APPLIED STEPS' pane shows the step 'Added Custom' has been applied.

CustomerID	TransactionDate	QuantitySold	Price	Revenue
1001	1/5/2023	50	800	40000
1002	1/10/2023	40	15	600
1003	2/15/2023	30	400	12000
1004	3/20/2023	60	1200	72000
1001	4/25/2023	70	800	56000
1002	5/30/2023	45	15	675
1005	6/5/2023	55	300	16500
1006	7/10/2023	38	40	1520
1007	8/15/2023	42	80	3360
1005	9/20/2023	68	300	20400

## Converting Revenue to Decimal Type

The screenshot shows the Power BI Desktop interface with the 'Table tools' tab selected. In the 'Fields' pane, the 'Revenue' column is highlighted. The 'Column tools' ribbon shows 'Format' set to 'General'. A dropdown menu for 'Data type' is open, showing options like 'Whole number', 'Decimal number', and 'Text'. The 'Decimal number' option is selected. The main area displays a table of sales transactions with columns: TransactionID, CustomerID, TransactionDate, QuantitySold, Price, and Revenue.

TransactionID	CustomerID	TransactionDate	QuantitySold	Price	Revenue
1	1001	Thursday, January 5, 2023	50	800	40000
2	1002	Tuesday, January 10, 2023	40	15	600
3	1003	Wednesday, February 15, 2023	30	400	12000
4	1004	Monday, March 20, 2023	60	1200	72000
5	1001	Tuesday, April 25, 2023	70	800	56000
6	1002	Tuesday, May 30, 2023	45	15	675
7	1005	Monday, June 5, 2023	55	300	16500
8	1006	Monday, July 10, 2023	38	40	1520
9	1007	Tuesday, August 15, 2023	42	80	3360
10	1005	Wednesday, September 20, 2023	68	300	20400

## Filter Data – Date Between 15 March and 15 May

The screenshot shows the Power BI Desktop interface with the 'Table tools' tab selected. In the 'Fields' pane, the 'TransactionDate' column is highlighted. The 'Column tools' ribbon shows 'Format' set to 'Wednesday, March 15, 2023'. A dropdown menu for 'Data type' is open, showing options like 'Date', 'Text', and 'Time'. The 'Date' option is selected. A date filter dialog is open over the table, showing a list of dates from January 5 to September 20, 2023. The 'Between...' option is selected, indicating a range filter is being applied.

TransactionID	ProductID	StoreID	CustomerID	TransactionDate	QuantitySold	Price
1	101	1	1001	Thursday, January 5, 2023	50	800
2	102	2	1002	Tuesday, January 10, 2023	40	15
3	103	1	1003	Wednesday, February 15, 2023	30	400
4	104	3	1004	Monday, March 20, 2023	60	1200
5	101	2	1001	Tuesday, April 25, 2023	70	800
6	102	3	1002	Tuesday, May 30, 2023	45	15
7	105	1	1005	Monday, June 5, 2023	55	300
8	106	2	1006	Monday, July 10, 2023	38	40
9	107	3	1007	Tuesday, August 15, 2023	42	80
10	105	1	1005	Wednesday, September 20, 2023	68	300

Subscription Details | Nuvepro x i-0f6de4eb9be57c1ae x PowerBI\_AssessmentPaper.pdf x +

Untitled - Power BI Desktop

File Home Help Table tools Column tools

Name TransactionDate Format \*Wednesday, March... Data type Date Summarization Don't summarize Data category Uncategorized Sort by column Sort Data groups Groups Manage relationships Relationships New column Calculations

**Structure** **Formatting** **Properties**

TransactionID	ProductID	StoreID	CustomerID	TransactionDate	QuantitySold	Price
1	101	1	1001	Thursday, January 5, 2023	50	800
2	102	2	1002	Tuesday, January 10, 2023	40	15
3	103	1	1003	Wednesday, February 15, 2023	80	400
4	204	3	2004	Monday, N		
5	101	2	1001	Tuesday,		
6	102	3	1002	Tuesday,		
7	105	1	1005	Monday,		
8	106	2	1006	Monday,		
9	107	3	1007	Tuesday, A		
10	105	1	1005	Wednesday, Septe		

**Date filters**

Show rows where 'TransactionDate'...

is on or after 03/15/2023  
 And  Or  
 is on or before 05/15/2023

OK Cancel

Fields

Search

> Customers

me  
ons  
d

Date Hierarchy

TransactionID

SalesTransactions

Stores

Table: SalesTransactions (10 rows) Column: TransactionDate (10 distinct values)

Update available (click to download)

10:16 AM 9/15/2023

Subscription Details | Nuvepro x i-0f6de4eb9be57c1ae x PowerBI\_AssessmentPaper.pdf x +

Untitled - Power BI Desktop

File Home Help Table tools Column tools

Name TransactionDate Format \*Wednesday, March... Data type Date Summarization Don't summarize Data category Uncategorized Sort by column Sort Data groups Groups Manage relationships Relationships New column Calculations

**Structure** **Formatting** **Properties**

TransactionID	ProductID	StoreID	CustomerID	TransactionDate	QuantitySold	Price
4	204	3	2004	Monday, March 20, 2023	60	1200
5	101	2	1001	Tuesday, April 25, 2023	70	800

**Fields**

Search

> Customers

Products

Category

Price

ProductID

ProductName

SalesTransactions

CustomerID

Price

ProductID

QuantitySold

Revenue

StoreID

TransactionDate

Date Hierarchy

TransactionID

Stores

Table: SalesTransactions (10 rows, 2 filtered rows) Column: TransactionDate (10 distinct values, 2 filtered distinct values)

Update available (click to download)

10:16 AM 9/15/2023

Data Modelling

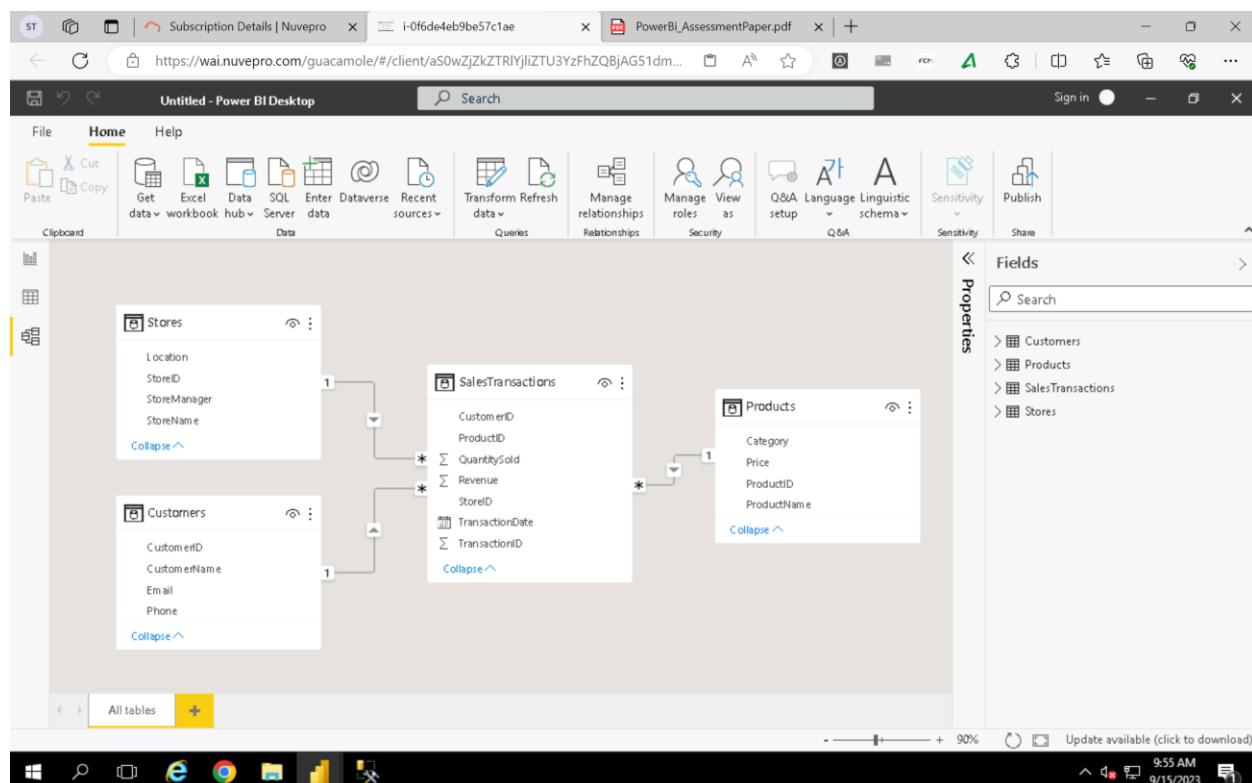
## Create Relationships:

Screenshot of the Power BI Desktop interface showing the "Manage relationships" dialog box.

The dialog box displays three active relationships:

- From: Table (Column) SalesTransactions (CustomerID) To: Table (Column) Customers (CustomerID)
- From: Table (Column) SalesTransactions (ProductID) To: Table (Column) Products (ProductID)
- From: Table (Column) SalesTransactions (StoreID) To: Table (Column) Stores (StoreID)

Buttons at the bottom of the dialog box include New..., Autodetect..., Edit..., Delete..., and Close.



## Create Hierarchy:

The screenshot shows the Power BI Desktop interface with the Home tab selected. A context menu is open over a visual element on the report canvas, specifically under the 'Visualizations' section. The menu path 'Create hierarchy' is highlighted. Other options visible in the menu include 'Check', 'New measure', 'New column', 'New quick measure', 'Rename', 'Delete from model', 'Hide', 'View hidden', 'Unhide all', 'Collapse all', 'Expand all', 'New group', 'Add to filters', 'Add to drill through', 'Drill through', 'Cross-report', 'Keep all filters', and 'Add drill-through fields here'. The report canvas displays a single rectangular visual with a dashed border.

The screenshot shows the Power BI Desktop interface with the Table tools tab selected. In the Fields pane, a table named 'Stores' is displayed with three rows: Downtown, Uptown, and Suburbia, each with columns for StoreID, Location, and StoreManager. A context menu is open over the 'Location' column header, with the 'Create hierarchy' option highlighted. The menu also includes 'Add to hierarchy', 'New measure', 'New column', 'New quick measure', 'Rename', 'Delete from model', 'Hide in report view', 'Unhide all', 'Collapse all', 'Expand all', and 'New group'. The table data is as follows:

StoreID	StoreName	Location	StoreManager
1	Downtown	New York	John Smith
2	Uptown	Los Angeles	Jane Doe
3	Suburbia	Chicago	Mike Johnson

Subscription Details | Nuvepro x i-0f6de4eb9be57c1ae x PowerBI\_AssessmentPaper.pdf x +

Untitled - Power BI Desktop

File Home Help Table tools

Cut Copy Paste Get data workbook hub Data SQL Server Enter Dataverse Recent sources Transform Refresh data Relationships Manage relationships New measure Relationships Quick measure column New table Calculations Manage roles as Security Sensitivity Publish Share

**Fields**

Search

Customer Products SalesTransactions Stores

Location

Location Hierarchy

Location StoreName StoreID StoreManager StoreName

Name 'Stores'[StoreName]  
Base field [StoreName]  
Description StoreName

Table: Stores (3 rows)

Update available (click to download)

9:59 AM 9/15/2023

### Date Hierarchy:

Subscription Details | Nuvepro x i-0f6de4eb9be57c1ae x PowerBI\_AssessmentPaper.pdf x +

Untitled - Power BI Desktop

File Home Help Table tools

Cut Copy Paste Get data workbook hub Data SQL Server Enter Dataverse Recent sources Transform Refresh data Relationships Manage relationships New measure Relationships Quick measure column New table Calculations Manage roles as Security Sensitivity Publish Share

**Fields**

Search

QuantitySold Revenue StoreID TransactionDate

Day TransactionID

Year Quarter Month

Date Hierarchy

Stores

Location

Location Hierarchy

Location StoreName StoreID StoreManager

Table: SalesTransactions (10 rows)

Update available (click to download)

10:00 AM 9/15/2023

## Requirement 4: Business Queries and Analysis

### 1. Who are the top-spending customers based on their total purchase amount? – Customer A

The screenshot shows a Power BI Desktop interface with a table visualization titled "CustomerName Sum of Revenue". The table lists seven customers with their total revenue: Customer A (96,000.00), Customer B (1,275.00), Customer C (12,000.00), Customer D (72,000.00), Customer E (36,900.00), Customer F (1,520.00), and Customer G (3,360.00). A "Total" row at the bottom shows a sum of 223,055.00. The Power BI ribbon is visible at the top, and the Data pane on the right shows the data source structure for SalesTransactions and Stores.

CustomerName	Sum of Revenue
Customer A	96,000.00
Customer B	1,275.00
Customer C	12,000.00
Customer D	72,000.00
Customer E	36,900.00
Customer F	1,520.00
Customer G	3,360.00
<b>Total</b>	<b>223,055.00</b>

### 2. How is sales revenue distributed among different store managers?

The screenshot shows a Power BI Desktop interface with a bar chart titled "Sum of Revenue by StoreManager". The chart displays three store managers and their respective revenue: John Smith (58,120.00), Mike Johnson (88,900.00), and Jane Doe (76,035.00). A "Total" row at the bottom shows a sum of 223,055.00. The Power BI ribbon is visible at the top, and the Data pane on the right shows the data source structure for SalesTransactions and Stores.

StoreManager	Sum of Revenue
Jane Doe	58,120.00
John Smith	88,900.00
Mike Johnson	76,035.00
<b>Total</b>	<b>223,055.00</b>

**Sum of Revenue by StoreManager**

A bar chart with "Sum of Revenue" on the Y-axis (0K, 50K, 100K) and "StoreManager" on the X-axis (John Smith, Mike Johnson, Jane Doe). The bars are blue.

### 3. What is the average price of products in each category?

The screenshot shows a Power BI report titled "Untitled - Power BI Desktop". The report contains two visualizations: a table and a pie chart.

**Table:**

Category	Average of Price
Clothing	27.50
Electronics	500.00
Furniture	640.00
<b>Total</b>	<b>405.00</b>

**Pie Chart:**

Average of Price by Category

The pie chart illustrates the proportion of average prices across three categories: Furniture (blue), Electronics (orange), and Clothing (red). The data points are:

- Furniture: 27.5 (2.36%)
- Electronics: 500 (42.83%)
- Clothing: 640 (54.82%)

**Visualizations pane:**

- Filters:** Shows filters for the current page and all pages.
- Visualizations:** A library of visualization icons.
- Fields:** A list of fields categorized by table:
  - Customers:** CustomerID, CustomerName, Email, Phone
  - Products:** Category, Price, ProductID, ProductName
  - SalesTransactions:** Add drill-through fields here
  - Stores:** Location, Location Hierarchy, StoreName, StoreID

Page 3 of 3

### 4. Are there specific days of the week when sales are higher?

The screenshot shows a Power BI report titled "Untitled - Power BI Desktop". The report contains two visualizations: a table and a line chart.

**Table:**

Day Name	Sum of Revenue
Monday	90,020.00
Thursday	40,000.00
Tuesday	60,635.00
Wednesday	32,400.00
<b>Total</b>	<b>223,055.00</b>

**Line Chart:**

Sum of Revenue by Day Name

The line chart displays the total revenue for each day of the week. The data points are:

- Monday: 90,020.00
- Tuesday: 60,635.00
- Wednesday: 32,400.00
- Thursday: 40,000.00

**Visualizations pane:**

- Filters:** Shows filters for the current page and all pages.
- Visualizations:** A library of visualization icons.
- Fields:** A list of fields categorized by table:
  - SalesTransactions:** ProductID, ProductName, CustomerID, Day Name, Price, ProductID, QuantitySold, Revenue, StoreID
  - TransactionDate:** Date Hierarchy
    - Year
    - Quarter
    - Month
    - Day
    - TransactionID

Page 4 of 8

## 5. How do sales trends vary by product category on a monthly basis?

Screenshot of Power BI Desktop showing a table visualization.

**Table Data:**

Month	Category	Sum of Revenue
January	Clothing	600.00
January	Electronics	40,000.00
February	Electronics	12,000.00
March	Furniture	72,000.00
April	Electronics	56,000.00
May	Clothing	675.00
June	Electronics	16,500.00
July	Clothing	1,520.00
August	Furniture	3,360.00
September	Electronics	20,400.00
<b>Total</b>		<b>223,055.00</b>

**Fields Panel:**

- Products:
  - Category
  - Price
  - ProductID
  - ProductName
- SalesTransactions:
  - CustomerID
  - Price
  - ProductID
  - QuantitySold
  - Revenue
  - StoreID
- TransactionDate:
  - Date Hierarchy
    - Year
    - Quarter
    - Month

Screenshot of Power BI Desktop showing a horizontal bar chart visualization.

**Chart Data:**

Month	Category	Sum of Revenue
January	Clothing	600.00
February	Clothing	675.00
March	Clothing	1,520.00
April	Clothing	600.00
May	Clothing	675.00
June	Electronics	16,500.00
July	Electronics	1,520.00
August	Electronics	675.00
September	Electronics	20,400.00

**Fields Panel:**

- Products:
  - Category
  - Price
  - ProductID
  - ProductName
- SalesTransactions:
  - CustomerID
  - Price
  - ProductID
  - QuantitySold
  - Revenue
  - StoreID
- TransactionDate:
  - Date Hierarchy
    - Year
    - Quarter
    - Month

6. What percentage of products account for 80% of total sales revenue? – Electronics and Furniture together contribute above 80% total max revenue.

The screenshot shows a Power BI report titled "Untitled - Power BI Desktop". The main visual is a pie chart titled "Sum of Revenue by Category". The chart shows the following data:

Category	Sum of Revenue
Clothing	2,795.00
Electronics	144,900.00
Furniture	75,360.00
Total	223,055.00

The chart indicates that Electronics account for 64.96% (144.9K) and Furniture account for 33.79% (75.36K) of the total revenue. A callout box highlights the Electronics slice with the text "2.8K (1.25%)".

The Power BI interface includes a ribbon with Home, Insert, Modeling, View, and Help tabs. The Home tab is selected. The ribbon also has sections for Data, Queries, Insert, Calculations, Sensitivity, and Publish. The Fields pane on the right lists various fields such as Revenue, StoreID, TransactionDate, Date Hierarchy, Year, Quarter, Month, Day, TransactionID, Stores, Location, StoreName, StoreID, StoreManager, and StoreName.

7. Are there any trends in repeat customer purchases? – Yes, Customer A and B did purchase in two months.

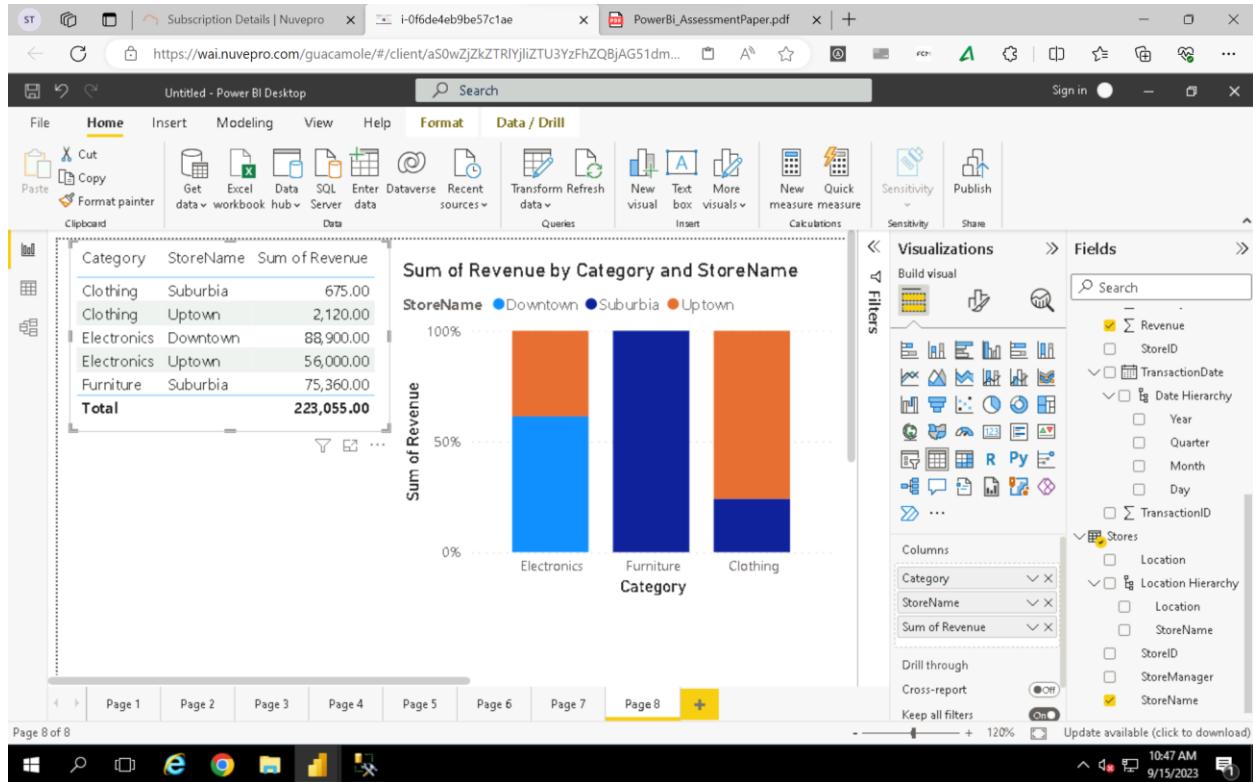
The screenshot shows a Power BI report titled "Untitled - Power BI Desktop". The main visual is a bar chart titled "Sum of Revenue by CustomerName". The chart shows the following data:

CustomerName	Month	Sum of Revenue
Customer A	January	40,000.00
Customer A	April	56,000.00
Customer B	January	600.00
Customer B	May	675.00
Customer C	February	12,000.00
Customer D	March	72,000.00
Customer E	June	16,500.00
Customer F	September	20,400.00
Customer G	July	1,520.00
Customer H	August	3,360.00
Total		223,055.00

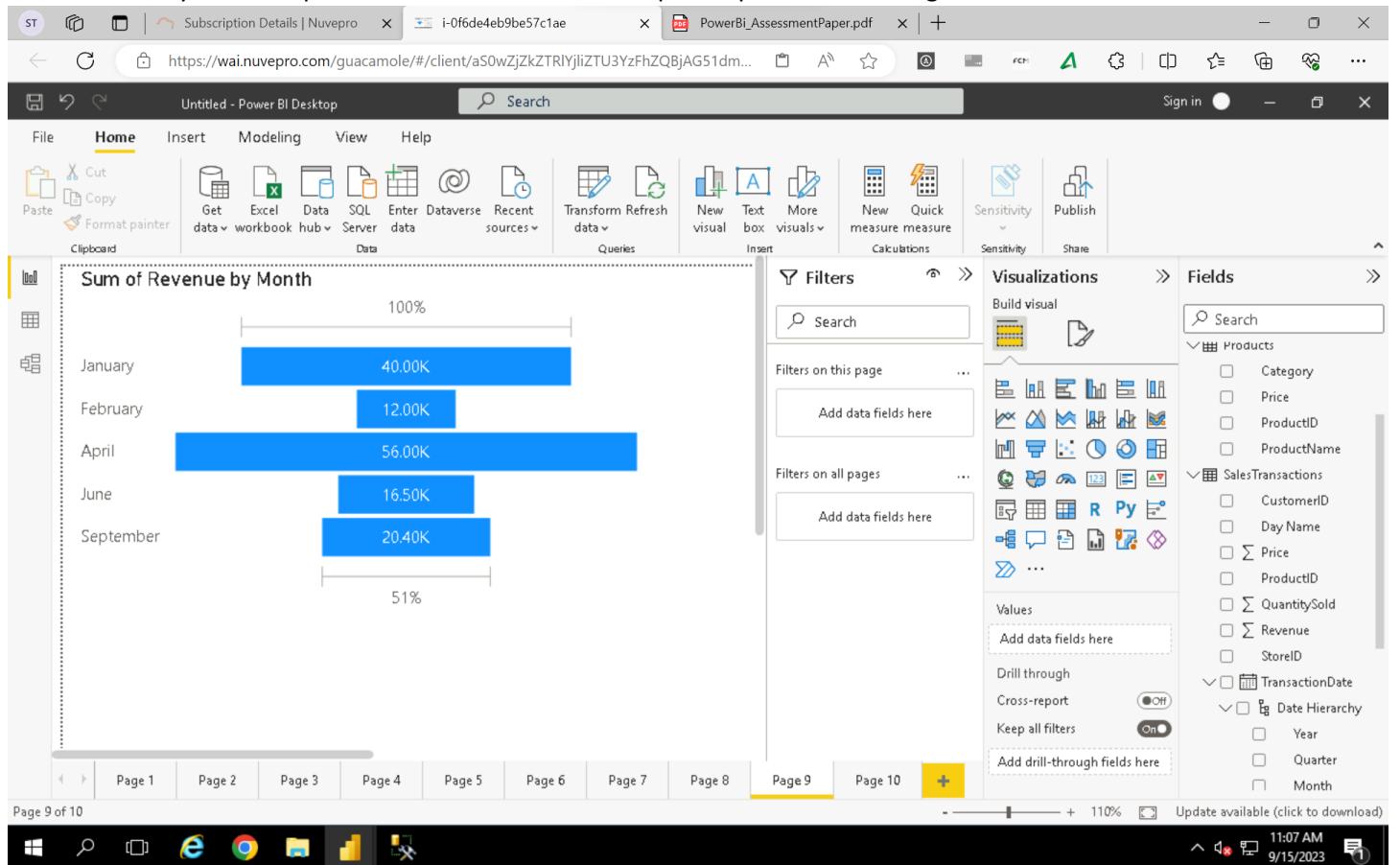
The chart shows that Customer A purchased in January and April, and Customer B purchased in January and May. Other customers have single purchases in their respective months. A callout box highlights the Customer A bar with the text "100K".

The Power BI interface is identical to the previous screenshot, with the Home tab selected and the Fields pane showing the same list of fields.

8. Which product categories perform best at each store location?



9. Are there any seasonal patterns or trends in sales for specific products or categories? – Electronics Sales Trend



10. Can customers be segmented into high, medium, and low-value segments based on their purchase history? – Yes, Customer A and D are high value segment, whereas Customer F and B are low-value customers

The screenshot shows a Power BI Desktop interface with a bar chart titled "Sum of Revenue by CustomerName". The chart displays revenue for seven customers: Customer A (40,000.00), Customer D (72,000.00), Customer E (12,000.00), Customer C (16,500.00), Customer G (1,520.00), Customer F (600.00), and Customer B (675.00). The total revenue is 223,055.00.

CustomerName	Month	Sum of Revenue
Customer A	January	40,000.00
Customer A	April	56,000.00
Customer B	January	600.00
Customer B	May	675.00
Customer C	February	12,000.00
Customer D	March	72,000.00
Customer E	June	16,500.00
Customer E	September	20,400.00
Customer F	July	1,520.00
Customer G	August	3,360.00
<b>Total</b>		<b>223,055.00</b>

## Requirement 5: Data Insights and Recommendations

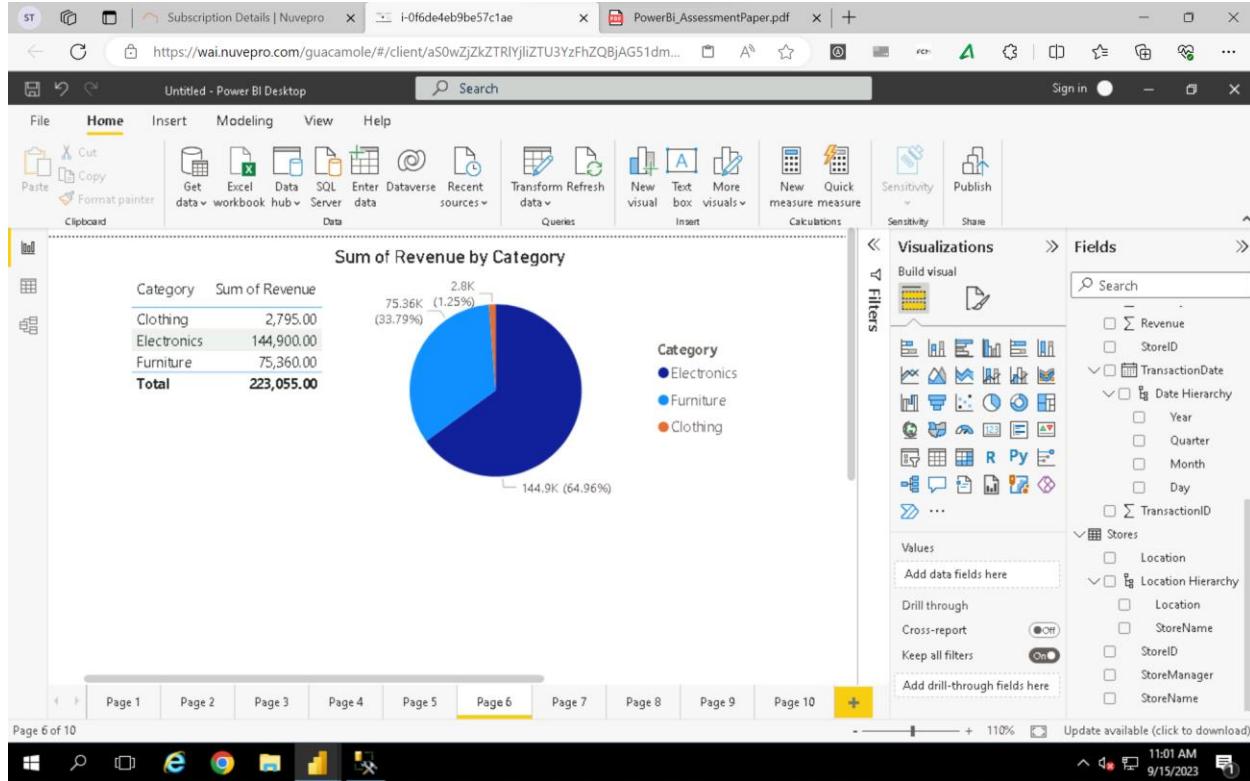
Analyze Patterns: Identify patterns and trends in the data, such as seasonality or regional variations and show it or mark it.

Monday in weekday has the highest revenue.

The screenshot shows a Power BI Desktop interface with a line chart titled "Sum of Revenue by Day Name". The chart shows a clear downward trend from Monday to Wednesday, with Thursday being the lowest point.

Day Name	Sum of Revenue
Monday	90,020.00
Thursday	40,000.00
Tuesday	60,635.00
Wednesday	32,400.00
<b>Total</b>	<b>223,055.00</b>

Generate Insights: Provide actionable insights based on your analysis. For example, suggest increasing marketing efforts for the most profitable product category.



Electronics and Furniture has the highest revenue categories.