EXPERIMENT – 4

Part A: Task:

- ***Create the visualization using Power BI for the Sales Performance analysis for sample superstore dataset.***
  1. ***Perform Exploratory Data Analysis: Univariate analysis, Bivariate analysis, Multivariate analysis.***
  2. ***Create summary Dashboard for the given information:***
     Total sales by Date, State, Product Name, Quantity, Discount and Profit.
  3. ***Create Power Bi report for Seasonal Sales.***
  4. ***Calculate order date plus one week, calculate how many days to take for shipping***

- Perform Exploratory Data Analysis: Univariate analysis, Bivariate analysis, Multivariate analysis.

Exploratory Data Analysis (EDA) in Power BI

Univariate Analysis

1. Summary Statistics:
   - Use the "Statistics" pane to calculate mean, median, mode, standard deviation, and range for individual variables.
   - Apply data cards to display key metrics for continuous variables.
2. Histogram:
   - Create histograms using the "Bar Chart" to visualize the distribution and frequency of continuous data.
   - Adjust bin size to refine the granularity of the distribution.
3. Box Plot:
   - Utilize box plots to identify outliers, quartiles, and the spread of data.
   - Combine with summary statistics to provide a comprehensive view of data distribution.
4. Slicer:
   - Implement slicers to filter data dynamically and interactively.
   - Use slicers to focus on specific subsets of data, such as date ranges or categories.
5. Card, Multirow Card, and Gauge:
   - Use cards to display single key metrics such as total sales or average values.
   - Multirow cards to present multiple metrics or KPIs in a compact form.
   - Gauges to visualize performance against targets or goals

Bivariate Analysis

1. Bar Charts:
   - Use bar charts to compare values between two categorical variables or a categorical and a continuous variable.
   - Utilize stacked or clustered bar charts to analyze relationships between categories.
2. Line Charts:
   - Create line charts to analyze trends over time for two variables.
   - Utilize dualaxis line charts to compare different measures over the same period.
3. Pie Charts and Donut Charts:
   - Use pie charts to visualize the proportional relationship between a categorical variable and a continuous variable.
   - Donut charts provide a similar visualization but with a central hole, offering a different aesthetic.
4. Multirow Card:
   - Use multirow cards to display multiple key metrics side by side for easy comparison.
   - Highlight relationships and differences between related metrics.
5. Tables:
   - Implement tables to display detailed data in a structured format, allowing for comparison between two variables.
   - Use conditional formatting to highlight significant values and trends within the table.

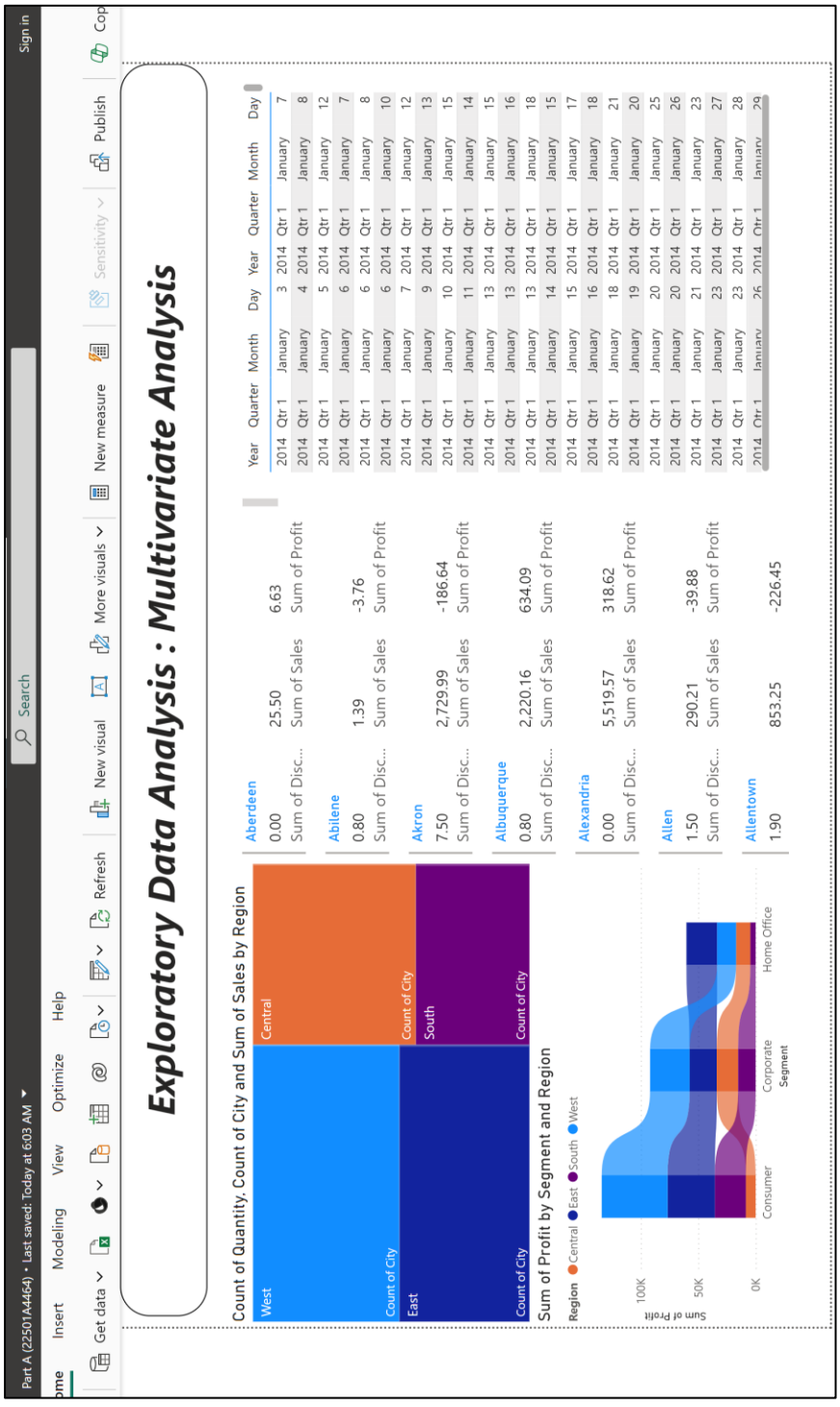
Multivariate Analysis

1. Treemap:
   - Display hierarchical data and the relative size of variables with treemaps.
   - Use treemaps to visualize parttowhole relationships and drill down into data hierarchies.
2. Scatter Plot:
   - Utilize scatter plots to explore relationships between multiple variables.
   - Apply different colors and sizes to points to represent additional variables, enhancing the visualization of multivariate data.
3. Multirow Card:
   - Use multirow cards to display multiple key metrics simultaneously, offering a compact and comprehensive view of several variables.
   - Highlight patterns and correlations among different metrics.
4. Tables:
   - Use tables to present complex multivariate data in a structured and detailed format.
   - Apply conditional formatting, sparklines, and other visual cues to enhance the readability and interpretability of the data.

Univariate Analysis:

Bivariate Analysis:

Multivariate Analysis:



- Create summary Dashboard for the given information:
  Total sales by Date, State, Product Name, Quantity, Discount and Profit.

This can be performed either by using a single table or using multiple charts

- Create Power Bi report for Seasonal Sales.

Use the Provided Formula to create a new column:

Enter the following DAX formula to create a new column that represents the quarter in which the sales order was placed:

DAX Formulae :
Quarter = "Q" & CEILING(MONTH([Order Date])/3, 1) & " " & YEAR([Order Date])

This formula works as follows:

- *MONTH([Order Date]):* extracts the month from the [Order Date].
- *CEILING(MONTH([Order Date])/3, 1):* calculates the quarter by dividing the month by 3 and using the CEILING function to round up to the nearest integer.
- *YEAR([Order Date]):* extracts the year from the [Order Date].
- The concatenation (&) of "Q", the quarter number, and the year results in the desired format.

- Calculate order date plus one week, calculate how many days to take for shipping

Add Calculated Columns to find expected shipping date and Number of days taken for delivery :

- Expected Shipping Date:

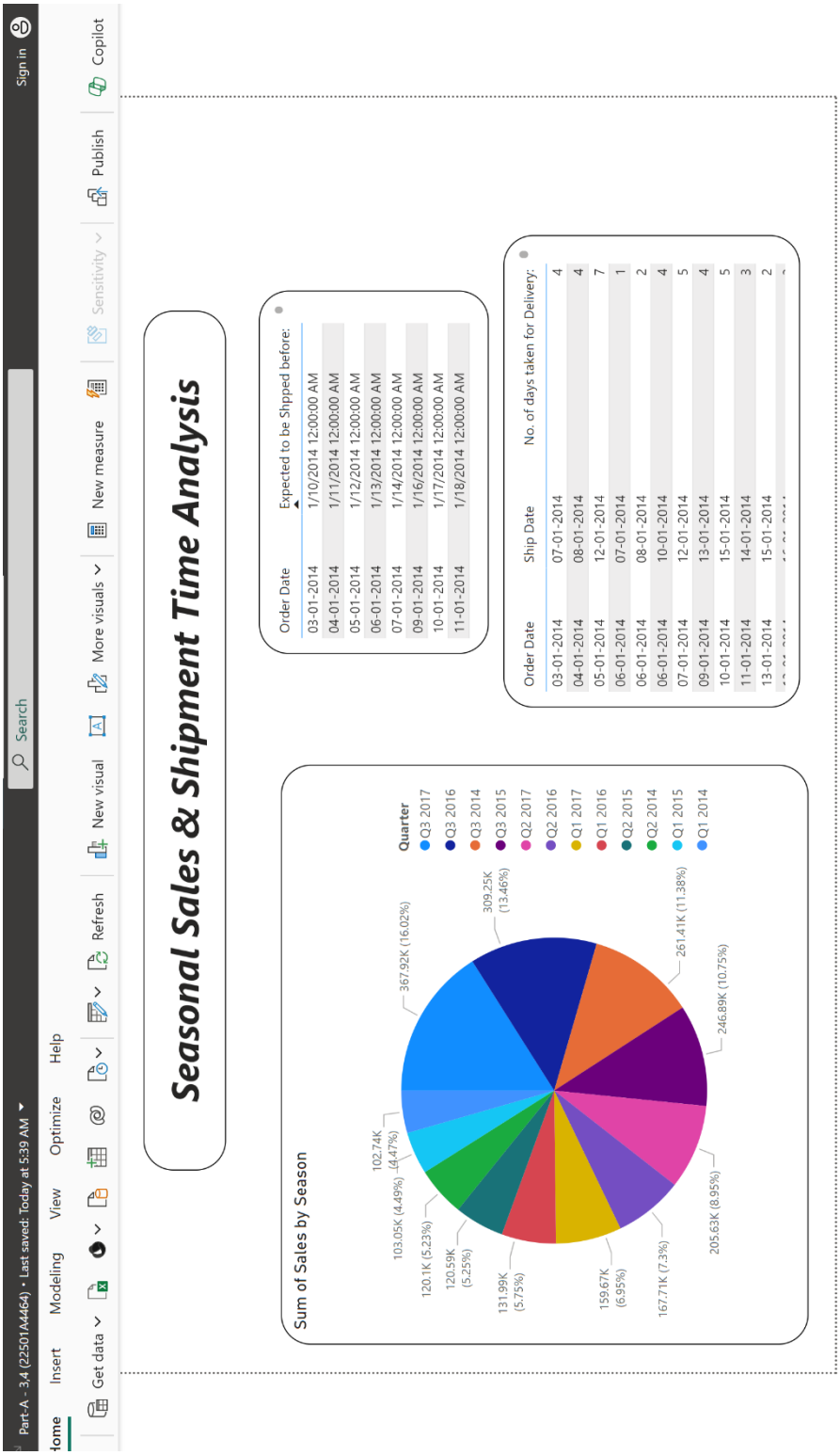
Use the following DAX formula to create a new column for the expected shipping date:
DAX formulae: *Expected Shipping Date = Orders[Order Date] + 7*

- Number of Days Taken for Delivery:

Use the following DAX formula to create a new column for the number of days for delivery:
DAX formulae*: Days Taken for Delivery = INT(Orders[Ship Date] - Orders[Order Date])*

- Insert Calculated Columns into a Table:
- Create a table on canvas. Add the necessary fields to the table:
    - Order Date, Expected Shipping Date
    - Order Date, Ship Date, Days Taken for Delivery

- Create Power Bi report for Seasonal Sales.
- Calculate order date plus one week, calculate how many days to take for shipping



Part B: Task:

- ***Create a sales analysis report for the given dataset by following steps***
  1. ***Connecting to data sources and Importing data from it.***
  2. ***Cleaning the data in the Power Query editor.***
  3. ***Creating a visual.***
  4. ***Creating a dashboard.***
  5. ***Create relationships***
  6. ***Create Interactivity Visuals***
  7. ***Create Time intelligence measure***
  8. ***Create a Table displaying Sales Amount by Quarter and Year and the YTD running total***

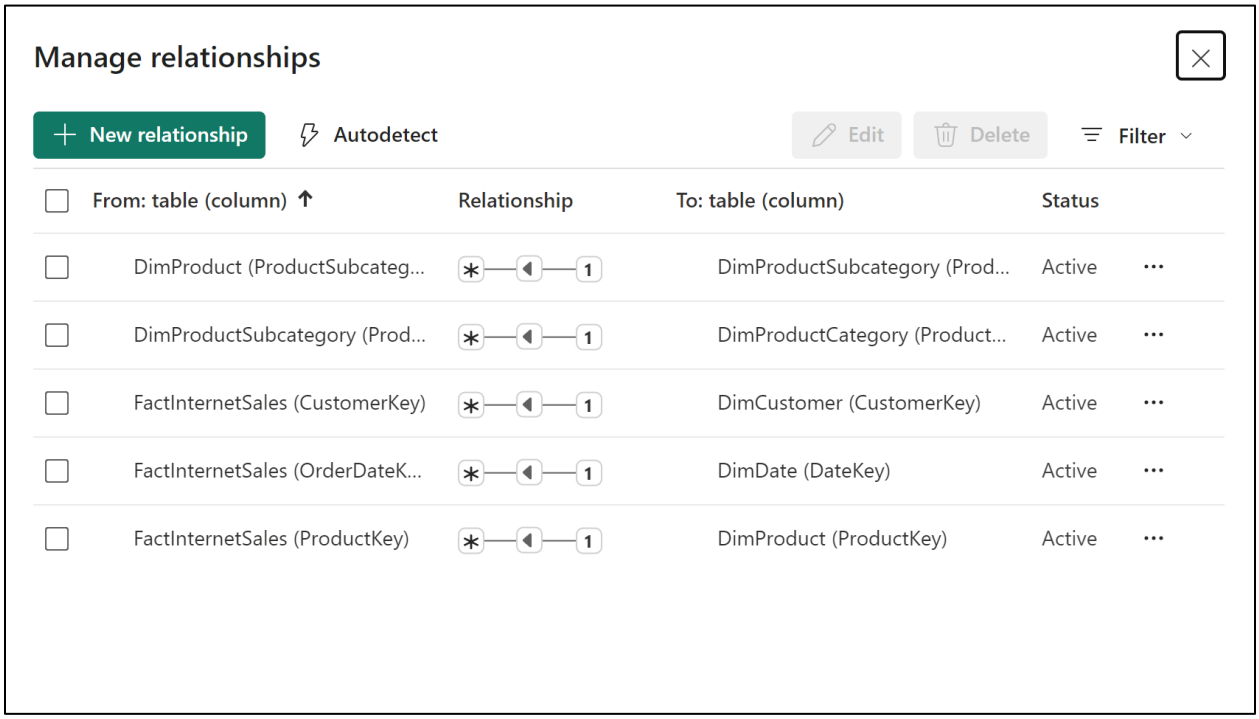
1. Connecting to Data Sources and Importing Data
   - Identify Data Sources: Determine the source of your data, such as Excel files, SQL databases, or online services.
   - Connect to Data Source: Use Power BI's "Get Data" feature to connect to your chosen data source.
   - Import Data: Select the relevant tables or sheets and import them into Power BI.

2. Cleaning the Data in the Power Query Editor
   - Remove Duplicates: Identify and remove duplicate rows to ensure data integrity.
   - Handle Missing Values: Fill or remove missing values to avoid inaccuracies in your analysis.
   - Transform Data Types: Ensure all columns have the correct data types (e.g., date, number, text).
   - Filter Rows: Remove unnecessary rows and apply filters to focus on relevant data.

3. Creating a Visual
   - Select Appropriate Visualizations: Choose charts and graphs that best represent your data, such as bar charts, line charts, and pie charts.
   - Customize Visuals: Adjust colors, labels, and titles to enhance readability and impact.
   - Add Data Labels: Include data labels to provide precise information directly on the visuals.

4. Creating a Dashboard
   - Combine Visuals: Bring together various charts and graphs onto a single dashboard.
   - Arrange Layout: Organize the visuals in a logical and visually appealing manner.
   - Add Interactive Elements: Include slicers, filters, and drilldown capabilities to enhance user interaction.

5. Create Relationships
   - Identify Relationships: Determine the logical relationships between different tables in your dataset.
   - Define Relationships: Use Power BI's "Manage Relationships" feature to establish relationships between tables.
   - Set Cardinality: Ensure the correct cardinality (one to many, many to one) for each relationship to avoid errors.

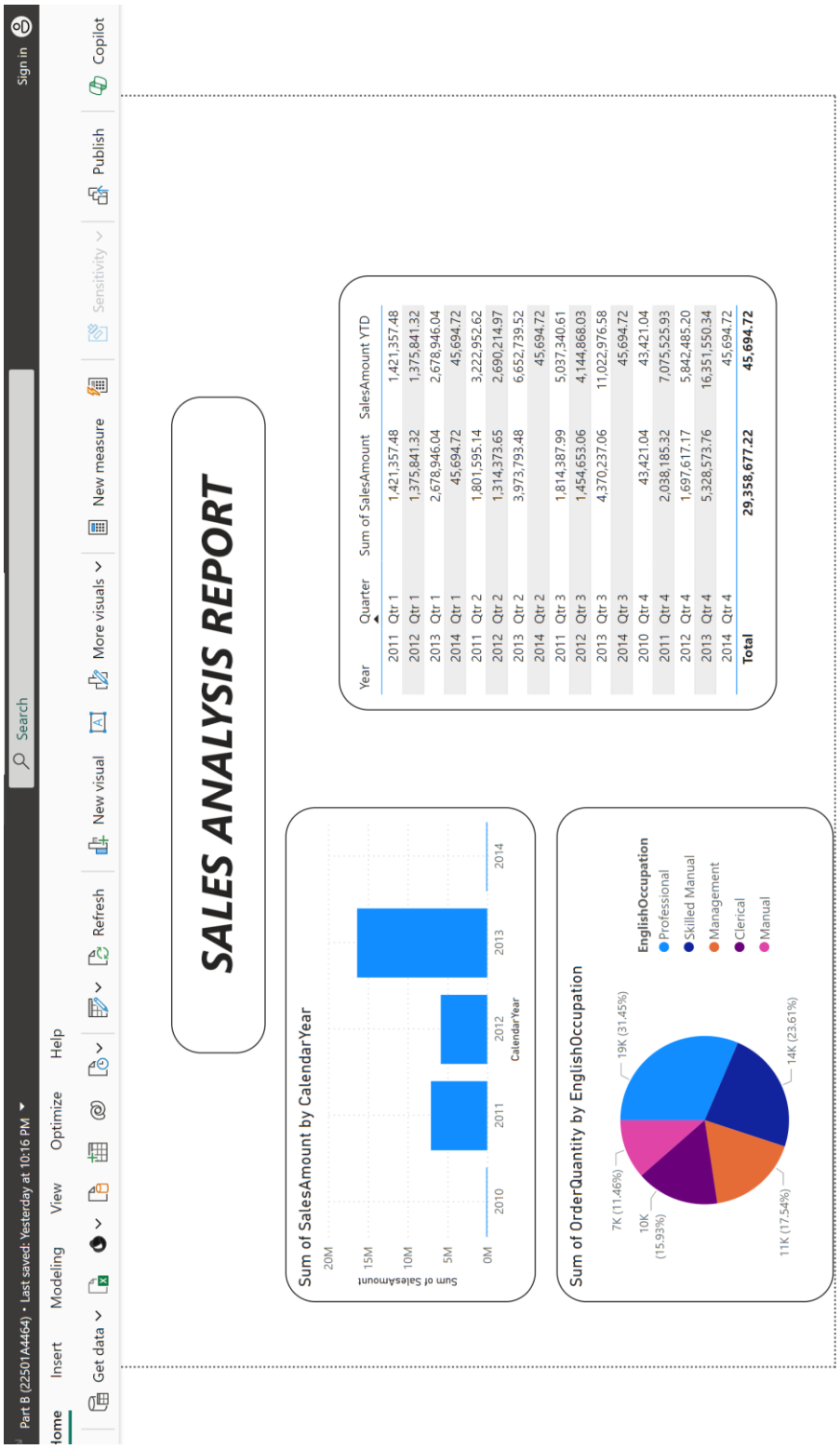


6. Create Interactivity Visuals
   - Slicers and Filters: Add slicers and filters to allow users to interact with the data and customize their view.
   - DrillThrough: Enable drillthrough features to provide detailed insights by clicking on specific data points.
   - Tooltips: Customize tooltips to show additional information when hovering over visuals.

7. Create Time Intelligence Measure
   - Create Date Table: Ensure there is a comprehensive date table in your model.
   - Calculate Measure using Quick measure: Calculate measure Year To Date Total

```
SalesAmount YTD =
IF(
    ISFILTERED('DimDate'[FullDateAlternateKey]),
    ERROR("Time intelligence quick measures can only be grouped or filtered by the Power BI-provided date hierarchy or primary date column."),
    TOTALYTD(
        SUM('FactInternetSales'[SalesAmount]),
        'DimDate'[FullDateAlternateKey].[Date]
    )
)
```

8. Create a Table Displaying Sales Amount by Quarter and Year and the YTD
   - Create a table
   - Add Fields: Include fields for Year, Quarter, and Sales Amount.



Year	Quarter	Sum of SalesAmount	SalesAmount YTD
2011	Qtr 1	1,421,357.48	1,421,357.48
2012	Qtr 1	1,375,841.32	1,375,841.32
2013	Qtr 1	2,678,946.04	2,678,946.04
2014	Qtr 1	45,694.72	45,694.72
2011	Qtr 2	1,801,595.14	3,222,952.62
2012	Qtr 2	1,314,373.65	2,690,214.97
2013	Qtr 2	3,973,793.48	6,652,739.52
2014	Qtr 2		45,694.72
2011	Qtr 3	1,814,387.99	5,037,340.61
2012	Qtr 3	1,454,653.06	4,144,868.03
2013	Qtr 3	4,370,237.06	11,022,976.58
2014	Qtr 3		45,694.72
2010	Qtr 4	43,421.04	43,421.04
2011	Qtr 4	2,038,185.32	7,075,525.93
2012	Qtr 4	1,697,617.17	5,842,485.20
2013	Qtr 4	5,328,573.76	16,351,550.34
2014	Qtr 4		45,694.72
Total		**29,358,677.22**	**45,694.72**