

Experiment No. 3

Aim: Data Analysis and Visualization using Advanced Excel

Objective: To leverage advanced Excel techniques for data analysis and visualization in order to extract actionable insights, facilitate informed decision-making, and enhance organizational performance.

Theory:

Power View is a feature of Microsoft Excel 2013 that enables interactive data exploration, visualization, and presentation encouraging intuitive ad-hoc reporting.

Create a Power View Sheet

Make sure Power View add-in is enabled in Excel 2013.

Step 1 – Click on the File menu and then Click on Options.

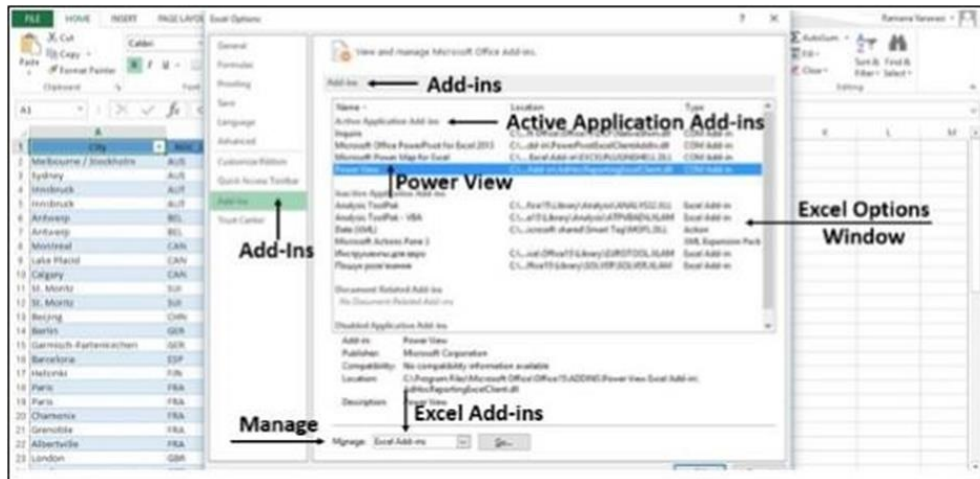


The Excel Options window appears.

Step 2 – Click on Add-Ins.

Step 3 – In the Manage box, click the drop-down arrow and select Excel Add-ins.

Step 4 – All the available Add-ins will be displayed. If Power View Add-in is enabled, it appears in Active Application Add-ins.



If it does not appear, follow these steps –

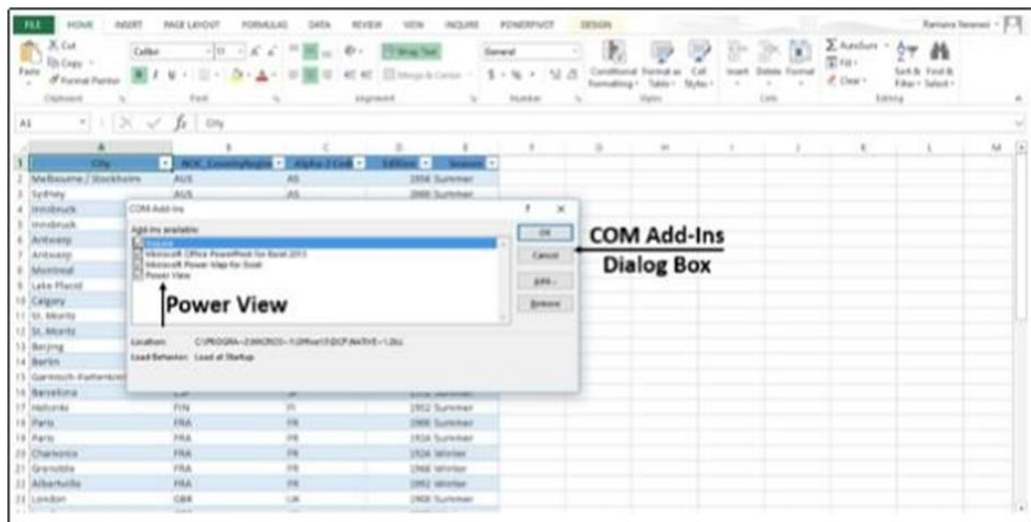
Step 1 – In the Excel Options Window, Click on Add-Ins.

Step 2 – In the Manage box, click the drop-down arrow and select COM Add-ins

Step 3 – Click on the Go button. A COM Add-Ins Dialog Box appears.

Step 4 – Check the Power View Check Box.

Step 5 – Click OK.



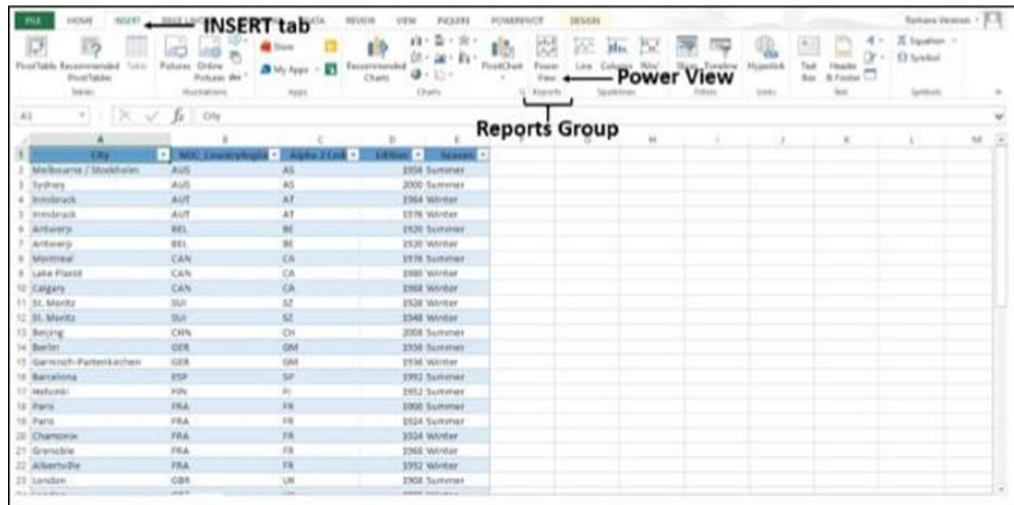
Now, you are ready to create the

Power View sheet.

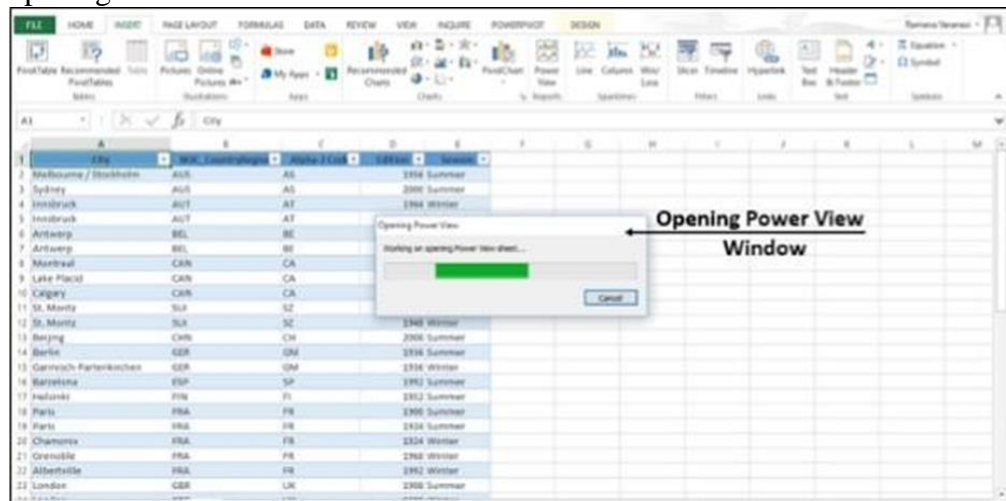
Step 1 – Click on the Data Table.

Step 2 – Click on Insert tab.

Step 3 – Click on Power View in Reports Group.

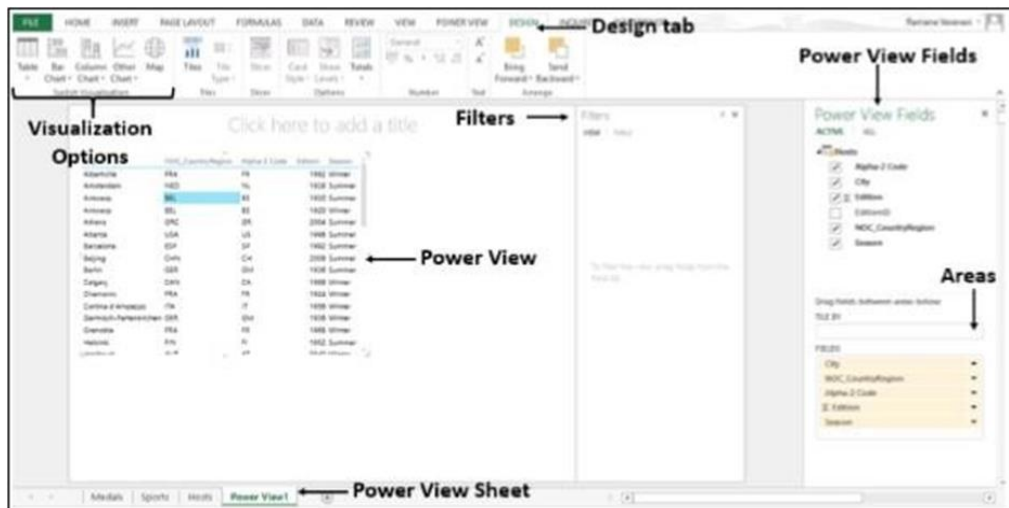


An Opening Power View window opens, showing the progress of Working on opening Power View sheet.



The Power View sheet is created for you and added to your Workbook with the Power View. On the Right-side of the Power View, you find the Power View Fields. Under the Power View Fields you will find Areas.

In the Ribbon, if you click on Design tab, you will find various Visualization options.



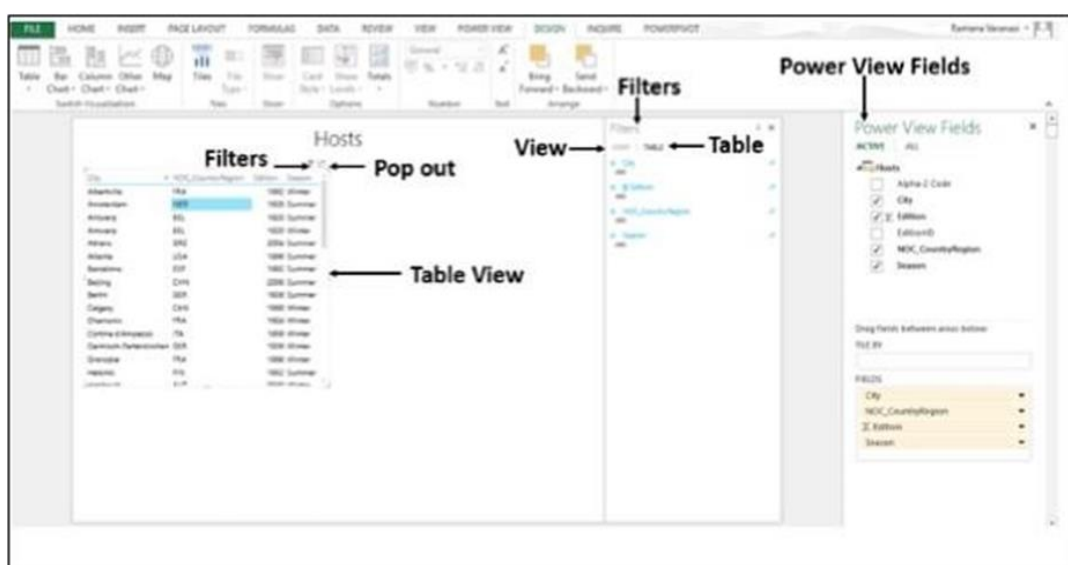
Create Charts and other Visualizations

For every visualization you want to create, you start on a Power View sheet by creating a table, which you then easily convert to other visualizations, to find one that best illustrates your Data.

Step 1 – Under the Power View Fields, select the fields you want to visualize.

Step 2 – By default, the Table View will be displayed. As you move across the Table, on the top-right corner, you find two symbols – Filters and Pop out.

Step 3 – Click on the Filters symbol. The filters will be displayed on the right side. Filters has two tabs. View tab to filter all visualizations in this View and Table tab to filter the specific values in this table only.



Visualization – Matrix

A Matrix is made up of rows and columns like a Table. However, a Matrix has the following capabilities that a Table does not have –

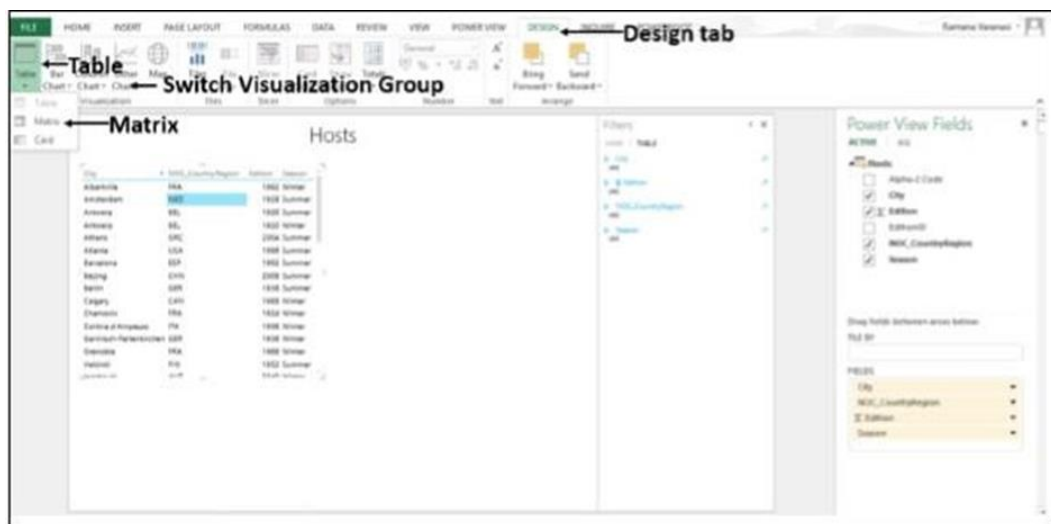
- Display data without repeating values.
- Display totals and subtotals by row and column.
- With a hierarchy, you can drill up/drill down.

Collapse and Expand the Display

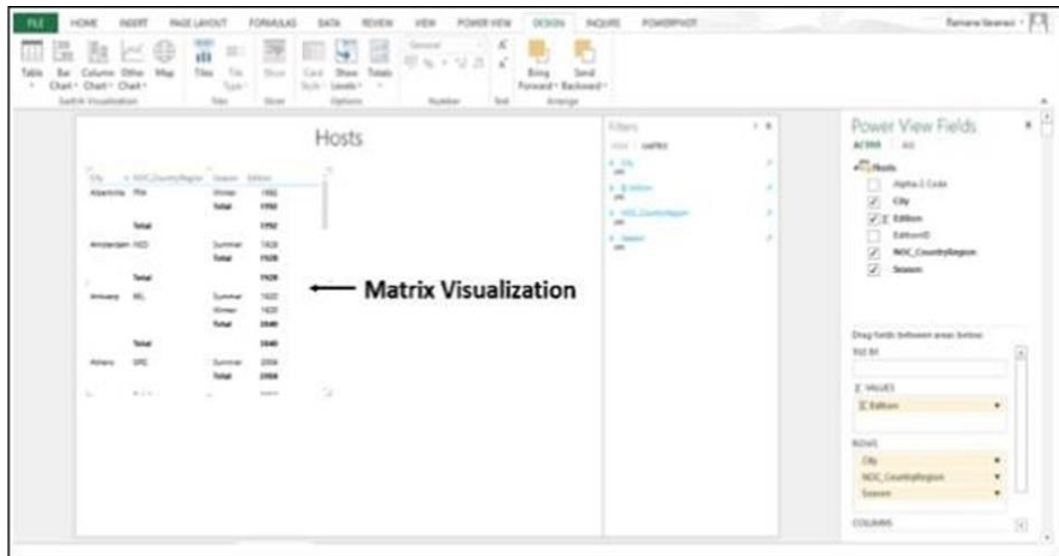
Step 1 – Click on the DESIGN tab.

Step 2 – Click on Table in the Switch Visualization Group.

Step 3 – Click on Matrix.



The Matrix Visualization appears.



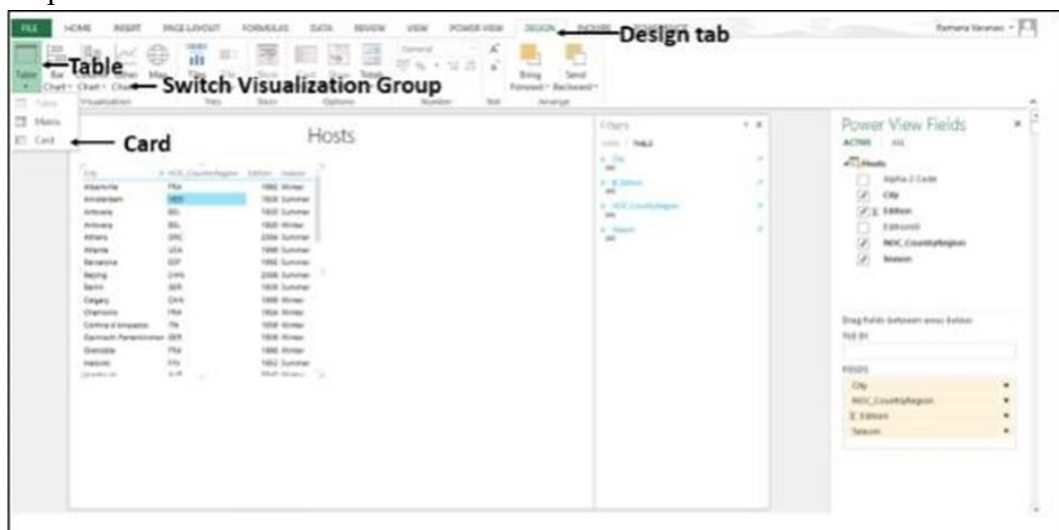
Visualization – Card

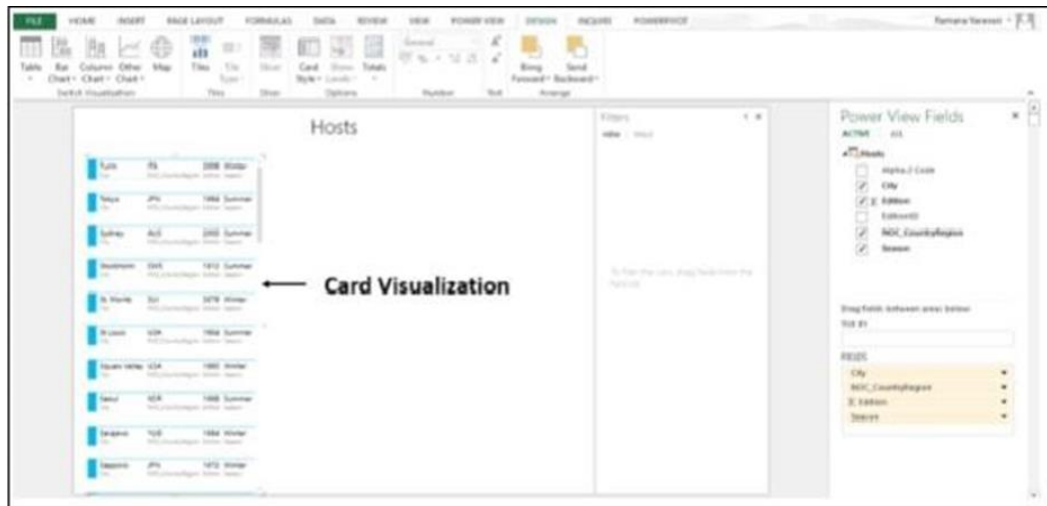
You can convert a Table to a series of Cards that display the data from each row in the table laid out in a Card format, like an index Card.

Step 1 – Click on the DESIGN tab.

Step 2 – Click on Table in the Switch Visualization Group.

Step 3 – Click on Card.





Visualization – Charts

In Power View, you have a number of Chart options: Pie, Column, Bar, Line, Scatter, and Bubble. You can use several design options in a chart such as showing and hiding labels, legends, and titles. Charts are interactive. If you click on a Value in one Chart –

- the Value in that chart is highlighted.

- All the Tables, Matrices, and Tiles in the report are filtered to that Value.
- That Value in all the other Charts in the report is highlighted.

The charts are interactive in a presentation setting also.

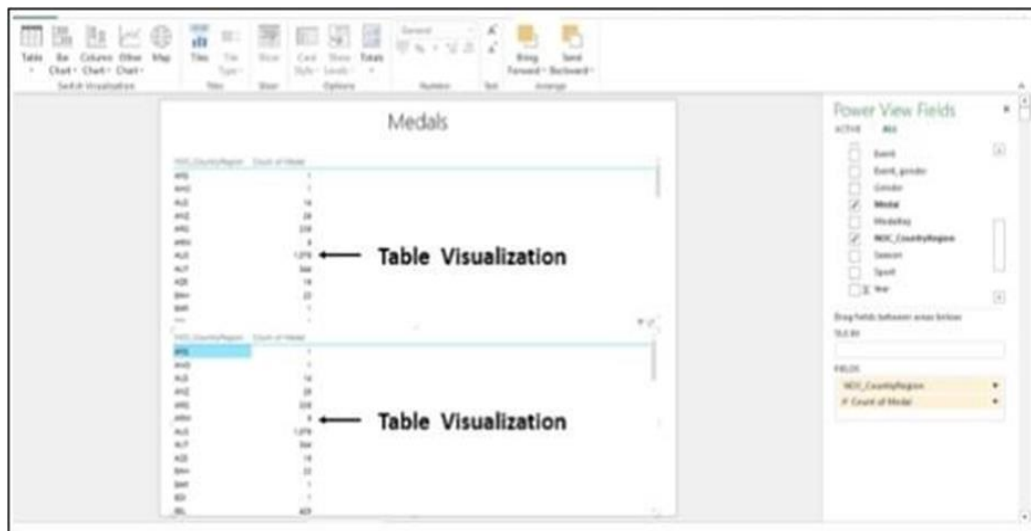
Step 1 – Create a Table Visualization from Medals data.

You can use Line, Bar and Column Charts for comparing data points in one or more data series. In these Charts, the x-axis displays one field and the y-axis displays another, making it easy to see the relationship between the two values for all the items in the Chart.

Line Charts distribute category data evenly along a horizontal (category) axis, and all numerical value data along a vertical (value) axis.

Step 2 – Create a Table Visualization for two Columns, NOC_CountryRegion and Count of Medal.

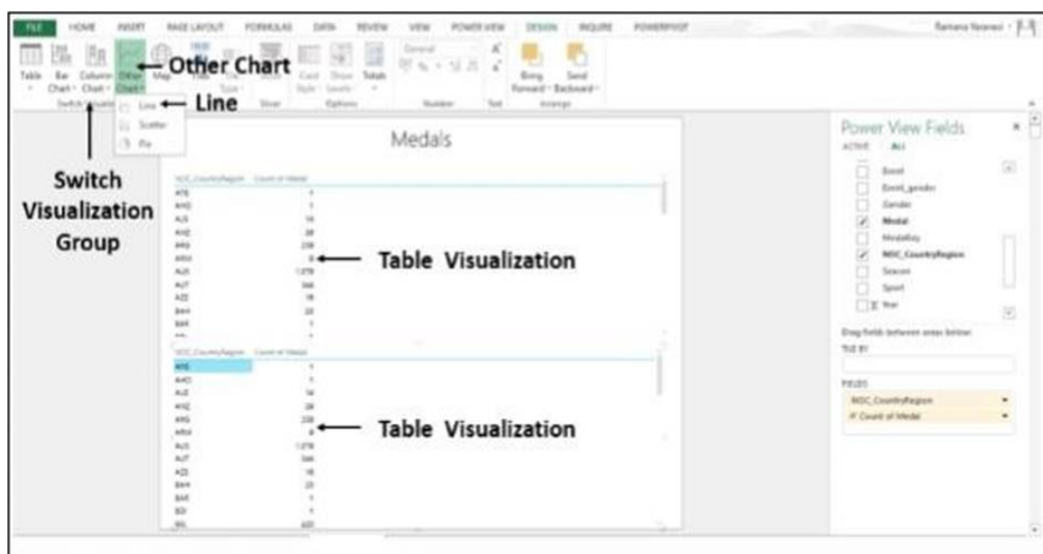
Step 3 – Create the same Table Visualization below



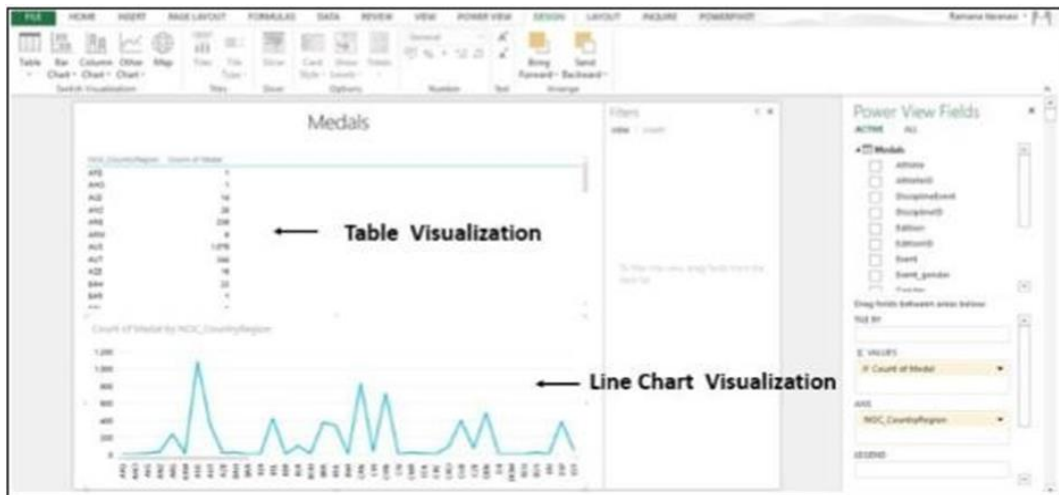
Step 4 – Click on the Table Visualization below

Step 5 – Click on Other Chart in the Switch Visualization group.

Step 6 – Click on Line.



The Table Visualization converts into Line Chart Visualization.



In a Bar Chart, categories are organized along the vertical axis and values along the horizontal axis. In Power View, there are three subtypes of the Bar Chart: Stacked, 100% stacked, and Clustered.

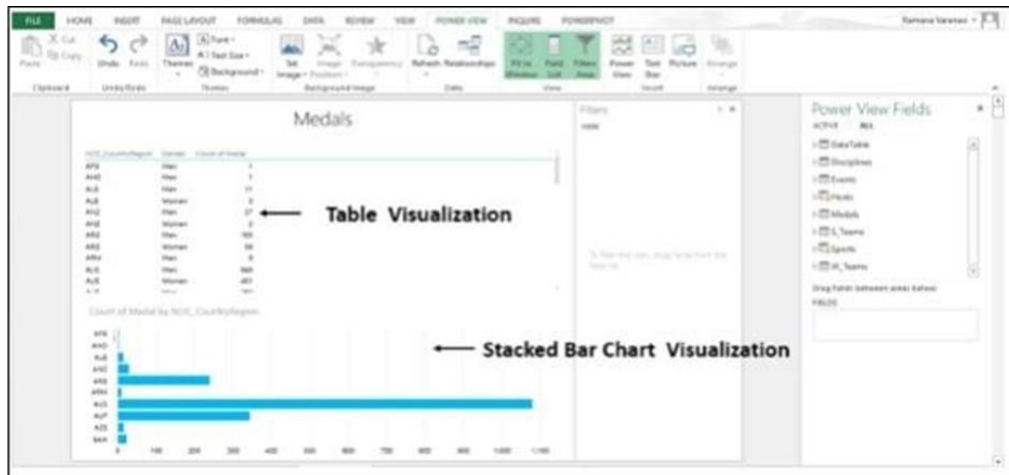
Step 7 – Click on the Line Chart Visualization.

Step 8 – Click on Bar Chart in the Switch Visualization Group.

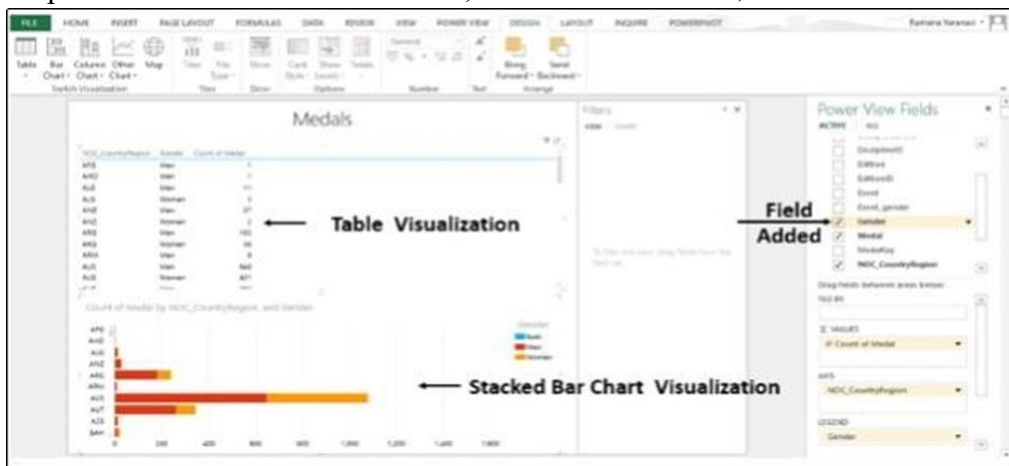
Step 9 – Click on the Stacked Bar option.



The Line Chart Visualization converts into Stacked Bar Chart Visualization.

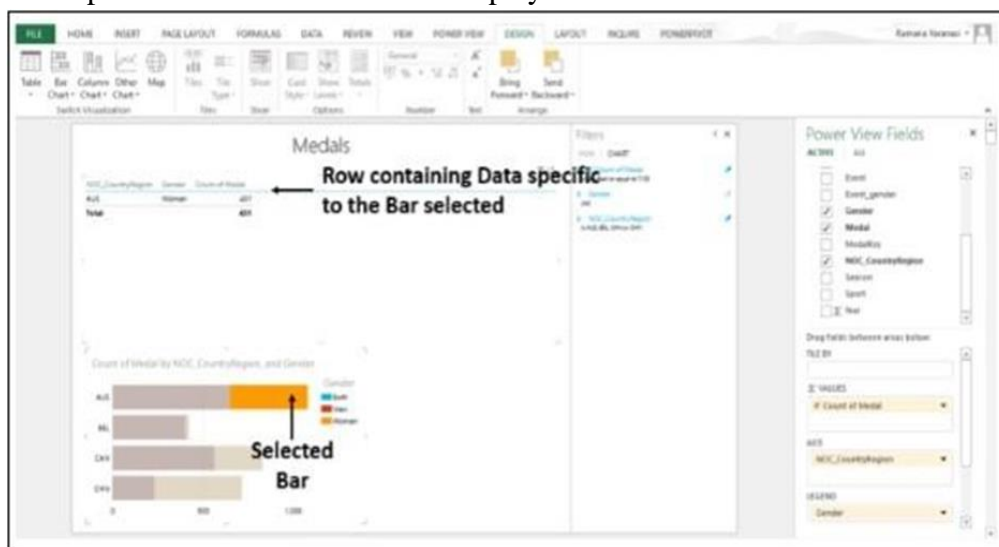


Step 10 – In the Power View Fields, in the Medals Table, select the Field Gender also.



Step 11 – Click on one of the bars. That portion of the bar is highlighted. Only the row containing the

Data specific to the selected bar is displayed in the table above.



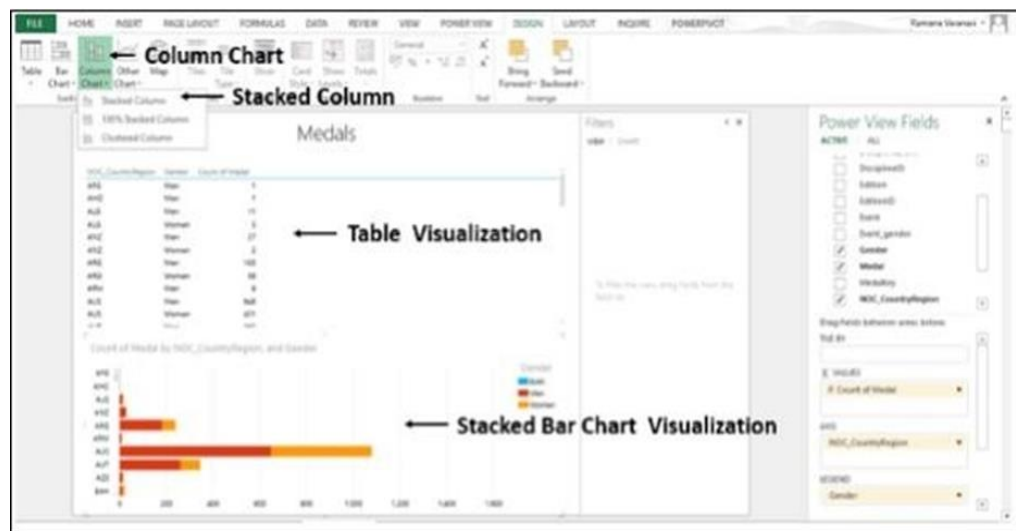
You can use the column charts for showing data changes over a period of time or for illustrating comparison among different items. In a Column Chart, the categories are along the horizontal axis and values are along the vertical axis.

In Power View, there are three Column Chart subtypes: Stacked, 100% stacked, and Clustered.

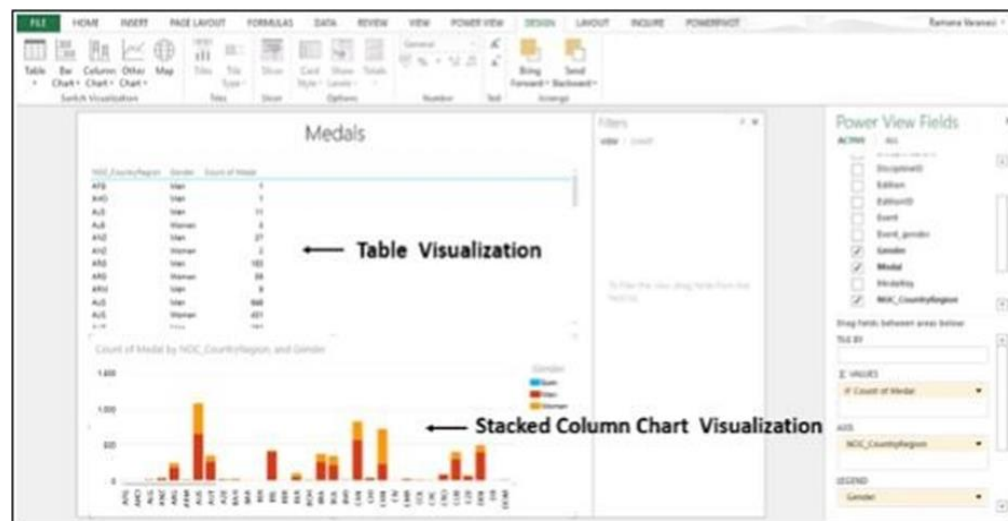
Step 12 – Click on the Stacked Bar Chart Visualization.

Step 13 – Click on Column Chart in the Switch Visualization group.

Step 14 – Click on Stacked Column.



The Stacked Bar Chart Visualization converts into Stacked Column Chart Visualization.

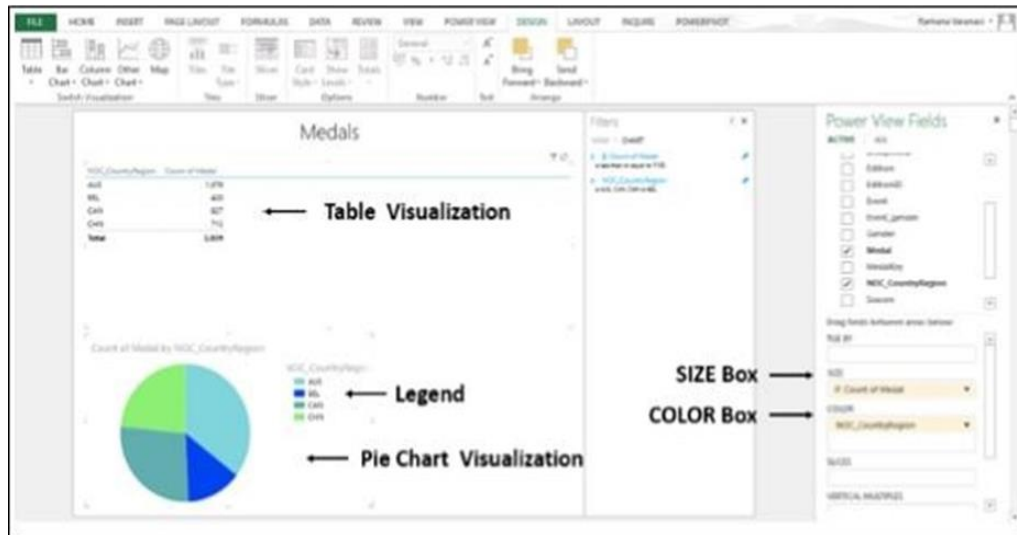


You can have simple Pie Chart Visualizations in Power View.

Step 1 – Click on the Table Visualization as shown below.

Step 2 – Click on Other Chart in the Switch Visualization group.

Step 3 – Click on Pie as shown in the image given below.



Applications:

Financial Analysis: Analyzing financial statements, conducting budgeting and forecasting, and creating financial models using Excel's advanced functions and features.

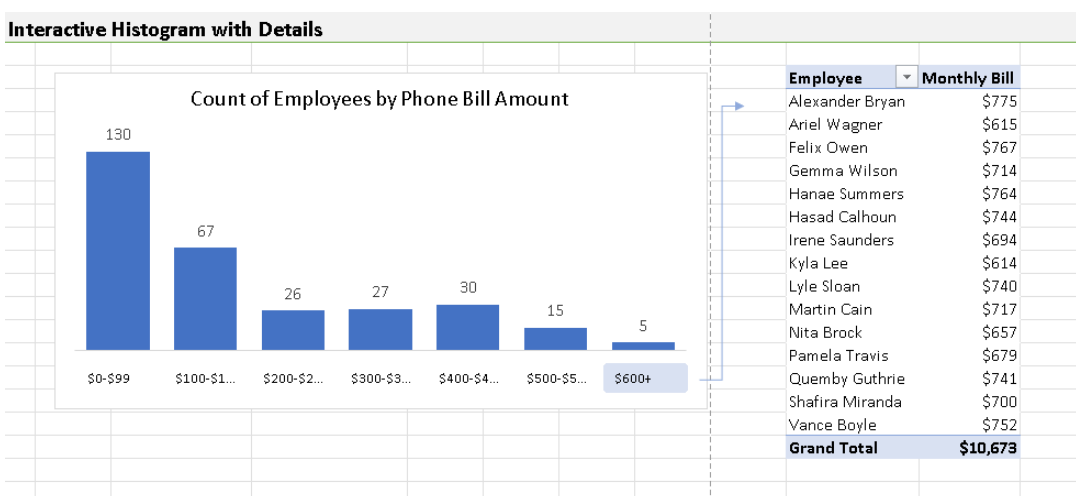
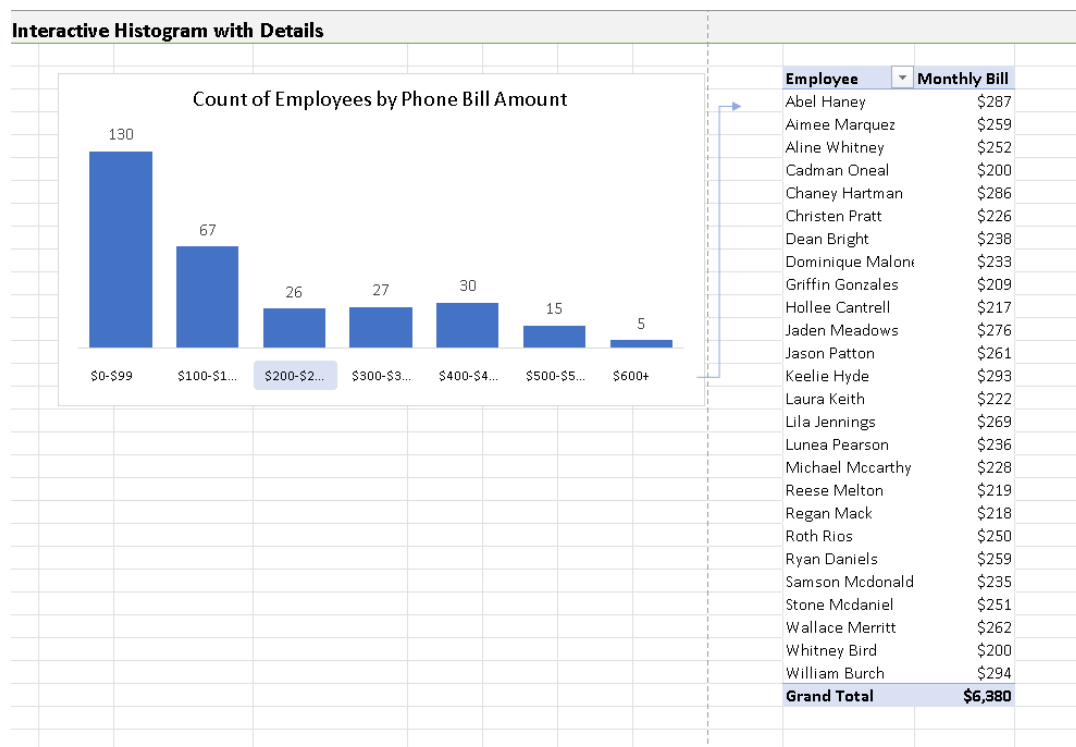
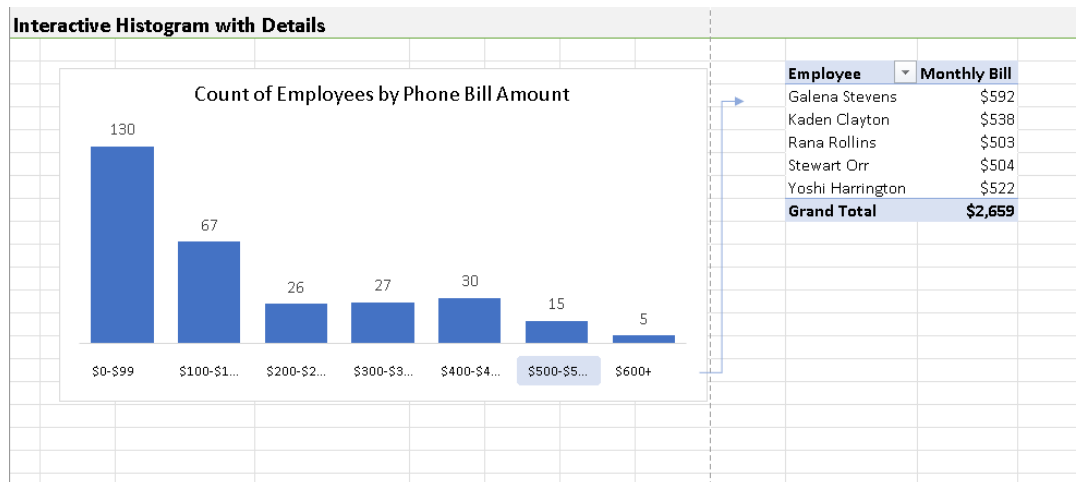
Supply Chain Management: Optimizing inventory levels, analyzing supplier performance, and identifying cost-saving opportunities by analyzing supply chain data in Excel.

Business Intelligence: Building interactive dashboards, performing ad-hoc analysis, and generating actionable insights from large datasets to support strategic decision-making.

Education Analytics: Analyzing student performance data, identifying areas for improvement in educational programs, and tracking learning outcomes using Excel's analytical capabilities.

Input: Employee dataset

Output:



Conclusion:

Outcome: The successful completion of the Data Analysis and Visualization using Advanced Excel project will result in the creation of visually compelling and insightful reports, presentations that effectively communicate complex data trends, patterns, and relationships.

This will enable stakeholders to make data-driven decisions with confidence, leading to improved efficiency, productivity, and strategic outcomes within the organization.

Questions:

1. How can advanced Excel features such as conditional formatting and data validation be used to improve the visual presentation and accuracy of analytical findings?
2. How can Excel be integrated with other data analysis and visualization tools or platforms to streamline workflows and enhance collaboration among team members?
3. What strategies can be employed to ensure the security and integrity of sensitive data when conducting analysis and visualization projects in Excel?

Answers:

1. Using Advanced Excel Features for Improved Presentation and Accuracy:

- **Conditional Formatting:** Conditional formatting allows highlighting cells based on specified criteria, making it easier to spot trends, outliers, or important data points. For example, using color scales or icon sets to visually represent data distribution or using data bars to compare values within a range.
- **Data Validation:** Data validation ensures data accuracy by restricting input to predefined criteria. By setting rules for data entry, such as numerical ranges, date formats, or dropdown lists, data validation helps maintain data integrity and consistency, reducing errors in analysis.

2. Integration of Excel with Other Tools for Streamlined Workflows and Collaboration:

- **Excel with Power BI:** Power BI integrates seamlessly with Excel, allowing users to import Excel data for advanced visualization and analysis. Power BI offers more sophisticated visualization options and interactive dashboards, enhancing data exploration and presentation.
- **Excel with SharePoint:** Integrating Excel with SharePoint enables centralized storage and sharing of Excel workbooks, facilitating collaboration among team members. SharePoint allows version control, access control, and real-time co-authoring, streamlining workflows and ensuring data consistency.

3. Ensuring Security and Integrity of Sensitive Data in Excel Projects:

- **Data Encryption:** Utilize Excel's built-in encryption features to password-protect sensitive workbooks or sheets, preventing unauthorized access to data.
- **Access Controls:** Implement strict access controls to limit access to sensitive data only to authorized personnel. Utilize Excel's sharing options to control who can view or edit specific parts of the workbook.
- **Data Masking:** Mask sensitive data by replacing actual values with dummy data or aggregating data to hide specific details while preserving overall trends or patterns.
- **Regular Backups:** Regularly backup Excel workbooks to prevent data loss due to accidental deletion or corruption. Utilize version control systems or cloud storage solutions to ensure data availability and integrity.