correlation.·one

TECH FOR JOBS

Support Session 3

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Agenda

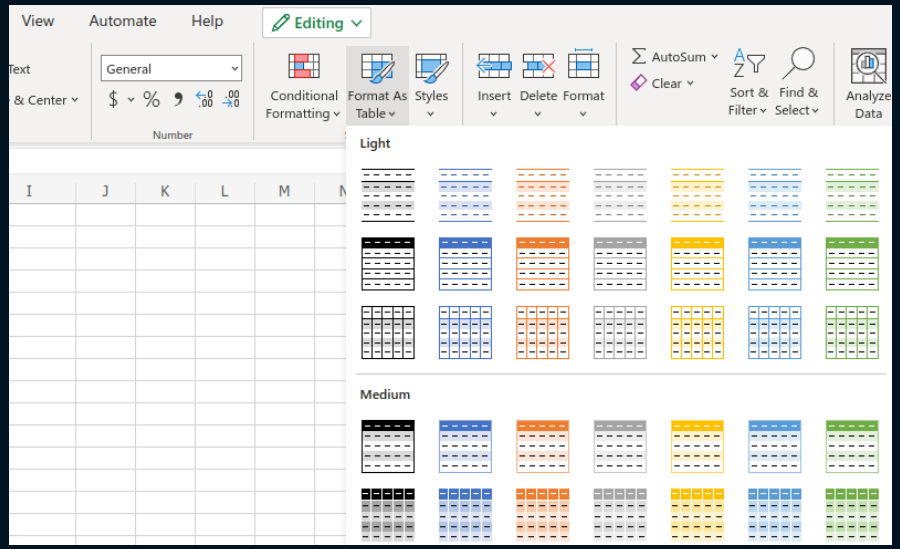
- Intro to Data Visualization (Viz)
- Exercises
- Logistics and Pivot Visualization in Excel
- Exercises

Purpose of Data Visualization

- Simplify Data: Makes complex data easier to understand.
- Highlight Insights: Shows patterns, trends, and relationships.
- Support Decisions: Helps stakeholders make informed decisions.
- Engage Audiences: Presents data in an engaging, visual way.

Formatting Data as a Table in Excel

- Purpose: Quickly format data for easy viewing and analysis.
- Benefits:
  - Automatic formatting & filtering
  - Structured references in formulas
  - Dynamic range expansion
- Steps:
  - Select data → Home → Format as Table
  - Choose a style and confirm headers.



Types of Data

- Categorical Data:
  - Non-numeric data in groups or categories.
  - Examples: Gender, Product Category.
- Numerical Data:
  - Numeric data with measurable values.
  - Examples: Sales, Height.

Correlation

- Definition: Measures the strength and direction of a relationship between two numerical variables.
- Values:
  - r = 1: Perfect positive correlation
  - r = 0: No correlation
  - r=−1: Perfect negative correlation
- Example: Advertising Spend vs. Sales Revenue
- Excel Formula: =CORREL(array1, array2)

Mathematical Overview of Correlation

- Formula: Pearson’s Correlation Coefficient

$$r = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2}\sqrt{\sum(y_i - \bar{y})^2}}$$

- Range: -1 to 1 (negative, no, or positive correlation)
- Interpretation: Direction and strength of linear relationship, but **no causation** implied

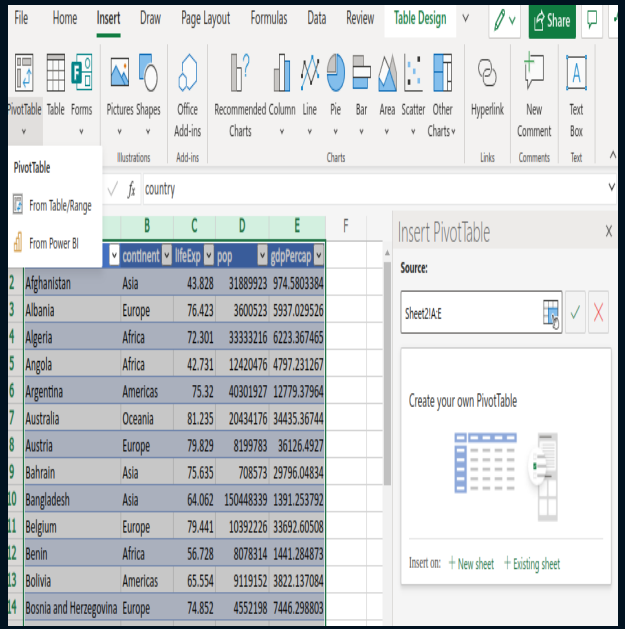
Why Correlation ≠ Causation

- Unseen Factors: Hidden variables or coincidental relationships can cause spurious correlations.

- Example: Ice Cream Sales & Drowning Incidents - both increase with warm weather, not due to one causing the other.

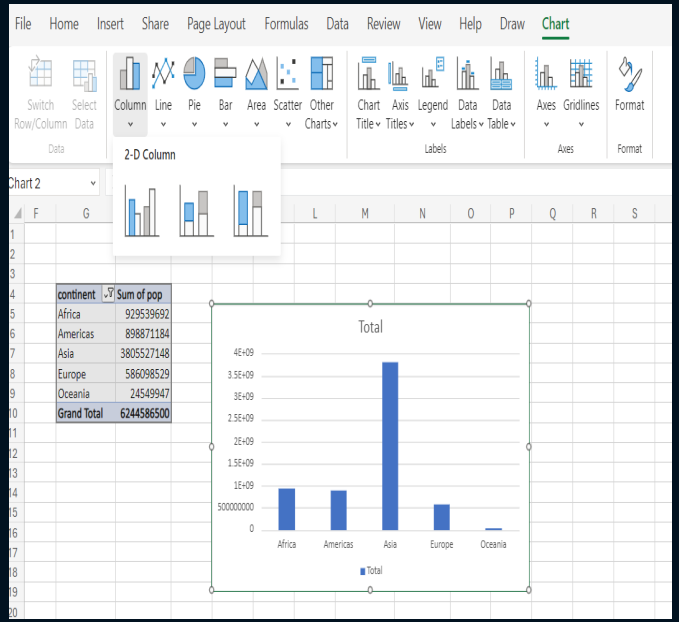
Pivot Tables

- Purpose: Summarize and analyze large datasets by grouping data.
- Benefits:
  - Quickly creates summaries (totals, averages, counts).
  - Easily reorganizes data for flexible analysis.
- Steps:
  - Select data range → Insert → Pivot Table
  - Drag fields to Rows, Columns, Values, Filters areas.



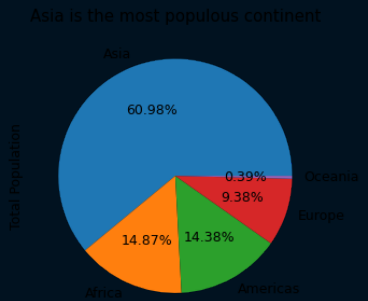
Types of Charts - Bar Chart

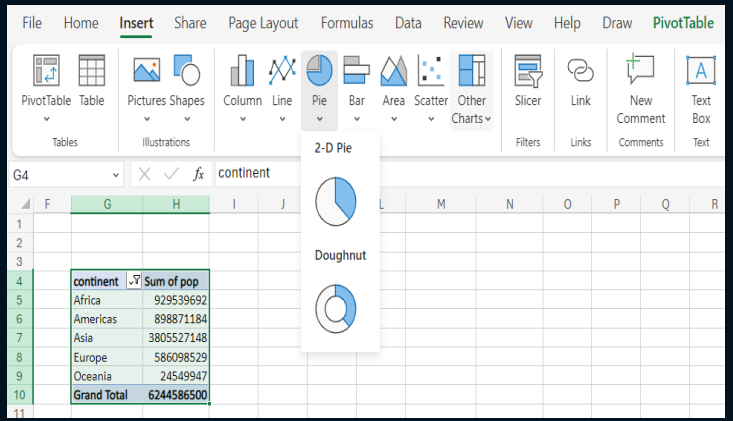
- Use: Compares values across categories with bars.
- Best For: Showing differences in categories.
- Example: Sales comparison by product type.
- Excel Steps:
  - Highlight data.
  - Insert → Column Chart



Types of Charts - Pie Chart

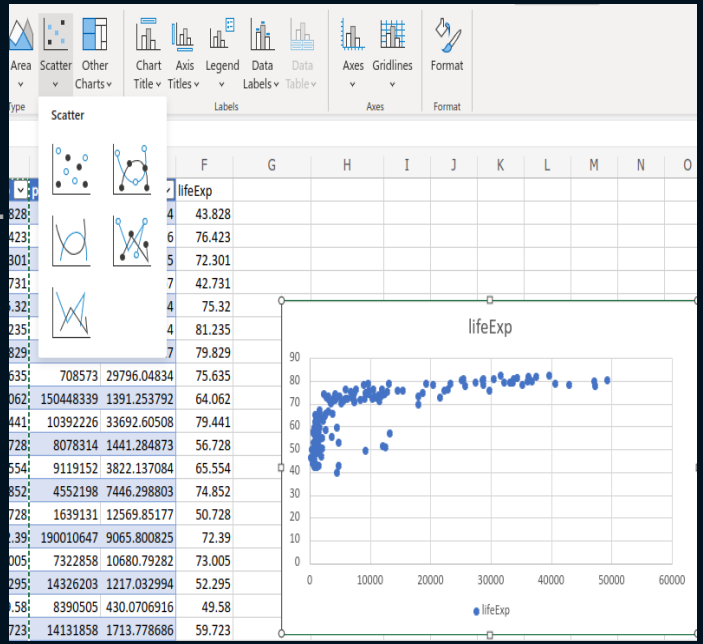
- Use: Represents data as parts of a whole in slices.
- Best For: Displaying proportional data for a limited number of categories.
- Example: Market share by company.
- Excel Steps:
  - Highlight data.
  - Insert → Pie Chart





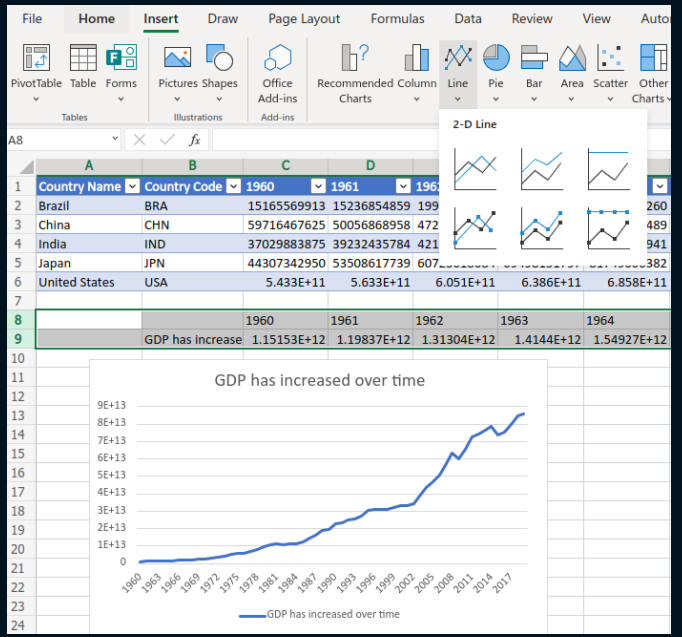
Types of Charts - Scatter Chart

- Use: Shows relationship between two variables with plotted points.
- Best For: Identifying correlations or patterns.
- Example: Advertising spend vs. sales revenue.
- Excel Steps:
  - Highlight data.
  - Insert → Scatter Chart

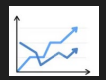


Types of Charts - Line Chart

- Use: Displays data trends over time or continuous data.
- Best For: Showing changes over intervals.
- Example: Monthly revenue trend over a year.
- Excel Steps:
  - Highlight data.
  - Insert → Line Chart



Comparison of Chart Types

Chart Type	Purpose	Data Type	Example Usage
Bar Chart 	Compares values across categories	Categorical	Sales comparison by product
Pie Chart 	Shows parts of a whole	Categorical (limited slices)	Market share breakdown
Scatter Chart 	Displays relationship between two numerical variables	Numerical	Advertising spend vs. sales
Line Chart 	Shows trends over time or continuous data	Numerical (time series)	Monthly revenue over a year

Summary

- Data Visualization Essentials:
  - Understanding data types and choosing the appropriate chart type is crucial.
- Excel Tools for Visualization:
  - Use features like "Format as Table" and chart types (bar, pie, scatter, line) to create effective visuals.
- Key Takeaway:
  - Effective data visualization enhances comprehension, aids decision-making, and communicates insights clearly.

Introduction to Pivot Tables

- Pivot Tables:
  - Organize and summarize data, turning raw information into insights.
  - Essential for analyzing large datasets in logistics and beyond.
- Why Use Them:
  - Simplifies analysis, helps identify trends, and improves decision-making.

Data Formats in Excel

- Wide Format: Data spread across columns, better for readability but challenging for detailed analysis.

WIDE FORMAT			
Candidate	Age	Sex	Votes
A	54	M	870
B	26	F	1596
C	33	F	612
D	42	M	1385

- Long Format: Data organized in rows,
- ideal for pivoting and detailed analysis.

LONG FORMAT		
Candidate	Variable	Value
A	Age	54
B	Age	26
C	Age	33
D	Age	42
A	Sex	M
B	Sex	F
C	Sex	F
D	Sex	M
A	Votes	870
B	Votes	1596
C	Votes	612
D	Votes	1385

Transposing Data

- Transpose: Switch rows and columns to rearrange data easily.
- When to Use: Useful for converting wide data into long format for easier pivoting.
- Steps: Select data, copy, use Paste Special, choose Transpose.

Splitting Data with Text to Columns

- Text to Columns: Separates data in one cell into multiple columns based on a delimiter (e.g., comma, space).
- Why Use It: Great for handling combined data, like names or addresses.
- Steps:
    - Select data, go to Data > Text to Columns, pick delimiter, finish.

Creating Pivot Tables

- Purpose: Pivot tables summarize data into insights with rows, columns, and values.
- Steps:
  - Select data.
  - Go to Insert > Pivot Table.
  - Arrange fields into Filters, Rows, Columns, and Values sections.

Pivot Table Components

- Filters: Apply criteria to display specific data.
- Rows & Columns: Organize data vertically and horizontally to break it into groups.
- Values: Show summarized data (e.g., totals, averages).

Using Pivot Charts

- Pivot Charts: Visualize pivot data to easily spot patterns and trends.
- Chart Types:
  - Column: Best for comparing categories.
  - Line: Shows trends over time.
  - Pie: Illustrates proportions.
- Steps:
  - Select pivot table, go to Insert, choose chart type, customize as needed.

Summary

- Takeaways:
  - Pivot tables and charts simplify and clarify data analysis.
  - These tools are valuable for logistical insights, improving decision-making.
  - Quick methods (Transpose, Text to Columns) save time and increase data flexibility.
- Next Steps: Try using pivot tables and charts in Excel to explore your data.