Module 5

Interactive Data Visualizations

Module Overview

- Introduction to Data Visualizations
- Creating Power BI reports

Lesson 1: Introduction to data visualization

- Charts
- Cards
- Maps
- Tables
- Tree maps
- Formatting charts

Charts

- Power BI Desktop includes a wide range of all the common chart types used in data analysis:
  - Bar and column charts
  - Line and area charts
  - Line and column charts
  - Funnel charts
  - Scatter charts
  - Bubble charts
  - Pie charts
  - Donut charts

Cards

- Present most important data first:
  - If users normally read left to right and top to bottom, show most important data in top left
  - Use card, multirow card, and KPI visuals to present important figures clearly and efficiently
- Card chart:
  - Displays a single numeric value, such as Total Sales
  - Optionally displays data label and title
- Multirow card chart:
  - Shows multiple numeric values, useful for small datasets, such as Main Category and Total Sales
  - Optionally include the data labels and a chart title
- KPI
  - Visualize a business objective and show progress towards the goal

Maps

- Power BI integrates with Bing to identify location
- Map chart:
  - Represents data as proportionally sized, color-coded bubbles
  - Good for data based on cities
- Filled map chart:
  - Uses shading across a region; darker shades for higher numbers, or rather, high density
  - Useful for demographic data
- ArcGIS map chart:
  - Uses points, areas, clusters, heat maps
  - Can analyze your data against demographic layers

Tables

- Display data in columns and rows:
  - Useful for displaying numeric data, such as financial
  - Each numeric column is aggregated
- Table:
  - Best for small datasets
  - Includes very little visual formatting
  - Data must be read to be understood
  - Consumes a lot of space on the report canvas
- Matrix:
  - Can add rows, columns, and values
  - Can enable drilldown

Tree maps

- The tree map functionality represents a tree, even though it doesn't look like one:
  - Data represented as a rectangle or branch
  - Branch can be further divided into nested rectangles, or leaves of the branch
- Represents data hierarchically
- Efficient use of space
  - Flattens data to show two layers—for example, sales by country, with each county broken into territories
  - No need to drill down to see this data

Formatting charts

- All charts can be customized with colors and borders:
  - Show or hide a chart title, change font color and size
  - Set X and Y position, width and height of each chart
  - Show or hide axis, data labels, or legends
  - Set colors of data points—for example all columns—or by each value
- Add shapes, text boxes, and images:
  - Use shapes to group related visuals
  - Use text boxes to add headers or create hyperlinks
  - Add corporate logos, pictures, or photos to enhance report
- Right-click bar or line: drill down to underlying records
- Customize tooltips by adding extra fields
- Quick measures quickly change the aggregation on a field
- Add trend, constant, and dynamic reference lines to charts

Demonstration

You will see how to:

- Add visualizations to a Power BI report
- Apply basic formatting to the visualizations

Lesson 2: Creating Power BI reports

- Page layout and formatting
- Working with multiple visualizations
- Creating charts
- Using geographic data
- Histograms

Page layout and formatting

- Customize each report using formatting options:
  - **Page name**: give each report a name to describe the content, rather than the Power BI default of *Page 1*, *Page 2*
  - **Page size**: default aspect ratio is 16:9. Change to 4:3, Cortana, Letter, or set width and height in pixels using the Custom option
  - **Page background**: change the background color and transparency. Use theme color, or own color. Use image to create highly customized reports
  - **Page view**: alter the zoom on the page. Default is Page view—fits all visuals onto screen. Choose Actual Size for one-to-one pixel mapping

Working with multiple visualizations

- Use settings and formatting to ensure multiple visuals interact correctly on a report:
  - **Visual relationships**:
    - **Filter**: only show corresponding data
    - **None**: show all data, do not interact
    - **Highlight**: shows all data, corresponding values highlighted
  - **Show items with no data**: displays items with empty values, value of 0 included by default
  - **Default summarization**: change from the default sum to average, minimum, maximum, count, or count distinct
  - **Default categorization**: for example, ensures address fields are categorized as City rather than Country, or State
  - **Arrange report elements**: sending visuals forwards or backwards to create layers—known as z-order

Creating charts

- Power BI includes a wide range of chart types:
  - Bar and column
  - Line and area
  - Line and column
  - Ribbon
  - Scatter and bubble
  - Funnel
  - Gauge
  - Pie and donut
  - Slicers
  - Waterfall
  - Table and matrix
  - Tree map
  - R visual
  - Python visual
- Formatting charts

Using geographic data

- Map and filled map charts:
  - Power BI integrates with Bing to determine location
  - Bing makes a best guess—known as geocoding
  - Always include location—longitude and latitude are aggregated
  - Add data categories to columns for better accuracy
  - Concatenate string address fields into one column
  - Display value data as:
    - Color-coded bubbles on map charts
    - Shaded regions on filled map charts
- ArcGIS map charts:
  - More customization
  - Provide reference layers, information pins, infographics

Histograms

- Histograms differ from bar charts:
  - No spaces between the bars
  - Bars (or bins or buckets) represent a range of values
  - Ranges must be contiguous
  - Width of the bars represent a proportion of the total bin limit
- Download Histogram visual from the marketplace
- Specify a data field for the **Values** (bin) and a field for the **Frequency**

Demonstration and Exercise 1

You will see how to:

- Control interactions between reports
- Steps to embed Python MatPlotLib graphic in a Power BI report
- Create visualizations