Introduction

Power BI visuals

- Attractive charts and graphics
- Represent information in insightful way.
- People can connect and interact with the information and make informed decisions quickly.

Table and Matrix Visualization

Table

- Supports Two Dimensions
- Can contain Header and Total Row

Configuring Report Properties using FORMAT:

- FORMAT option is used to control the look and feel of visualization item.
- You can play with fonts, foreground, background, alignment, conditional colouring etc.
- **Formatting provides additional context to data using Colours, Tooltips, Size etc**.

Conditional Formatting in Table:

- Specify customized cell colors, including color gradients, based on field values.
- Represent cell values with data bars or KPI icons, or as active web links.

Note:

Note For All the Labs in this Module use the Files present in following Location : ***C:\PowerBI-Learn\ClassLabs\Visualization\Starter***

Sample files are provided in starter folder.Create copy of it and work on it.so you do not lose the starter files.

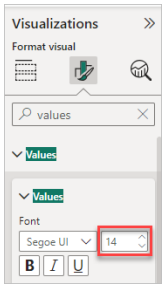
Example: save Visualization-starter-part1.pbix as Visualization-part1.pbix

Lab1: Create Table with Yearwise, Countywise, Total Sales

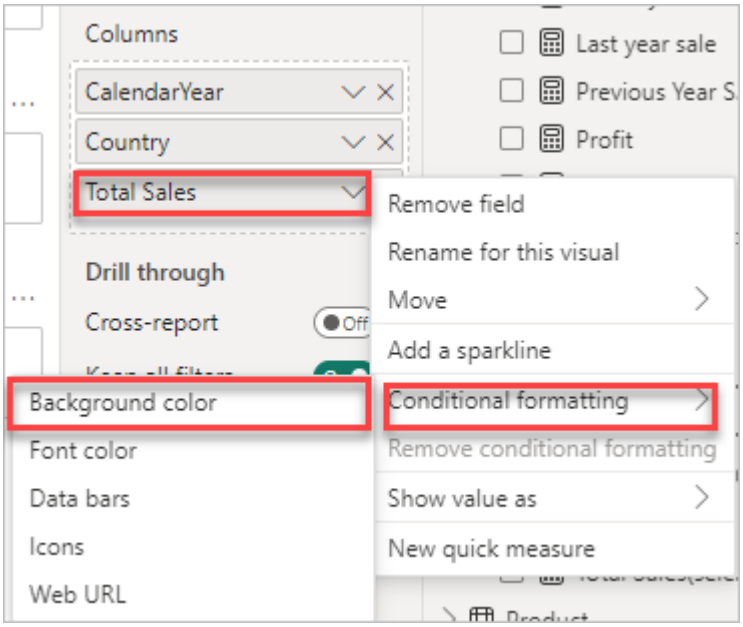
- Explore formatting.
- Set Conditional Formatting

Solution:

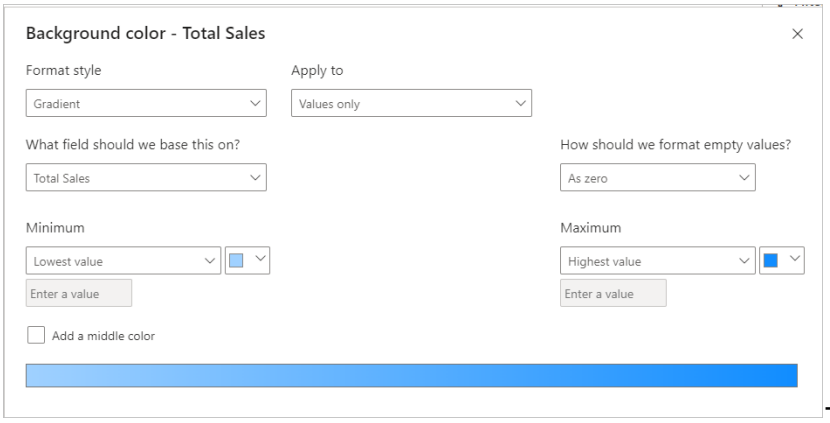
1. Open File *:* ***C:\PowerBI Learn\ClassLabs\Visualization\Starter*** **\Visualization-starter-part1.pbix**
2. Save this File as Visualization-part1.pbix
3. Click on Empty Canvas→Select Table visual
4. Choose following Fields:Calender Year,Country,Total Sales
5. Select Table visual created→Visualization pane→Format Visual→search for **Values→Change font size to 14**



6. Search for header and change font size to 14
7. Set Conditional Formatting
8. Click on drop down arrow near Total Sales→Conditional formatting→Background color



9. Observe following window pops up



→OK

You can change colours, Add middle color.

You can change Format style as Rule and specify rules for values and specify color.

10. Click on page1→Right click→Rename →Name it as **Table and Matrix**

Matrix:

The **Matrix** visualization looks similar to the table visualization; however, it allows you to select one or more elements (rows, columns, values) in the matrix to cross-highlight other visuals on the report page.

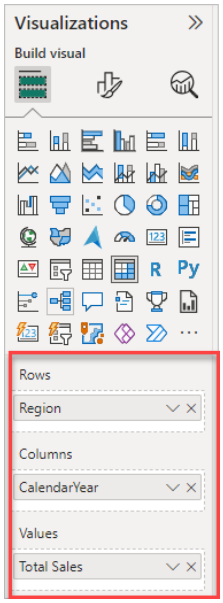
Lab2: Create Matrix with Yearwise, Regionwise Total Sales

1. Click on Empty Canvas→Select Matrix visual
2. Choose following Fields

   Rows: Region

   Columns: Calender Year

   Values: Total Sales



Charts

Bar and Column Charts:

- There are variety of bar and Column charts in stacked and Clustered format.

Lab3: Create Sales by Country Bar Chart

1. Click on **+** on bottom bar to Create New page→Rename as Charts
2. Select Clustered Column Chart
3. Configure as follows:

   X-axis:Country

   Y-axis:Total Sales

Lab 4: Modify to include Customer Age Breakdown

1. In existing Chart select AGE Breakdown Field
2. Observe that is it added to Legend

What is Tooltip?

- Tooltip provides contextual information and detail to data points.
- You can Simply add additional fields to tooltip field.
- You can have Custom tooltips based on hidden report pages.
- Report page tooltps can include visuals, images and any other items.

Lab 5: Modify to show Total Sales and Profit and Customer Age Breakdown

Note: Following solution will not work Y-axis: Total sales, Profit Legend: Customer Age Breakdown **Solution: You can add Profit to Tooltip**

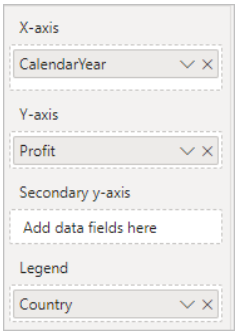
Note: You can convert one visual to another visual type.

Line and area charts:

- The line chart and area chart visualizations are beneficial in helping you **present trends over time**.

Lab6: Create a (Line)chart to show profit trend for each country yearwise.

1. Click on Empty Canvas→Select Line Chart and Configure as follows:



2. Convert Chart to Different Types of Charts and Observe.

Pie chart, donut chart, and Treemaps:

- The pie chart, donut chart, and Treemap visualizations show you the relationship of parts to the whole by dividing the data into segments.
- These charts are best suited for illustrating percentages, such as the top five sales by product or country, or any other available categories.

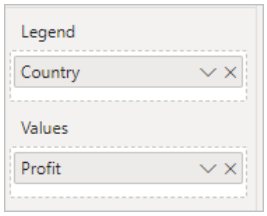
TreeMap:

- Treemap visualization displays data as a set of nested rectangles.
- The space inside each rectangle is allocated based on the value that is being measured.
- A TreeMap is ideal to visualize large amounts of Hierarchical data
- The distribution pattern of the measure across each level of categories in the hierarchy.

Note: When using pie charts, donut charts, and Treemaps, try to avoid presenting too many categories because it results in thin slices

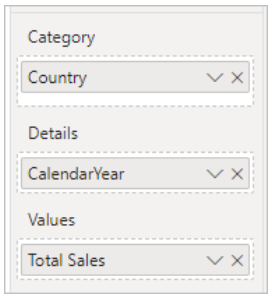
Lab 7: Create Pie Chart and donut chart for Profit By Country

1. Click on Empty Canvas →Select Pie Chart Visual



Lab 8: Create Tree Map for Profit/Sales by Country and year division

1. Click on Empty Canvas →Select Tree Map Visual



Combo charts

The **combo** chart visualization is a combination of a column chart and a line chart that can have one or two Y axis. The combination of the two charts into one lets you:

- Compare multiple measures with different value ranges.
- Illustrate the correlation between two measures in one visual.
- Identify whether one measure meets the target that is defined by another measure.
- Conserve space on your report page.

Card , Map

Card visualization:

- The card visualization displays a single value: a single data point for visualizing important statistics such as total value, YTD sales, or year-over-year change.
- The multi-row card visualization displays one or more data points, with one data point for each row.

Lab 9: Create card to show Total Sales and Profit

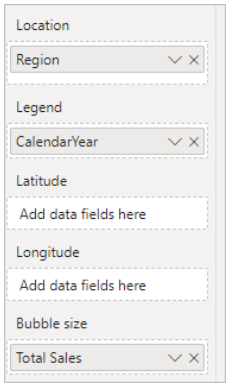
1. **Create new page→Rename it as CardAndMap**
2. Select Card Visual and add field Total Sales
3. Select one more Card Visual and add field Profit

Maps:

Power BI integrates with Bing Maps to provide default map coordinates (a process called geocoding), so you can create maps.

Lab10: Create Map for Region wise,yearwise Sales

1. Click on Empty Canvas →Select Map Visual and Configure as following



Q&A visualization

- The Q&A visualization allows you to ask natural language questions and get answers in the form of a visual.
- It can be accessed in Reports and Dashboards

Best Practices for Q&A

- Each table in Model should represent one Business Entity.
- Relationships must be properly established.
- Tables and Columns should be Named Meaningfully.
- Colum Properties like Data type, Data Category and Summarization should be set properly.

Lab11: Q & A Visual

File Path:

1. Open File ***C:\PowerBI Learn\ClassLabs\Visualization\Starter*** **\Visualization-starter-part2.pbix**→save as **Visualization-part2.pbix**
2. Create New Report Page→Double Click and observe the Q&A Visual
3. Try following Questions
   - what is the total sales by category
   - number of customers by age
4. Type this question :
   - Total sales by color
   - total sales for Australia
   - Revenue by Year
   - Income for Australia
5. Add Revenue word as synonym for Total Sales
6. Go to Modeling view→Select Sales Amount Field→Properties pane→Add Revenue in Synonym Property.
7. Similarly ,Add Year word as synonym for CalenderYear
8. Now observe the Visual

Drilling Into Hierarchy

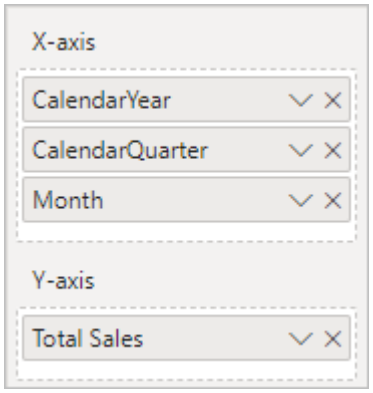
Hierarchy is nothing but fields arranged in levels. You can drill down in the next levels.

Example: Date Hierarchy, Product Hierarchy

Lab 12: Create a chart Total Sales by Year, Qtr and Month and Explore Hierarchy

1. Create a New page and rename as Hiearchies-Chart
2. Create Clustered Column chart with following fields

Axis:



Explore Hierarchy options:

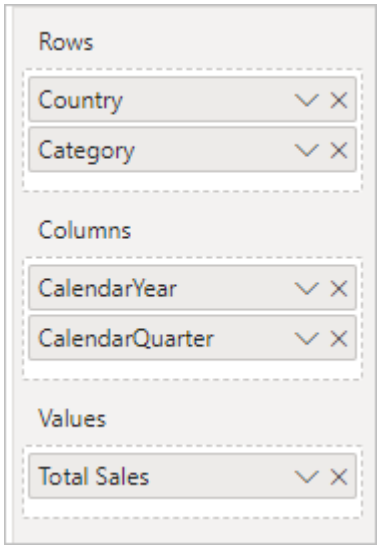
Drill Up  **:** move back up the hierarchy.

Go to the next level in the hierarchy  **:** Clicking on this will go to Qtr, month for all years

Expand all down one level in the hierarchy  **:** Clicking on this will go to next level like Year and qtr wise , Year and qtr and month wise.

Click to turn on Drill Down  **:** When turned on selecting particular year will drill down to Qtr and Particular Qtr will drill down month.

Lab 13: Create Matrix with following Fields.



Observer that On a Matrix visual, you can drill either into rows or columns.

Explore Sort , More options in Visual

Sorting:

Sorting the visuals in your report can help you discover trends, identify patterns, and visualize insights more effectively.

Lab 14: Sorting in Chart and Matrix Visual

1. Open Report Page named Sort
2. Select Chart→Upper Right corner→…(More options)→Sort Axis
3. Explore sorting by selecting different fields and sort order
4. Select Matrix→ Upper Right corner→…(More options)
5. Explore options Sort By, Sort ascending, Sort descending

Note: In Table Visual you can click on Column Header to Sort the Data

More Options for Visual:

Select Visual→ Upper Right corner→…(More options)→

Observe Export Data, Show as Table and Spotlight

Export Data:

- You can set options for Exporting data.
- In PowerBI Desktop Observe the options for Export Data on following window:
  File →Options and Settings→Options→Current File→Report Settings
- You can also set options for Export Data in Power BI Service.

Export Data From a Visual :

Select Visual→ Upper Right corner→…(More options)→Export data

Slicing and Filtering

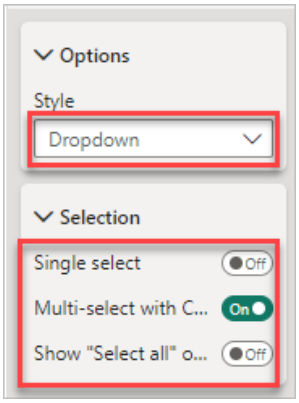
- Slicers and Filters let you define which data points need to be displayed in report.
- To display limited data points you can use slicer, Filter, or combination of both.

Slicer visualization:

- A slicer is a type of filter which can be used to segment the data in the report by a specific value, such as by year or geographical location.
- It is used to:
  - Filter visuals on the page.
  - **Provide quicker access to commonly used or important filters.**
  - By Placing slicer next to important visual more Focused look can be provided
- You can turn your slicer into buttons to make it easier for users to filter data. Also, you can use your slicer with date type columns, so you can select a different data range by using the slider.

Lab15: Create Slicer for Country

1. Go to **Slicer and Filter Report Page**→Click on Empty place in canvas→Select Slicer from Visualization pane 
2. Add Contry Field to it
3. Select required countries in slicer and observe the other visuals are getting filtered based on that.
4. You can configure slicer for Single Select, Multi Select with CTRL or Show "Select ALL"
   Format Visual→Slicer setting→Selection
5. Configure Slicer to display as DropDown, Tile or vertical list
   Format Visual→Slicer setting→Options→Style



Note: Creating slicer with Date type column gives different options for <u>Style</u> to provide slider.

Filter:

- You can filter the data from the query which need to be displayed.
- The filters allow users to interact with the visuals at the report, page, and visual level.
- Filters are defined using Filter Pane and pane can be shown or hidden from consumers

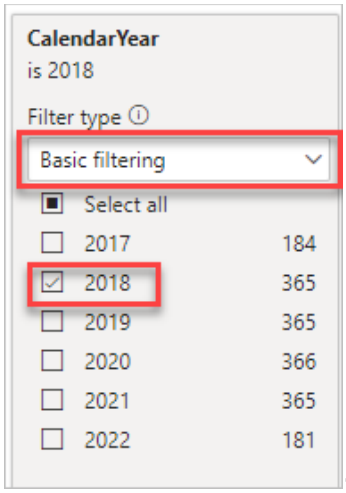
- Filter can be applied at different levels:
    1. Filters on this visual: Filters that apply to the selected visual and nothing else. This section only displays if you have a visual selected.
    2. Filters on this page: Filters that apply to the whole page that you currently have open.
    3. Filters on all pages: Filters that apply to all the pages in your report.
    4. Drillthrough: Filters that apply to a single entity in a report.
- You need to select the fields based on which you need to filter the data.

Lab 16: Explore all three types of filters using Filter Pane.

1. **SlicerAndFilter Page**→Select Chart for Total Sales by Country→Add **Legend** as Calender Year
2. Expand Filters Pane →**Filters on this visual**→Add CalenderYear→Click on it→Select

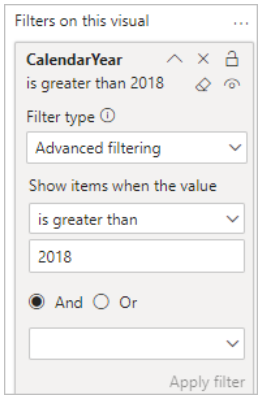
   Filter Type: Basic

   Select required years



→**Apply Filter**

3. observe change in that visual
4. Change Filter type to **Advanced filtering** as shown and Observe the change



Note: Based on data type of Field, in Advanced Filtering you can perform more sophisticated filtering

5. Remove **CalenderYear** from Filter Pane
6. Explore the same CalenderYear field by adding it to **Filters on this page** section.
7. Observe the changes in all visuals on that page.

Note: You can show or hide filter from report user. You can also lock the filter so used can see but can't change value of filter

Visual Interactions

- You can customize how the visualizations on your report page impact each other.
- Interaction can be

1. Cross Filtering: When a data point is clicked on visual, any other related **visuals show filtered result**.
2. Cross Highlighting: When a data point is clicked on visual, any related visual maintain all data but **selected data point is Highlighted**.
3. No interaction: When a data point is clicked on visual, any related visual does not have any impact.

- You can stop default interaction from happening or change a highlight action to a filter action and vice versa.

Lab 17: Configure Visual Interaction as following:

- **Cards visuals should not be filtered based on selection in any other visual**
- **Total Sales by** Category Visual should **get filtered** based on Total Sales by **Calender**

1. Open **VisualIneraction Page**
2. Select Total Sales by category visual
3. Format Menu→Click on Edit Interactions→Observe following icons for card visuals

4. **For Each Card visual click on None**
5. **Select** Total Sales by Calender **visual→** For Each Card visual **click on None** icon
6. For Total Sales by Category Observe following icons

7. **Click on Filter Icon**
8. Test the Interactions

Note: number of interactions between your visuals will impact the performance of your report.

*To optimize the performance consider the **query reduction** options*

File > Options and settings > **Options→Scroll down→ Query reduction

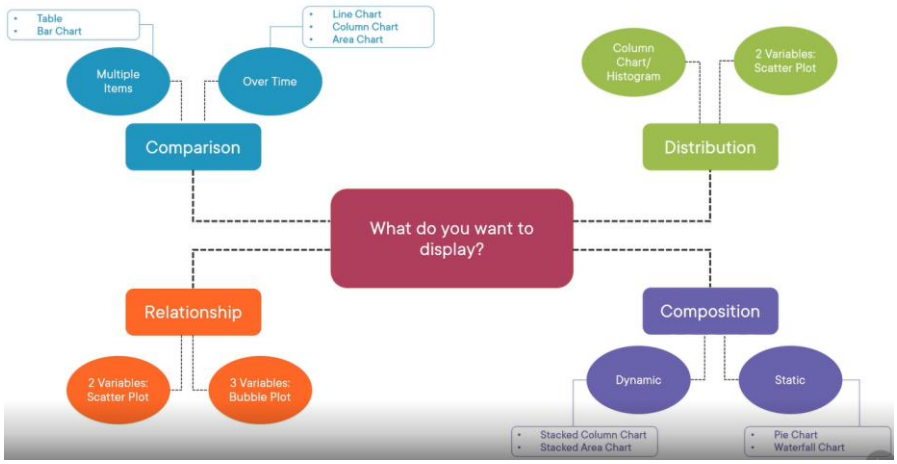
Import Custom Visual

You can extend Power BI Default library by importing a custom visual .

Lab 18: Import Custom Slicer visual

1. Open Custom visual page
2. Visualization→ … →Get More Visuals→PowerBI visual window opens

3. Under search type :chiclet
4. Select Chiclet Slicer→Click on Add
5. Observe the New Slicer in Visualization Pane
6. Replace existing slicer with Chicklet Slicer or create new Chicklet Slicer visual with **Country** Field



Report page

Report Design Guidelines:

- Divide the report in multiple pages.
- Limit visuals on each page instead of making it clumsy.
- Use drillthrough pages and report page tooltips to provide information, instead of using multiple visuals.
- It is best practice to place the most important visual in the upper-left corner of your report because your users most likely read left-to-right and top-to-bottom

Set Report Page Properties:

Navigation:

Select the white space on your report canvas →Visualizations →**Format page**

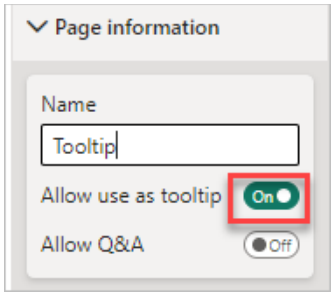
Observe and explore several properties.

Lab19: Create Custom Tooltip For Chart in Main page

1. Open C:\PowerBI Learn\ClassLabs\Visualization\Starter Visualization-starter-part3.pbix→Save as Visualization-part3.pbix
2. Go to Tooltip page →Select the white space on your report canvas →Visualizations →**Format** page
3. Configure **Page information** property

   Name: Tooltip

Allow use as tooltip:on



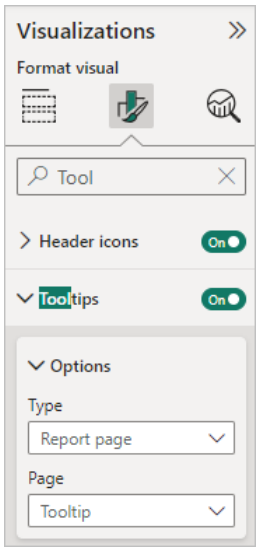
4. Configure Canvas setting Property

   Type: Tooltip

5. Go to Main page →select chart visual→Format visual→search for Tooltip
6. Expand **options** and set

   Type: Report page

   Page: Tooltip



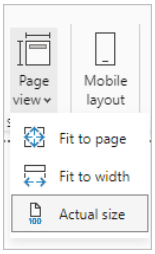
7. Hover mouse over any bar and observe the Tooltip.

Report View:

You can set page view and design mobile layout.

Navigation:

View Ribbon→Page View



Report for Mobile use:

- Create an additional view that is optimized for mobile devices in portrait orientation.

  View→Mobile Layout→Rearrange the visuals in effective way.

Report Theme:

You can change Theme of report using built in Themes or customize theme.

Navigation:

View Ribbon→Themes→Click on dropdown→You can select theme or customize it.

Align Visuals:

Navigation:

Select visual→Format Menu→Align

Observe different options.

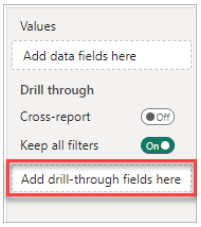
Drill Through Feature

- **Drill through** feature to create a page in your report that focuses on a specific entity, such as a product, category, or region.
- The information that displays on the Drill through page will be specific to the item that you select on the visual in main page

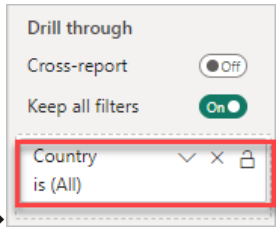
Lab20: Create Report with Drill Through feature to show details of product sold in selected year.

1. **Main page:** Visual with Total Sales by Country
2. **Detail page:** Contains table visual with details of sales of product.
3. **Configure Drill Through in detail page**

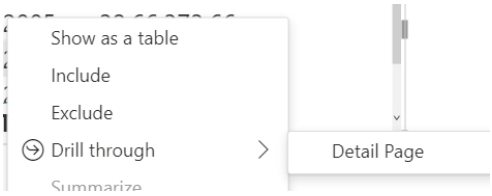
   Detail page→Empty canvas→Visualization →Observer (Add-drill-through fields here)



→Add Drill through field as Country→



4. Observe automatically **Back button** is added
5. Go to main page with any visual with Country→ Right Click →



Cross Report Drill Through:

- The **Cross-report drill through** feature allows you to contextually jump from one report to another report in the same Power BI service workspace or app.
- This feature allows you to connect two or more reports that have related content.

- You can also pass filter context along with that cross-report connection.

Enable Cross-report drill through:

File > Options and settings > Options→ **then scroll down →the** Current File → Report settings→ Cross-report drillthrough →**Enable**

Using Selection Pane

Selection Pane allows to group visuals, change the visibility and change layering order.

Layer Order:

You can Layer visuals so that visuals can be placed in front or behind other visuals.

Navigation:

View Ribbon→Selection→Under Selection Pane→Layer Order

Tab Order:

Important for navigation for users who do not want to use mouse or may be use screen reader.

You can change Tab order by just arranging visuals in required order in this window.

Navigation:

View Ribbon→Selection→Under Selection Pane→Tab Order

Grouping Visuals:

You can group collection of visuals together. It simplifies selection and management of those visuals.

Lab21:

Add card visual to show Total Sales and use it in hole of Donut Chart Showing Total Sales by Country

Add card visual to show Profit and use it in hole of Donut Chart Showing Profit by Country

1. Open page Group Visuals→Add 2 card visuals for Total Sales and Profit respectively
2. For both the cards change following property values and resize it.
   - Search for property **font** →Under **Callout value** observer **Font**→and change it to smaller size(12)
   - Search for property label and make it off
3. Go to view menu→show panes→ **Selection**→Observer all visuals.
4. Double click on card and rename the cards as TotalSales Card and Profit Card Respectively
5. Drag the card visual in respective donut chart hole
6. Go to selection pane to change layer order to place cards after their respective Donut charts
7. To make card visible, change **following property** for both donut chart
8. General Section→Effects→background→increase transparency to 100

Lab22: Group sales related visuals in one group and profit related visuals in one group

1. Make sure Selection pane is open
2. Use Ctril+Click to select all sales related visuals→Right click on selected visual in selection pane→Click on Group→observe group is created.

3. Rename the group as Sales by double clicking on it.
4. Repeat same steps to group Profit related visuals together
5. Test the groups by hiding and showing it.

Bookmark, Button

Bookmarks:

- Capture the currently configured view(state) of a report page so you can quickly return to that view later.
- Captures:
  - Filters
  - Slicers, including slicer type (for example, drop-down or list) and slicer state
  - Visual selection state (such as cross-highlight filters)
  - Sort order
  - Drill location
  - Visibility of an object (by using the **Selection** pane)
  - Focus or Spotlight modes of any visible object

- Use to keep track of your own progress when creating reports.
- Use to build a PowerPoint-like presentation and tell story.
- Useful for navigation when combined with buttons or images.

Note: Power BI Service allows users to create "Personal" bookmarks.

Note: Perform Lab using Visualization-Starter-part4.pbix

Lab23: Create two Bookmarks

1. For Group of profit Visual
2. For Group of Sales Visual

Solution:

1. Open C:\PowerBI Learn\ClassLabs\Visualization\Starter Visualization-Starter-part4.pbix→Save as Visualization-part4 →go to Group visuals page
2. View ribbon→Selection→Selection Pane opens
3. Hide Sales Group→Open Bookmarks Pane→Click on Add to add Bookmark
4. Rename is as Profit Report
5. Unhide Sales Group and Hide Profit Group
6. Click on Add to add Bookmark→Rename new bookmark as Sales Report
7. Test it by Toggling in Bookmark section
8. In Selection pane unhide **Profit** Group

Button:

You can use buttons for:

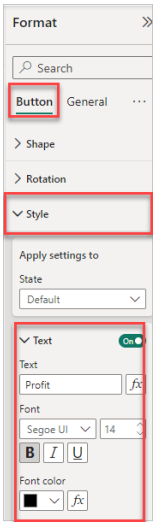
- Switch between two visuals in a report
- Drill down into the data in a visual,
- Move from one page in your report to another

Lab24 : Add Buttons to switch between two bookmarks created in last report

1. Insert menu→Buttons→Blank Button
2. Format→**Button** Property→Style→Text(on)→

   Text:Profit

   Font color:Select Black



3. Format→**General** Properties→Effects→

   Background(on) Select Any color

   Shadow(on)
4. Create copy of the button and change

   Text:Sales
5. Profit Button→**Button** property→Action(on)→expand and set

   Type:Bookmark, Bookmark:Profit Report
6. Similarly configure action for Sales button for Sales Report bookmark
7. Test button using Ctrl+click on respective buttons.

Report Navigation

Report navigation can be designed by

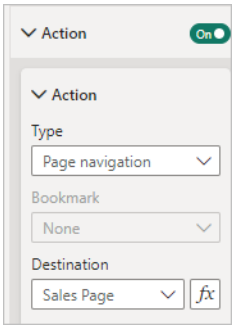
- **Navigation** page in your report
- Add navigation buttons on that page.
- You can also use a combination of both options.

Lab25: Create Report Navigation with Buttons

1. Open C:\PowerBI Learn\ClassLabs\Visualization\Starter Visualization-Starter-part5.pbix→Save as Visualization-part5
2. Go to Main page
3. Configure Sales Button
4. Format→Button→Action(on)

   Type:Page Navigation

   Destination :Sales Page



8. Configure Profit Button on Main page
9. In all destination pages, to return to the **Navigation** page, you can use
   - **Back** button
   - Blank button with Action Type: Back

Synchronizing Slicers

You can synchronize slicers in multiple pages.

Lab26: Synchronize slicer from Main page to Sales and Profit Page

1. Go to Main Page→Select Slicer visual→Copy
2. Go to Sales Page and Paste it.
3. Sync visual window pops up→Click on Sync

Note: You can also use the option Sync slicer

Navigation: *View Ribbon →Show panes →Sync slicer →Use slicer pane to select pages for syncing*

Paginated Report

- **Paginated reports** are designed to be printed or shared.
- Example:Sales Invoices, purchase orders
- They are formatted to fit well in page.
- Headers and footers are repeated on every page
- It enables you to have full control of report page layout even if report has 1000s of rows and spans multiple pages
- **PowerBI Report Builder** is used to develop paginated reports

Tune performance of Report:

- Performance of that report depends on how quickly data can load onto the report page.
- **Performance analyzer** tool can be used to investigate any issues.
- **Performance analyzer** allows you to discover how each of your report elements, such as visuals and DAX formulas, are performing.
- **Performance analyzer** provides you with logs that measure (in time duration) how each of your report elements performs when users interact with them.

Using Performance Analyser:

1.Clear the Cache

File > Options and settings > Options > Data Load > Data Cache Management Options > Clear Cache.

2.View→Performance Analyser→Start recording→Interact with report like user→Stop recording

3.Observe Performance results of each item in the report displayed, in milliseconds, under the **Duration** column.

4.If you find that visuals are not causing the performance issues, you should assess the DAX query results and investigate those results further

*Note: if you want to examine the DAX query, select **Copy query** and then paste it into DAX Studio for further analysis.*