Ex06

Introduction: Information is for decision making. Information retrieval is a big topic. Data Visualization is an art in providing valuable information to decision makers. Power BI provides many visual elements where we can use them to prepare useful information via reports and dashboards. This exercise will cover basic reporting features in Power BI Desktop.

Objective: This exercise is to demonstrate and explain the following Power BI features

- **What is the impact of Relationship Direction?**
- **How to using Map Visuals to present geographical related information?**
- **How to add more external Visuals?**
- **What are the different Filtering Scopes?**
- **How to Drill Down the Hierarchical data?**
- **How to Drill Through from one report page to other page?**
- **What is Matrix?**
- **How to create Virtual Columns at the reporting level?**
- **How to create and use Measures?**

Pre-requisites:

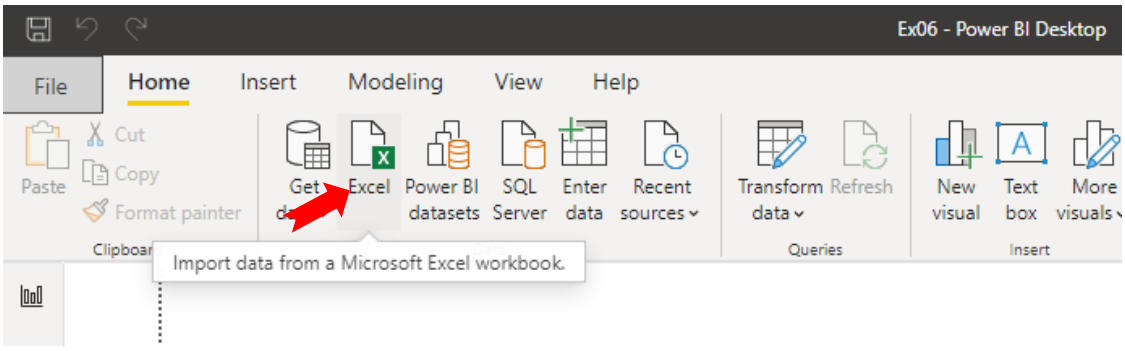
1) Understand how to perform data loading from MS Excel
2) Know how to transformation data
3) Be able to construct Data Model

Steps:

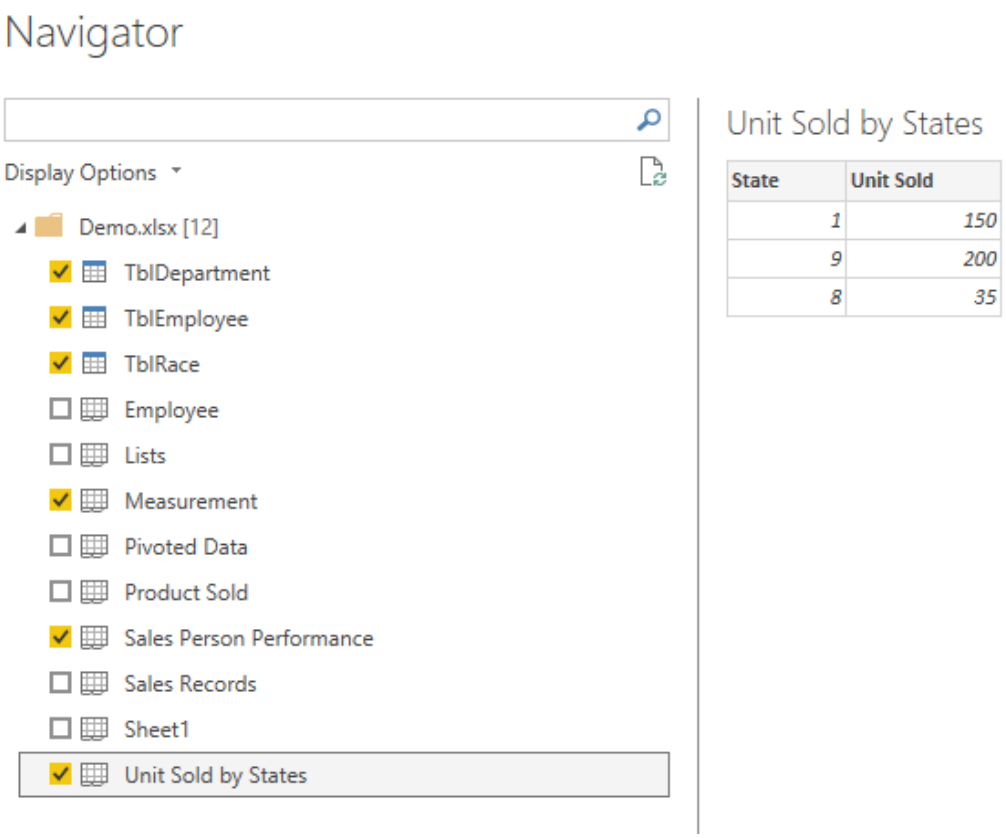
Part-1: Prepare Data Workbook and create Data Model

Note: In this exercise you will only use the provided MS Excel workbook as the only data source. Make sure that you already hide the total row of all the Tables in the Excel workbook before saving it.

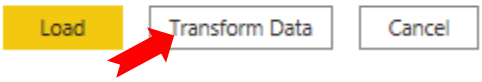
1. Start a new Power BI desktop project with name “Ex06”
2. Load an “Ex06.xlsx” Excel file provided.



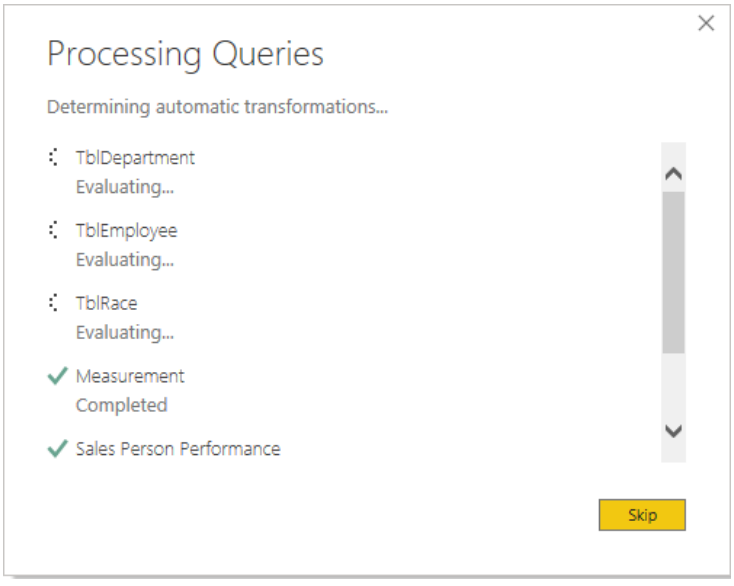
3. Select the following Tables and Worksheets:



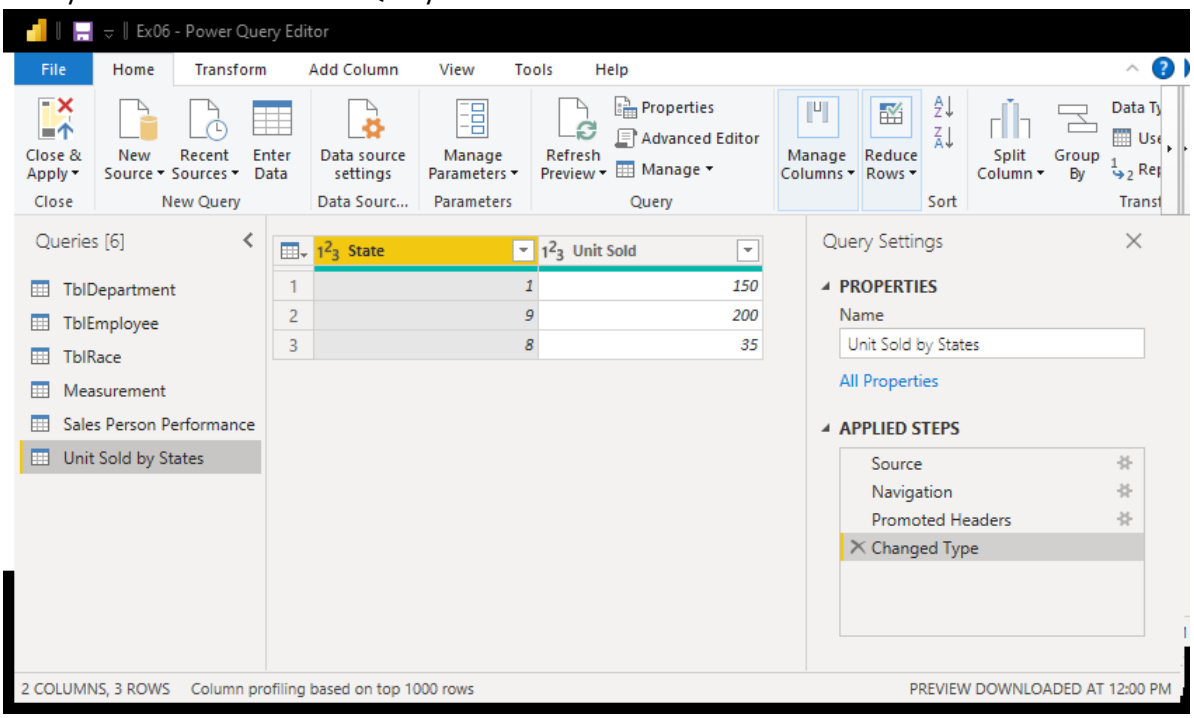
4. While still under Navigator dialog box, select “Transform Data”:



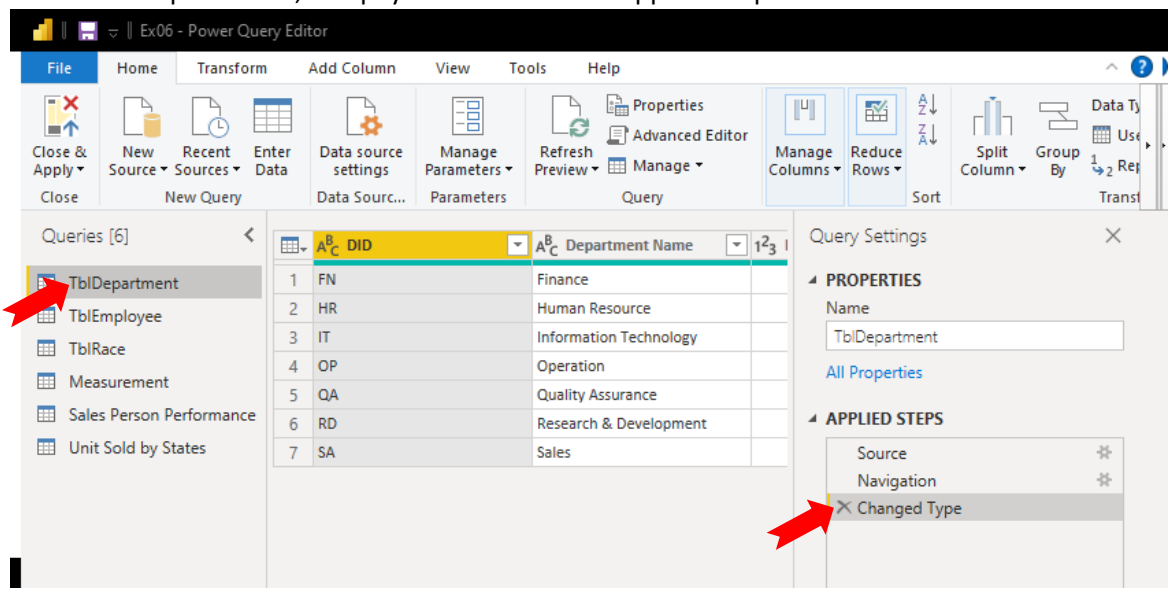
5. Wait until the following Query Processing completed:



6. Now you should be under the Query Editor:

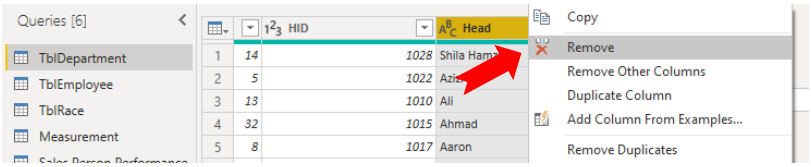


7. Select “TblDepartment”, and pay attention to the “Applied Steps”:

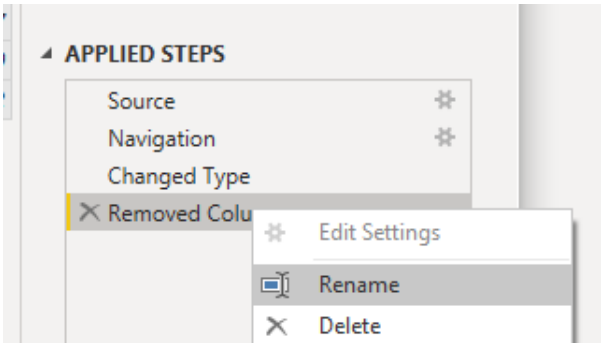


So far these are the default steps produced by the Query Editor. Next, we will perform additional transformation steps to this table.

a. Removed Department Head Name Column:
   i. If needed, scroll until you can see the “Department Head” column
   ii. Right click, select **Remove**

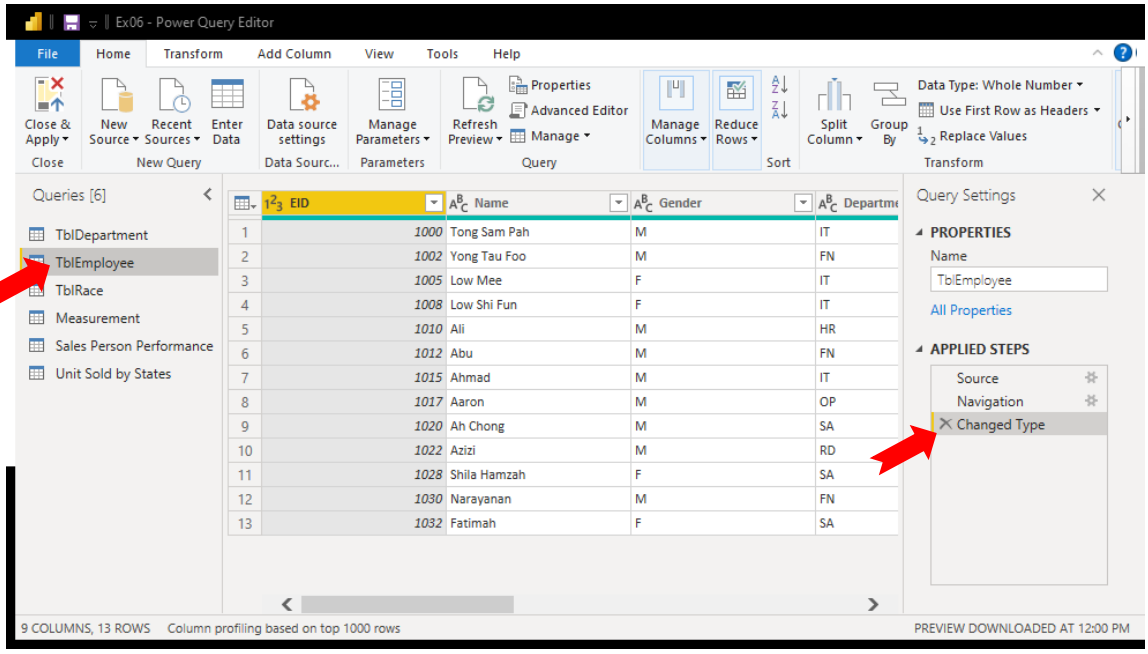


iii. A new step added. Now right click to rename it to “Removed Department Head Name Column”.



b.

8. Select “TblEmployee”, and pay attention to the “Applied Steps”:

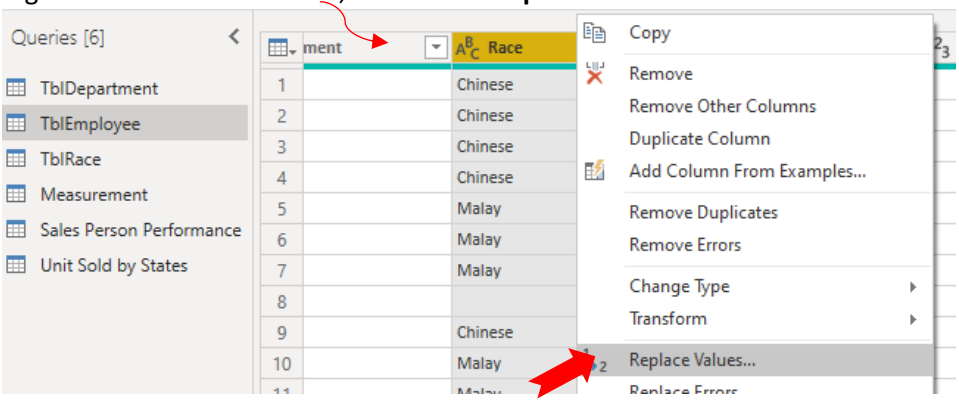


So far these are the default steps produced by the Query Editor. Next, we will perform additional transformation steps to this table.

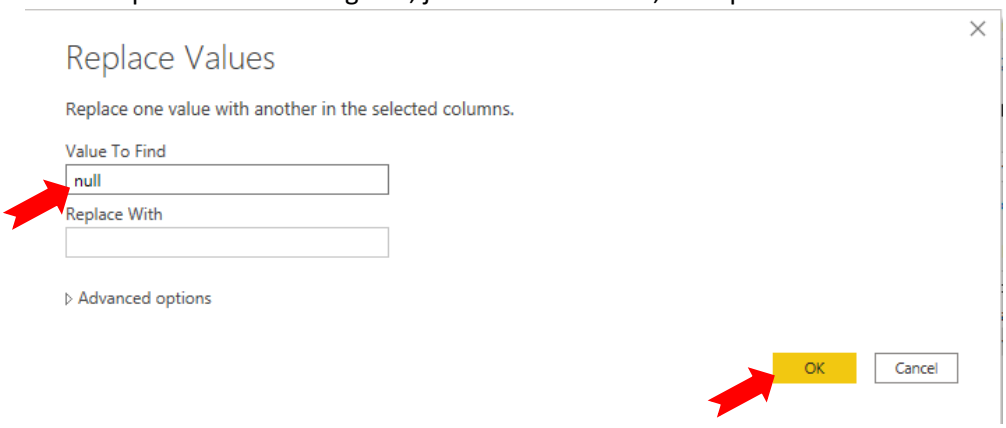
a. Replace null Race as Empty:

i. If needed, scroll until you can see the “Race” column

ii. Right click Race **column title**, then select **Replace Values…**



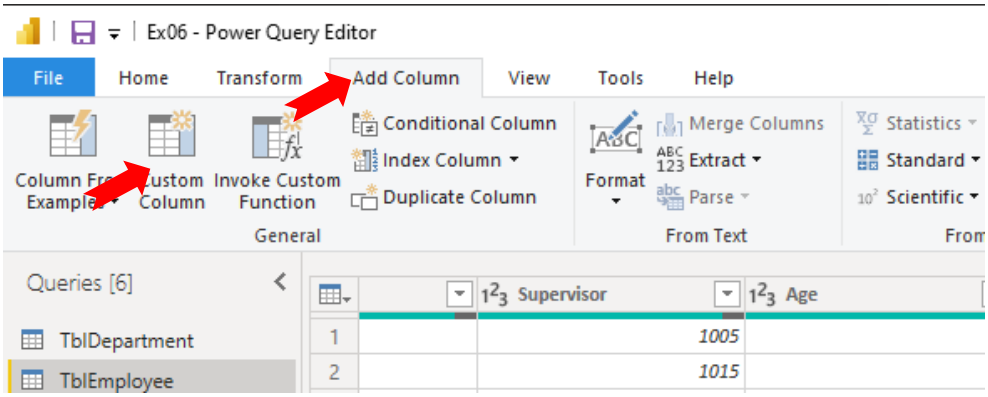
iii. In the Replace Values dialog box, just fill in the “null”, then press OK to confirm



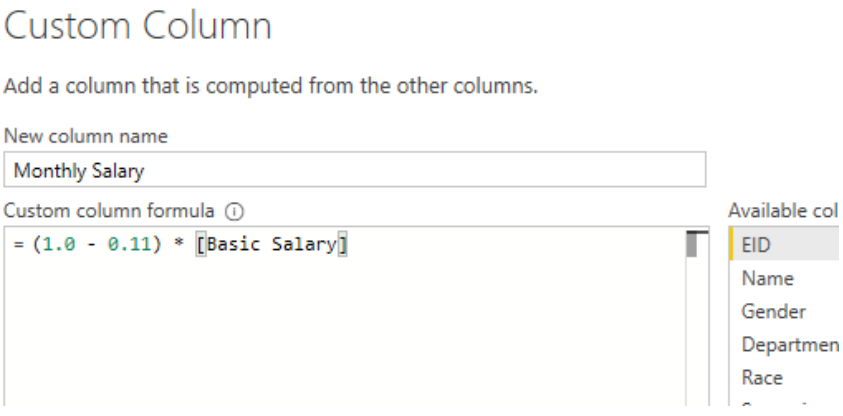
iv. Rename the step generated as “Replaced null Race as Empty”

b. Remove Chart column
   i. If needed, scroll until you can see the “Chart” column
   ii. Right click on the Chart column title, then select **Remove**
   iii. Rename the step generated as “Removed Chart column”

c. Add Monthly Salary Virtual Column
   i. Go to **Add Column** ribbon
   ii. Select **Custom Column**



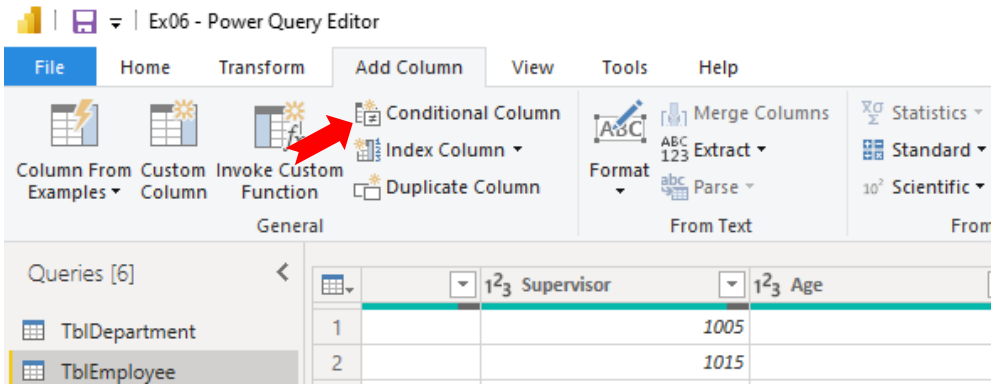
iii. In the Custom Column dialog box, fill in the following:



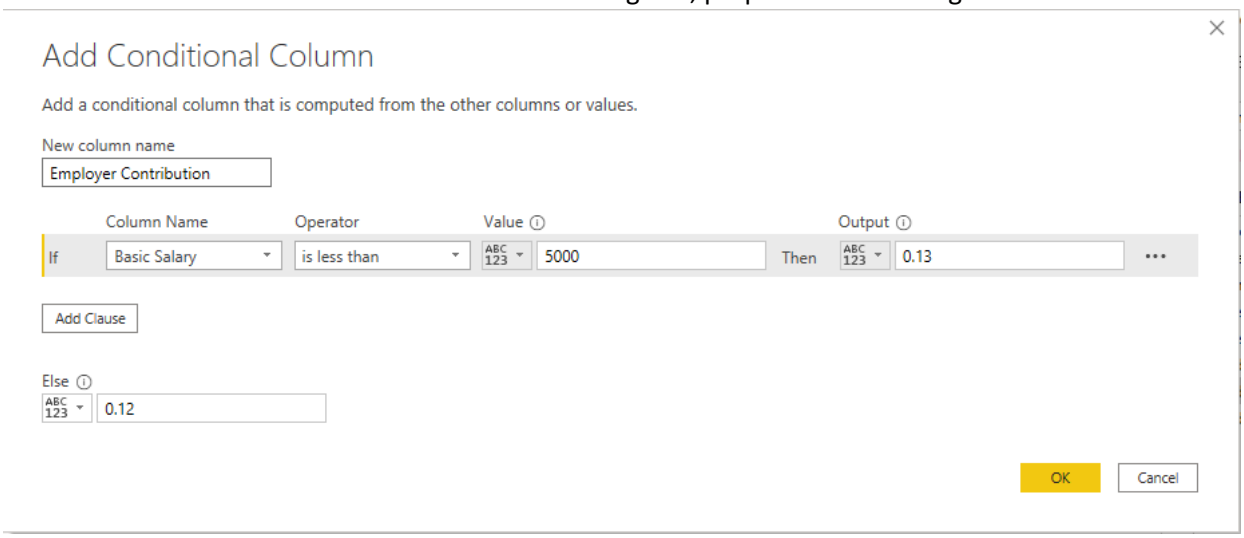
iv. Select **OK** to confirm

v. Rename the step generated as “Added Monthly Salary Column”

d. Add Employer Contribution Conditional Virtual Column
   i. Make sure that you still under Add Column ribbon tab
   ii. Select **Conditional Column**

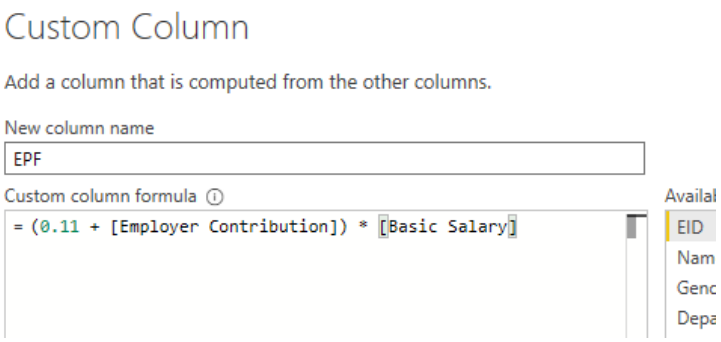


   iii. In the Add Conditional Column dialog box, prepare the following:



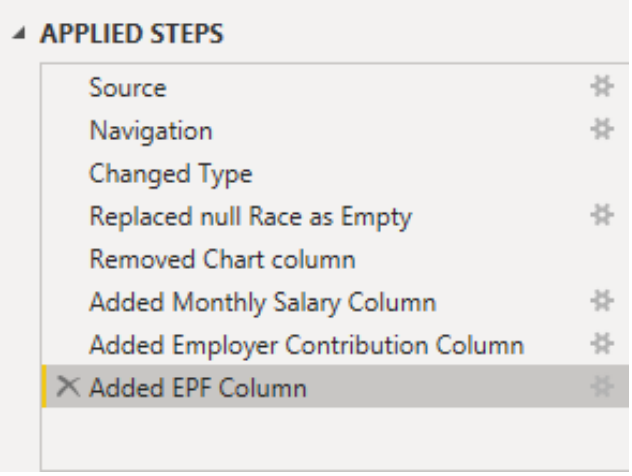
   iv. Select **OK** to confirm
   v. Rename the step generated as “Added Employer Contribution Column”

e. Add EPF Virtual Column
   i. Select **Custom Column** again under Add Column ribbon tab
   ii. Add another virtual column as following:

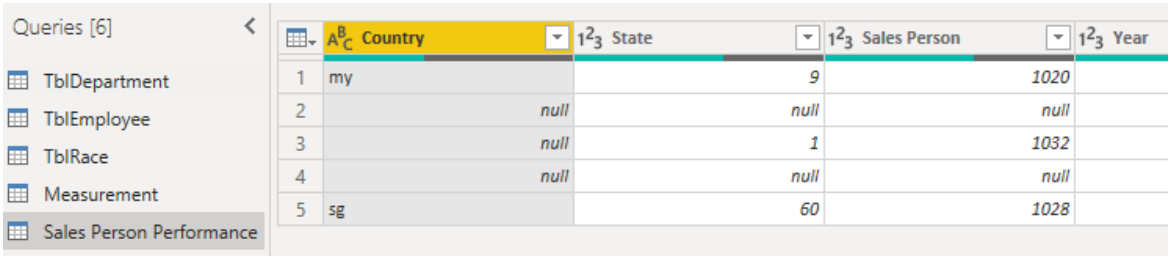


   iii. Select **OK** to confirm
   iv. Rename the step generated as “Added EPF Column”

f. At this point, the Applied Steps for this TblEmployee table should be as below:

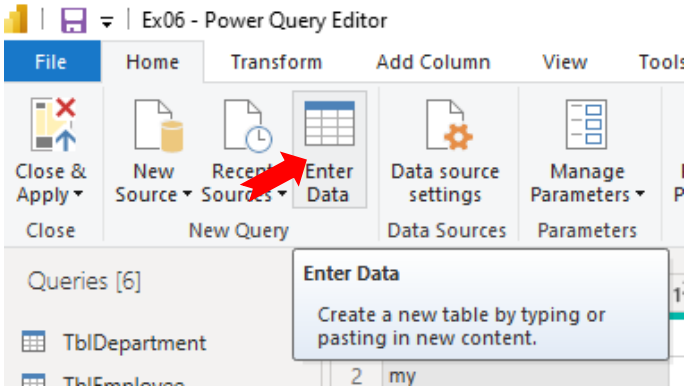


9. Select "Sales Person Performance" table, showing that the table is not well formed. We need to fill up all the null values:

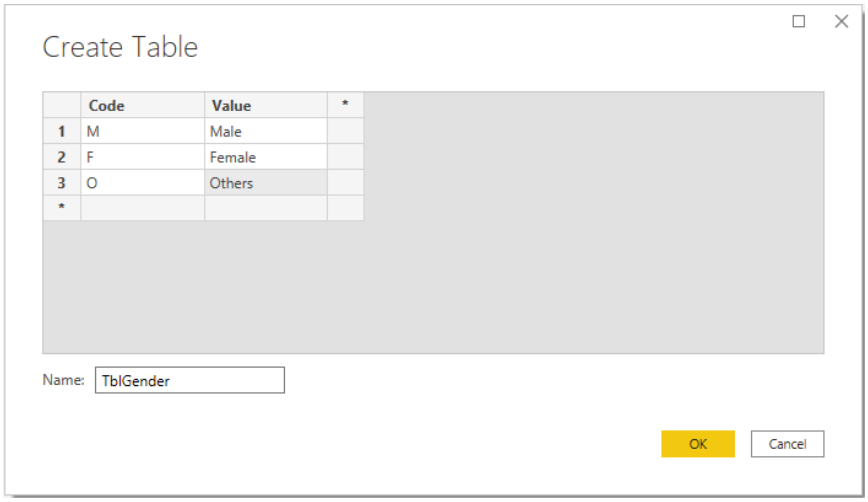


   a. Right click on the "Country" column, select **Fill** → **Down**
   b. Repeat the same for "State" and "sales Person" columns
   c. Noticed that all these 3 steps will be combined as a single Applied Step. Rename the step generated as "Filled Down null values"

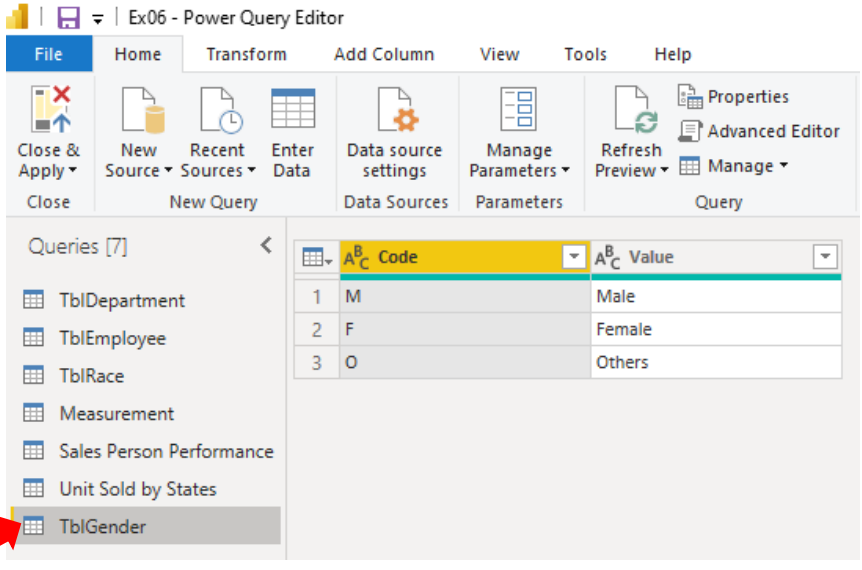
10. In order to resolve the Gender code from TblEmployee, we going to add a new table with name "TblGender" for lookup.
   a. Back to **Home** ribbon tab
   b. Select Enter Data



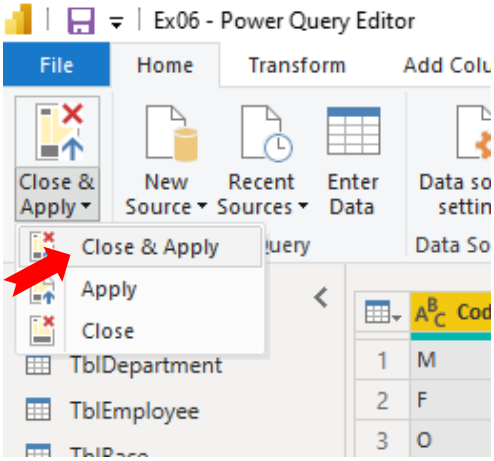
   c. Prepare the following under the **Create Table** dialog box:



d. Select OK to confirm. You will get a new table listed



11. Now we will complete the loading from our Excel data source. Under **Home** ribbon tab, select **Close & Apply**.

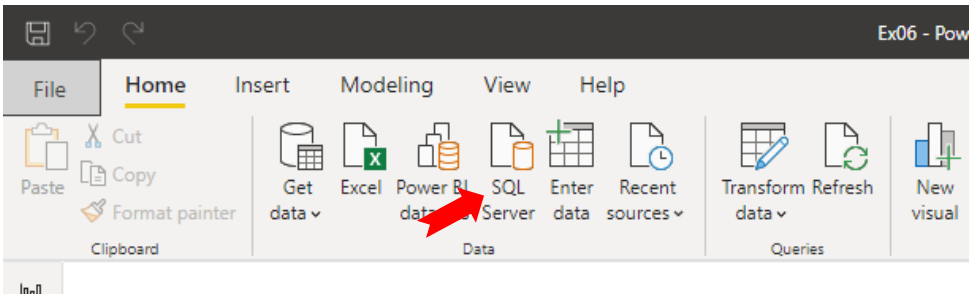


12. Wait until Apply query changes completed.

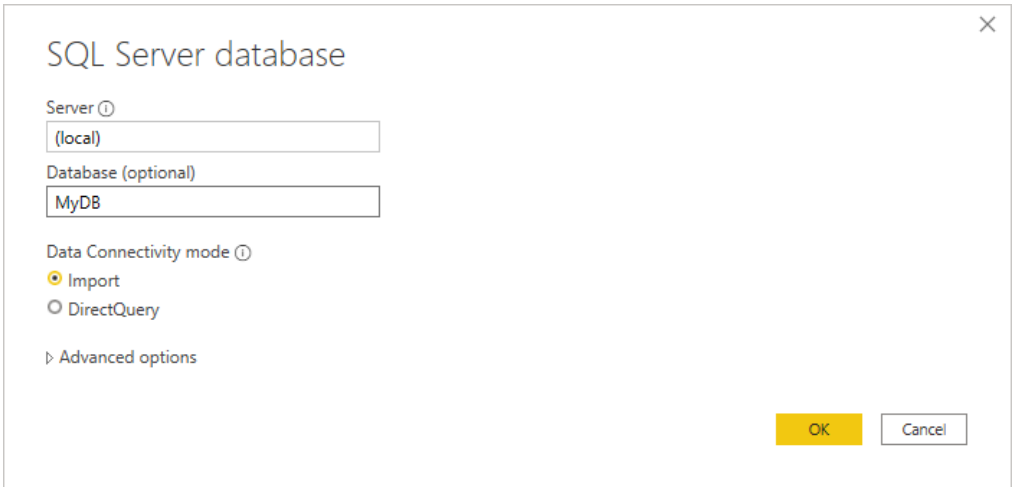
Loading Data from Excel Microsoft SQL Server

Note: Consult training instructor how to set up the database MyDB. In this section, we assume the database is ready under local computer.

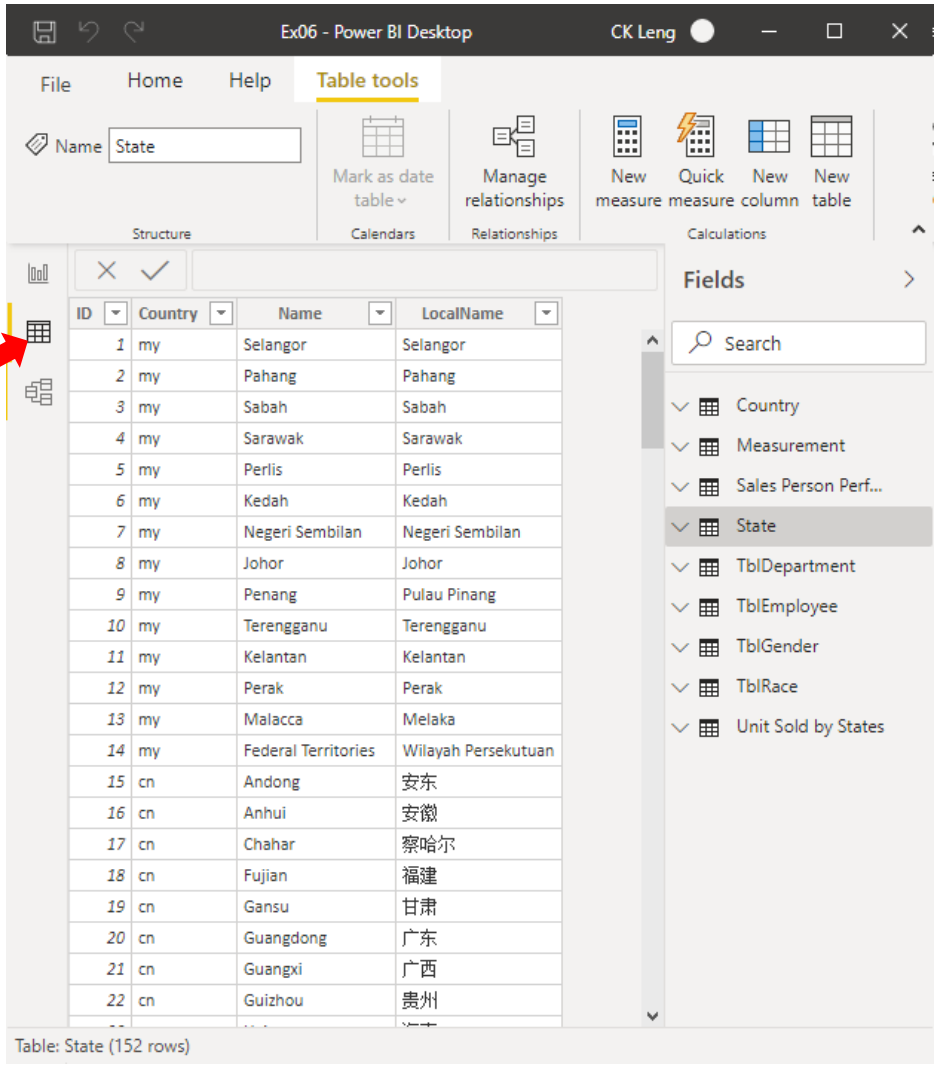
1. Make sure now you are under the Power BI main window.
2. Go to **Home** ribbon tab.
3. Select **SQL Server** under the **Data** group



4. Under SQL Server database dialog box, prepare the following:



5. Select **OK** to continue.
6. Under Navigator dialog box, Select “Country” and “State” table only.
7. Select Load to start loading the data. No transformation needed for this data source.
8. Select the **Data** view to view the loaded data for each table

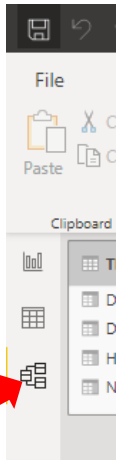


ID	Country	Name	LocalName
1	my	Selangor	Selangor
2	my	Pahang	Pahang
3	my	Sabah	Sabah
4	my	Sarawak	Sarawak
5	my	Perlis	Perlis
6	my	Kedah	Kedah
7	my	Negeri Sembilan	Negeri Sembilan
8	my	Johor	Johor
9	my	Penang	Pulau Pinang
10	my	Terengganu	Terengganu
11	my	Kelantan	Kelantan
12	my	Perak	Perak
13	my	Malacca	Melaka
14	my	Federal Territories	Wilayah Persekutuan
15	cn	Andong	安东
16	cn	Anhui	安徽
17	cn	Chahar	察哈尔
18	cn	Fujian	福建
19	cn	Gansu	甘肃
20	cn	Guangdong	广东
21	cn	Guangxi	广西
22	cn	Guizhou	贵州

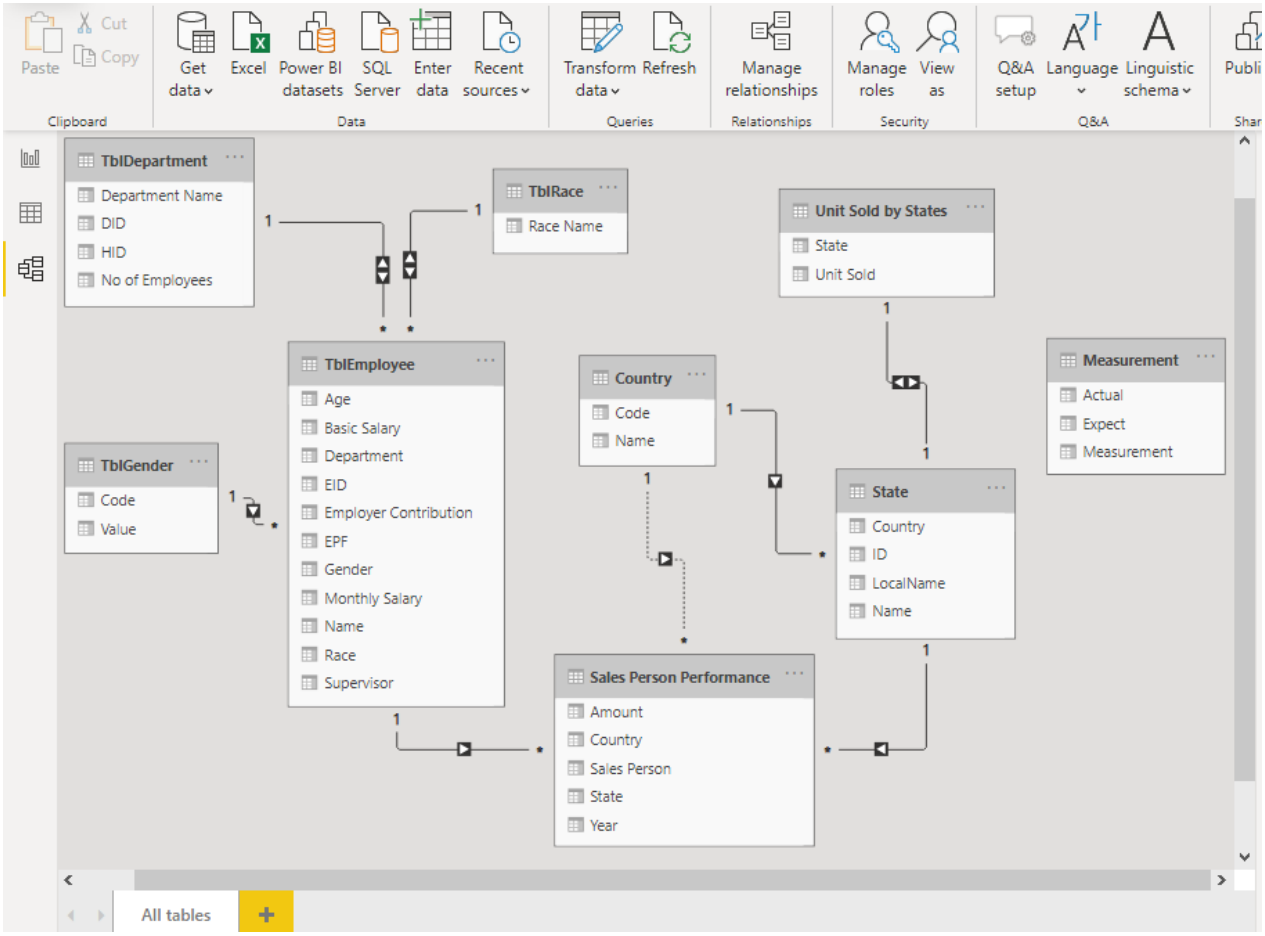
Establish Relationships for Model

Before we can consume the data for our reporting, it is crucial to establish proper relationships among tables loaded from different sources.

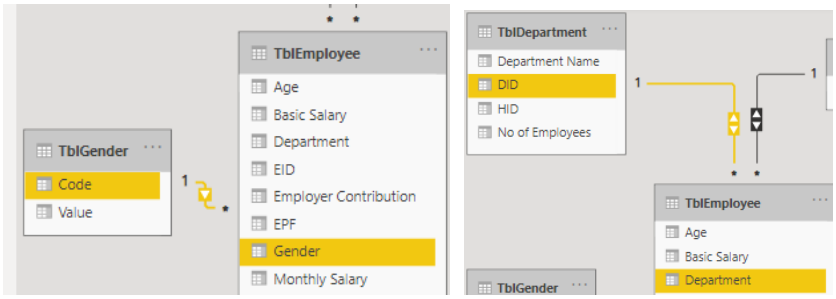
1. Select the **Model** view

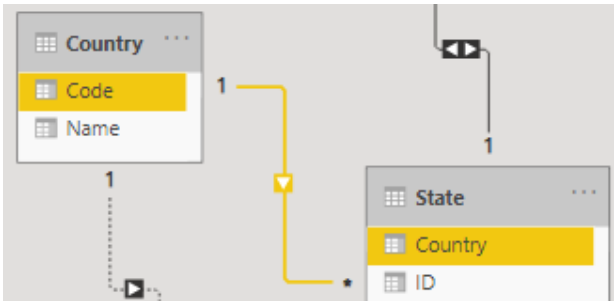


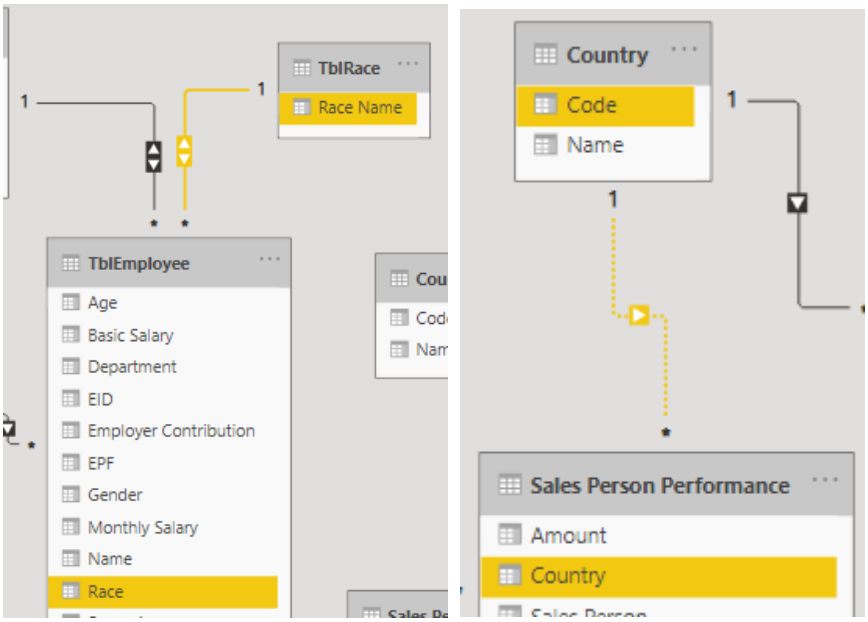
2. Resize all tables so that can see every fields. Arrange them and we will create relationships as following:

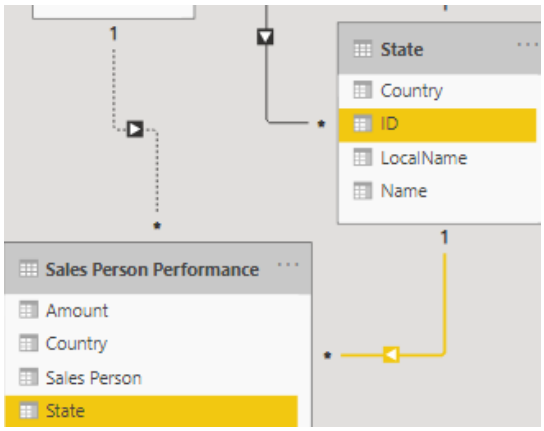


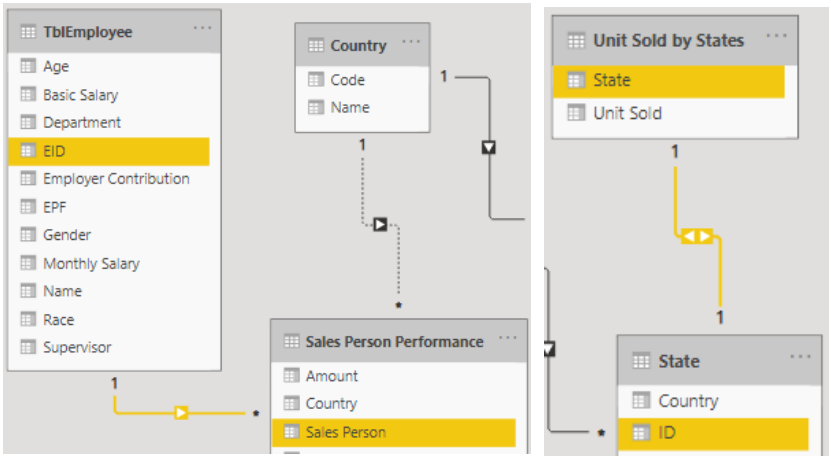
3. The following will be details for each relationship:











4. There might be other “Inferred” relationships. The entire model should have exactly 8 relationships. Remove any extra relationships.

5. Make sure that the **Cardinality** and **Direction** of relationships are correctly configured. Any mistake can simply right click on the relationship to fix it.
6. Congratulation! Now you have a solid model to the reporting.

Prepare Reports

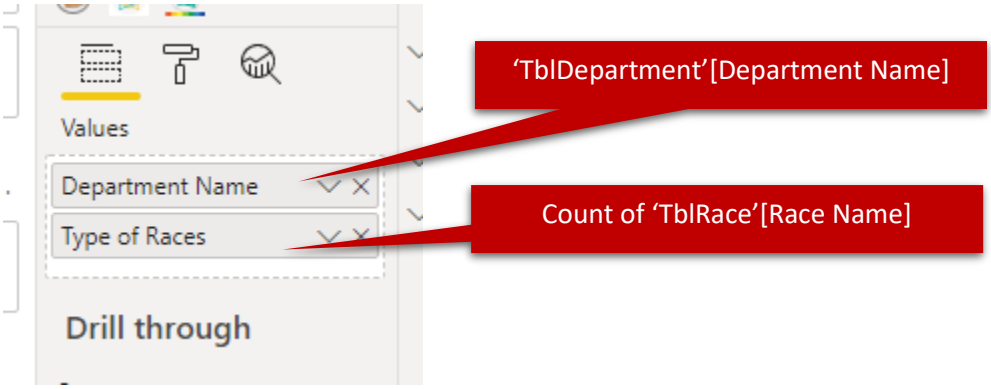
Once the Data Model is created, the next step is to prepare report for **Data Visualization**, so that users can get useful information for decision making. In this section we will try to learn the following:

- What is the impact of Relationship Direction?
- How to using Map Visuals to present geographical related information?
- How to add more external Visuals?
- How to Drill Down the Hierarchical data?
- How to Drill Through from one report page to other page?
- What is Matrix?
- What are the different Filtering Scopes?
- How to create Virtual Columns at the reporting level?
- How to create and use Measures?

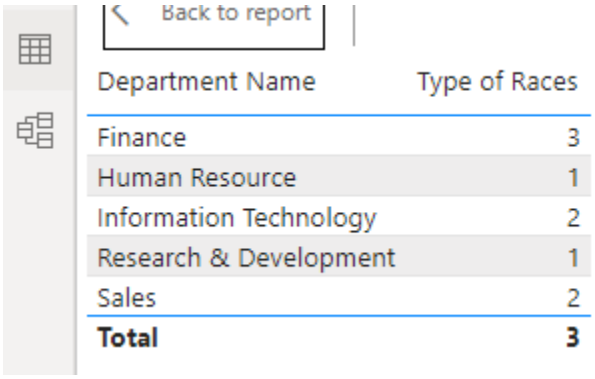
What is the impact of Relationship Direction?

Steps:

1. Create a new Report Page with name “Use Direction”.
2. Add the first table visual element with the following property settings:

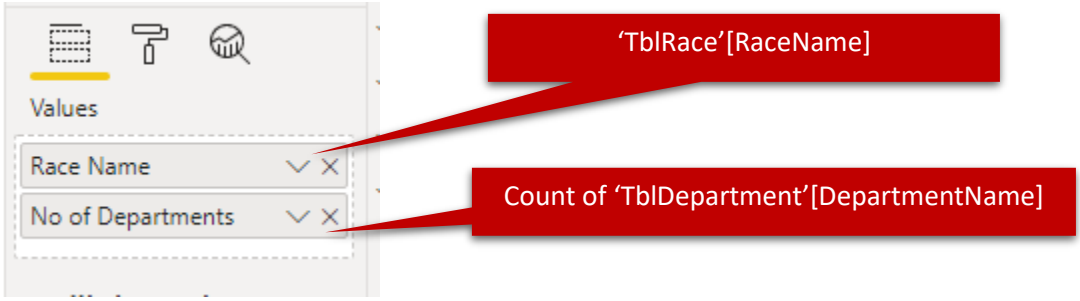


3. The result of the visual element is as below:

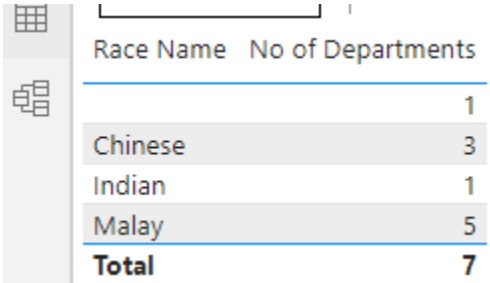


What is this means?

4. Add a second table visual element on the same page with the following property settings:

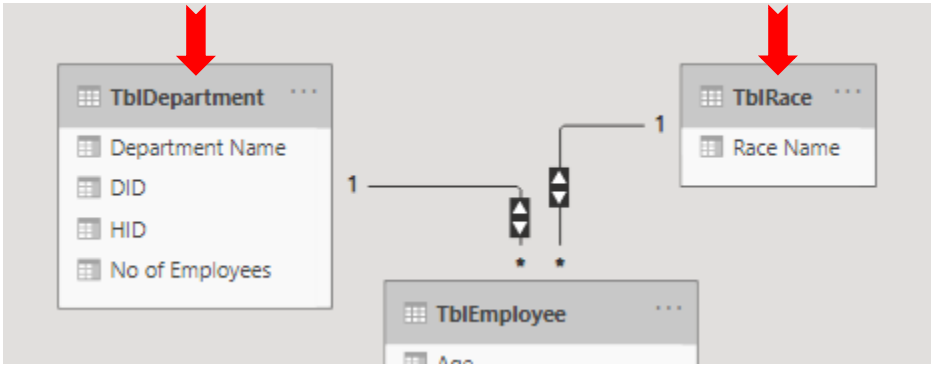


5. The result of the visual element is as below:

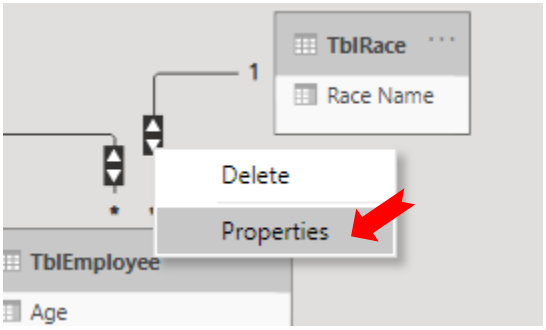


What is this means?

6. Take notes that the tables involved do not have direct relationship in our data model:



7. Currently the direction used are “Both”. Try to change any one of those “Both” directions to single, and go back to report page to observe the changes.



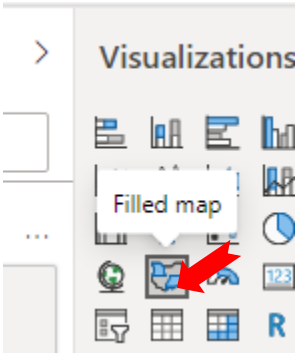
8. What is the conclusion?

Notes: The default direction of earlier version of Power BI is “Both”. But this default cause performance issue. Newer version of Power BI changed the default to “Single” that provides better performance, but this can cause some side effects.

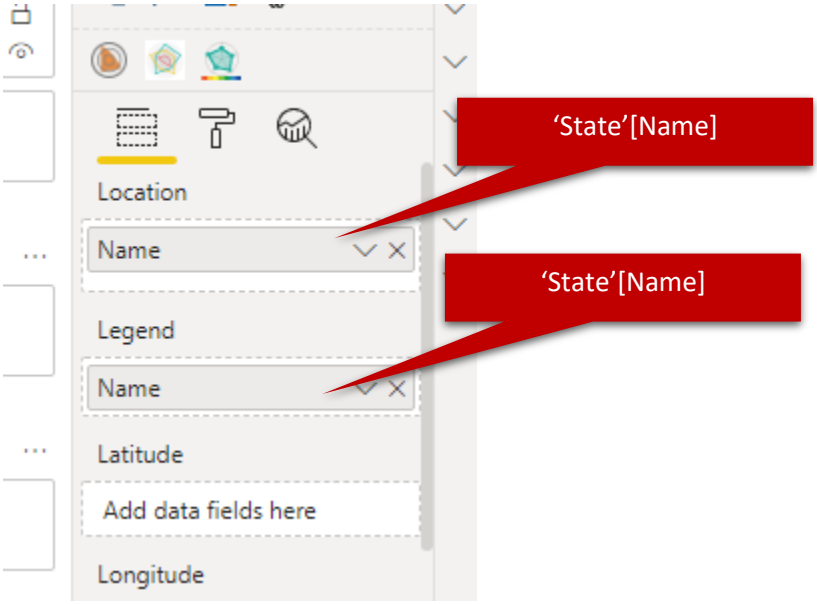
How to using Map Visuals to present geographical related information?

Steps:

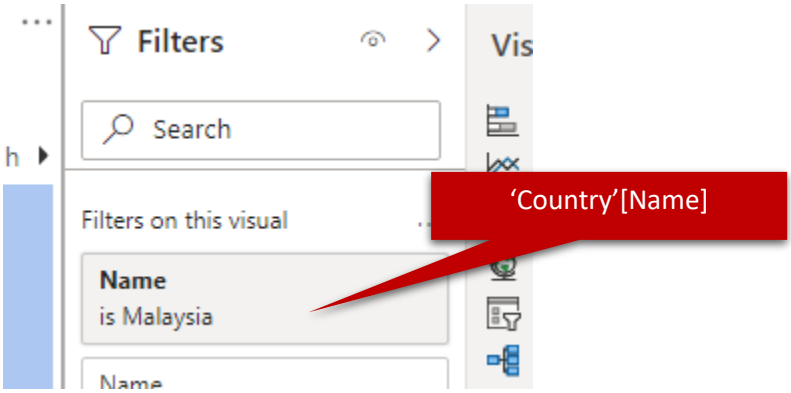
1. Make sure that you have connection to Internet. This needed to connect to Bing Map Server.
2. Create a new Report Page with name “Map Exercises”.
3. Insert a new Fill Map visual element to the page:



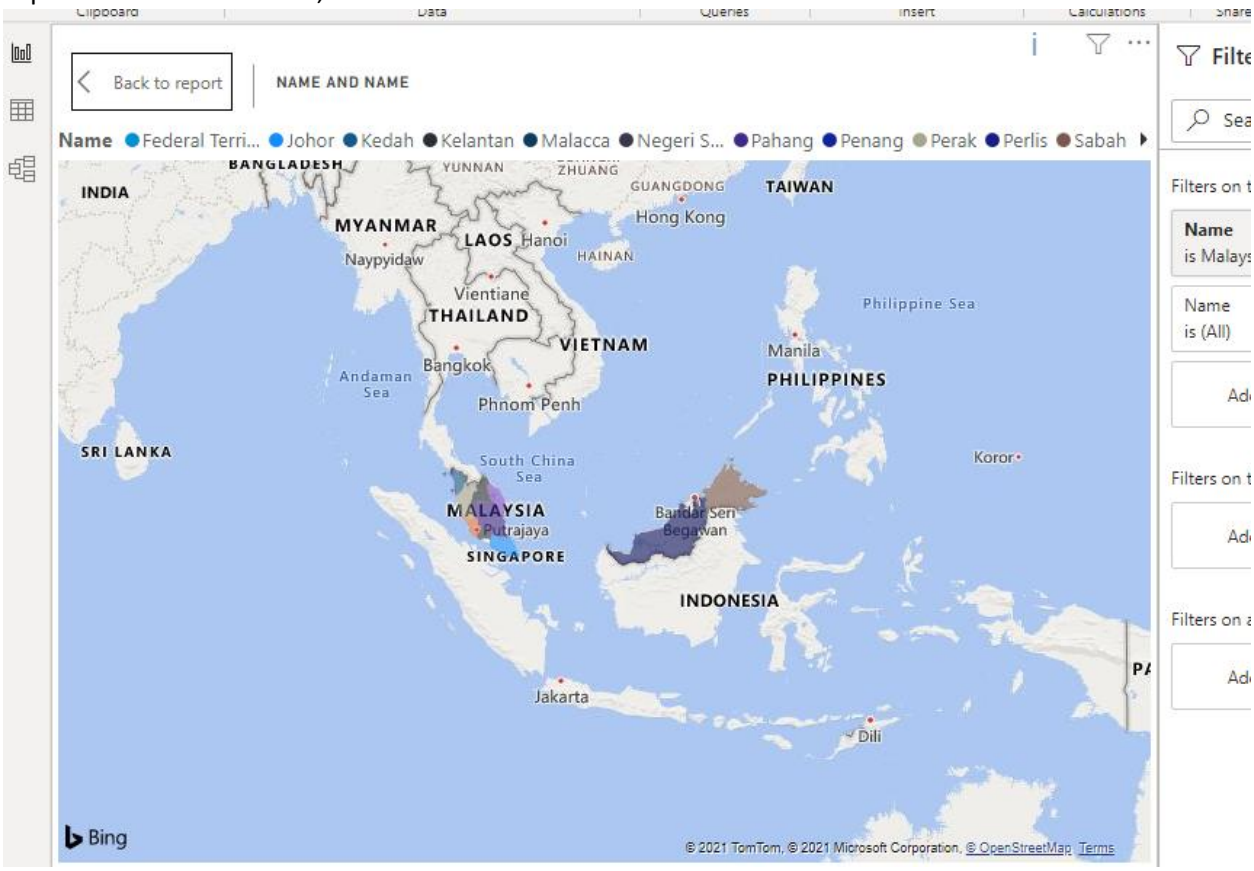
4. In the property setting:



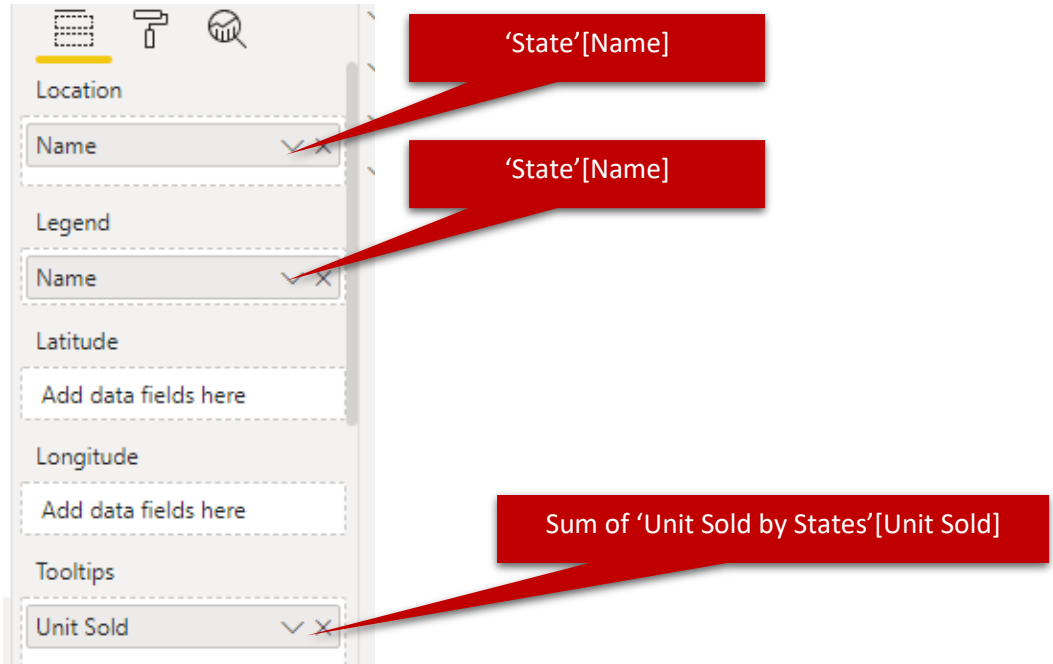
5. In the Filters:



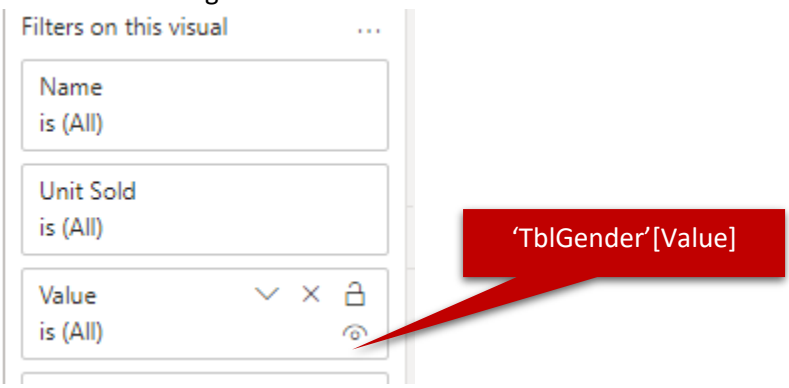
6. Expand the visual element, the result should as below:



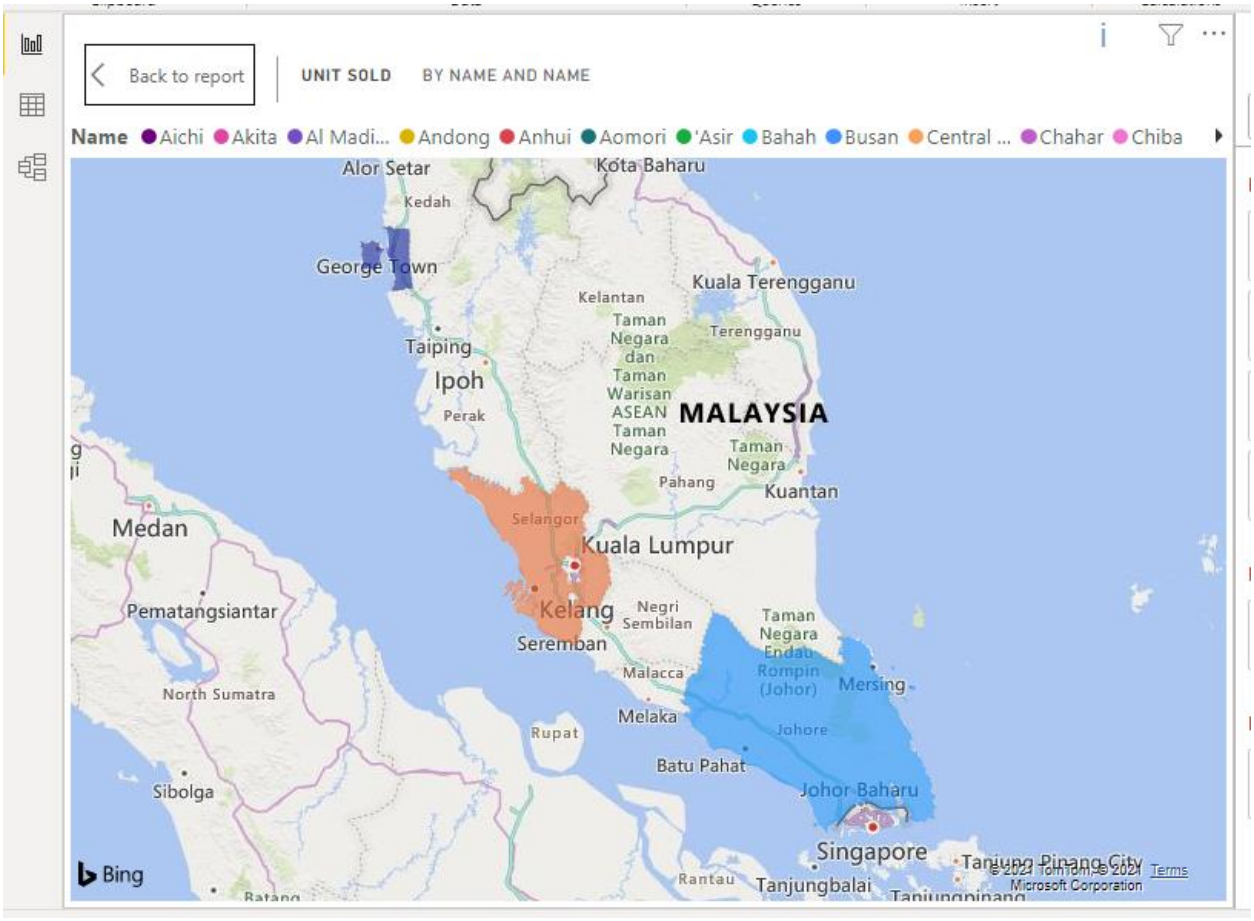
7. Try to Pan and Zoom the map.
8. Minimize the Fill Map element and click elsewhere to unselect it.
9. Add another new Fill Map at the right of previous Fill Map.
10. While the second Fill Map is selected, set the properties:



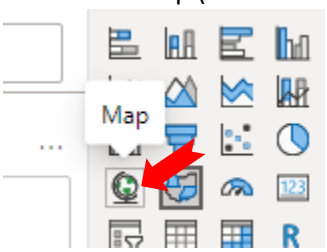
11. In the Filter setting:



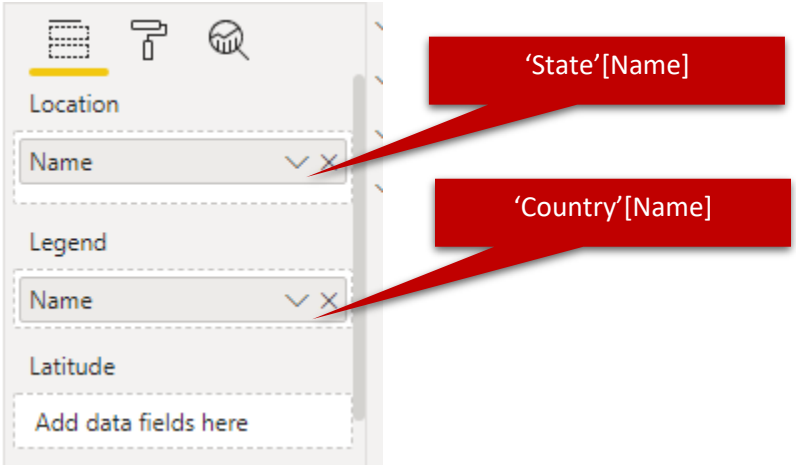
12. Expand the Fill Map:



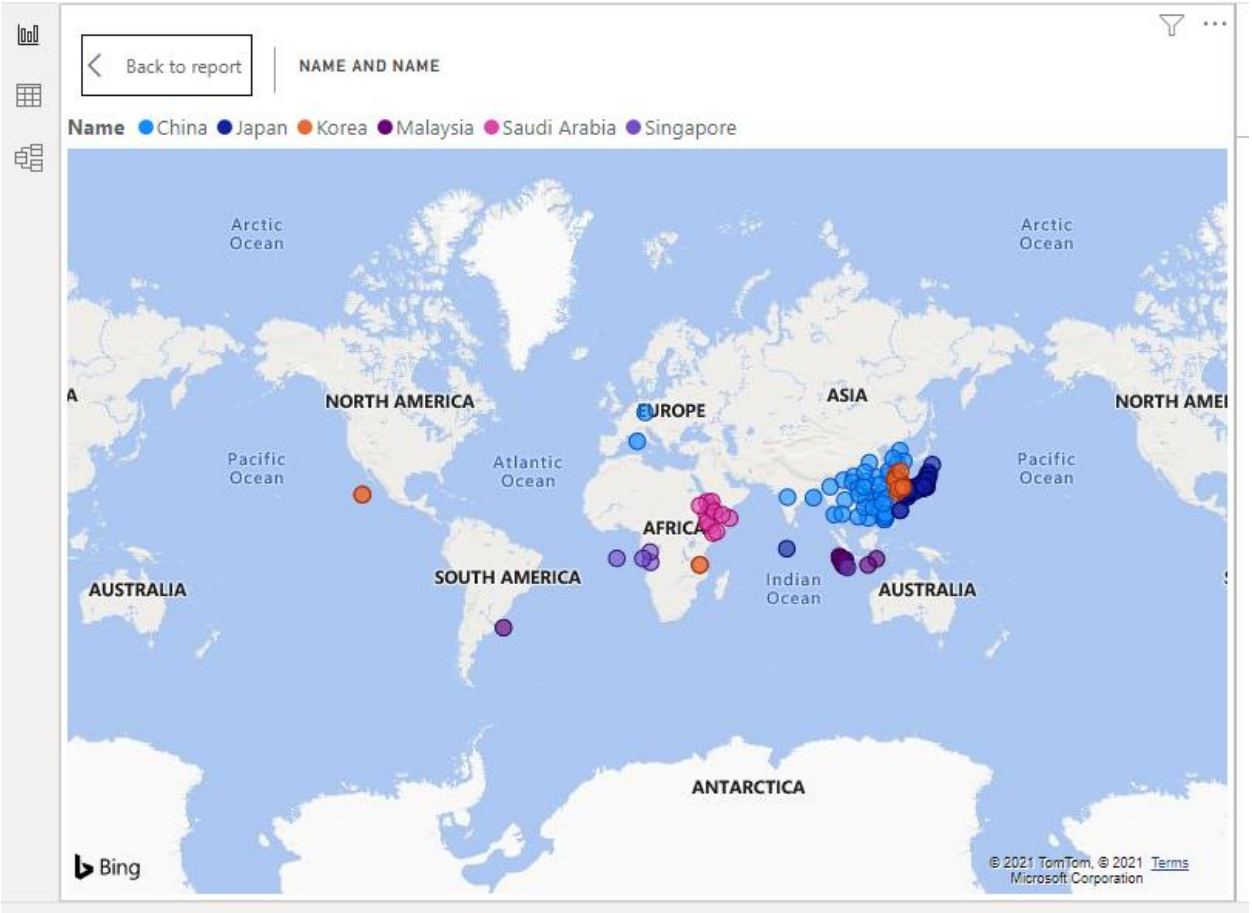
13. Move the mouse cursor to each highlighted state and stay there for a while, what you can see?
14. Minimized the Fill Map. Select elsewhere to unselect it.
15. Add a new Map (Not Fill Map) element just below the first Fill Map element:



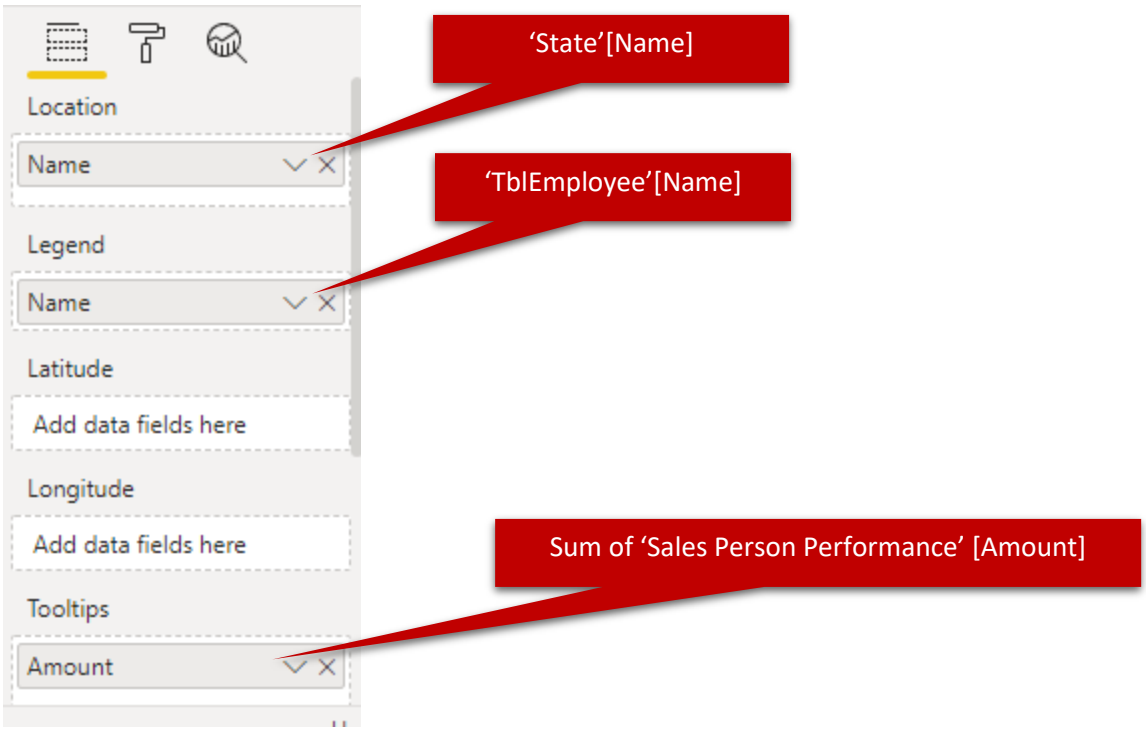
16. While the 3rd visual element is selected, set the properties:



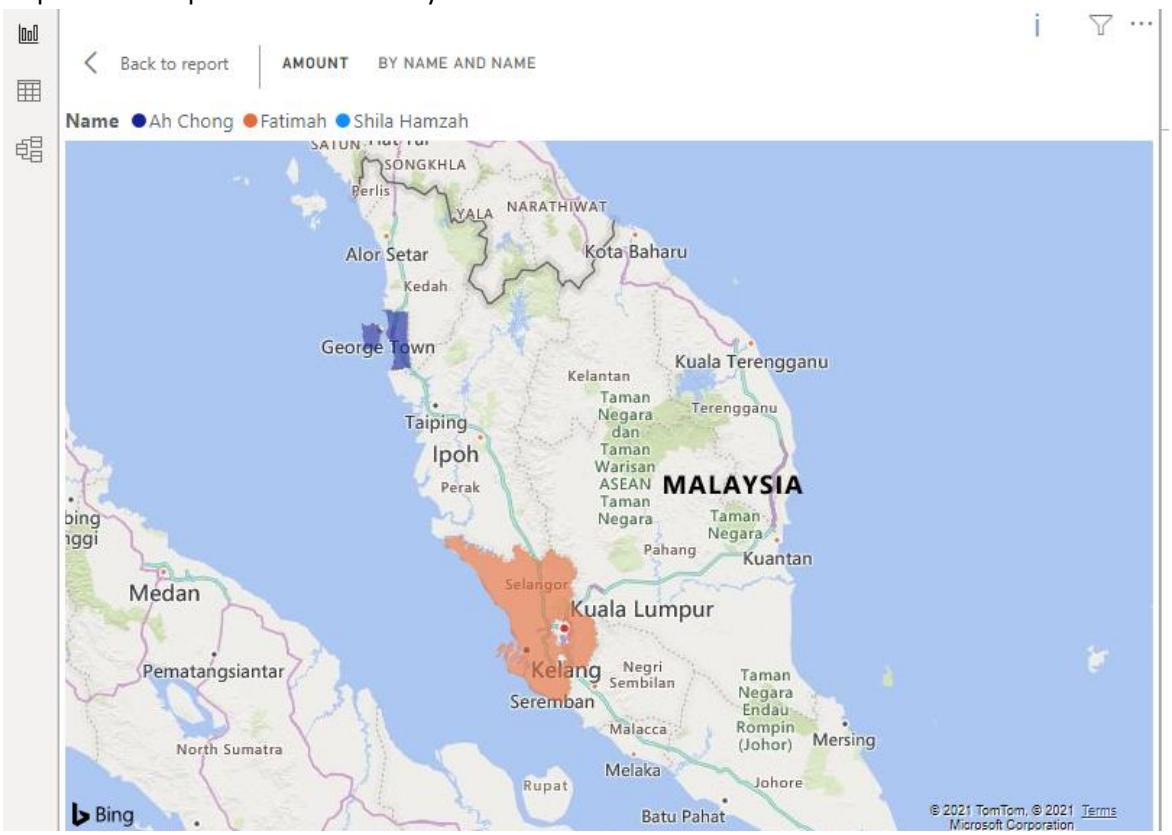
17. Expend the Map element:



18. What do you think about this type of map to show the states of country?
19. Minimize the map, and unselect elsewhere to unselect it.
20. Add new Fill Map as visual element #4 for this page, and place it just at the right of the 3rd element. While this newly created Fill Map is selected, set its properties:



21. Expand the map and zoom to Malaysia:

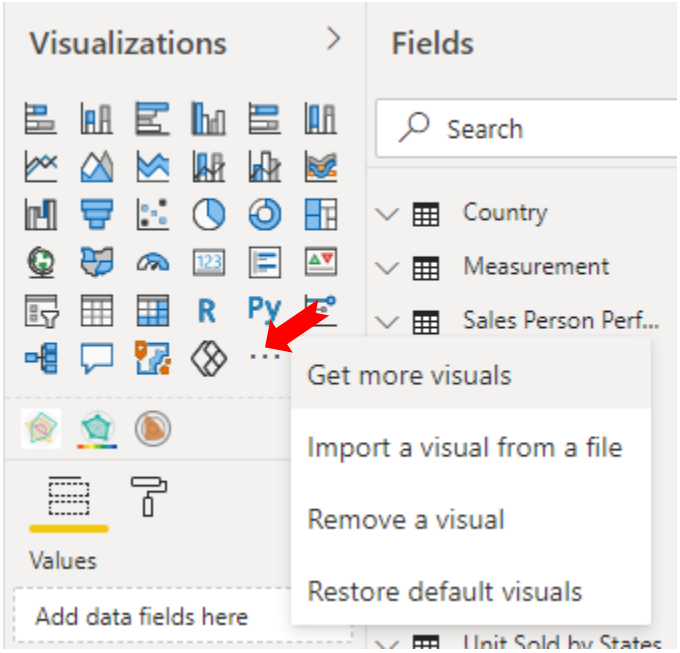


22. Move the mouse cursor to Penang or Selangor, and stay there for a while. What you can see? Also take note of the Legend.
23. Minimize the map.

How to add more external Visuals?

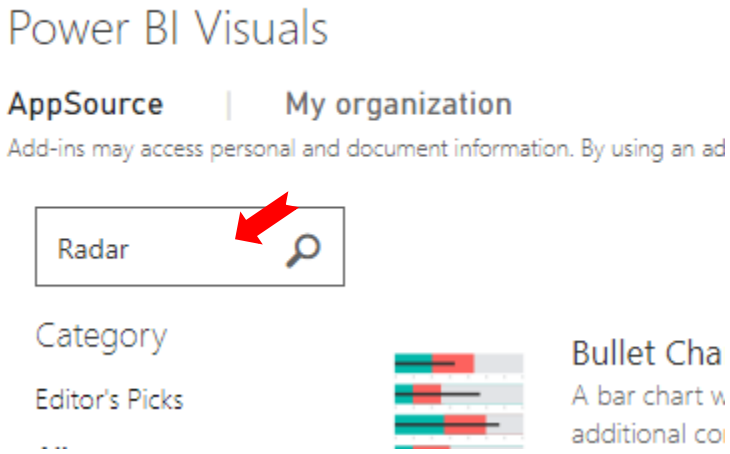
Steps:

1. You need to have a Power BI account in order to run this part of exercise. If you don't have one, consult the trainer.
2. Create a new Report Page with name "External Visuals".
3. Power BI provides many types of visual elements. But sometimes you need other types of visual elements, you can load external visual elements it in to the project.
4. Go to Visualization, select the … then select "Get more visuals":

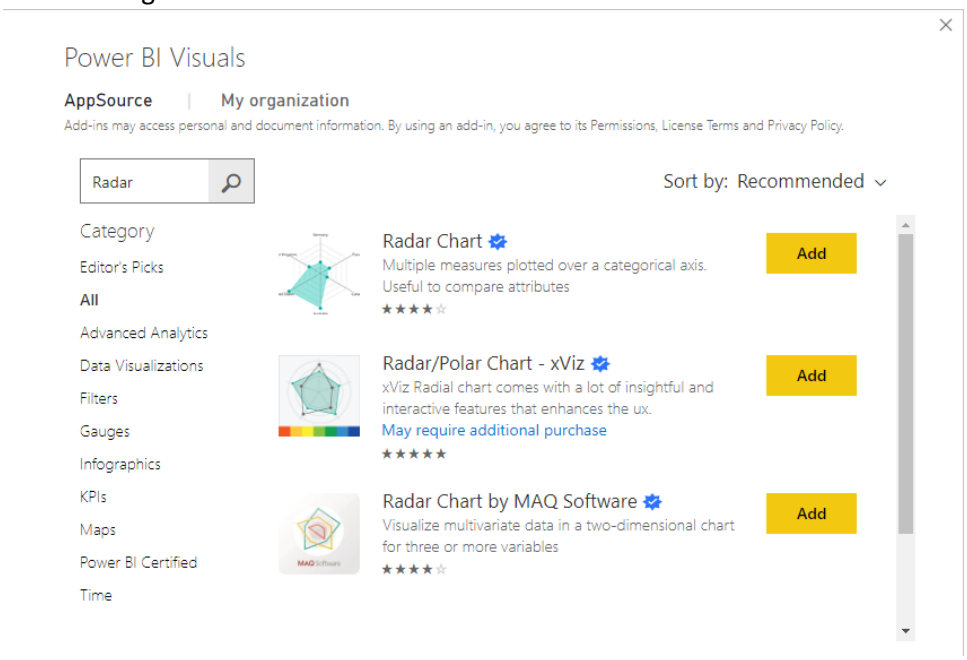


This will bring you to App Source once you logged in with the account.

5. Key in "Radar" in the search box and press "Enter" to start the search:

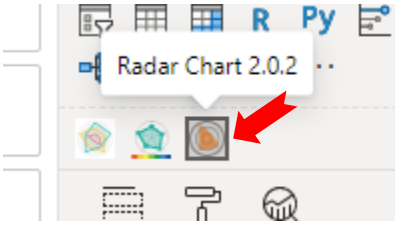


6. You should get the search results a below:

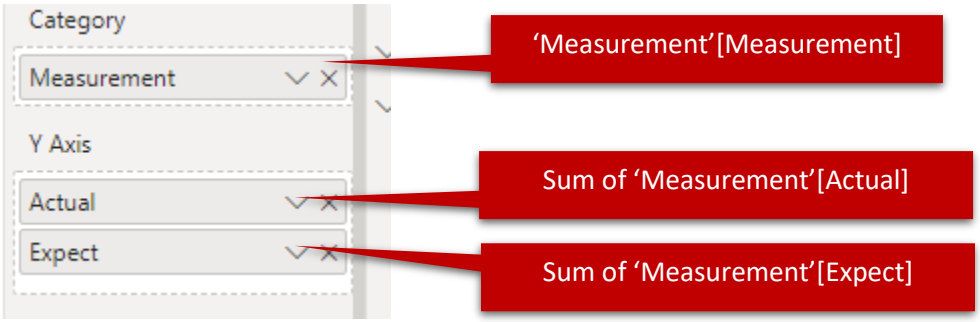


7. Add all 3 of these Radar Charts elements:

8. Try add a new radar chart:

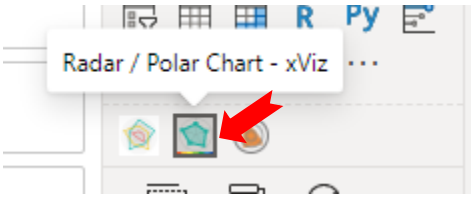


9. Set the properties:

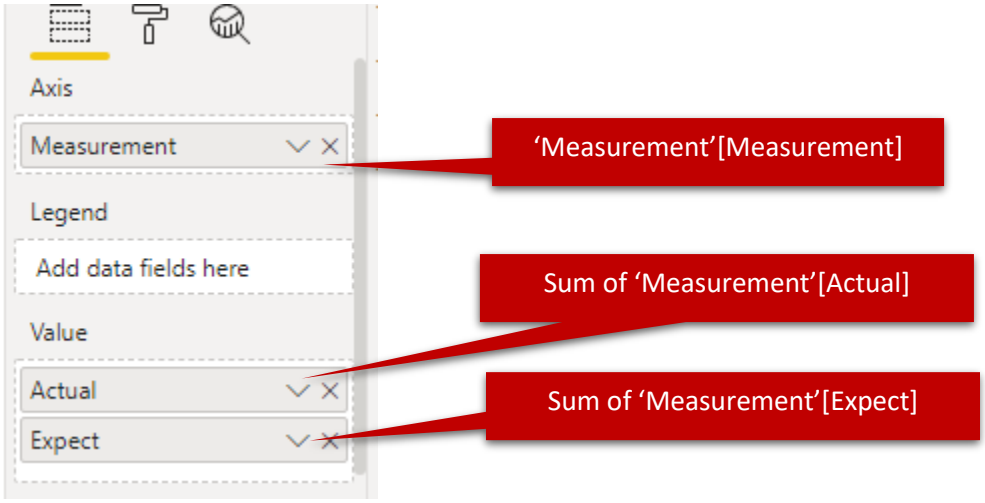


10. Expand the element and study it

11. Minimize the element, click elsewhere to unselect it. Add another Radar/Polar chart:



12. Set its properties:

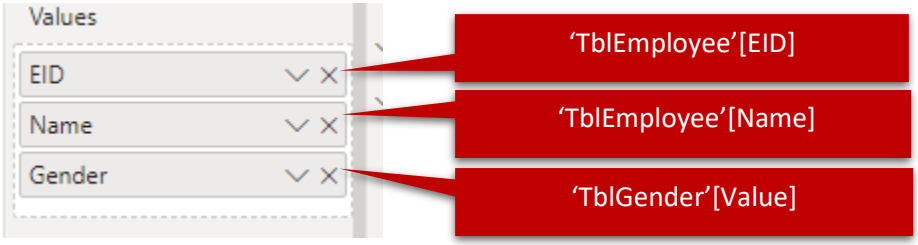


13. Expand the element and study it

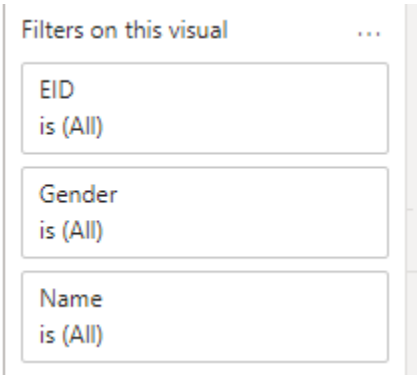
What are the different Filtering Scopes?

Steps:

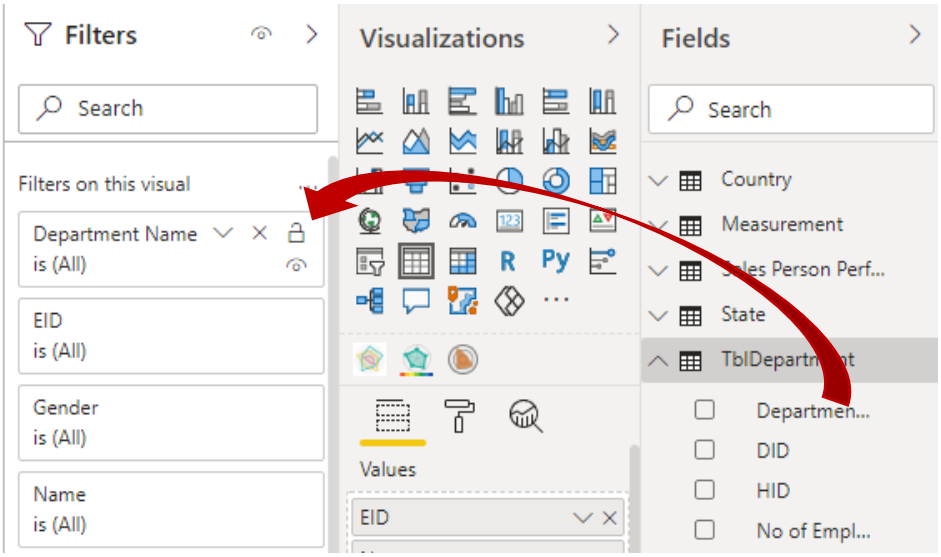
1. Create a new Report Page with name “Filters”.
2. Add a new Table element and set its properties:



3. Pay attention that all these fields in used will automatically as filter at the visual element level as well. You can’t remove these types of filters. However, you can choose not to apply them:

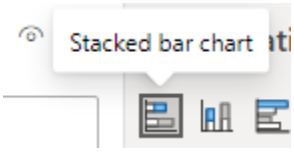


4. Now, try to drag the “Department Name” from TblDepartment as new filter to this element:

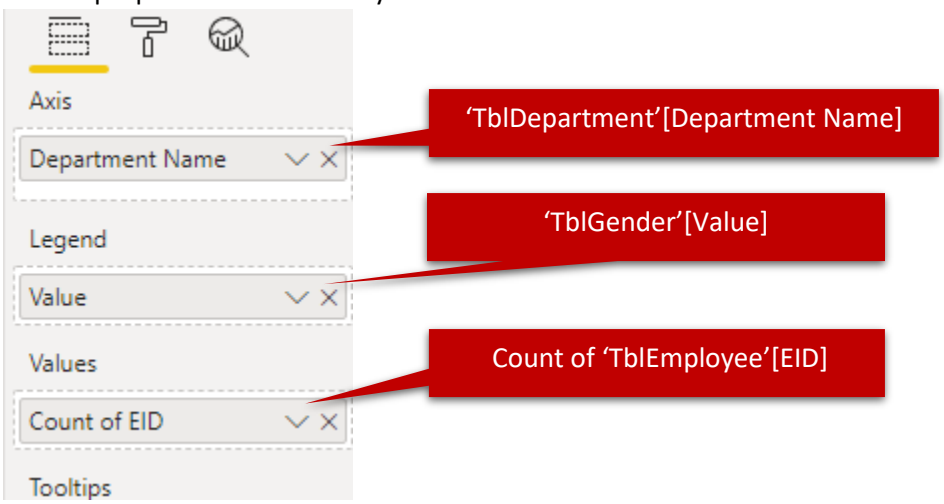


What is the different of this newly added filter if compare to the previous 3?

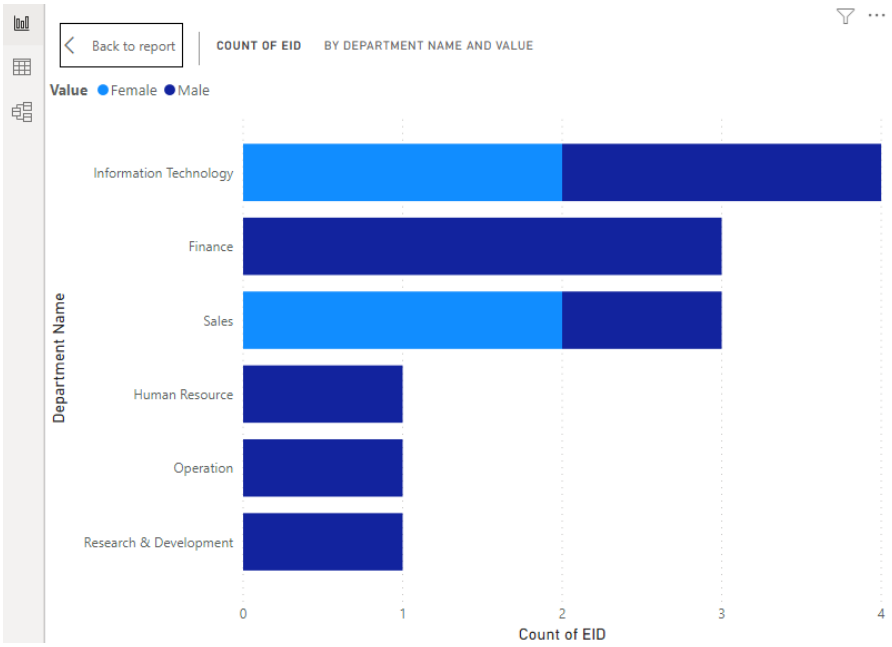
5. Unselect this table element. Add a new Stacked bar chart:



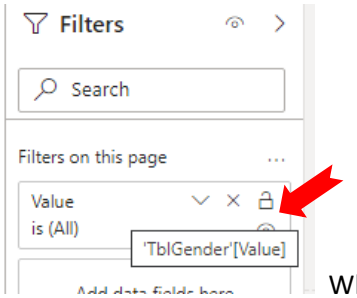
6. Set the properties for this newly added chart:



7. Enlarge the chart, you should get the following:



8. After study the chart result, minimize it.
9. Now, drag in field "Value" from TblGender in to the page filter and apply filter for "Female":



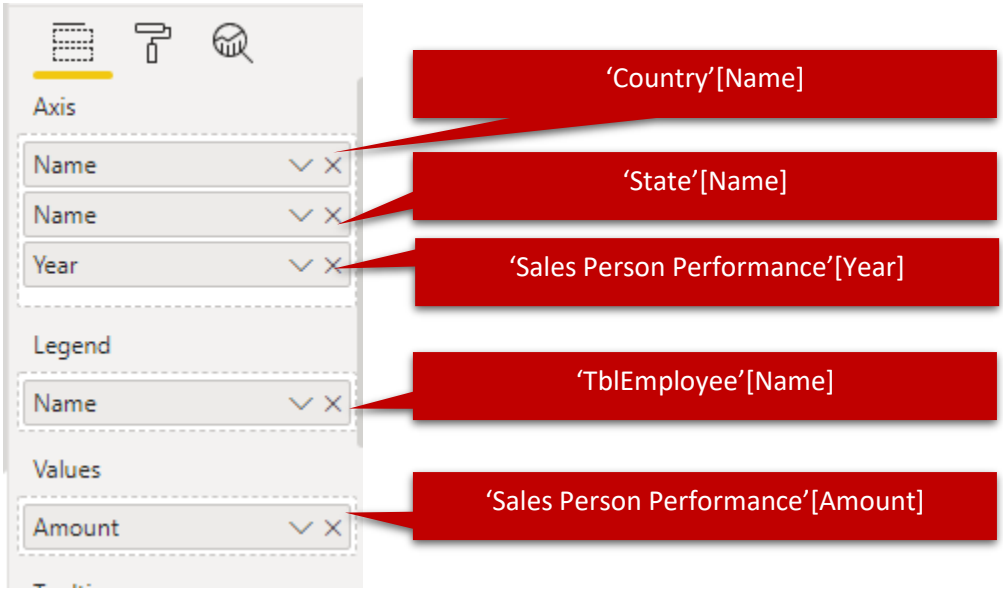
What happened now?

10. Guess what the report filter for?

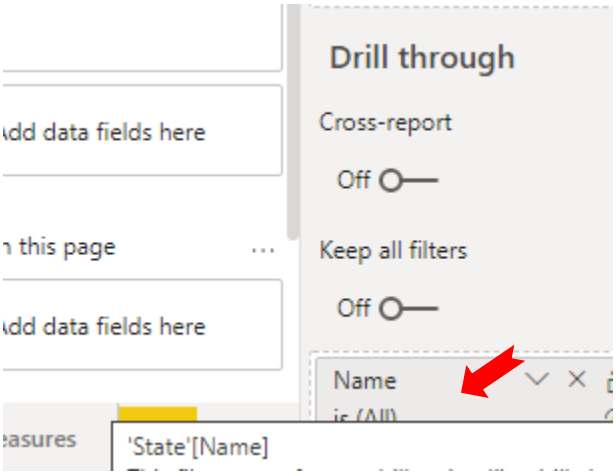
How to Drill Down the Hierarchical data?

Steps:

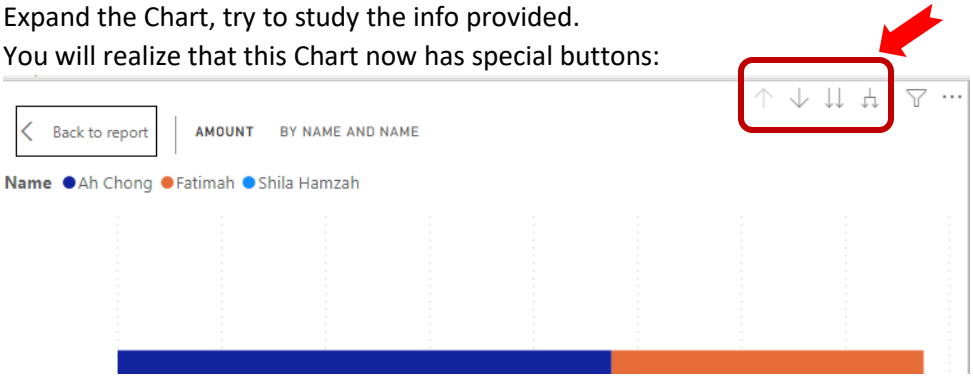
1. Create a new Report Page with name “Sales Result”.
2. Add a new Stack Bar Chart element to the page and set its properties:



3. Scroll down the property list until you will find the “Drill Through” section. Drag the ‘State’[Name] in:



4. Expand the Chart, try to study the info provided.
5. You will realize that this Chart now has special buttons:

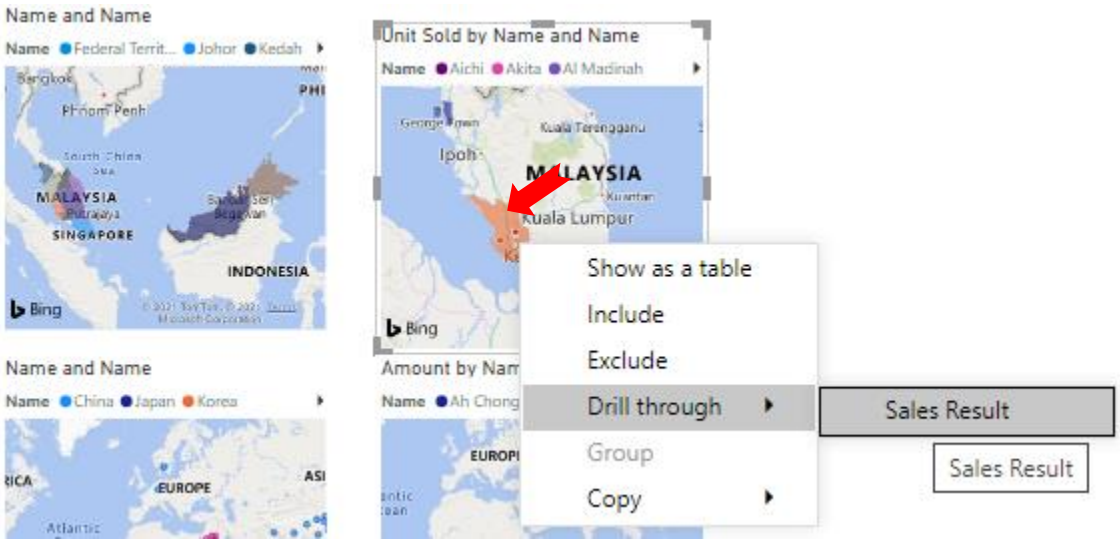


6. Click the down arrow:

7. Click the Malaysia Bar on chart. What will happened?
8. Try to find out what other special buttons for?
9. Why this chart is given this special buttons?

How to Drill Through from one report page to other page?

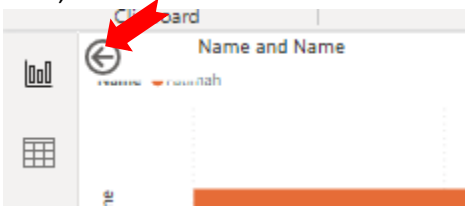
1. Now select the previously created “Map exercises” page. In Map #2, right-click “Selangor”:



Select “Drill through”, then “Sales Result”. What you will get?

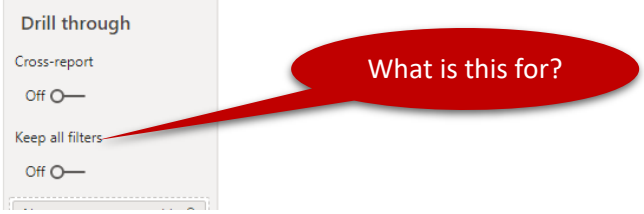
2. You should be redirected to the “Sales Result” page with the filter State=Selangor:

3. Now, Control+Mouse click this icon:



What will happened?

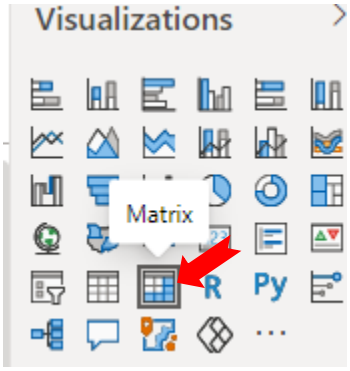
4. Your challenge:



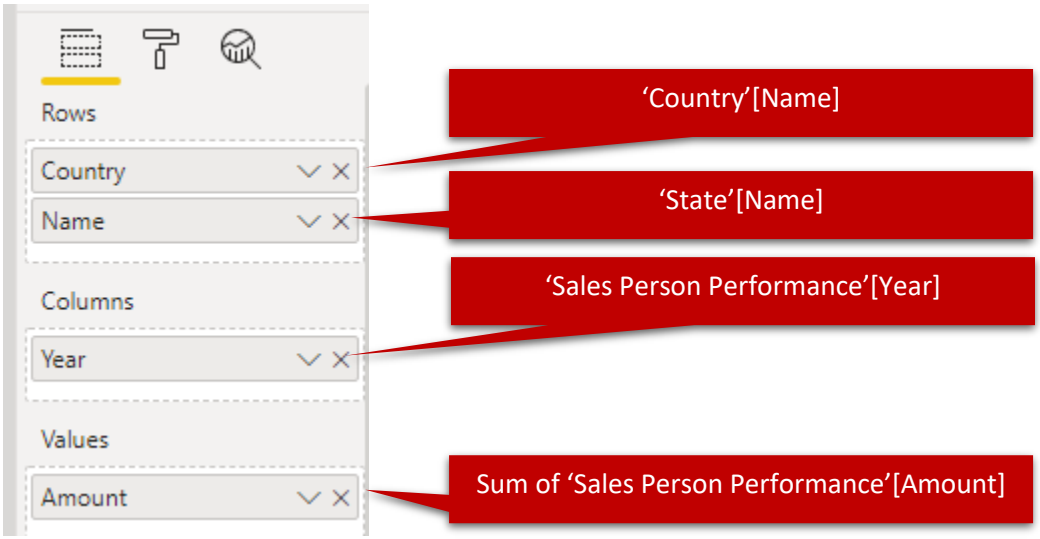
What is Matrix?

Steps:

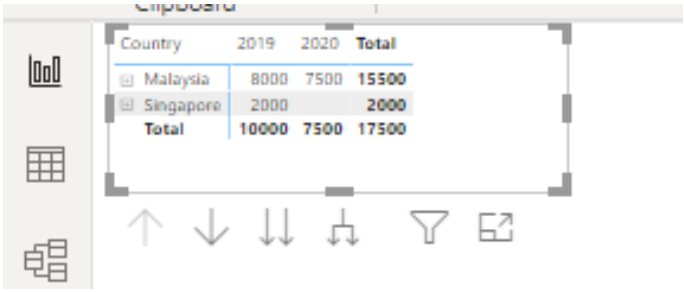
1. Create a new Report Page with name “Matrix”.
2. Add a new Matrix element to the page:



3. Set the properties:



4. The element should look like this:

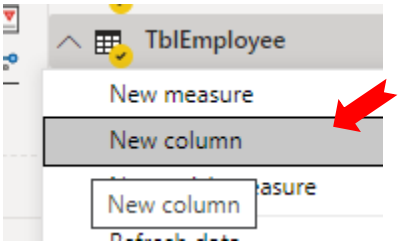


5. So, what is the different between Matrix and Table element?

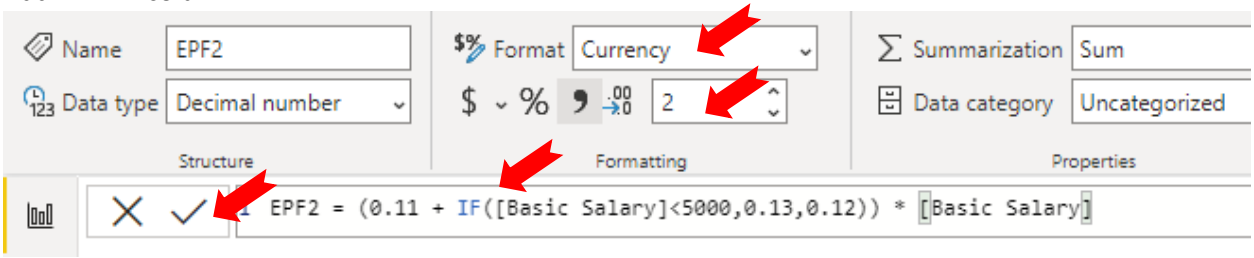
How to create Virtual Columns at the reporting level?

Steps:

1. Create a new Report Page with name “Virtual Columns”.
2. Right click the TblEmployee to add new Column:

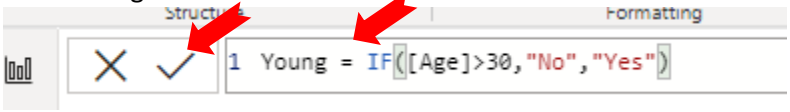


3. Add “EPF2” column:

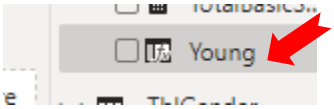


4. New column added:

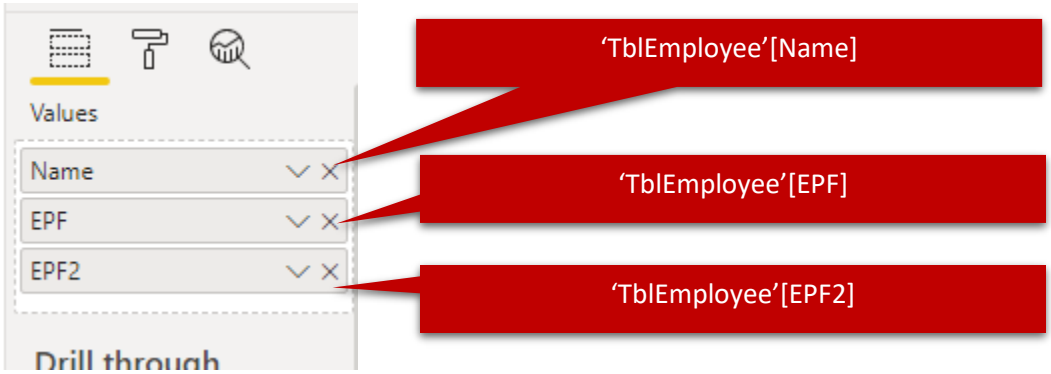
5. Add “Young” column:



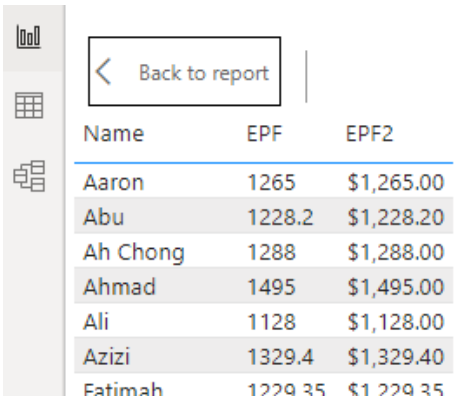
6. New column added:



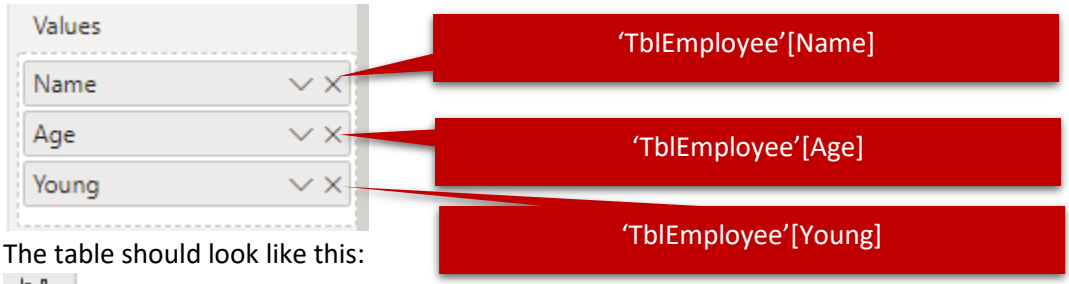
7. Add a new Table element and set the properties:



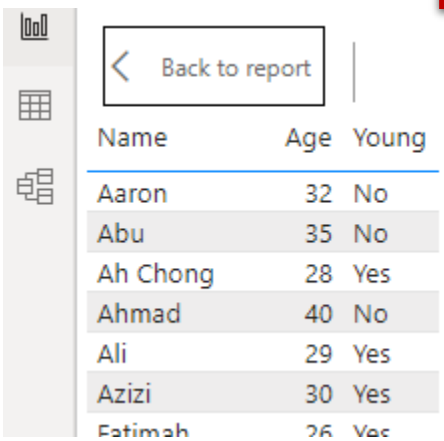
8. The table should look like this:



9. Add another table to the page just below the previous one. Set properties:



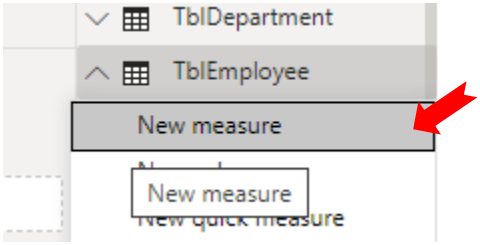
10. The table should look like this:



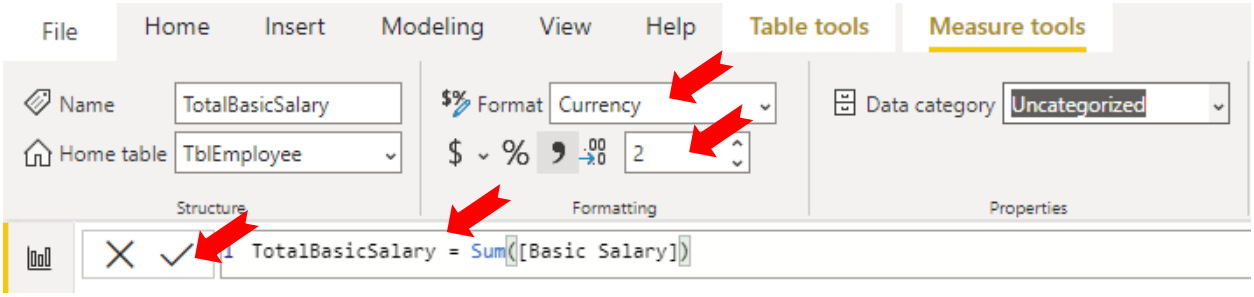
How to create and use Measures?

Steps:

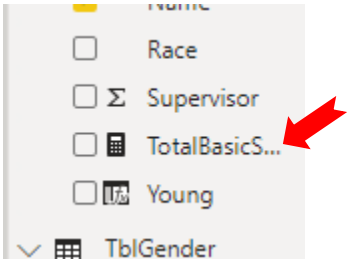
1. Create a new Report Page with name “Measures”.
2. Right click the TblEmployee to add “New measure”:



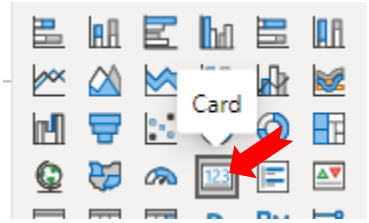
3. Add TotalBasicSalary measure:



4. New measure added:

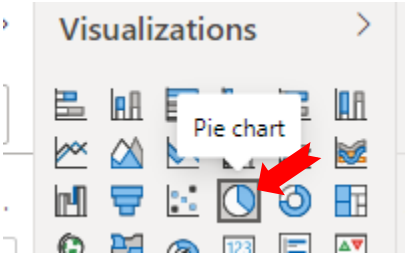


5. Add a new Card element:

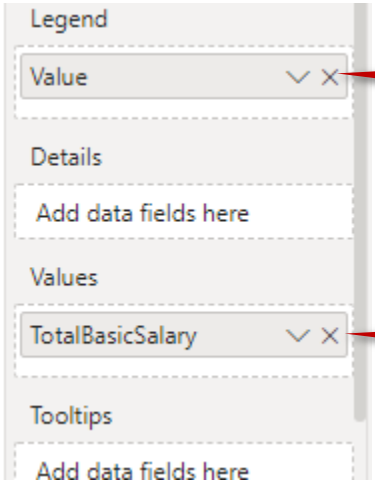


6. Set the properties:

7. Add a new Pie Chart to the right of the Card:



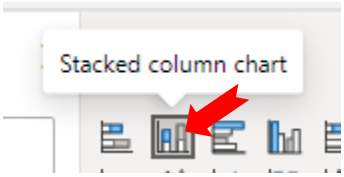
8. Set the properties:



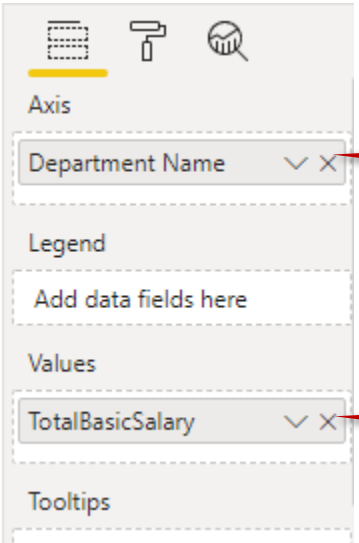
'TblGender'[Value]

'TblEmployee'[TotalBasicSalary]

9. Add a new Stacked column chart below the Card:



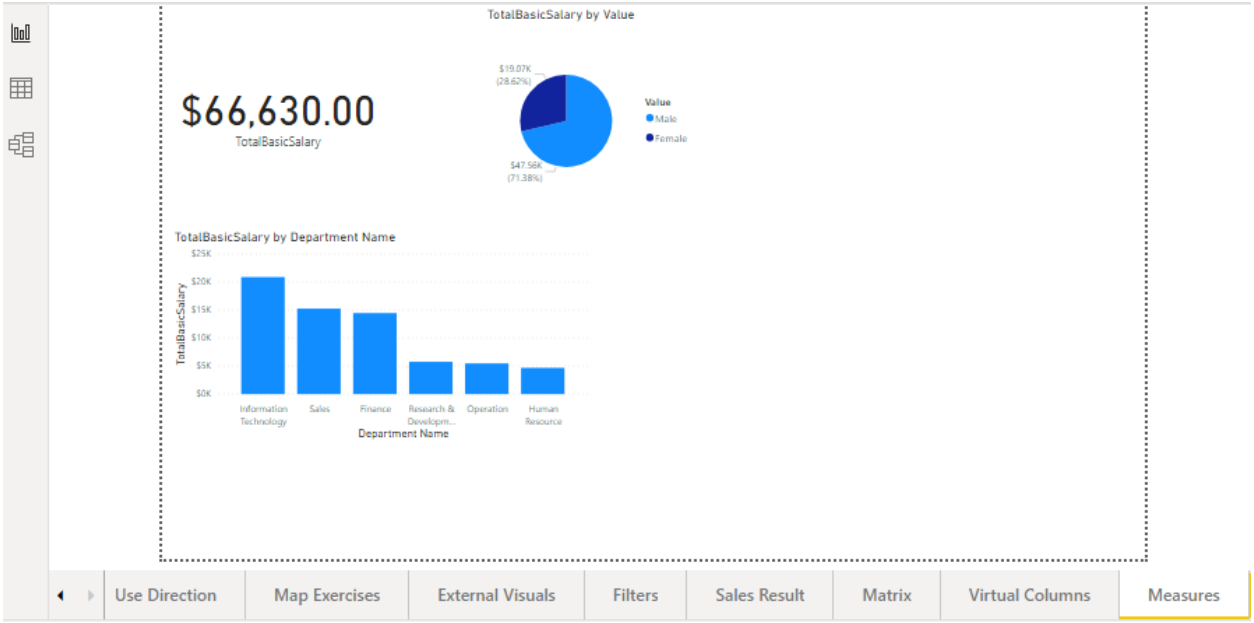
10. Set the properties:



'TblDepartment'[Department Name]

'TblEmployee'[TotalBasicSalary]

11. The report page is as below:



Notes: You can think that Measure is a stored expression. The evaluation is based on the **Context** it is applied. The above example:

a) Card – The context is entire company

b) Pie Chart – The context is gender group

c) Stack Chart – The context is per Department