

Exercise 4: Introduction to M



In the next steps we are using SharePoint/Teams/Onedrive as a data source. Keeping your files online on Sharepoint makes reports more reliable as data can be refreshed, even when your computer is offline. The necessary data for this exercise has been uploaded here: [Sharepoint folder](#)

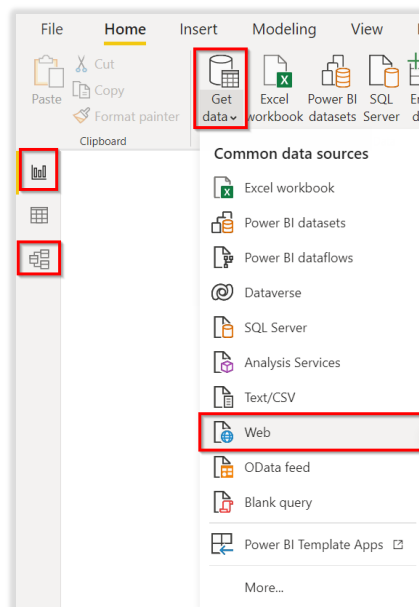
If you don't have access to the folder, use these link (they are public and don't need authentication):

https://raw.githubusercontent.com/justin-m-schmidt/powerbi_resources/main/Exercise%20%20%20sales%20regions.csv

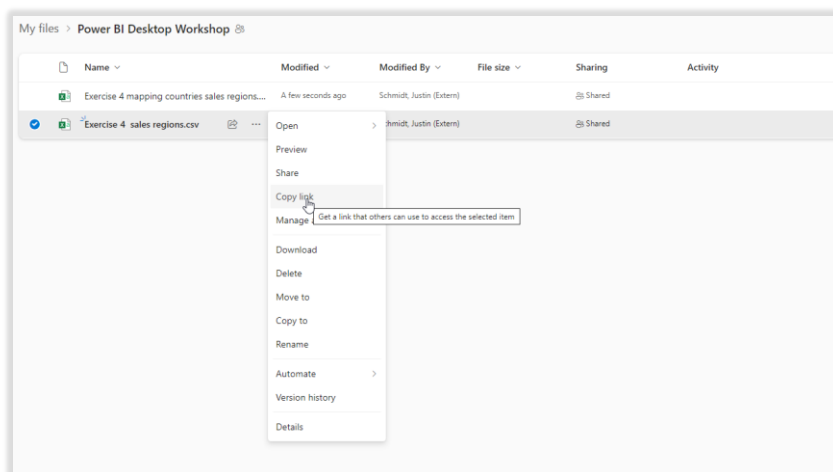
https://raw.githubusercontent.com/justin-m-schmidt/powerbi_resources/main/Exercise%20%20mapping%20countries%20sales%20regions.csv

[Backup resources](#)

1.  In Report View or  in Model View: click on “Get data” and select “Web”:



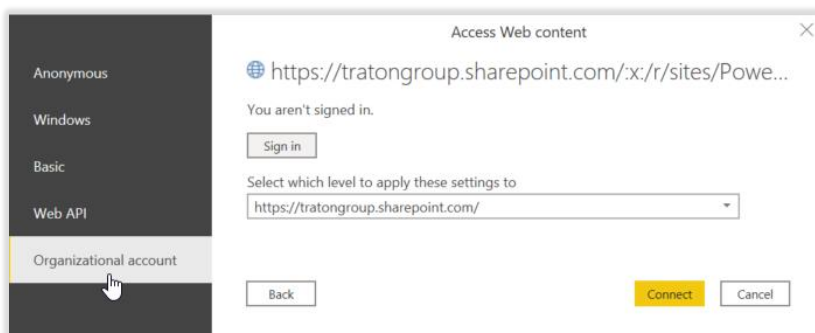
2. Open the [Sharepoint folder](#) and copy the link of the “Exercise 4 sales regions.csv” file.




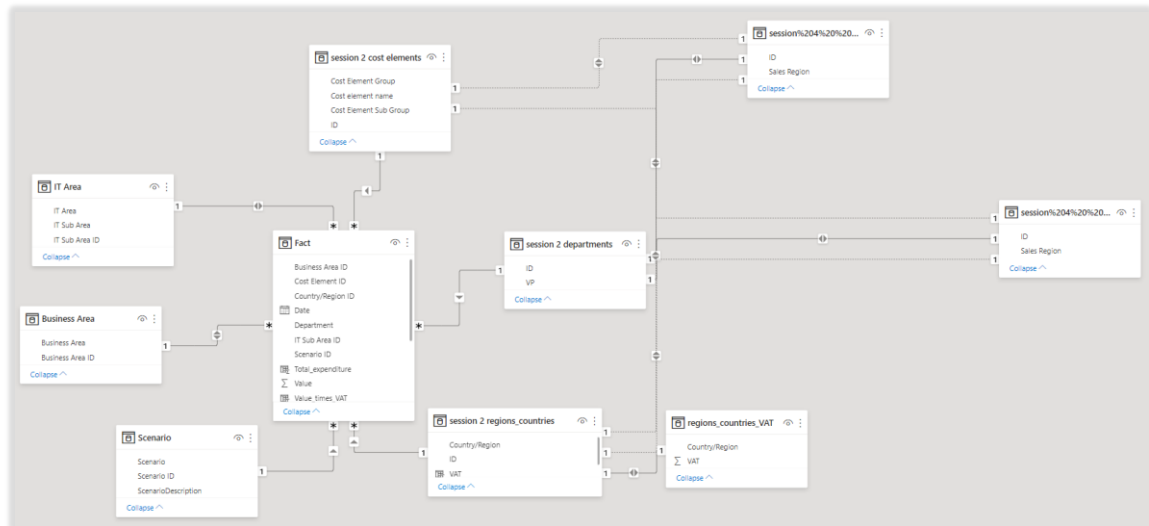
3. Paste following file path from SharePoint-File and confirm with “ok”:



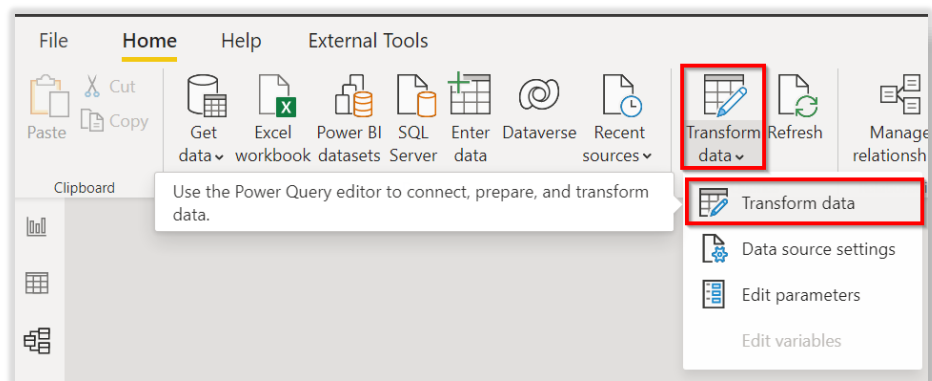
4. Click on Login with Organizational Account and Sign in with your credentials and 2FA. (If you used the backup files, you don't need authentication, you can leave the selection on “Anonymous”)



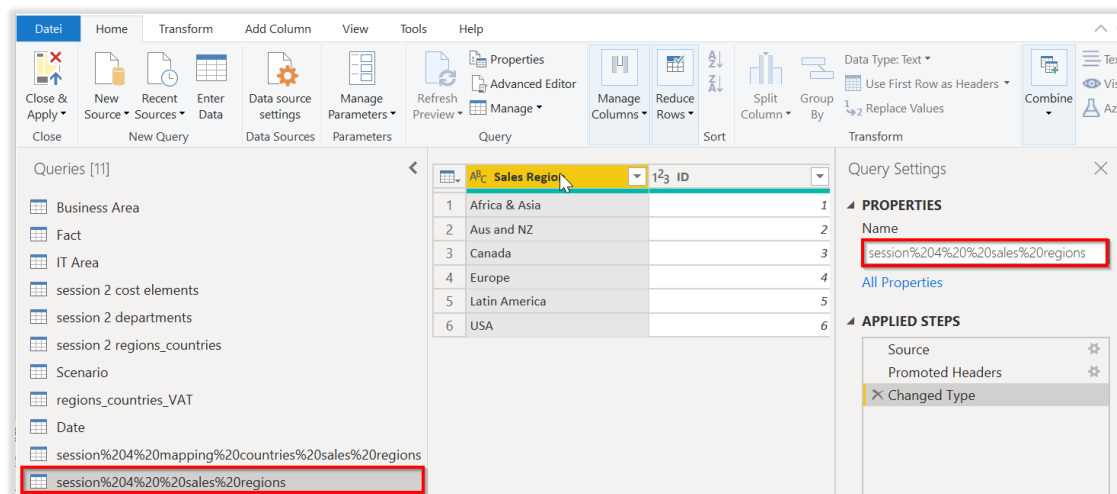
5. Click on “Load”.
6. Repeat this process for “Exercise 4 mapping countries sales regions.csv” from the same folder.
7. Go to Model View . Your model should look similar to the model in the screenshot, i.e., featuring unnecessary relationships:



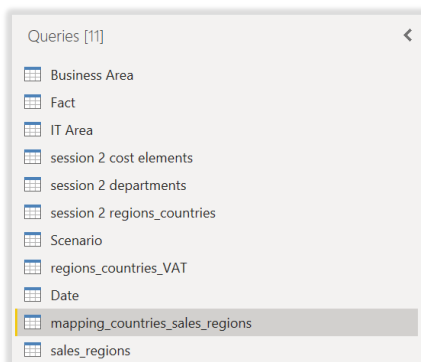
8. Delete the relationships between the two new tables and the rest of the model.
9. In the home menu: select “Transform data”



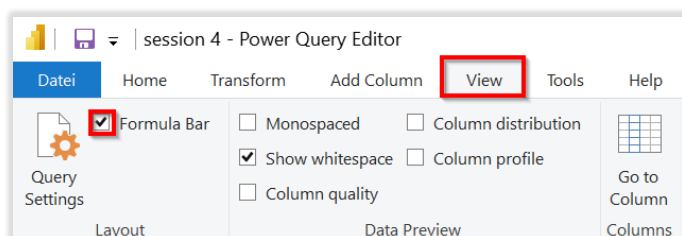
10. In the Queries pane on the left, select the query for “exercise 4 sales regions.csv”.
11. In the Queries Settings, rename the query to “sales_regions”:



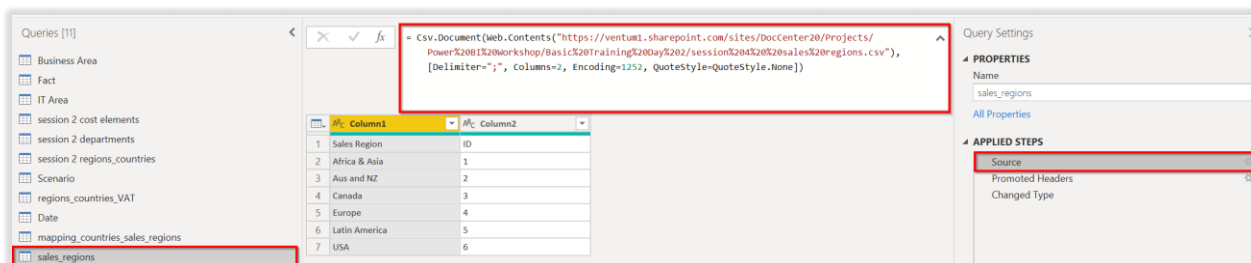
12. Rename the query for “exercise 4 mapping countries sales regions.csv” into “mapping_countries_sales_regions”.
13. Your Queries pane should look like this:



14. In the top menu, select “View” and activate “Formula Bar”



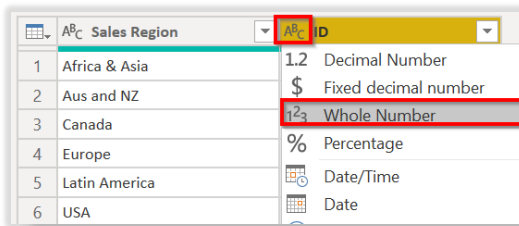
15. Click on query for “sales_regions”. Click on “Source” in Applied Steps under Query Settings and look at M query displayed in formula bar:



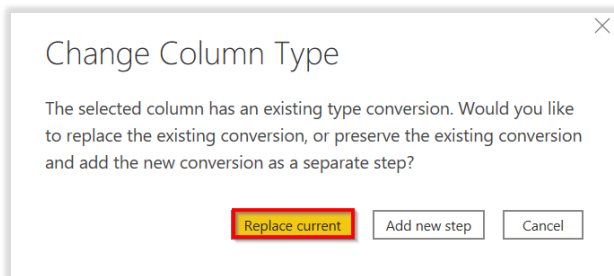
16. What you see is the M query that was automatically created while loading the file from SharePoint. You can see that PowerBI correctly identified the delimiter as a semicolon.
17. Change the Delimiter in the query to a comma and observe the change in the data set.
18. Change the delimiter back to a semicolon.
19. Click on “Promoted Headers” under Applied Steps in Query Settings. What changed?
20. Click on “Changed Type” under Applied Steps. Replace “INT64.Type” with “type text”.

= Table.TransformColumnTypes(#"Promoted Headers",{{"Sales Region", type text}, {"ID", type text}})

21. Click on “ABC”-symbol next to ID in data preview and change data type to “Whole Number”:

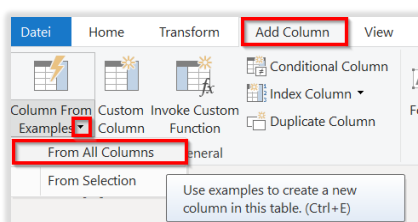


22. In dialog, click on “Replace current”:

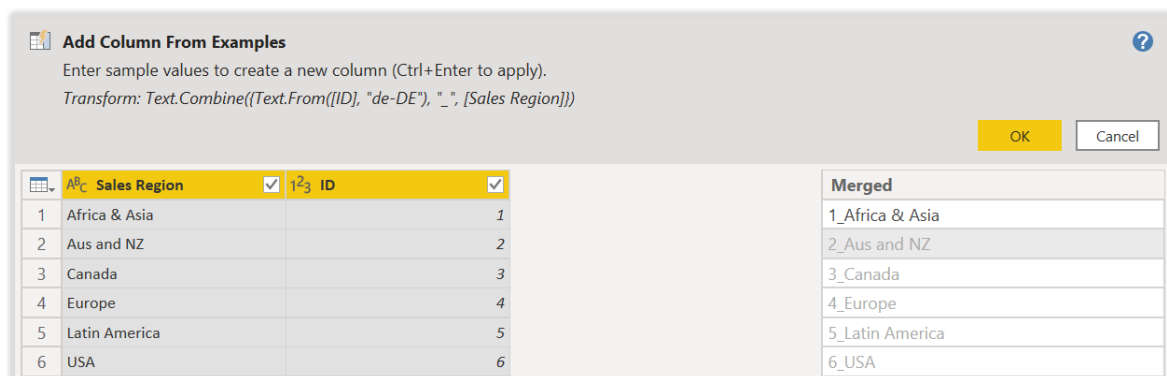


23. Check what changed in “Changed Type” under “Applied Steps”

24. In top menu, change to tab “Add Column”, click on arrow under “Column From Examples” and select “From All Columns”



25. Enter in first line under “Column1” the entry A“1_Africa & Asia” and hit enter



26. Power BI should have automatically recognized the pattern and suggested the content of the other rows. If not, then ask a tutor for help. Otherwise, confirm content by clicking on “OK”-Button

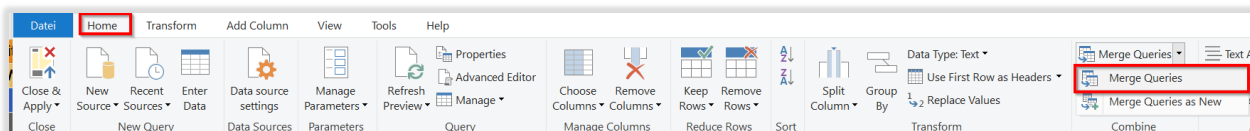
27. Review M query for the new inserted merge column. Replace “Merged” with “ID Sales Region” and “_” with “ ”:

```
= Table.AddColumn("#Changed Type", "ID Sales Region", each Text.Combine({Text.From([ID], "de-DE"),  
    " ", [Sales Region]}), type text)
```

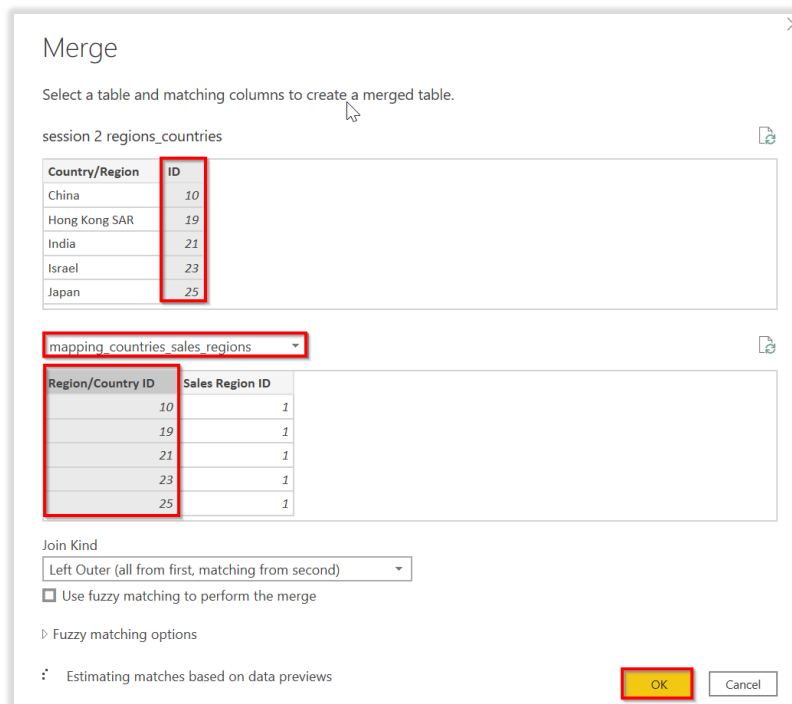
28. Your table sales_regions table should look like this:

	Africa & Asia	123 ID	Africa & Asia
1	Africa & Asia	1	1 Africa & Asia
2	Aus and NZ	2	2 Aus and NZ
3	Canada	3	3 Canada
4	Europe	4	4 Europe
5	Latin America	5	5 Latin America
6	USA	6	6 USA

29. Select Query “Exercise 2 regions_countries” and select in top menu home tab. Click on “Merge Queries”



30. Select “mapping_countries_sales_region” in lower table menu. Click in upper data preview on “ID” and in lower data preview on “Region/ Country ID”. Leave Join Kind on “Left Outer”. Confirm with “OK”. If a window on privacy levels opens up, select “ignore” and confirm.



Merge

Select a table and matching columns to create a merged table.

session 2 regions_countries

Country/Region	ID
China	10
Hong Kong SAR	19
India	21
Israel	23
Japan	25

mapping_countries_sales_regions

Region/Country ID	Sales Region ID
10	1
19	1
21	1
23	1
25	1

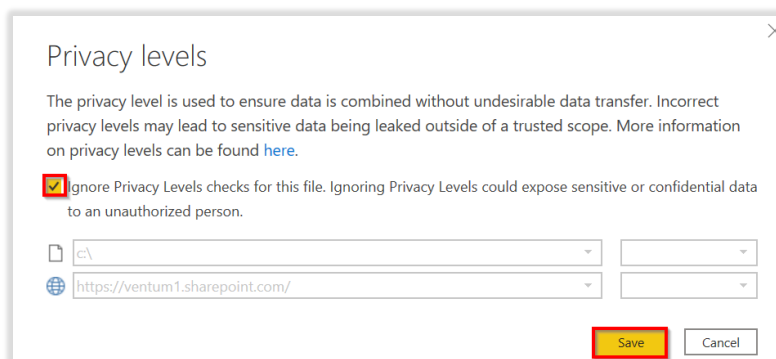
Join Kind
Left Outer (all from first, matching from second)

☐ Use fuzzy matching to perform the merge

▸ Fuzzy matching options

Estimating matches based on data previews

OK Cancel



Privacy levels

The privacy level is used to ensure data is combined without undesirable data transfer. Incorrect privacy levels may lead to sensitive data being leaked outside of a trusted scope. More information on privacy levels can be found [here](#).

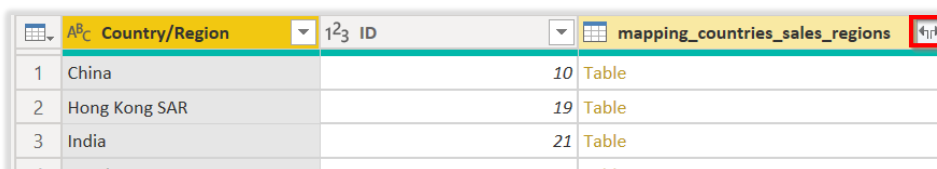
☒ Ignore Privacy Levels checks for this file. Ignoring Privacy Levels could expose sensitive or confidential data to an unauthorized person.

c:\

https://ventum1.sharepoint.com/

Save Cancel

31. Expand column “mapping_countries_sales_regions”



	Country/Region	ID	mapping_countries_sales_regions
1	China	10	Table
2	Hong Kong SAR	19	Table
3	India	21	Table
4	Israel	23	Table
5	Japan	25	Table

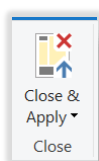
32. Select all columns and confirm
33. Your table should look like in the below screenshot. Note, that for the merged columns, PowerBI automatically put in front the name of the source table (mapping_countries_sales_regions).

	ABC Country/Region	ID	mapping_countries_sales_regions.Region/Country ID	mapping_countries_sales_regions.Sales Region ID
1	China	10	10	1
2	Hong Kong SAR	19	19	1
3	India	21	21	1

34. Merge table “sales_regions” onto “exercise 2 regions_countries” (analogous to steps 29-33). Your final table should look like below screenshot:

	ABC Country/Region	ID	mapping_countries_sales_regions.Region/Country ID	mapping_countries_sales_regions.Sales Region ID	sales_regions.Sales Region	sales_regions.ID	sales_regions.ID Sales Region
1	China	10	10	1	Africa & Asia	1	1 Africa & Asia
2	Hong Kong SAR	19	19	1	Africa & Asia	1	1 Africa & Asia
3	India	21	21	1	Africa & Asia	1	1 Africa & Asia
4	Israel	23	23	1	Africa & Asia	1	1 Africa & Asia
5	Japan	25	25	1	Africa & Asia	1	1 Africa & Asia

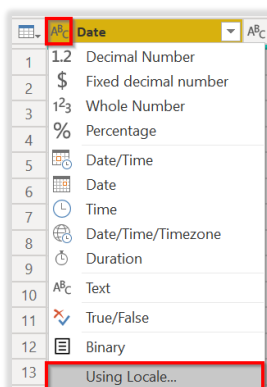
35. In top menu (home tab), click on “Close & Apply”



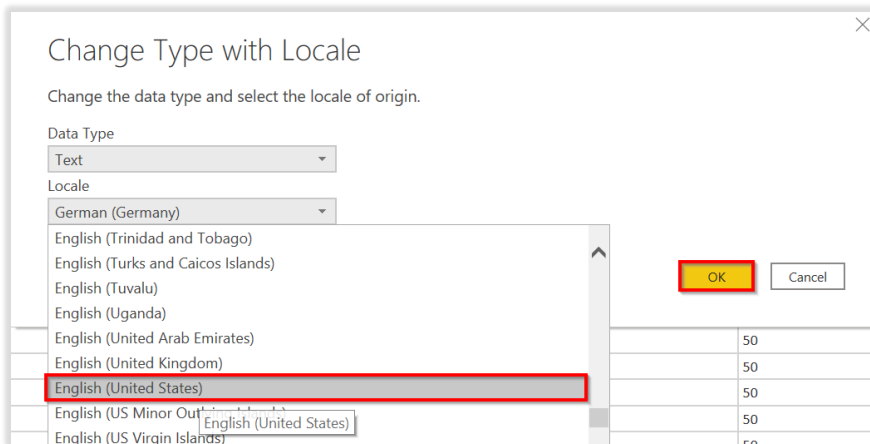
36. Go to Model view and delete all relationships connecting “Sales_regions” and “mapping_countries_sales_regions” with the rest of the model. As long as you do not use them in any visuals, their relationships won’t slow down the system, but they will make the data model more cluttered and harder to interpret than necessary.

Bonus Exercise:

1. Import “bonus data scenarios fact table.csv”. Do not click on “Load”, but on “Transform Data” (if you already clicked on “Load”, open Power Query editor by selecting “Transform Data” in top menu.)
2. In Query Editor, select query “bonus data scenarios fact table” and view all applied steps (Source, Promoted Headers, Changed Type).
3. The source data states the date in American style, that is month/day/year. Power BI did not recognize this and hence translated the strings into wrong dates. To fix this, click on “Promoted Headers”. In this state, column “Date” is still in text format. Click on ABC symbol next to Date and select “Using Locale ...”



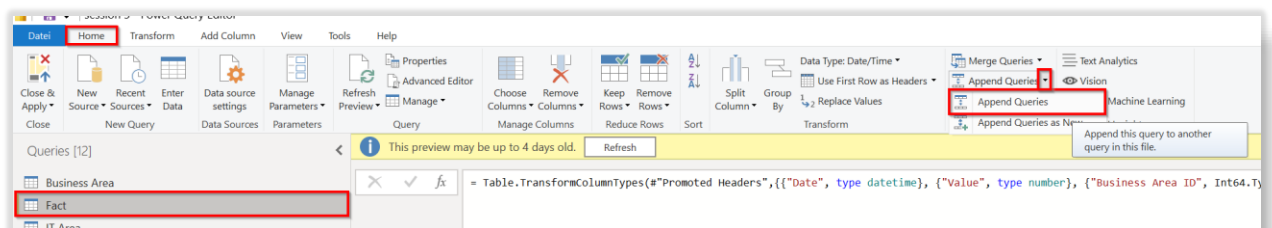
4. Confirm “Insert Step” and select “English (United States)” as Locale:






5. In DAX formula bar, replace “type text” with “type datetimezone”:
`= Table.TransformColumnTypes(#"Promoted Headers", {{ "Date", type datetimezone }}, "en-US")`
6. To test, if power BI actually recognized the date correctly, add a column and enter the custom formula “=Date.Month([Date])”. Do the numbers match the months? If so, delete the custom column. Otherwise, review the steps before.
7. Your query should look like this now:

	Date	Value	Department	Cost Element ID	Business Area ID	IT Sub Area ID	Scenario ID	Country/Region ID
1	01.01.2014 00:00:00 +01:00	0	277	155	6	22	5	50
2	01.10.2014 00:00:00 +02:00	0	277	155	6	22	5	50
3	01.11.2014 00:00:00 +01:00	0	277	155	6	22	5	50
4	01.12.2014 00:00:00 +01:00	0	277	155	6	22	5	50
5	01.02.2014 00:00:00 +01:00	0	277	155	6	22	5	50


8. Select query for Fact table. In top menu, select “Append Queries”

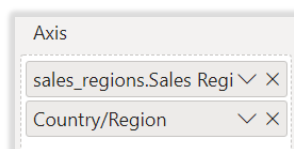


9. Select “bonus data scenarios fact table” as table to append and confirm with ok.
10. Change data type of column “Date” to Datetime: 
11. Click on “Close & Apply”
12.  In Model View: delete all relations connecting “bonus data scenarios fact table” with the rest of the model.
13. Open Query editor again (“Transform Data”) and right click on query for fact-table. Select “duplicate”
14. In duplicate Fact table (“Fact (2)”), select Date column and convert column type to “text”.
15. select “replace values” in top menu: 
16. Replace “2014” with “2021”
17. Convert column type back to “date”
18. Remove all other columns apart from column “Date”
19. Remove duplicate values from column “Date” (select “Remove Rows” -> select “Remove Duplicates”)

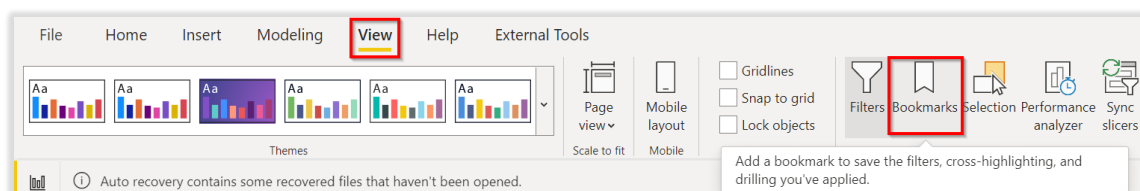
20. Filter list of dates as after 01.01.2021
21. In M query code, replace “#date(2021, 1, 1)” with “DateTime.Date(DateTime.LocalNow())”
22. The list should be empty, since there are no values that lie in the future.
23. Rename query future months. Click on close & apply
24. In data view: select table future_months. Data should look like in below screenshot (date format may vary):


Date
Freitag, 1. Oktober 2021
Montag, 1. November 2021
Mittwoch, 1. Dezember 2021

25.  In Report View:
 - a. Duplicate sheet “exercise 3” and rename it “exercise 4”.
 - b. Click on column chart visual and add “sales_regions.Sales Region” from table “exercise 2 regions_countries” as axis. Click on “Country/Region” in “Axis” window and drag and drop it, so it is displayed on top:



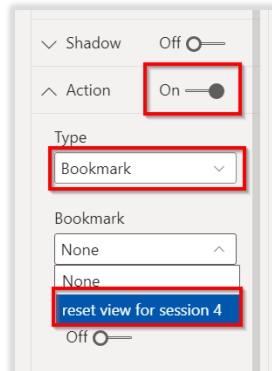
- c. Within column chart visual: click on the two arrows down in the top right corner ↓↓
26. Add table of countries and expenditures, where the expenditures must be larger than 0. (Analogous to the table “Countries with no planned expenditures”). Click on Regions in column chart and observe how entries change.
27. Add a measure diff_plan_actual where you subtract measure “Actual” from measure “Plan”.
28. Add a line chart with Fact.Date as axis, sales_regions.”Sales Region” as Legend and diff_plan_actual as Values. Give the visual a meaningful title and adjust the axis titles. Click inside the line chart to check the drilling. Use the arrow up sign to drill back up.
29. Select a drill level and filtering on the page that you want to be the default view whenever the page is opened.
30. In top menu, select “View” tab and activate “Bookmarks”



31. In Bookmarks page, click on “Add” 
32. Give the bookmark a meaningful name, such as “reset view for exercise 4”.
33. Click on an entry in a visual so that the data gets filtered, then click on the bookmark entry.
34. Insert a text box and enter the text “reset all filters”. Format the background color as black and the text color as bold white. Adjust the size of the text box, so that it fits the text inside:

reset all filters

35. Insert a rectangle shape (Tab "insert" -> Shapes -> rectangle)
36. Format the shape so it matches the size of the "reset all filters"-text field. Make the shape completely transparent ("Fill" = off, outline = off, background transparency = 100%).
37. While rectangle shape is selected, in form shape pane, turn on "Action" and select "Bookmark" as Type and select your bookmark.



38. Place the transparent shape directly over the text box. Select different filters on the page, press ctrl (German keyboard: strg) and click on the transparent shape. The filters should reset now to your desired default view. If not, ask a tutor for help.

Your final report should look like the below screenshot.

