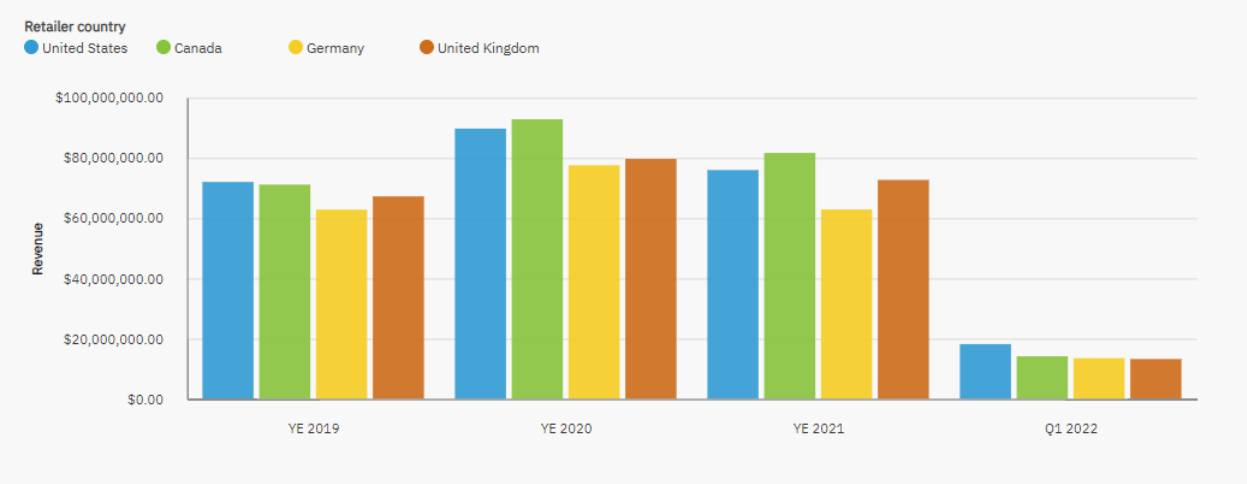
How do I create a single chart from a union of queries?

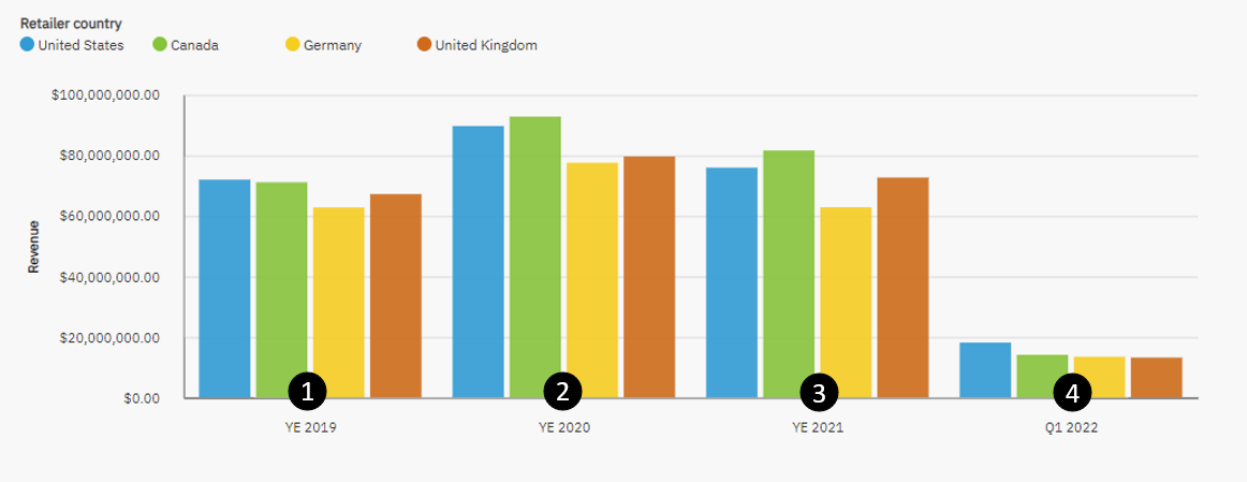
Suppose you want to make a chart like this:



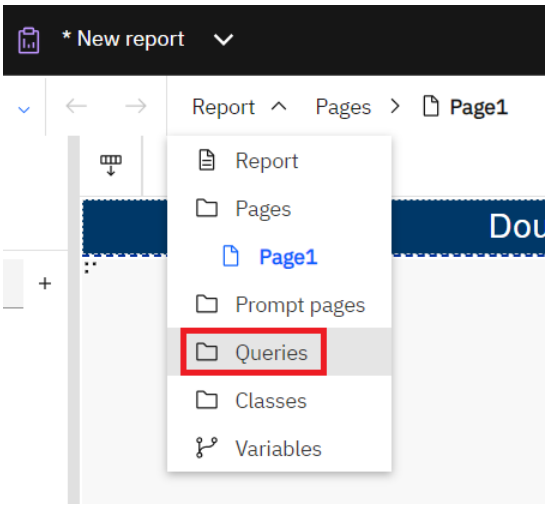
In order to do this in a single chart (rather than 4 separate ones), we need to obtain our values from multiple queries (one for each set of bars), and then join them all together with a union. This document will show you how…

Create a Union between four queries

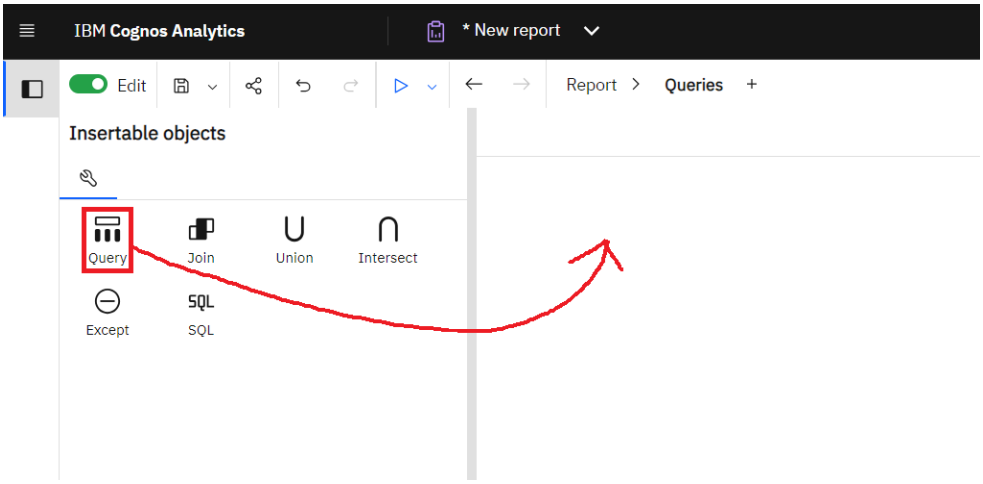
First, we need to create one query for each distinct piece of information that will be used in the chart, like this:



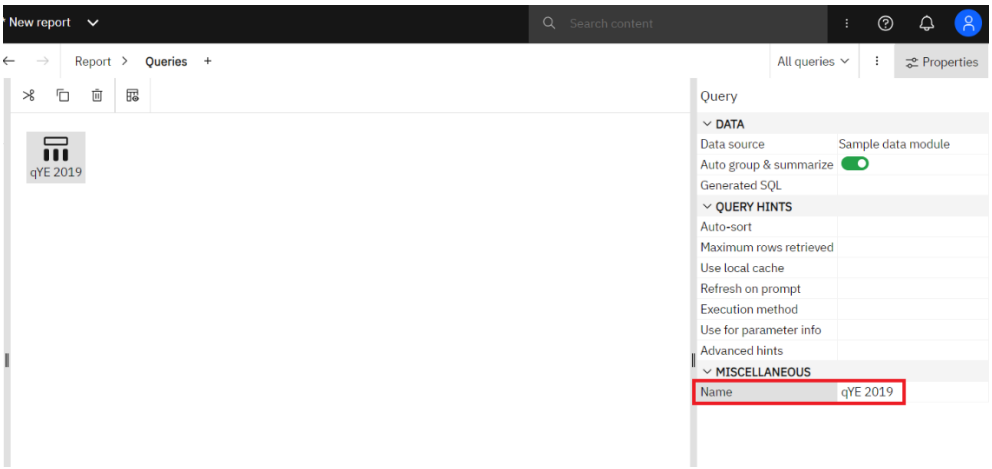
1. Create a new report with the following sample data: *Team content > Samples > By feature > Core > Data > Sample data module*
2. Navigate to *Queries*:



3. Drag in a new *Query* object from the Toolbox  :



4. In the *Name* property, type **qYE 2019**:

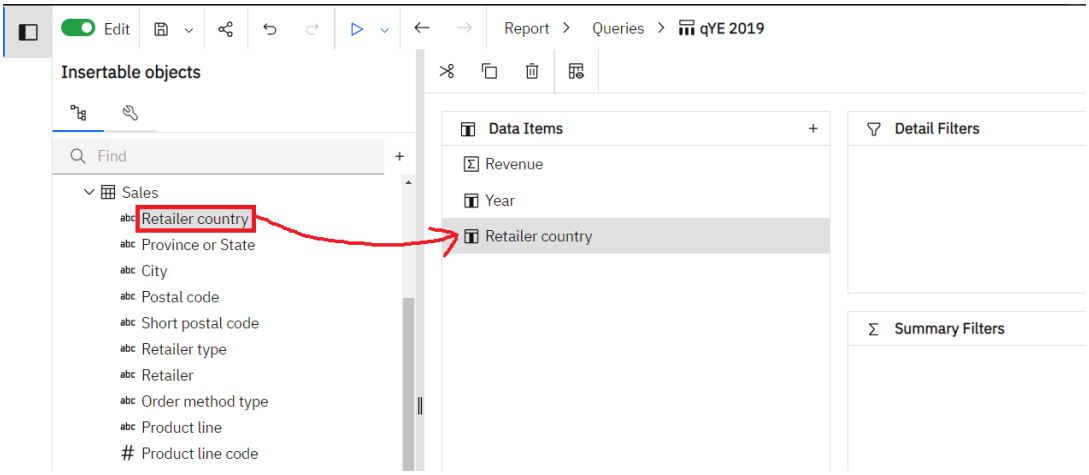


5. Double-click the query icon 

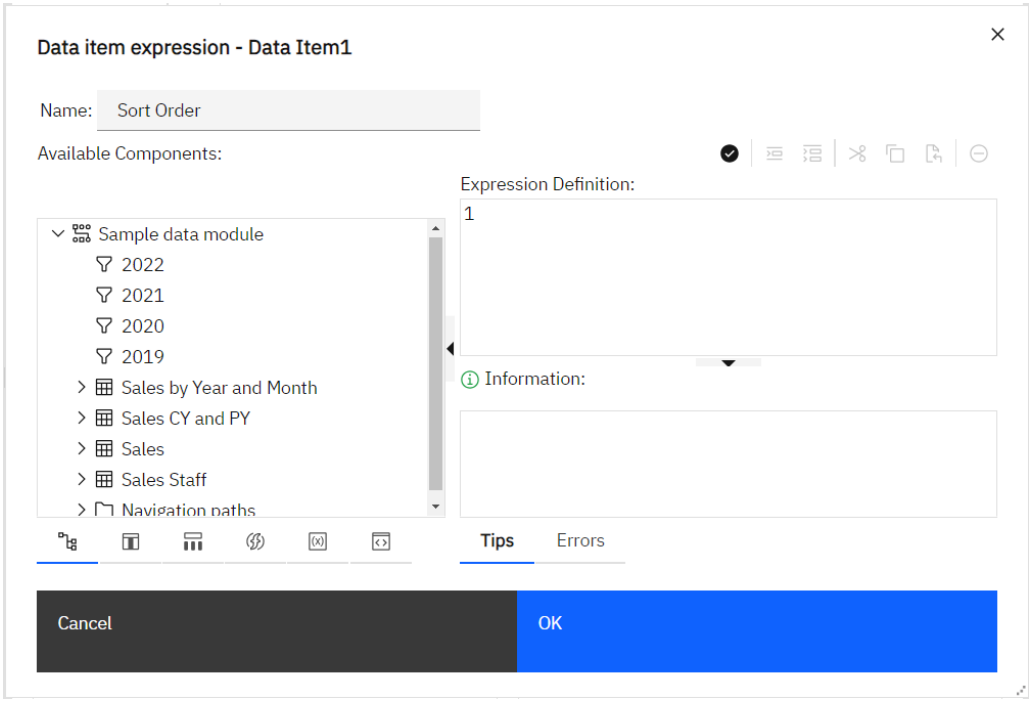
to open it.

6. Open the *Sources*  tab.

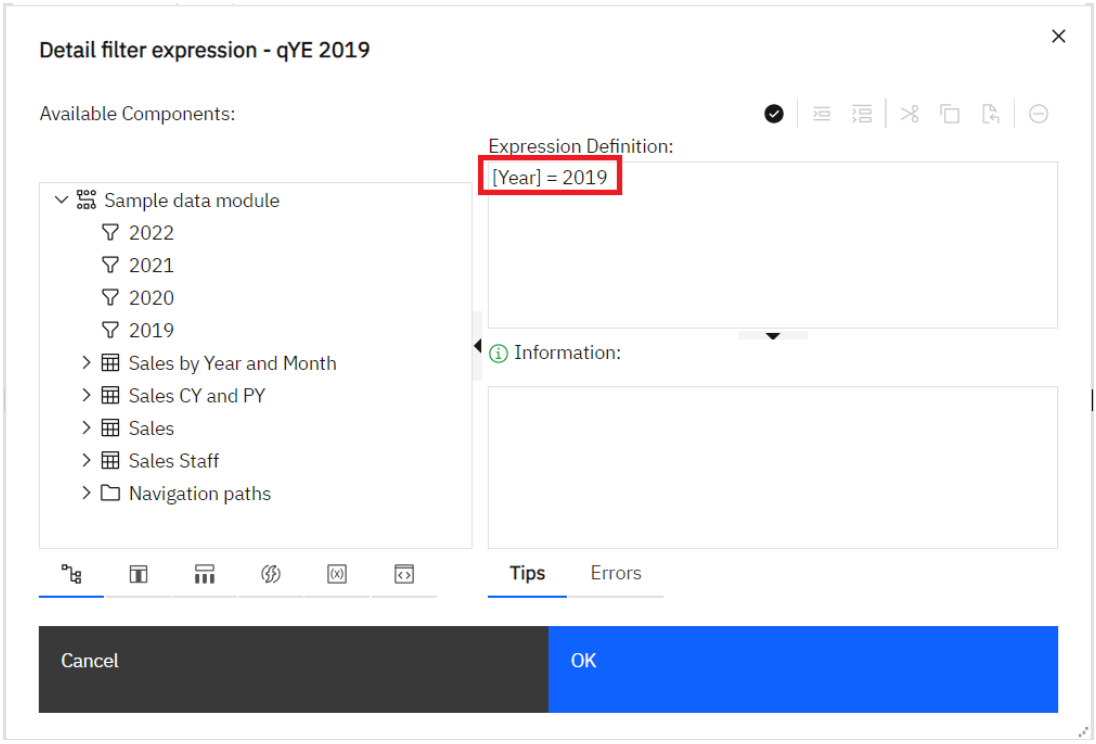
7. Open the *Sales* table and drag *Revenue*, *Year*, and *Retailer country* onto the *Data Items* box, in this order:



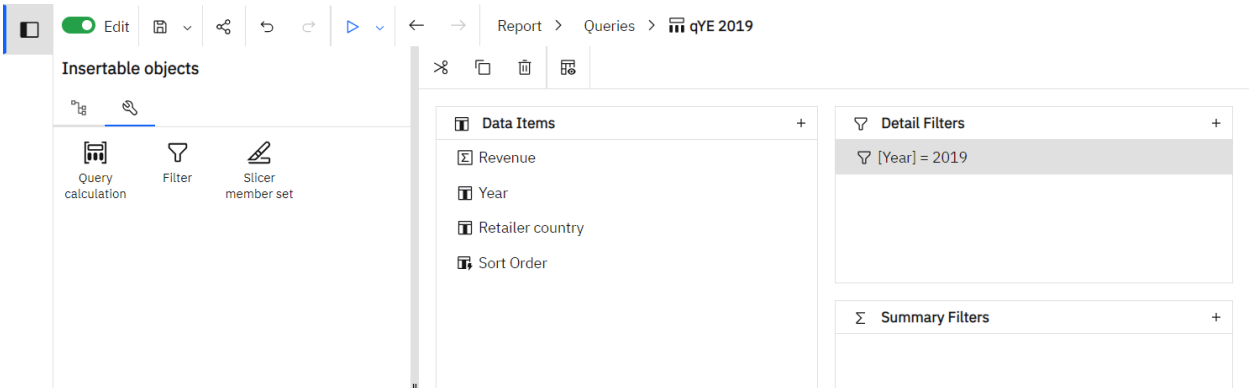
8. Open the Toolbox  and drag a *Query calculation*  onto the *Data Items* box.
9. In the resulting dialog, type **Sort Order** in the *Name* box, and type **1** in the *Expression Definition* box and click *OK*:



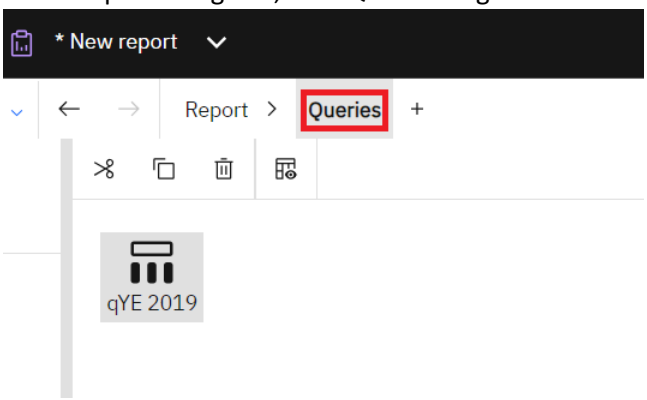
10. To create a filter, drag *Year* from the *Data Items* box and drop it on the *Detail Filters* box.
11. In the resulting dialog, type **= 2019** and click *OK*:



12. Your query should now look like this:

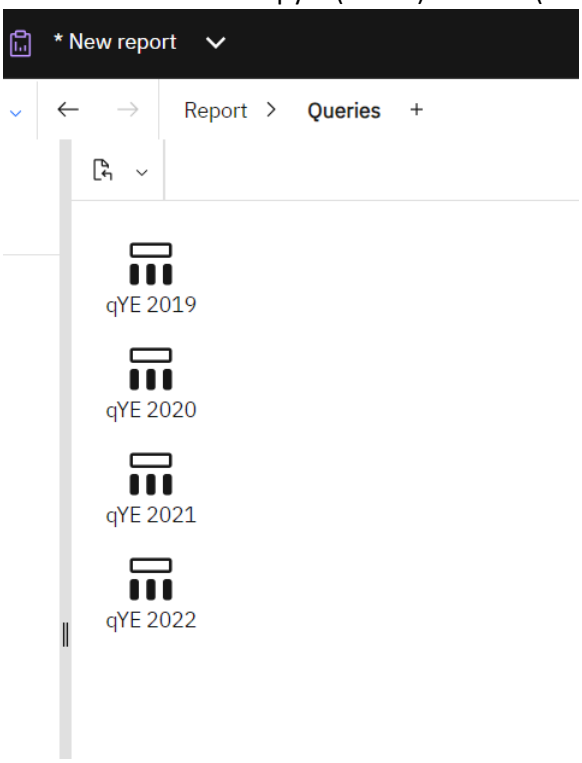


13. In the report navigator, click *Queries* to get back to the root level:



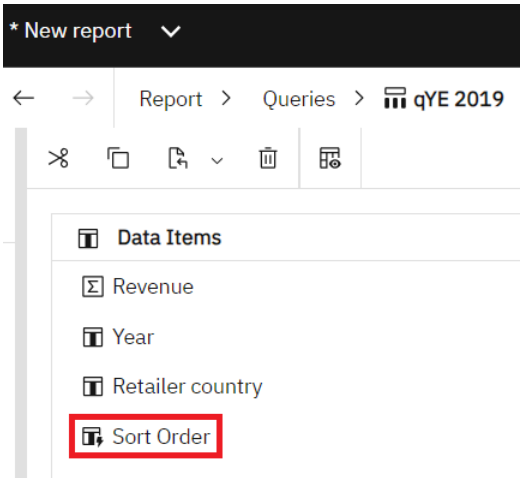
14. Select 

and copy it (Ctrl+C). Paste it (Ctrl+V) three times to obtain this:



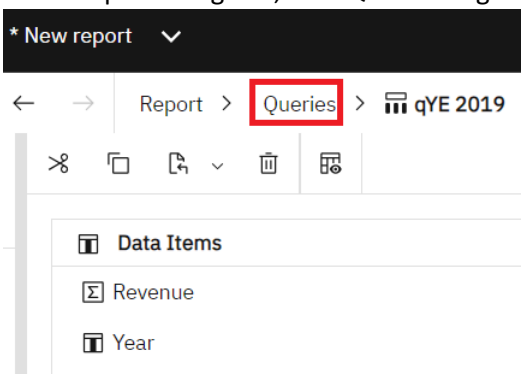
15. Double-click 

16. Double-click the detail filter: [Year] = 2019
17. Change **2019** to **2020** and click *OK*
18. Double-click *Sort Order:*

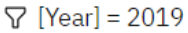


19. Change **1** to **2** and click *OK*

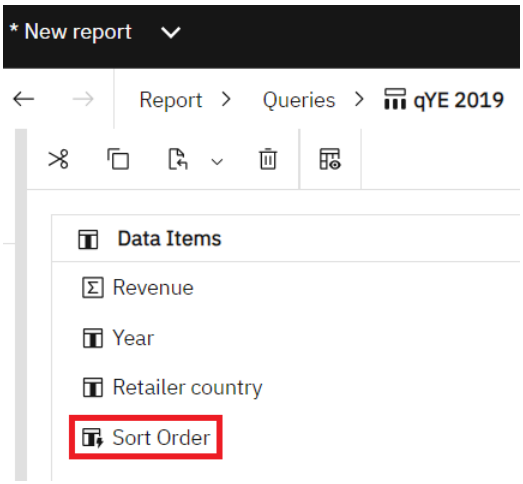
20. In the report navigator, click *Queries* to get back to the root level:



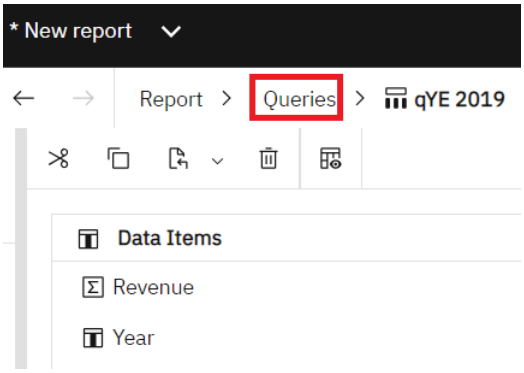
21. Double-click 

22. Double-click the detail filter: 

23. Change **2019** to **2021** and click *OK*
24. Double-click *Sort Order:*

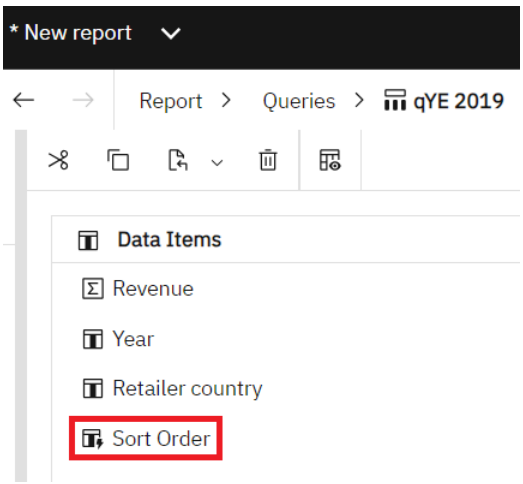


25. Change **1** to **3** and click *OK*
26. In the report navigator, click *Queries* to get back to the root level:

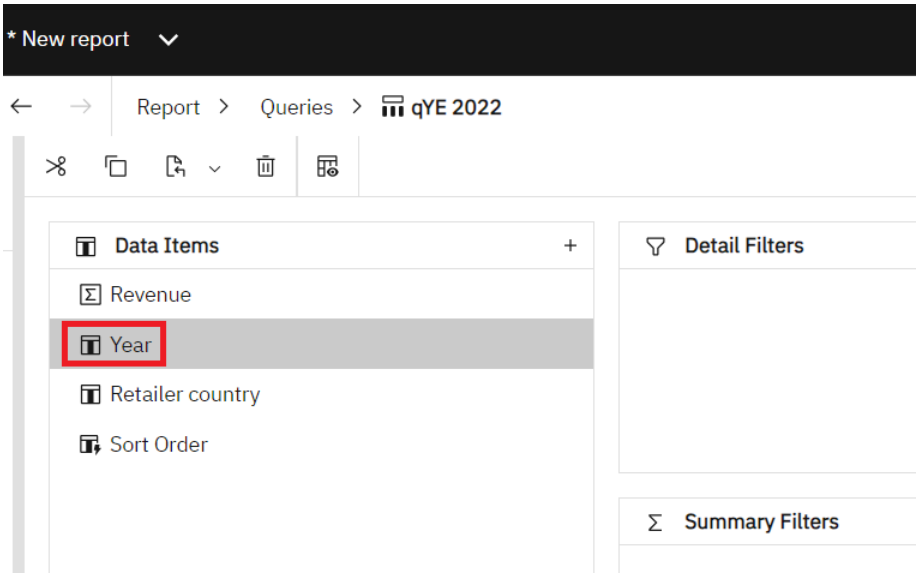


27. Double-click 

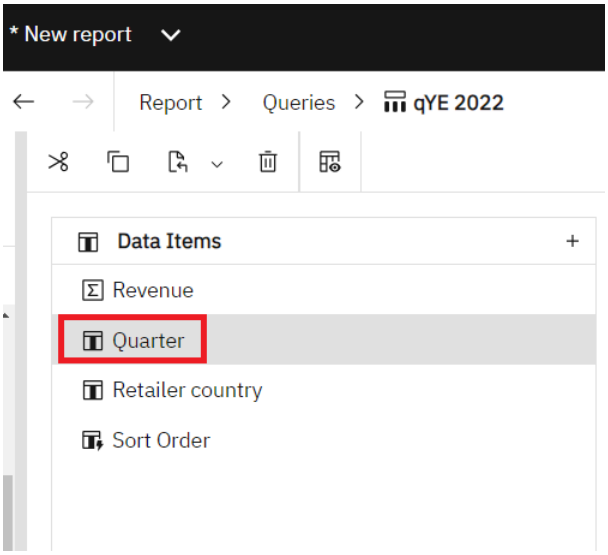
28. ⚠ This one is different. Please follow these steps carefully. Double-click *Sort Order:*



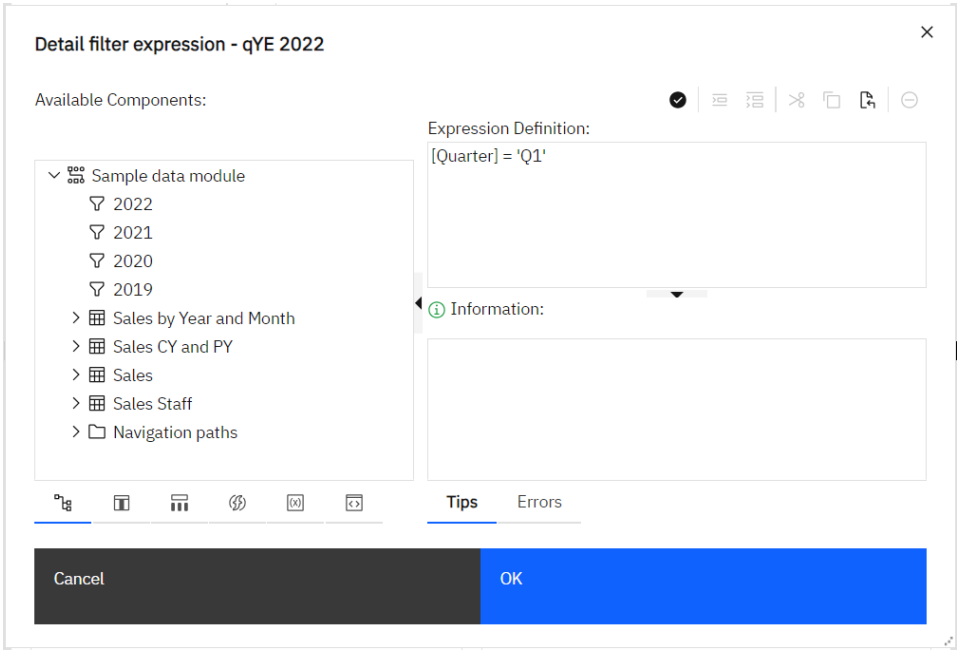
29. Change **1** to **4** and click *OK*
30. Select the detail filter: [Year] = 2019 and click *Delete* on your keyboard
31. Select *Year* and click *Delete* on your keyboard:



32. Open the *Sources*  tab and drag *Quarter* under *Revenue*, like this:

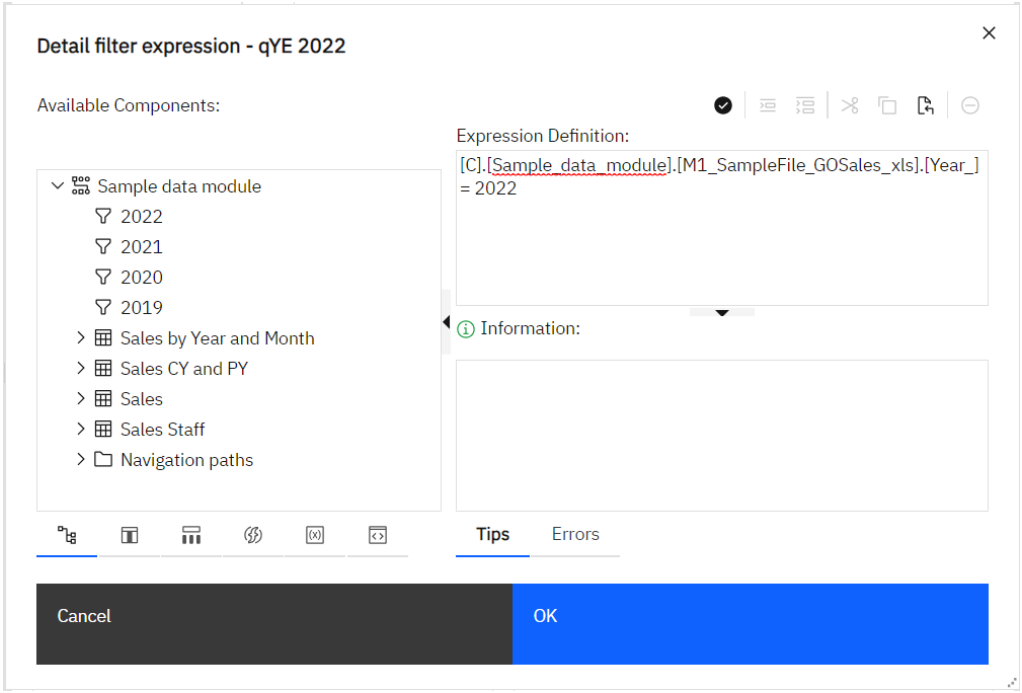


33. To create a filter, drag *Quarter* from the *Data Items* box and drop it on the *Detail Filters* box.
34. In the resulting dialog, type **= 'Q1'** and click *OK*:

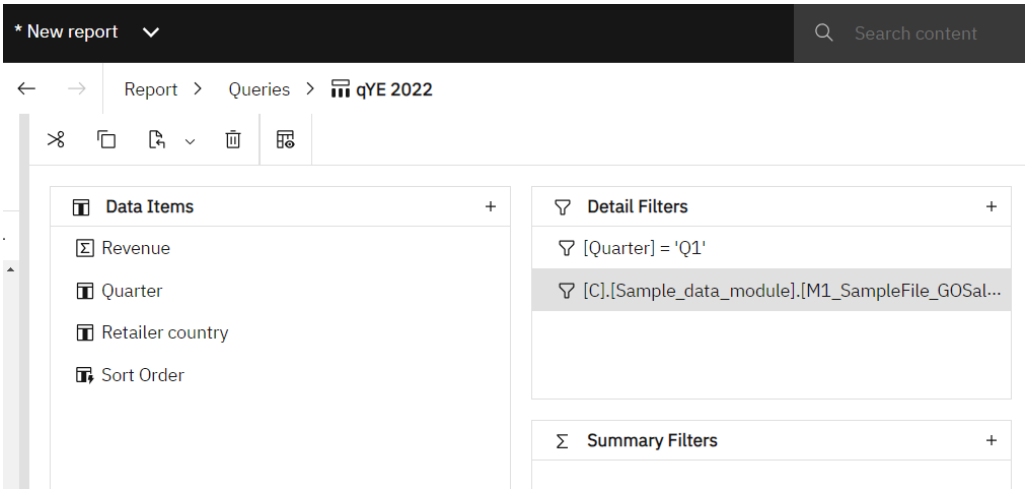


35. Finally, drag *Year* from the *Sources*  tab and drop it on the *Detail Filters* box.

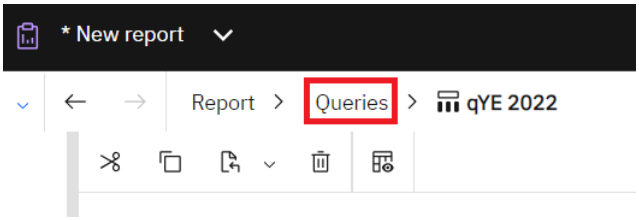
36. In the resulting dialog, type **= 2022** at the end and click *OK*:



37. Your query should look like this:



38. In the report navigator, click *Queries* to get back to the root level:



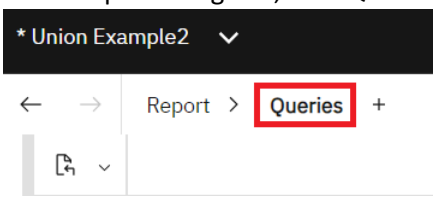
39. Select *qYE 2022*  and rename it to *qQ1 2022* in the properties.

Technical

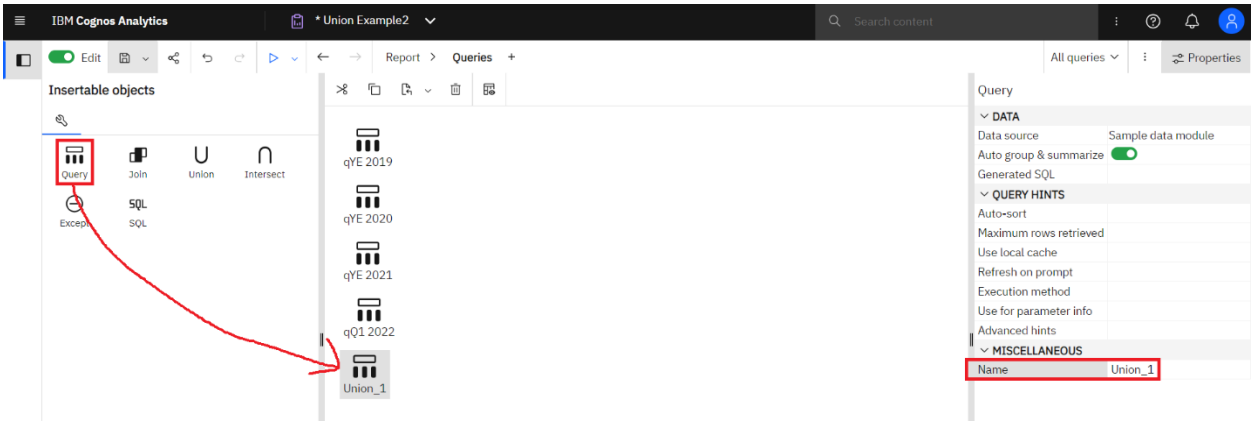
To create a successful Union, all four queries must have the same number of data items (in our example, 4) in the same order (in our example: measure, time, category, sort).

Now we can start to build the union. A union returns all rows from both queries. Since we can only union 2 queries at a time, we will need to create a total a of 3 unions to achieve the result we need from 4 queries.

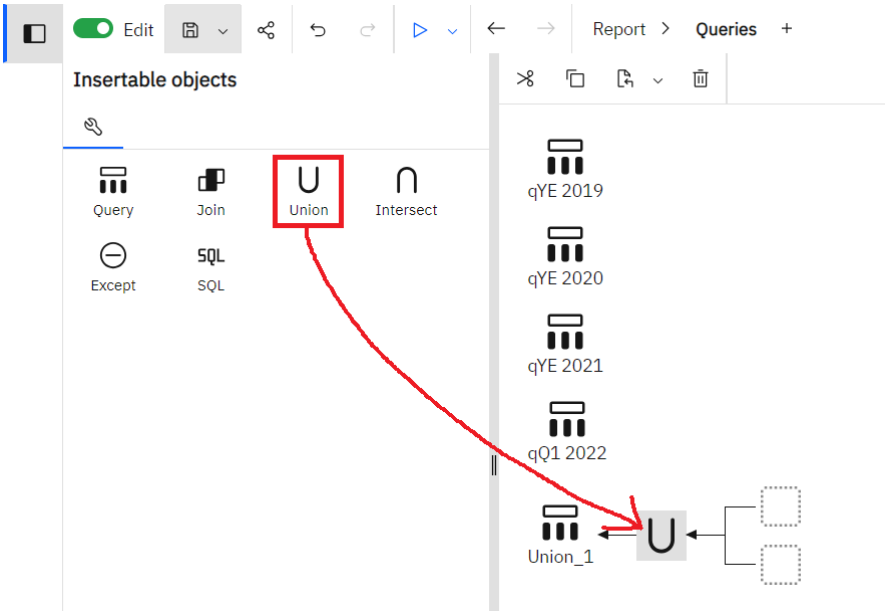
1. In the report navigator, click *Queries* to get back to the root level:



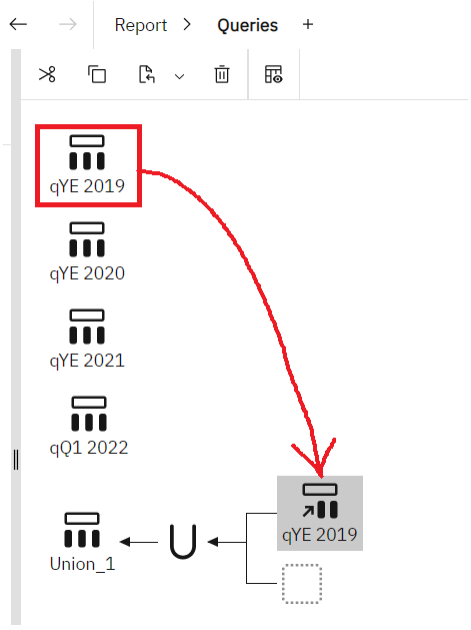
2. From the Toolbox , drag a *Query* object onto the report and rename it **Union_1**:



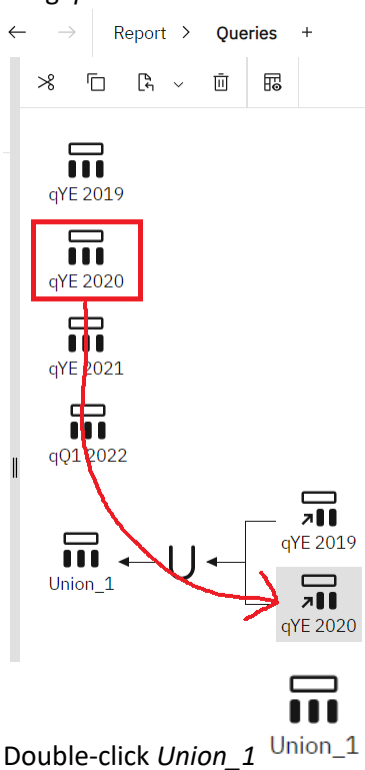
3. From the Toolbox , drag a *Union* object onto the report to the right of *Union_1*:



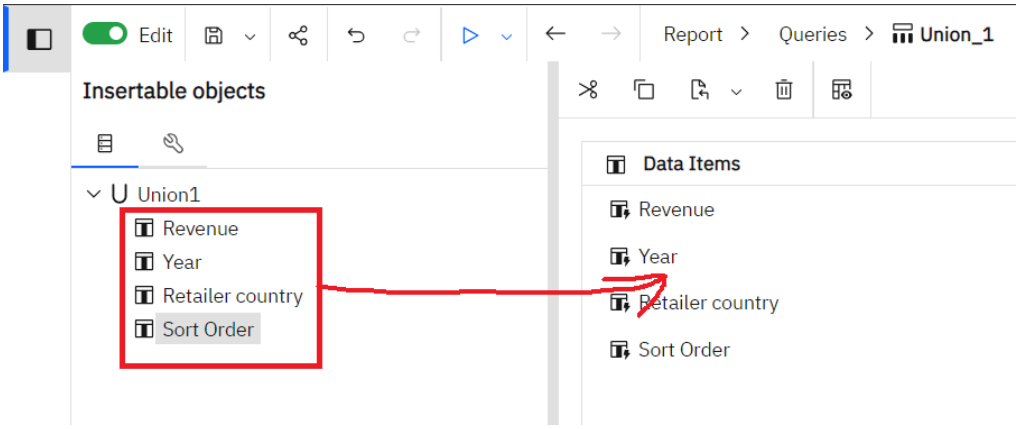
4. Drag *qYE 2019* onto the first empty box in the union:



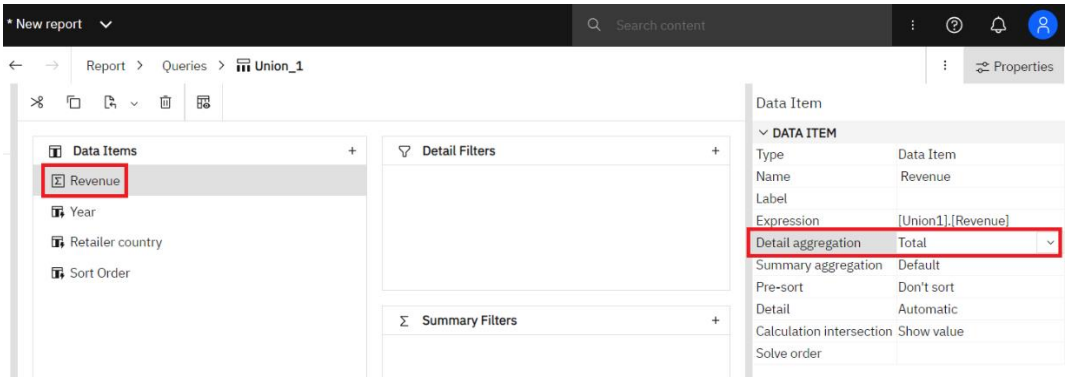
5. Drag *qYE 2020* onto the second empty box in the union:



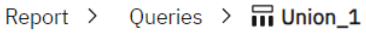
6. Double-click *Union_1*
7. Open the *Source* tab
8. Drag all 4 data items from the *Source* tab onto the *Data Items* box:



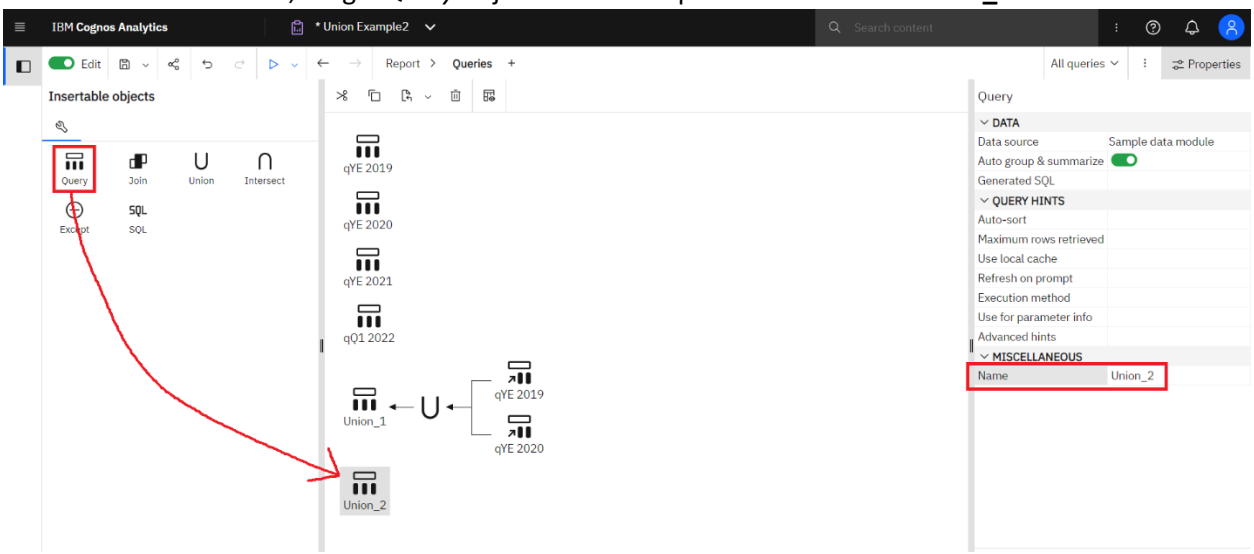
9. Select *Revenue* (in the *Data Items* box) and set the *Detail aggregation* property to *Total*. This will turn it back into a Measure:



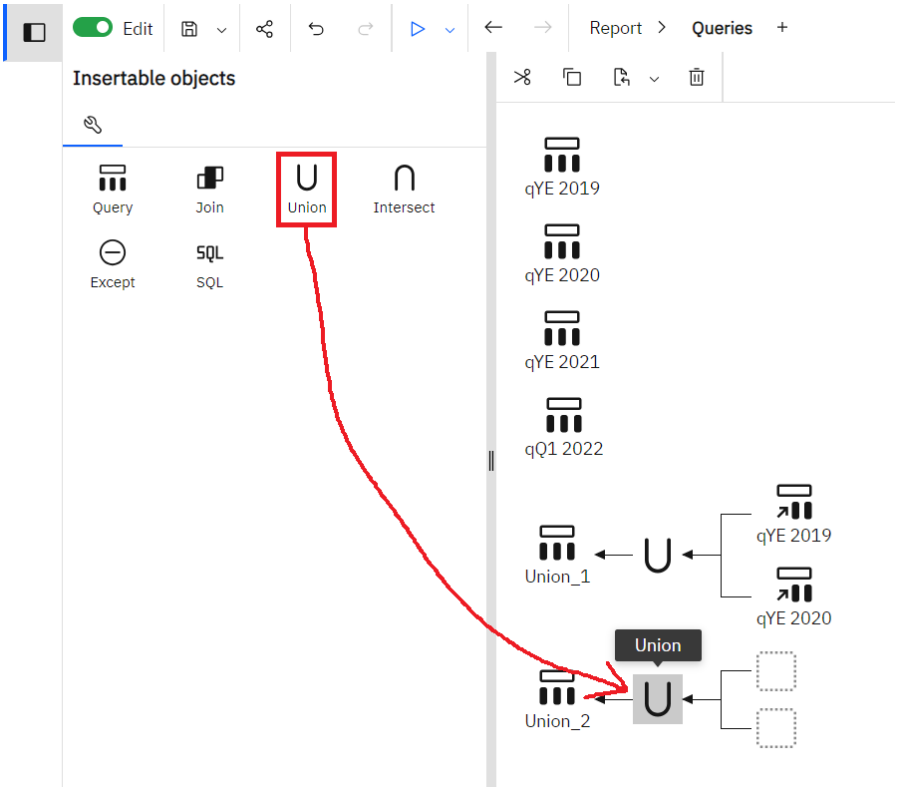
10. In the report navigator, click *Queries* to get back to the root level:



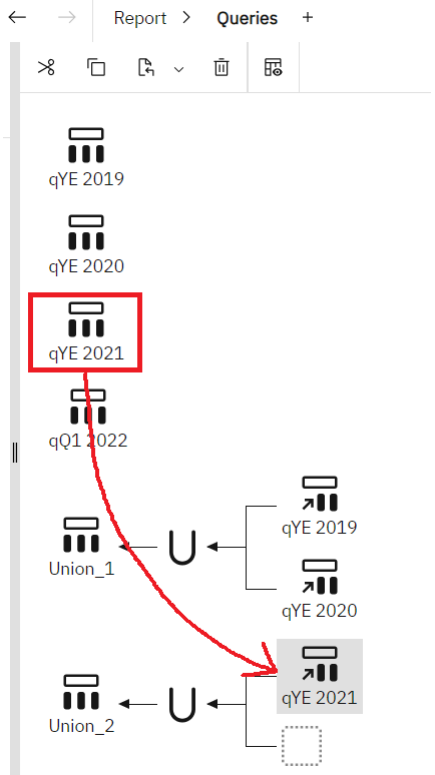
11. From the Toolbox  , drag a *Query* object onto the report and rename it **Union_2**:



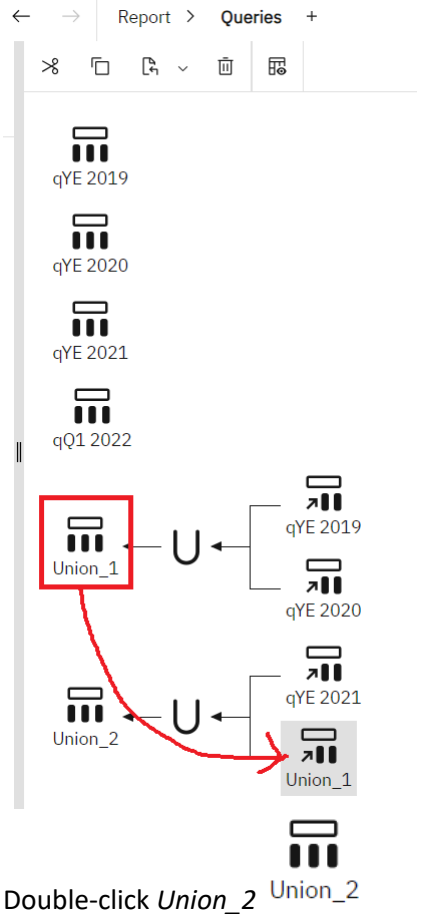
12. From the Toolbox , drag a *Union* object onto the report to the right of *Union_2*:



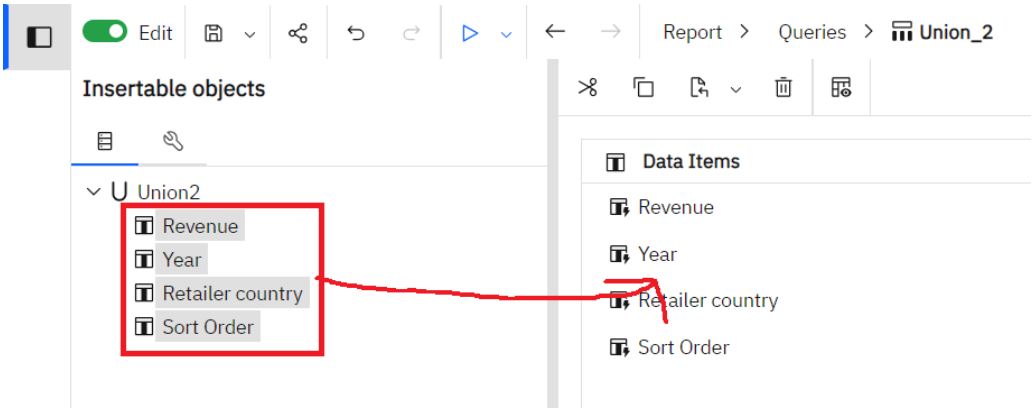
13. Drag *qYE 2021* onto the first empty box in the union:



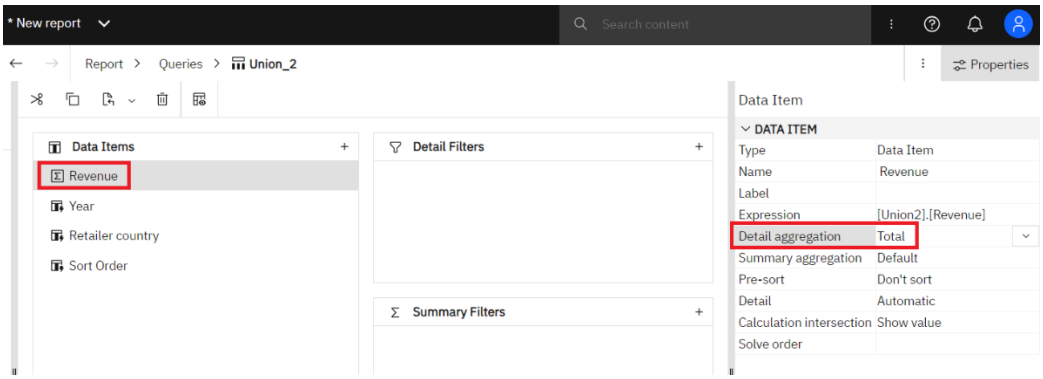
14. Drag *Union_1* onto the second empty box in the union:



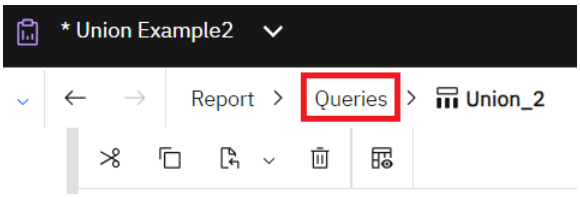
15. Double-click *Union_2*
16. Open the *Source* tab
17. Drag all 4 data items from the *Source* tab onto the *Data Items* box:



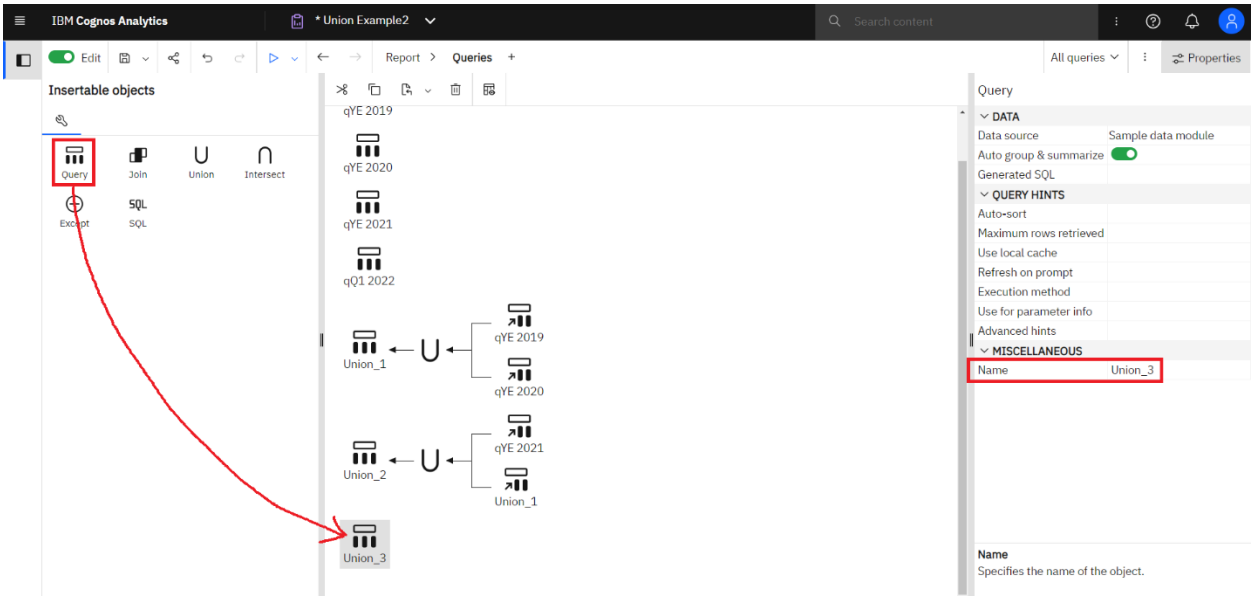
18. Select *Revenue* (in the *Data Items* box) and set the *Detail aggregation* property to *Total*. This will turn it back into a Measure:



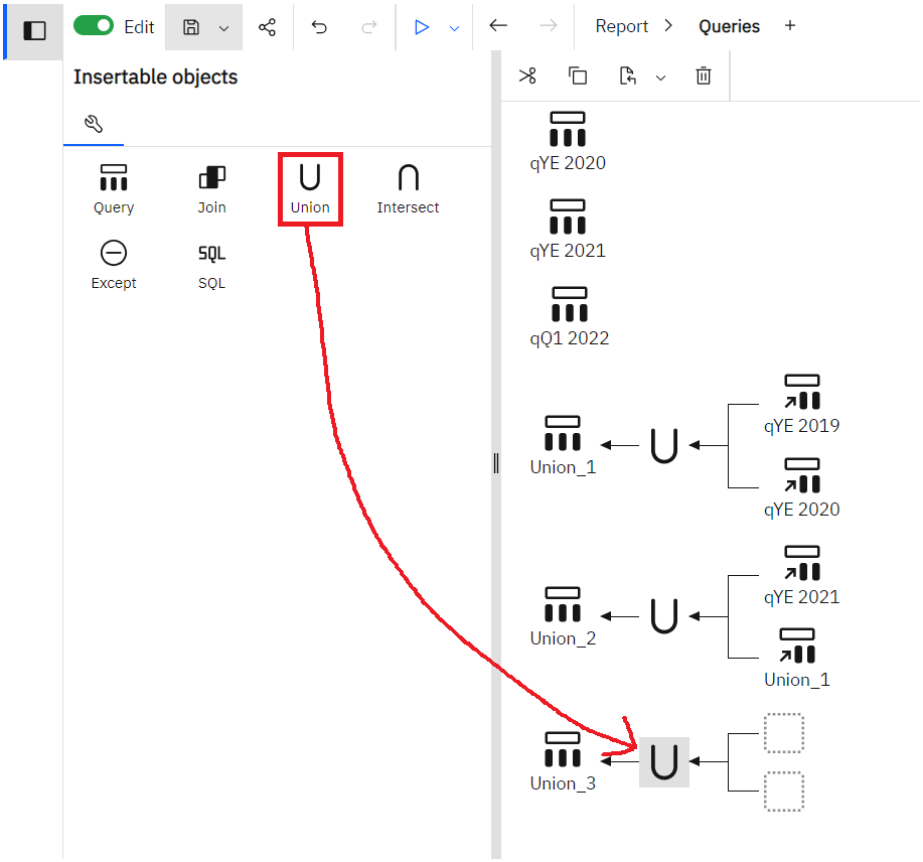
19. In the report navigator, click *Queries* to get back to the root level:



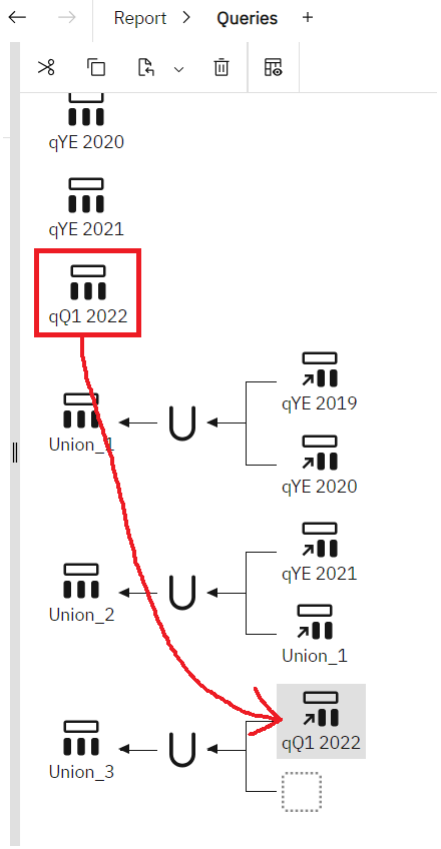
20. From the Toolbox  , drag a *Query* object onto the report and rename it **Union_3**:



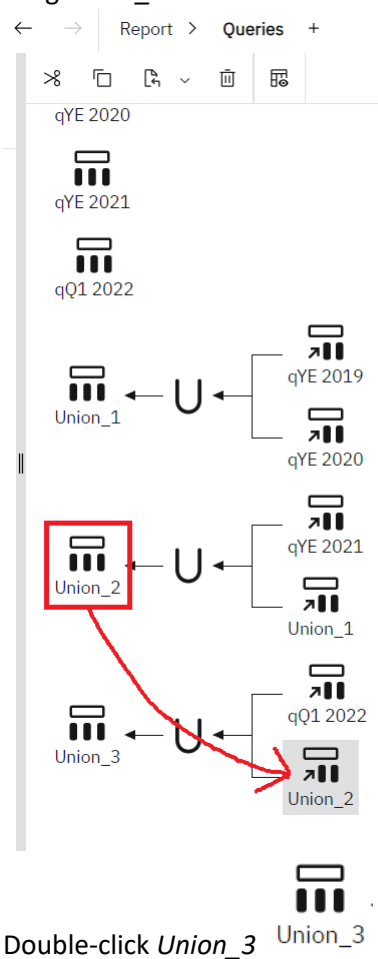
21. From the Toolbox , drag a *Union* object onto the report to the right of *Union_3*:



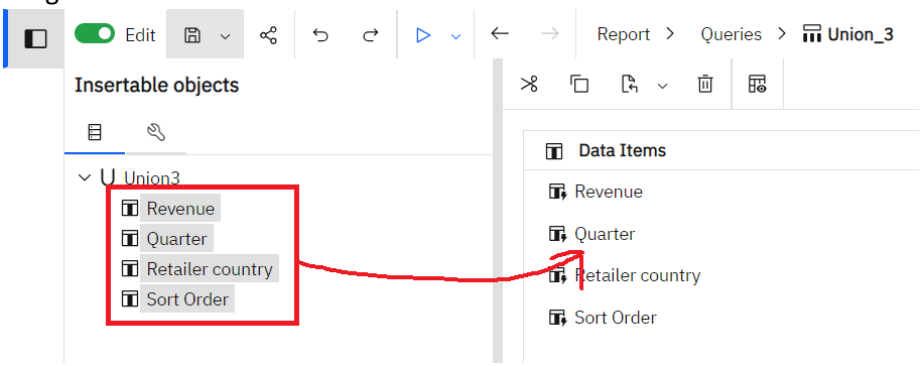
22. Drag *qQ1 2022* onto the first empty box in the union:



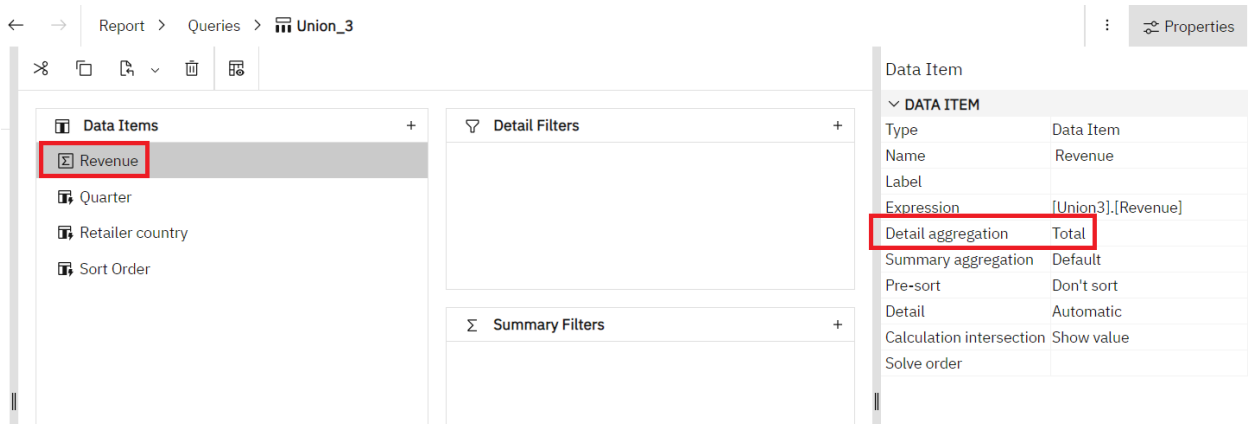
23. Drag *Union_2* onto the second empty box in the union:



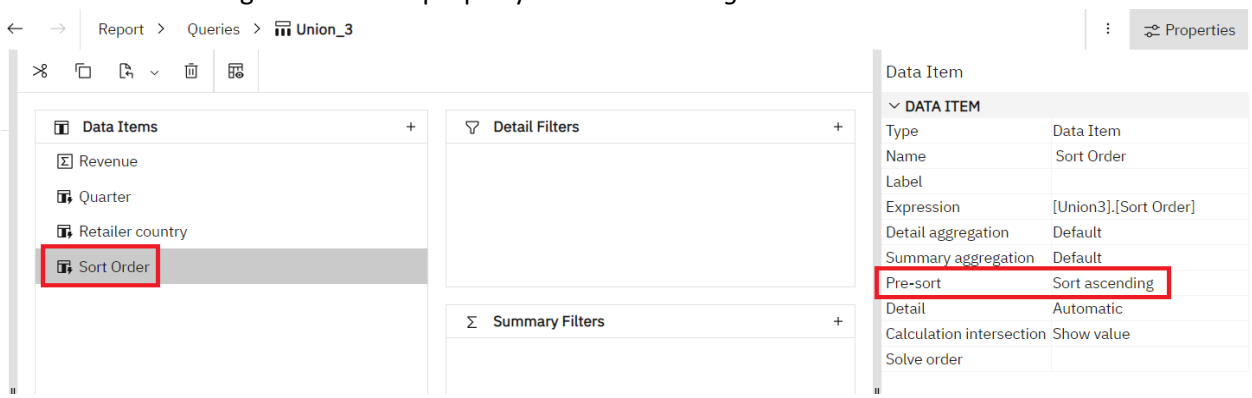
24. Double-click *Union_3*
25. Open the *Source* tab
26. Drag all 4 data items from the *Source* tab onto the *Data Items* box:



27. Select *Revenue* (in the *Data Items* box) and set the *Detail aggregation* property to *Total*. This will turn it back into a Measure:



28. Now we will set the sort order. In the final query named *Union_3*, select the data item named *Sort Order* and change the *Pre-sort* property to *Sort ascending*:



29. To obtain the labels we want to display in our chart, we need to add a Case statement to Quarter. Double-click *Quarter* in the *Data Items* box. In the resulting dialog, type this in the *Expression Definition* box and click *OK*:

```
case [Union3].[Quarter]
when ('2019') then ('YE 2019')
when ('2020') then ('YE 2020')
when ('2021') then ('YE 2021')
when ('Q1') then ('Q1 2022')
else ([Union3].[Quarter])
end
```


Technical

You will notice that in the first 3 queries we have:

- Revenue
- Year
- Retailer country
- Sort Order

In the 4th query we have:

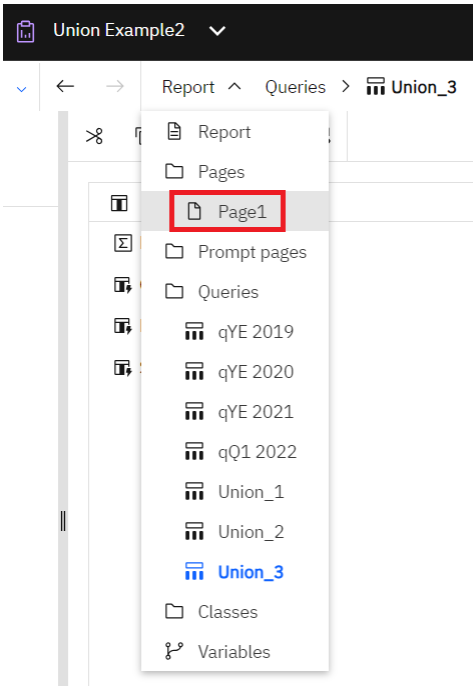
- Revenue
- Quarter
- Retailer country
- Sort Order

In Step 26, you will only see the query items for the 4th query after you create the union. Do not be alarmed that you don't see *Year* anymore. You only see *Quarter* because it was last in the union. Remember, to create a successful Union, all four queries must have the same number of data items (in our example, 4) in the same order (in our example: measure, time, category, sort). The second data item always holds our element of time, whether it is a year or a quarter.

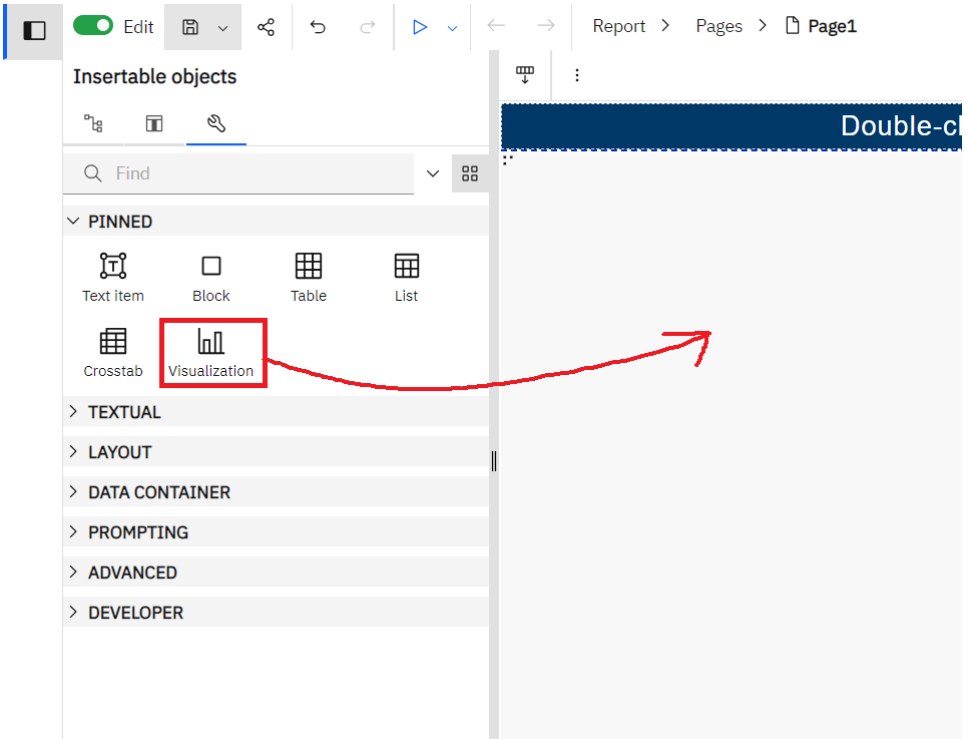
See Appendix A for more information.

Now we are ready to build a visualization using our unioned data. In this example, we will build a Clustered Column visualization from the data in Union_3.

1. Use the report navigator to go to *Page1*:

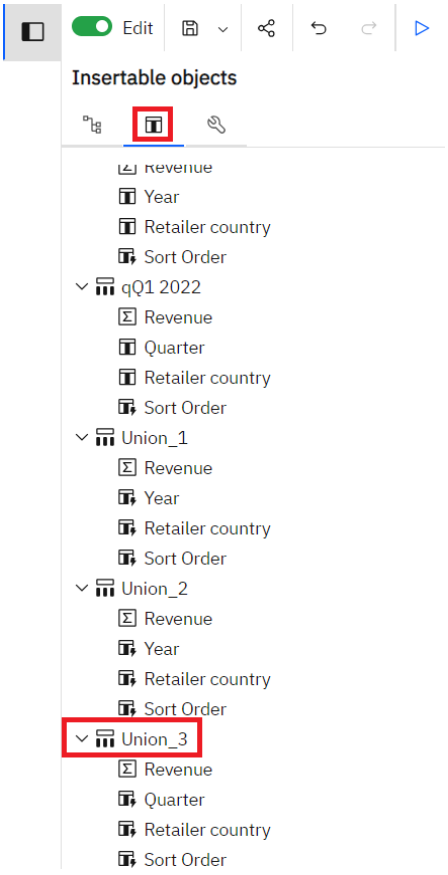


2. From the Toolbox , drag a *Visualization* onto the report:



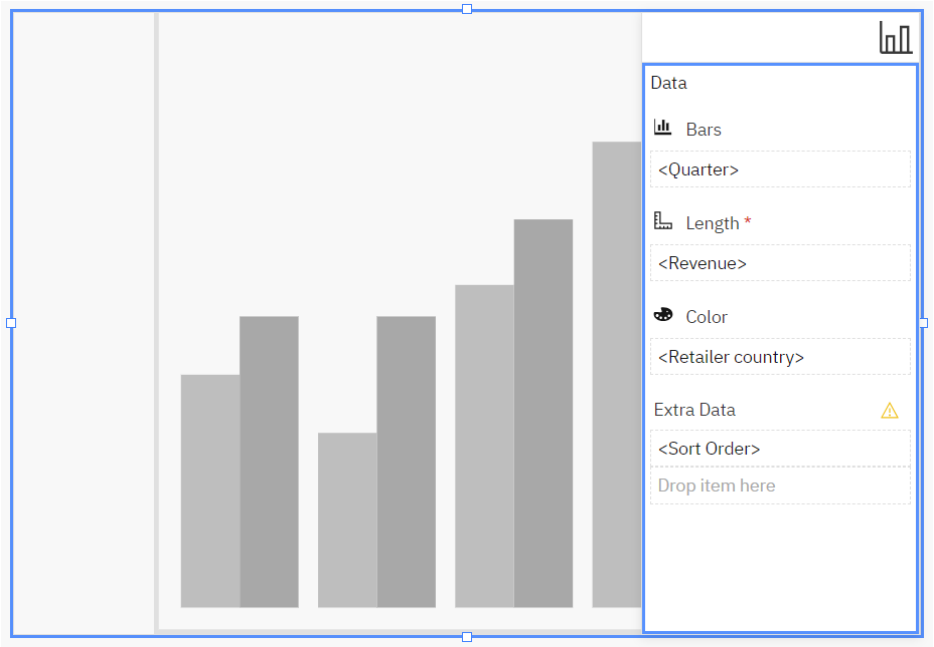
3. In the *Visualization Gallery* dialog, select *Clustered column* and click *OK*.

4. Open the Data Items panel and scroll down to *Union_3*:

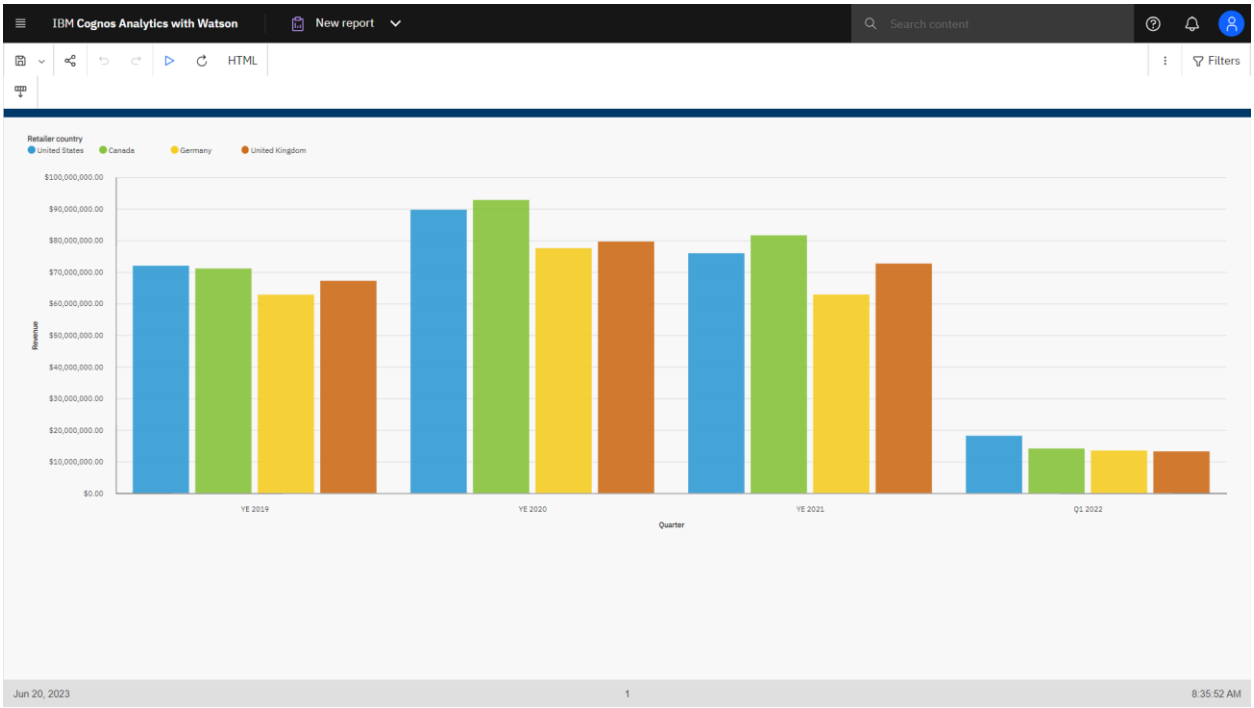


5. Drag and drop the following data items onto the slots in the visualization:
    a. Drag *Revenue* to the *Length* slot
    b. Drag *Quarter* to the *Bars* slot
    c. Drag *Retailer country* to the *Color* slot
    d. Drag *Sort Order* to the *Extra Data* slot

6. Your visualization now looks like this:

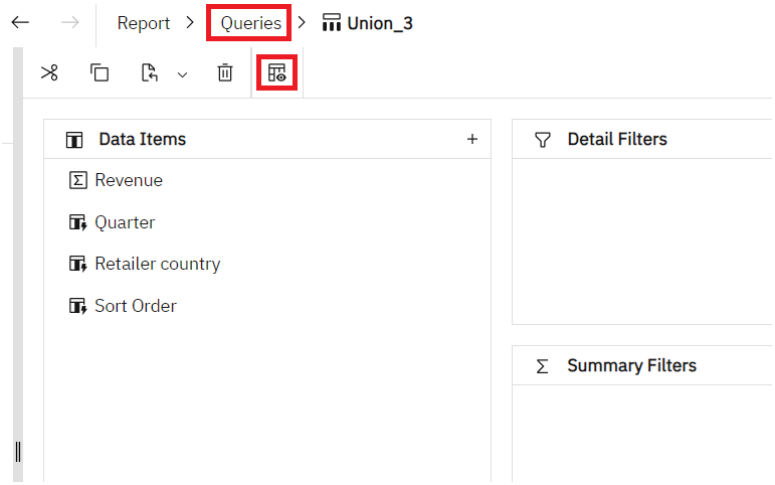


7. If you run the report, the visualization is rendered like this:

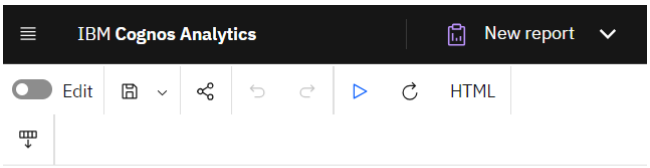


Appendix A

The union is almost like a data set. To see the actual data that is returned and verify that it is correct, navigate to the final union in the *Queries* view and click *View tabular data* :



Now you can really see why the 4 queries all need to have the same data items in the same order:



Revenue	Quarter	Retailer country	Sort Order
$71,097,620.63	2019	Canada	1
$62,805,043.64	2019	Germany	1
$71,972,533.83	2019	United States	1
$67,196,315.79	2019	United Kingdom	1
$92,783,128.03	2020	Canada	2
$77,524,883.12	2020	Germany	2
$89,683,016.86	2020	United States	2
$79,624,005.65	2020	United Kingdom	2
$81,601,807.58	2021	Canada	3
$62,854,179.50	2021	Germany	3
$75,921,070.07	2021	United States	3
$72,659,589.45	2021	United Kingdom	3
$14,124,637.72	Q1	Canada	4
$13,485,056.36	Q1	Germany	4
$18,164,089.99	Q1	United States	4
$13,207,460.12	Q1	United Kingdom	4

The final result ultimately generates just 16 rows.