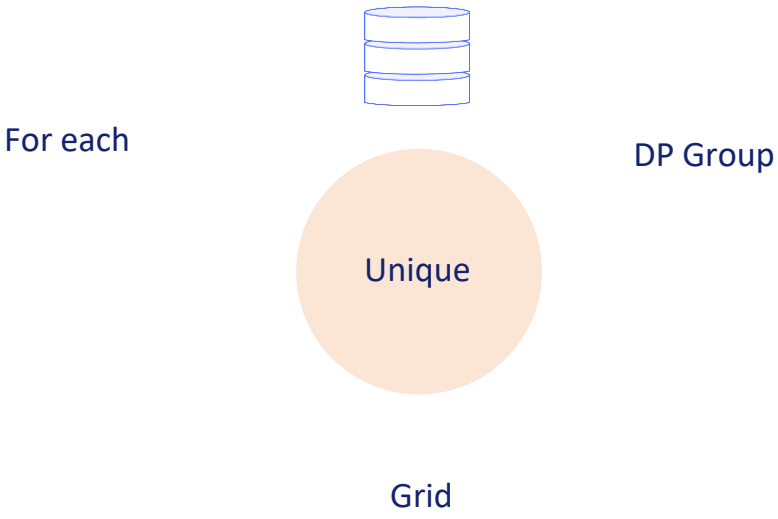
Logic for querying the database with GeneXus

For each command: Unique clause

GeneXus™



We will discuss in some detail the Unique clause applied to the For each command, knowing that it can also be used in groups of data providers and grids with a base table.

For each *BaseTrn$_1$, … , BaseTrn$_n$*

skip *expression$_1$* **count** *expression$_2$*
order *att$_1$*, *att$_2$*, … , *att$_n$* [**when** *condition*]
order *att$_1$*, *att$_2$*, … , *att$_n$* [**when** *condition*]
order none [**when** *condition*]
unique *att$_1$*, *att$_2$*, … , *att$_n$*
using *DataSelector* (*parm$_1$*, *parm$_2$*, … , *parm$_n$*)
where *condition* [**when** *condition*]
where *condition* [**when** *condition*]
where *att* **IN** *DataSelector* (*parm$_1$*, *parm$_2$*, … , *parm$_n$*)
blocking *n*
main_code
when duplicate
when_duplicate_code
when none
when_none_code

endfor

Here we see it among the other clauses of the For each.

Navigation group

unique D, E → **Print info //** D, E

A*	B*	C	D	E	F	G	H	I

When the value of a set of attributes is repeated for many records—in this example, D and E—we can use the unique clause to work with one of all the records whose value is repeated (as if it represented the group); for example, printing the values of those attributes (since they will be the same for all the records of the group), and then moving on to the next group, to do the same. And so on until using all of them.

Navigation group

unique D, E → **Print info //** D, E

A*	B*	C	D	E	F	G

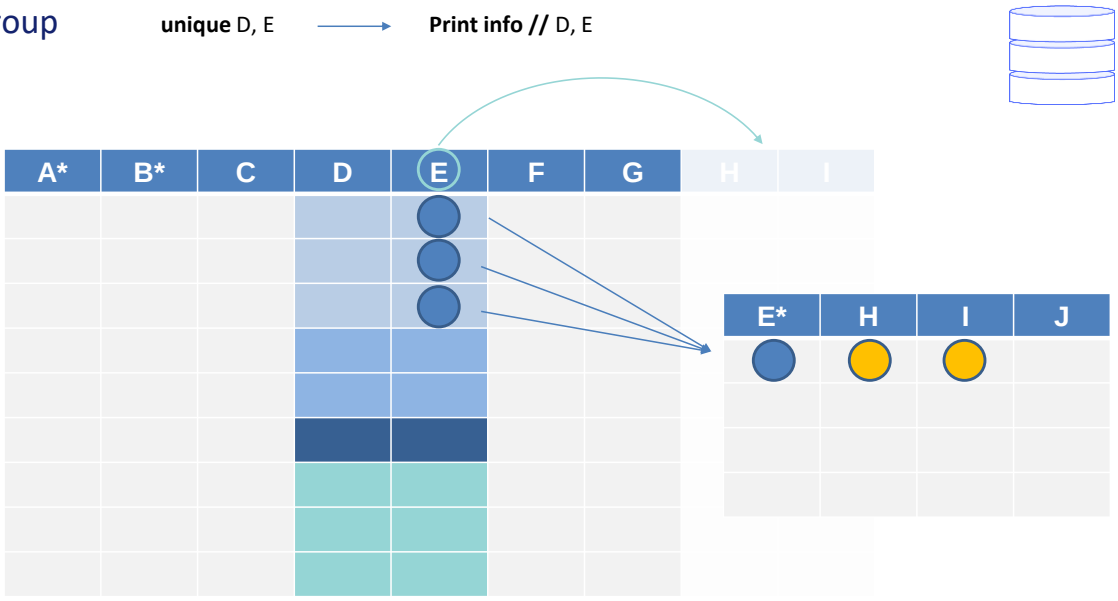
```
For each BaseTrn1, ... , BaseTrnn
    skip expression1 count expression2
    order att1, att2, ... , attn [when condition]
    order att1, att2, ... , attn [when condition]
    order none [when condition]
    unique att1, att2, ... , attn
    using DataSelector ( parm1, parm2, ... , parmn )
    where condition [when condition]
    where condition [when condition]
    where att IN DataSelector ( parm1, parm2, ... , parmn )
    blocking n
        main_code
    when duplicate
        when_duplicate_code
    when none
        when_none_code
endfor
```

For this to make sense, only attributes whose value is unique for each and every record in the group can appear in the code to be executed for each group.

The attributes included there do not have to be part of the same table. They can be in the extended one.

Navigation group

unique D, E → **Print info //** D, E



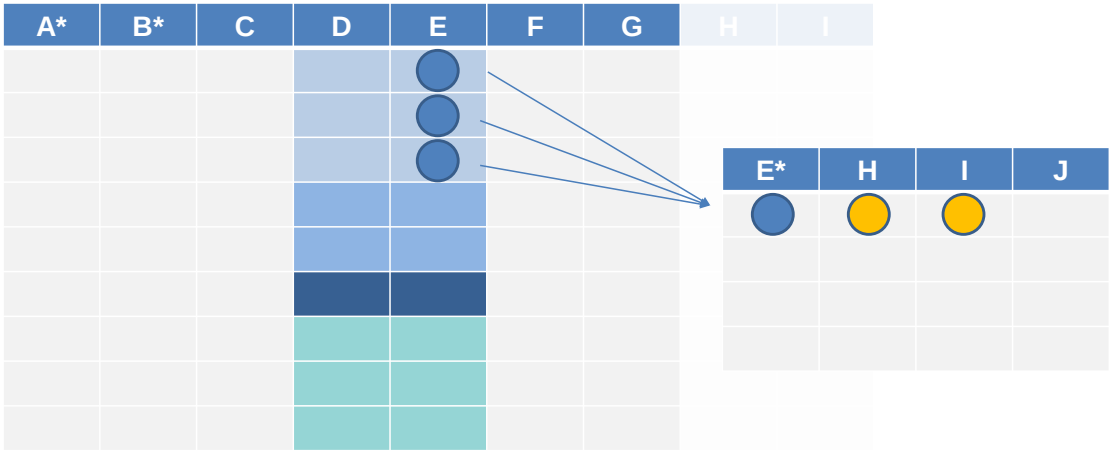
Let's suppose that this is a graphical representation of the extended table and not a physical table.

For example, suppose that E is a foreign key that determines H and I. That is, this physical table exists.

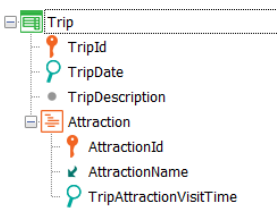
This means that for all the records in the group, since the values of E are the same, the values of H and I will also be the same.

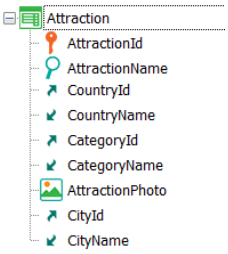
Navigation group

unique D, E → **Print info //** D, E , H, I



This means that we can also use the H and I attributes within the code that will be executed for the group, since they will also be unique to that set of records.






```
for each Trip.Attraction
   order AttractionId
      for each Trip.Attraction
      endfor
      print AttractionInfo //AttractionName
endfor


for each Trip.Attraction
   unique AttractionId
      print AttractionInfo //AttractionName
endfor
```

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
3	1	200
1	3	120
3	6	180
4	6	240
2	10	120
2	12	90

AttractionId*	AttractionName	...
1	Louvre Museum	...
2	The Great Wall	...
3	Eiffel Tower	...
4	Christ the Redeemer	...
5	Smithsonian Institute	...
6	Matisse Museum	....
7	Forbidden city	...
10	Rifugio Nuvolau	...
12	Cinque Terre	

Let's see examples.

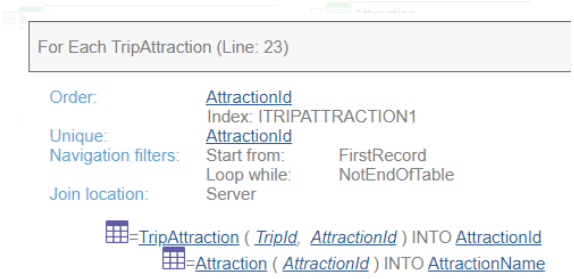
We have the trips that can be made to different tourist attractions with an assigned amount of time for each visit.

We want to obtain a list of the tourist attractions included in these trips. Let's suppose that this is the current data from the tables. We will want to list only these attractions.

A first option could be to implement a control break that navigates TripAttraction and groups by AttractionId.

In this way, we can be sure that we are only listing attractions actually included in trips. Also, by placing the print command after the nested For each (although placing it before would have been the same), we know that for each group we will be printing only the AttractionName that is repeated.

This can be solved in a much simpler way using the Unique clause. It's the most obvious use case.




```
for each Trip.Attraction
   order AttractionId
      for each Trip.Attraction
      endfor
      print AttractionInfo //AttractionName
endfor
```

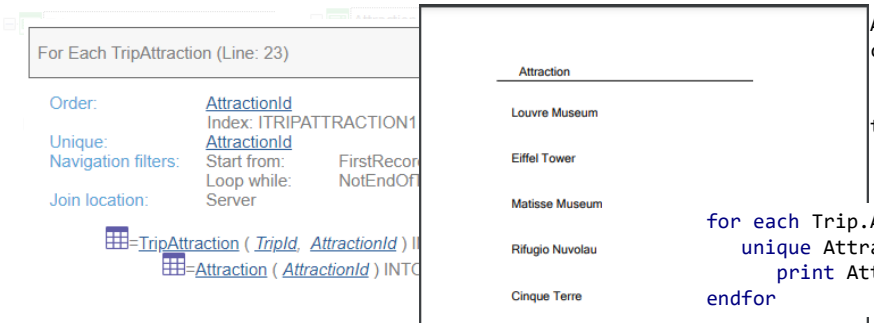
```
for each Trip.Attraction
   unique AttractionId
      print AttractionInfo //AttractionName
endfor
```

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
3	1	200
1	3	120
3	6	180
4	6	240
2	10	120
2	12	90

AttractionId*	AttractionName	...
1	Louvre Museum	...
2	The Great Wall	...
3	Eiffel Tower	...
4	Christ the Redeemer	...
5	Smithsonian Institute	...
6	Matisse Museum	....
7	Forbidden city	...
10	Rifugio Nuvolau	...
12	Cinque Terre	

In the navigation list of the For each with Unique, we see that since it has an index by AttractionId in TripAttraction (because it is a foreign key) it will choose to sort by that attribute.

Therefore, it starts in the first group where the value of AttractionId is repeated, and its AttractionName (which is unique for all the records of the group) is printed in the output: Louvre Museum.




```
Attraction
ctionId
 Trip.Attraction

tractionInfo //AttractionName
```

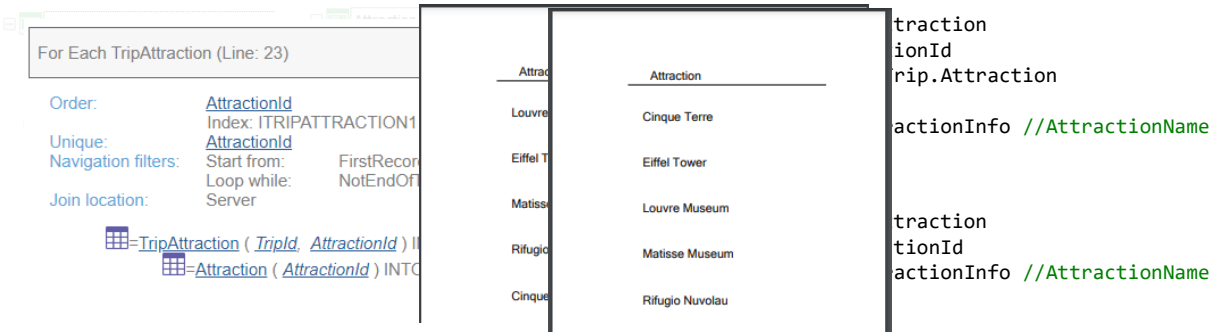
```
for each Trip.Attraction
   unique AttractionId
      print AttractionInfo //AttractionName
endfor
```

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
3	1	200
1	3	120
3	6	180
4	6	240
2	10	120
2	12	90

AttractionId*	AttractionName	...
1	Louvre Museum	...
2	The Great Wall	...
3	Eiffel Tower	...
4	Christ the Redeemer	...
5	Smithsonian Institute	...
6	Matisse Museum	....
7	Forbidden city	...
10	Rifugio Nuvolau	...
12	Cinque Terre	

The next group is a single record: Eiffel Tower is printed.

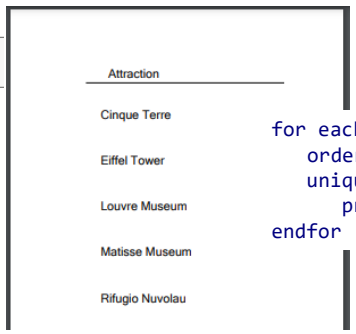
Then the attraction with ID 6, which is Matisse Museum. Then 10, and finally 12.



TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
3	1	200
1	3	120
3	6	180
4	6	240
2	10	120
2	12	90

AttractionId*	AttractionName	...
1	Louvre Museum	...
2	The Great Wall	...
3	Eiffel Tower	...
4	Christ the Redeemer	...
5	Smithsonian Institute	...
6	Matisse Museum	....
7	Forbidden city	...
10	Rifugio Nuvolau	...
12	Cinque Terre	

If we wanted these attractions to be sorted by attraction name...




```
for each Trip.Attraction
   order AttractionName
   unique AttractionId
      print AttractionInfo //AttractionName
endfor
```

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
3	1	200
1	3	120
3	6	180
4	6	240
2	10	120
2	12	90

AttractionId*	AttractionName	...
1	Louvre Museum	...
2	The Great Wall	...
3	Eiffel Tower	...
4	Christ the Redeemer	...
5	Smithsonian Institute	...
6	Matisse Museum	....
7	Forbidden city	...
10	Rifugio Nuvolau	...
12	Cinque Terre	

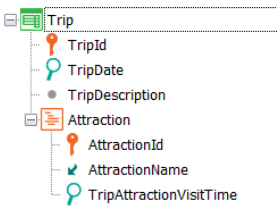
...we could add the order clause.

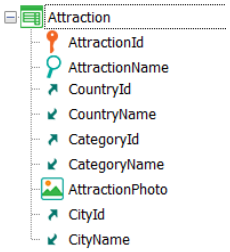
And so we see the navigation list. The single value being sought is still AttractionId but the result of the query will be ordered by AttractionName.

Could we instead use the AttractionName attribute directly in the unique clause?

Yes, but note two things. On one hand, doing this does not ensure that the list is also sorted by AttractionName. Note that the navigation list shows Order NONE. GeneXus doesn't know about the existence of an index by AttractionName. So we should still order by AttractionName if that is what we want.

On the other hand, let's think about what would happen if we had two attractions with the same name in the database.






```
for each Trip.Attraction
   order AttractionName
   unique AttractionId
      print AttractionInfo //AttractionName
endfor

for each Trip.Attraction
   order AttractionName
   unique AttractionName
      print AttractionInfo //AttractionName
endfor
```

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
3	1	200
1	3	120
3	6	180
4	6	240
5	8	60
2	10	120
2	12	90

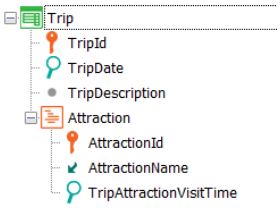
AttractionId*	AttractionName	...
1	Louvre Museum	...
2	The Great Wall	...
3	Eiffel Tower	...
4	Christ the Redeemer	...
5	Smithsonian Institute	...
6	Matisse Museum	....
7	Forbidden city	...
8	Louvre Museum	
10	Rifugio Nuvolau	...
12	Cinque Terre	

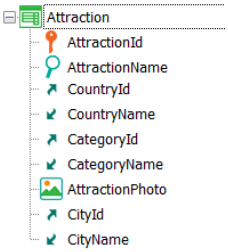
For example, 1 and 8. If we don't have a unique index by AttractionName this will be allowed. And note that we have attraction 1 in 2 trips, and 8 in 1.

The only difference between this For each and this other one is the unique clause.

In the first case, these two records will be handled together, and Louvre Museum will be listed; and this one will be handled separately, in another group, and Louvre Museum will be listed again.

In the second case, however, the three records will be in the same group, and Louvre Museum will be listed only once, even if it corresponds to two different attractions.



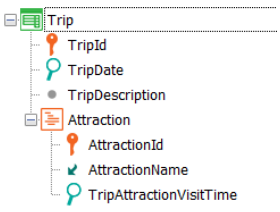


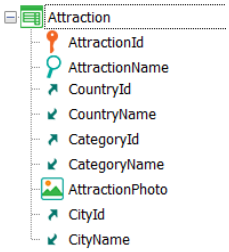

```
for each Trip.Attraction
   order AttractionName
   unique AttractionId
      print AttractionInfo //AttractionName
endfor

for each Trip.Attraction
   order AttractionName
   unique AttractionName
      print AttractionInfo //AttractionName
endfor
```

TripId*	AttractionId*	TripAttractionVisitTime	AttractionName
1	1	180	Louvre Museum
3	1	200	Louvre Museum
1	3	120	Eiffel Tower
3	6	180	Matisse Museum
4	6	240	Matisse Museum
5	8	60	Louvre Museum
2	10	120	Rifugio Nuvolau
2	12	90	Cinque Terre

AttractionId*	AttractionName	...
1	Louvre Museum	...
2	The Great Wall	...
3	Eiffel Tower	...
4	Christ the Redeemer	...
5	Smithsonian Institute	...
6	Matisse Museum	....
7	Forbidden city	...
8	Louvre Museum	
10	Rifugio Nuvolau	...
12	Cinque Terre	

We can see it very clearly if we imagine the data like this, with the extended table as a super table.






```
for each Trip.Attraction
   order AttractionName
   unique AttractionId
      print AttractionInfo //AttractionName
endfor

for each Trip.Attraction
   order AttractionName
   unique AttractionName
      print AttractionInfo //AttractionName
endfor
```

TripId*	AttractionId*	TripAttractionVisitTime	AttractionName
2	12	90	Cinque Terre
1	3	120	Eiffel Tower
1	1	180	Louvre Museum
3	1	200	Louvre Museum
5	8	60	Louvre Museum
3	6	180	Matisse Museum
4	6	240	Matisse Museum
2	10	120	Rifugio Nuvolau

AttractionId*	AttractionName	...
1	Louvre Museum	...
2	The Great Wall	...
3	Eiffel Tower	...
4	Christ the Redeemer	...
5	Smithsonian Institute	...
6	Matisse Museum	....
7	Forbidden city	...
8	Louvre Museum	
10	Rifugio Nuvolau	...
12	Cinque Terre	

If we order it by AttractionName we see it more clearly... Note that there is no problem with the attribute of the unique clause being in the extended table and not in the base table.

In short, it will not be the same to ask for unique values for AttractionId and for AttractionName.

If the unique index exists, then the result of both For each commands will be exactly the same, because this record 8 cannot possibly exist.

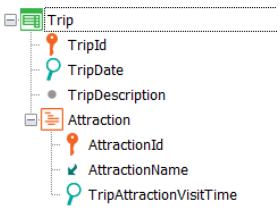
Navigation group

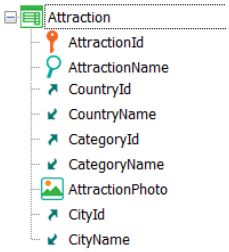
unique D, E → **&qty = Count(C)**
Print info // D, E , &qty

A*	B*	C	D	E	F	G	H	I

In addition, we can not only keep one of the repeated records to do something with the information that doesn't vary (like printing it), but we can also run aggregation formulas on the repeated ones; for example, to count them. Of course, the formula must navigate the same table.

So, we take the first group and run the count on its records (it will give 3 in this case). And it prints D and E—information that is unique to that group—and 3.
Then the next group, for which the count will give 2.
Then the third one, for which the count will give 1. And finally the fourth one, for which the count will give 3.



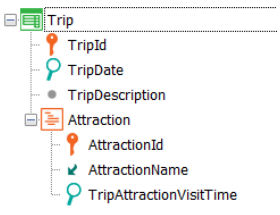


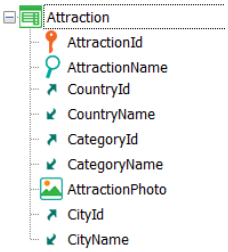

```
for each Trip.Attraction
   unique AttractionId
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //AttractionName, &qty
endfor
```

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
3	1	200
1	3	120
3	6	180
4	6	240
5	8	60
2	10	120
2	12	90

AttractionId*	AttractionName	...
1	Louvre Museum	...
2	The Great Wall	...
3	Eiffel Tower	...
4	Christ the Redeemer	...
5	Smithsonian Institute	...
6	Matisse Museum	....
7	Forbidden city	...
8	Louvre Museum	
10	Rifugio Nuvolau	...
12	Cinque Terre	

In this example, besides keeping the non-repeated AttractionId to list its name, we want to count how many times it is repeated.
In short, the number of trips where it is present.





TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
3	1	200
1	3	120
3	6	180
4	6	240
5	8	60
2	10	120
2	12	90

```
for each Trip.Attraction
   unique AttractionId
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //AttractionName, &qty
endfor
```

For Each TripAttraction (Line: 23)

Order: AttractionId
Index: ITRIPATTRACTION1
Unique: AttractionId
Navigation filters: Start from: FirstRecord
Loop while: NotEndOfTable
Join location: Server

=TripAttraction (*TripId*, *AttractionId*) INTO AttractionId
=Attraction (*AttractionId*) INTO AttractionName
=count(TripAttractionVisitTime) navigation (*AttractionId*)

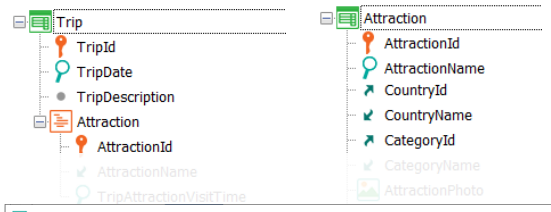
Formulas

Navigation to evaluate: count(TripAttractionVisitTime)

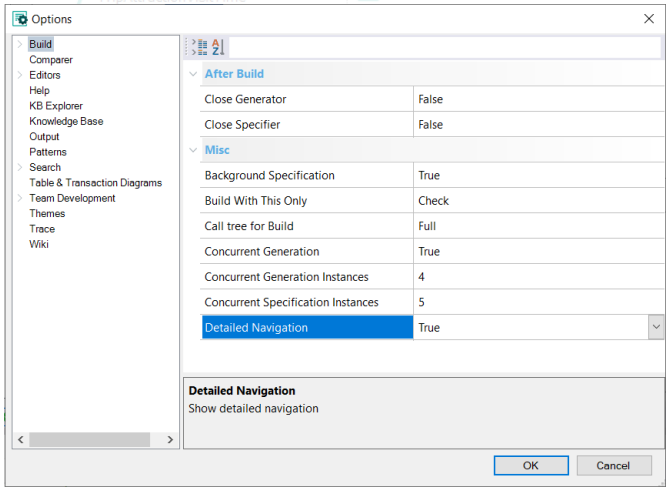
Given: AttractionId
Index: ITRIPATTRACTION
Group by: AttractionId

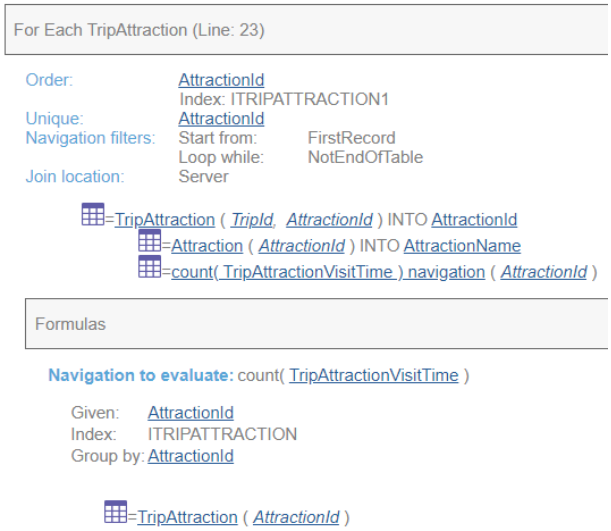
=TripAttraction (*AttractionId*)

The Count formula is using the secondary attribute of the table you want to navigate, so when this is determined, the Count formula will have a special behavior: it will group by the unique attribute, as we see in the navigation list.




```
for each Trip.Attraction
   unique AttractionId
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //AttractionName, &qty
endfor
```





Remember that for the list to show the navigation of the formula we must activate the detailed navigation... through Tools/Options....

Attraction	Trips
Louvre Museum	2
Eiffel Tower	1
Matisse Museum	2
Louvre Museum	1
Rifugio Nuvolau	1
Cinque Terre	1

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
3	1	200
1	3	120
3	6	180
4	6	240
5	8	60
2	10	120
2	12	90

```
for each Trip.Attraction
   unique AttractionId
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //AttractionName, &qty
endfor
```

For Each TripAttraction (Line: 23)

Order: AttractionId
Index: ITRIPATTRACTION1
Unique: AttractionId
Navigation filters: Start from: FirstRecord
Loop while: NotEndOfTable
Join location: Server

=TripAttraction (*TripId*, *AttractionId*) INTO AttractionId
=Attraction (*AttractionId*) INTO AttractionName
=count(TripAttractionVisitTime) navigation (*AttractionId*)

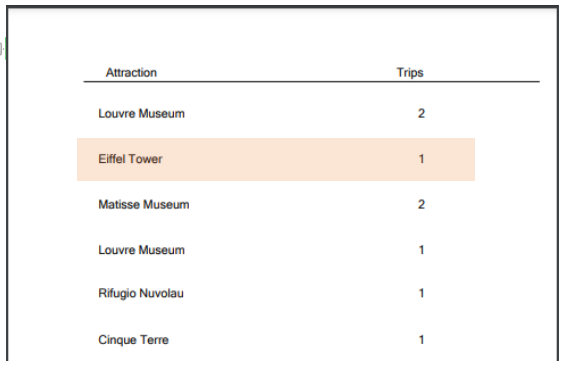
Formulas

Navigation to evaluate: count(TripAttractionVisitTime)

Given: AttractionId
Index: ITRIPATTRACTION
Group by: AttractionId

=TripAttraction (*AttractionId*)

Then, for each group of repeated ones, it will count the records for that given AttractionId, that of each group. Thus, the first group with repeated AttractionId is obtained, its records are counted—those with the same AttractionId—and the attraction name and that number are printed in the output.



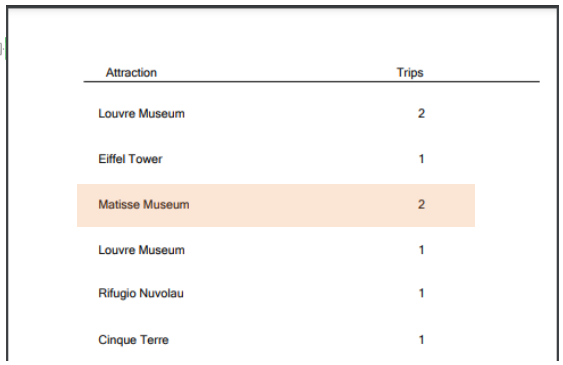
Attraction	Trips
Louvre Museum	2
Eiffel Tower	1
Matisse Museum	2
Louvre Museum	1
Rifugio Nuvolau	1
Cinque Terre	1

```
for each Trip.Attraction
   unique AttractionId
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //AttractionName, &qty
endfor
```

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
3	1	200
1	3	120
3	6	180
4	6	240
5	8	60
2	10	120
2	12	90

AttractionId*	AttractionName	...
1	Louvre Museum	...
2	The Great Wall	...
3	Eiffel Tower	...
4	Christ the Redeemer	...
5	Smithsonian Institute	...
6	Matisse Museum	....
7	Forbidden city	...
8	Louvre Museum	
10	Rifugio Nuvolau	...
12	Cinque Terre	

Then the next group, for which the count is 1.



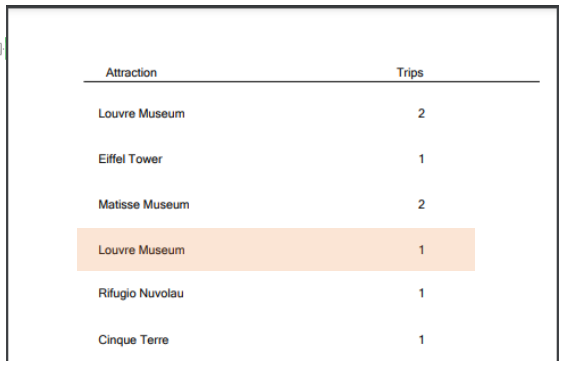
Attraction	Trips
Louvre Museum	2
Eiffel Tower	1
Matisse Museum	2
Louvre Museum	1
Rifugio Nuvolau	1
Cinque Terre	1

```
for each Trip.Attraction
   unique AttractionId
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //AttractionName, &qty
endfor
```

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
3	1	200
1	3	120
3	6	180
4	6	240
5	8	60
2	10	120
2	12	90

AttractionId*	AttractionName	...
1	Louvre Museum	...
2	The Great Wall	...
3	Eiffel Tower	...
4	Christ the Redeemer	...
5	Smithsonian Institute	...
6	Matisse Museum	....
7	Forbidden city	...
8	Louvre Museum	
10	Rifugio Nuvolau	...
12	Cinque Terre	

Then the next one, which gives 2.



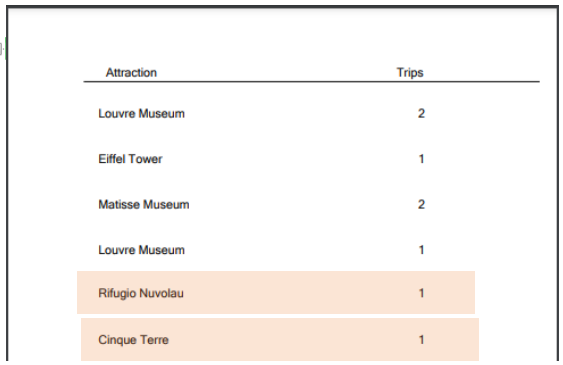
Attraction	Trips
Louvre Museum	2
Eiffel Tower	1
Matisse Museum	2
Louvre Museum	1
Rifugio Nuvolau	1
Cinque Terre	1

```
for each Trip.Attraction
   unique AttractionId
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //AttractionName, &qty
endfor
```

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
3	1	200
1	3	120
3	6	180
4	6	240
5	8	60
2	10	120
2	12	90

AttractionId*	AttractionName	...
1	Louvre Museum	...
2	The Great Wall	...
3	Eiffel Tower	...
4	Christ the Redeemer	...
5	Smithsonian Institute	...
6	Matisse Museum	....
7	Forbidden city	...
8	Louvre Museum	
10	Rifugio Nuvolau	...
12	Cinque Terre	

The next one, with the same name as the first one, gives 1.



Attraction	Trips
Louvre Museum	2
Eiffel Tower	1
Matisse Museum	2
Louvre Museum	1
Rifugio Nuvolau	1
Cinque Terre	1

```
for each Trip.Attraction
   unique AttractionId
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //AttractionName, &qty
endfor
```

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
3	1	200
1	3	120
3	6	180
4	6	240
5	8	60
2	10	120
2	12	90

AttractionId*	AttractionName	...
1	Louvre Museum	...
2	The Great Wall	...
3	Eiffel Tower	...
4	Christ the Redeemer	...
5	Smithsonian Institute	...
6	Matisse Museum	....
7	Forbidden city	...
8	Louvre Museum	
10	Rifugio Nuvolau	...
12	Cinque Terre	

The next one also gives 1, and the last one too.

On the other hand, if instead of AttractionId...

Attraction	Trips
Cinque Terre	1
Eiffel Tower	1
Louvre Museum	3
Matisse Museum	2
Rifugio Nuvolau	1

```
for each Trip.Attraction
   unique AttractionName
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //AttractionName, &qty
endfor
```

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
3	1	200
1	3	120
3	6	180
4	6	240
5	8	60
2	10	120
2	12	90

AttractionId*	AttractionName	...
1	Louvre Museum	...
2	The Great Wall	...
3	Eiffel Tower	...
4	Christ the Redeemer	...
5	Smithsonian Institute	...
6	Matisse Museum	....
7	Forbidden city	...
8	Louvre Museum	
10	Rifugio Nuvolau	...
12	Cinque Terre	

...we use AttractionName in the unique clause, the group corresponding to Louvre Museum will count 3 records.

Attraction	Trips
Cinque Terre	1
Eiffel Tower	1
Louvre Museum	3
Matisse Museum	2
Rifugio Nuvolau	1

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
3	1	200
1	3	120
3	6	180
4	6	240
5	8	60
2	10	120
2	12	90

```
for each Trip.Attraction
   unique AttractionName
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //AttractionName, &qty
endfor
```

For Each TripAttraction (Line: 23)

Order: NONE
Unique: AttractionName
Navigation filters: Start from: FirstRecord
Loop while: NotEndOfTable
Join location: Server

=TripAttraction (*TripId*, *AttractionId*) INTO AttractionId
=Attraction (*AttractionId*) INTO AttractionName
=count(TripAttractionVisitTime) navigation (*AttractionName*)

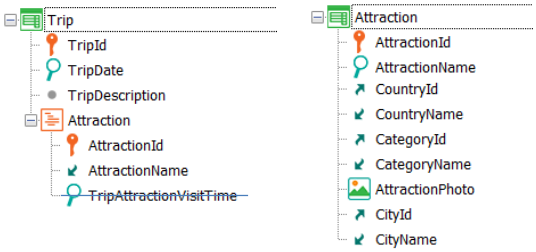
Formulas

Navigation to evaluate: count(TripAttractionVisitTime)

Given: AttractionName
Index: ITRIPATTRACTION
Group by: AttractionName

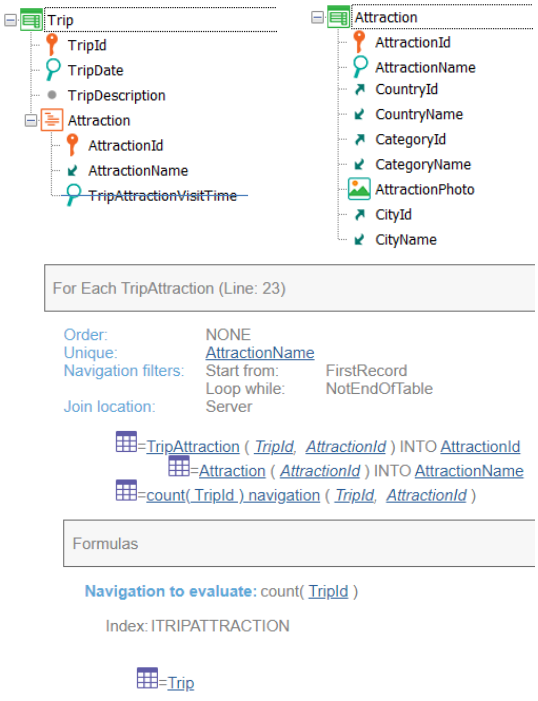
=TripAttraction
=Attraction (*AttractionId*)

In the navigation, we see Given and Group by.

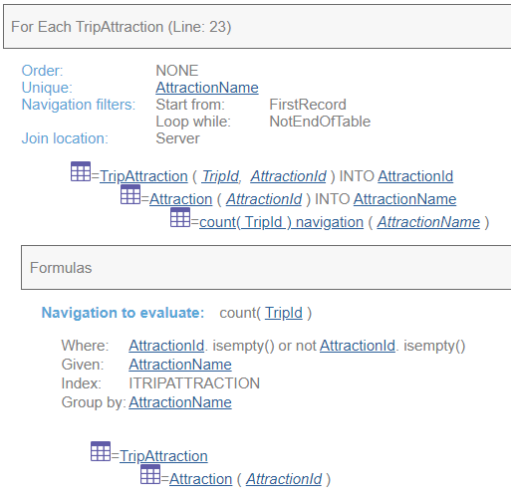



```
for each Trip.Attraction
   unique AttractionName
      &qty = Count(TripAttractionVisitTime)

      print AttractionInfo //AttractionName, &qty
endfor
```

Let's look at this particular case. If there is no secondary attribute in the table we want to navigate, then we may have to do something so that GeneXus understands that we want to navigate that table for the formula.



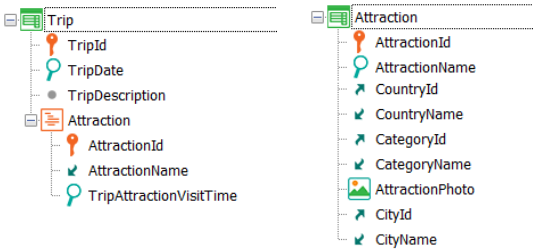

```
for each Trip.Attraction
   unique AttractionName
      &qty = Count(TripId), AttractionId.IsEmpty() or
                                 not AttractionId.IsEmpty())
      print AttractionInfo //AttractionName, &qty
endfor
```



That is to say, if, for example, we place the TripId attribute for the Count and in unique we leave AttractionName, GeneXus may not choose the TripAttraction table to solve the Count formula, but Trip, and the result will not be the desired one.
It is reported that it will navigate the Trip table and count all the trips then, because there is no condition reported for the formula.

It should choose to navigate TripAttraction for it to do what we want. Since we don't have a base transaction for the formulas, we can use a trick: add a condition that is always true and contains an attribute that causes it to determine the base table we want.
For example, this condition that uses AttractionId and that will always be true.
Note the navigation list indicating what we want.

Now it is navigating TripAttraction and also grouping by the AttractionName given in the For each; therefore, only counting the tripattractions of the same AttractionName.




```
for each Trip.Attraction
   unique TripDate, AttractionName
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //TripDate, AttractionName, &qty
endfor
```

01/01/2023 Eiffel Tower 1

TripId*	TripDate	TripDescription
1	1/1/2023	...
2	4/4/2023	...
3	1/1/2023	...
4	5/5/2023	...

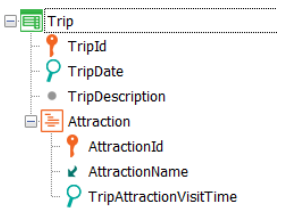
TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
2	1	200
1	3	120
3	6	180
4	6	240
3	8	60

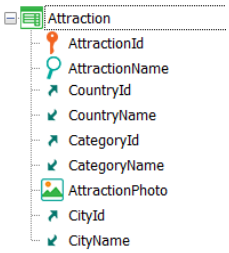
AttractionId*	AttractionName	...
3	Eiffel Tower	...
1	Louvre Museum	...
8	Louvre Museum	....
6	Matisse Museum	....

Let's go a little further. We know that we can specify several attributes in the unique clause, and that they do not have to belong to the base table of the For each, as in this example.

We want to count the number of trips that include a visit to the same attraction name on the same date. That is, for the same TripDate and AttractionName, how many records there are in TripAttraction.

If this is the data from the tables (we only show the relevant records), we see that for Eiffel Tower there will only be one record in TripAttraction: the one for trip 1, which is on this date.






```
for each Trip.Attraction
   unique TripDate, AttractionName
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //TripDate, AttractionName, &qty
endfor
```

01/01/2023 Eiffel Tower 1

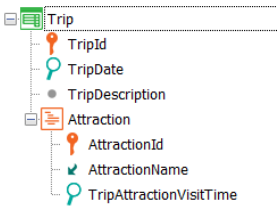
01/01/2023 Louvre Museum 2

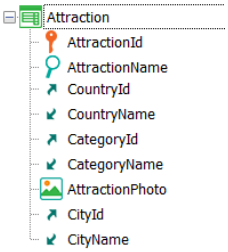
TripId*	TripDate	TripDescription
1	1/1/2023	...
2	4/4/2023	...
3	1/1/2023	...
4	5/5/2023	...

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
2	1	200
1	3	120
3	6	180
4	6	240
3	8	60

AttractionId*	AttractionName	...
3	Eiffel Tower	...
1	Louvre Museum	...
8	Louvre Museum	....
6	Matisse Museum	....

We have the Louvre Museum in these 3 records. When we look at the dates, for trip 1 and for trip 3 they are the same, so in the output we will have...






```
for each Trip.Attraction
   unique TripDate, AttractionName
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //TripDate, AttractionName, &qty
endfor
```

01/01/2023 Eiffel Tower 1

01/01/2023 Louvre Museum 2

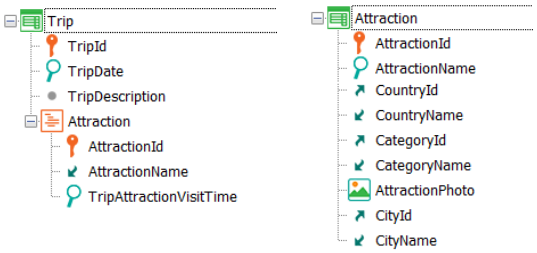
4/4/2023 Louvre Museum 1

TripId*	TripDate	TripDescription
1	1/1/2023	...
2	4/4/2023	...
3	1/1/2023	...
4	5/5/2023	...

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
2	1	200
1	3	120
3	6	180
4	6	240
3	8	60

AttractionId*	AttractionName	...
3	Eiffel Tower	...
1	Louvre Museum	...
8	Louvre Museum	....
6	Matisse Museum	....

And for 2 it's this other one, so this will be shown in the output.




```
for each Trip.Attraction
   unique TripDate, AttractionName
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //TripDate, AttractionName, &qty
endfor
```

TripId*	TripDate	TripDescription
1	1/1/2023	...
2	4/4/2023	...
3	1/1/2023	...
4	5/5/2023	...

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
2	1	200
1	3	120
3	6	180
4	6	240
3	8	60

01/01/2023 Eiffel Tower 1

1/1/2023 Louvre Museum 2

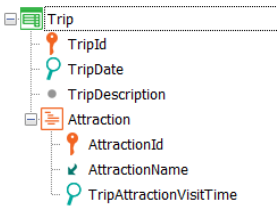
4/4/2023 Louvre Museum 1

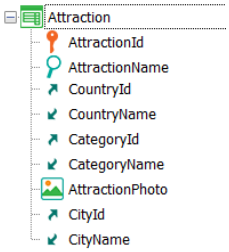
01/01/2023 Matisse Museum 1

05/05/2023 Matisse Museum 1

AttractionId*	AttractionName	...
3	Eiffel Tower	...
1	Louvre Museum	...
8	Louvre Museum	....
6	Matisse Museum	....

Lastly, for Matisse Museum: we have trip 3 and 4, which, since they have different dates, will lead to two prints in the output.






```
for each Trip.Attraction
   unique TripDate, AttractionName
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //TripDate, AttractionName, &qty
endfor
```

TripId*	TripDate	TripDescription
1	1/1/2023	...
2	4/4/2023	...
3	1/1/2023	...
4	5/5/2023	...

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
2	1	200
1	3	120
3	6	180
4	6	240
3	8	60

01/01/2023 Eiffel Tower 1

01/01/2023 Louvre Museum 2

4/4/2023 Louvre Museum 1

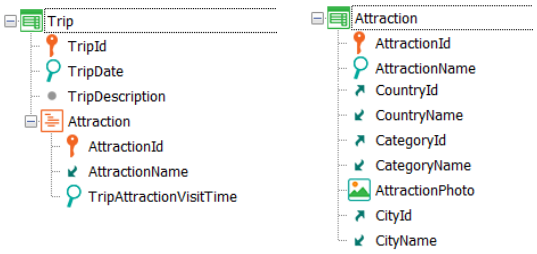
01/01/2023 Matisse Museum 1

05/05/2023 Matisse Museum 1

AttractionId*	AttractionName	...
3	Eiffel Tower	...
1	Louvre Museum	...
8	Louvre Museum	....
6	Matisse Museum	....

In this example, neither of the two attributes of the unique clause belongs to the base table of the For each.

We could also use formulas in the unique clause, as long as they are global.




```
for each Trip.Attraction
   unique TripDate.Year(), AttractionName
      &tripYear = TripDate.Year()
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //&tripYear, AttractionName, &qty
endfor
```

2023 Eiffel Tower 1

TripId*	TripDate	TripDescription
1	1/1/2023	...
2	4/4/2023 2024	...
3	1/1/2023	...
4	5/5/2023	...

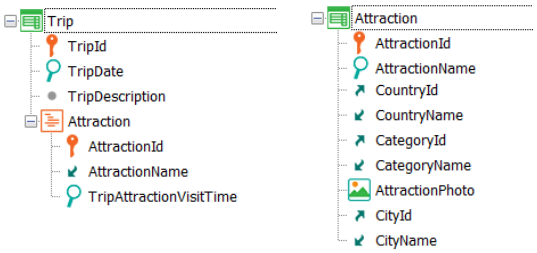
TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
2	1	200
1	3	120
3	6	180
4	6	240
3	8	60

AttractionId*	AttractionName	...
3	Eiffel Tower	...
1	Louvre Museum	...
8	Louvre Museum	....
6	Matisse Museum	....

For example, let's suppose we want to count the trips by attraction name, according to the year of the trip. That is, for each attraction name, by year, how many trips it is in.

We will be tempted to write this unique clause, so that if we change the year of trip 2, for this other one, then the output would have to be as follows:

AttractionName Eiffel Tower is only on one trip, so its year is listed and the count will give 1.




```
for each Trip.Attraction
   unique TripDate.Year(), AttractionName
      &tripYear = TripDate.Year()
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //&tripYear, AttractionName, &qty
endfor
```

2023 Eiffel Tower 1

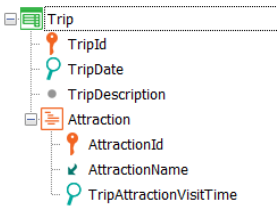
2023 Louvre Museum 2

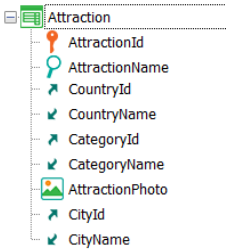
TripId*	TripDate	TripDescription
1	1/1/2023	...
2	4/4/2023 2024	...
3	1/1/2023	...
4	5/5/2023	...

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
2	1	200
1	3	120
3	6	180
4	6	240
3	8	60

AttractionId*	AttractionName	...
3	Eiffel Tower	...
1	Louvre Museum	...
8	Louvre Museum	....
6	Matisse Museum	....

Then comes Louvre Museum which is on 3 trips. The year of 1 and 3 match, so the output will show this.






```
for each Trip.Attraction
   unique TripDate.Year(), AttractionName
      &tripYear = TripDate.Year()
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //&tripYear, AttractionName, &qty
endfor
```

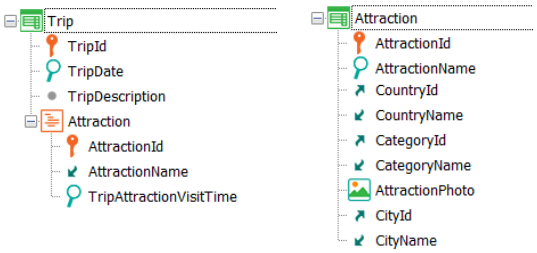
2023	Eiffel Tower	1
2023	Louvre Museum	2
2024	Louvre Museum	1

TripId*	TripDate	TripDescription
1	1/1/2023	...
2	4/4/2023 2024	...
3	1/1/2023	...
4	5/5/2023	...

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
2	1	200
1	3	120
3	6	180
4	6	240
3	8	60

AttractionId*	AttractionName	...
3	Eiffel Tower	...
1	Louvre Museum	...
8	Louvre Museum	....
6	Matisse Museum	....

Since the year for trip 2 is different, this will be shown in the output.




```
for each Trip.Attraction
   unique TripDate.Year(), AttractionName
      &tripYear = TripDate.Year()
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //&tripYear, AttractionName, &qty
endfor
```

TripId*	TripDate	TripDescription
1	1/1/2023	...
2	4/4/2023 2024	...
3	1/1/2023	...
4	5/5/2023	...

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
2	1	200
1	3	120
3	6	180
4	6	240
3	8	60

2023 Eiffel Tower 1

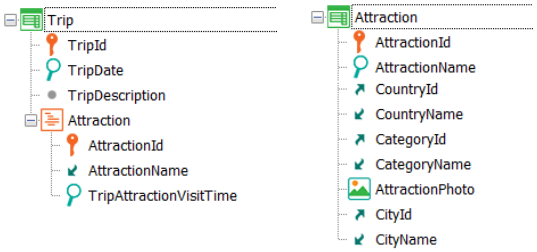
2023 Louvre Museum 2

2024 Louvre Museum 1

2023 Matisse Museum 2

AttractionId*	AttractionName	...
3	Eiffel Tower	...
1	Louvre Museum	...
8	Louvre Museum	....
6	Matisse Museum	....

Then we move on to the last AttractionName, which is on two trips, 3 and 4, which are from the same year. So, the output will look as follows.



TripId*	TripDate	TripDescription
1	1/1/2023	...
2	4/4/2023 2024	...
3	1/1/2023	...
4	5/5/2023	...

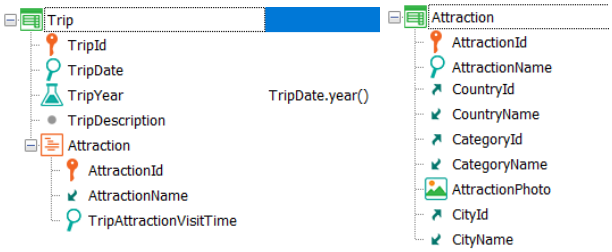
TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
2	1	200
1	3	120
3	6	180
4	6	240
3	8	60

```
for each Trip.Attraction
   unique TripDate.Year(), AttractionName
      &tripYear = TripDate.Year()
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //&tripYear, AttractionName, &qty
endfor
```

```
For each BaseTrn1, ... , BaseTrnn
    skip expression1 count expression2
    order att1, att2, ... , attn [when condition]
    order att1, att2, ... , attn [when condition]
    order none [when condition]
    unique att1, att2, ... , attn
    using DataSelector ( parm1, parm2, ... , parmn )
    where condition [when condition]
    where condition [when condition]
    where att IN DataSelector ( parm1, parm2, ... , parmn )
    blocking n
        main_code
    when duplicate
        when_duplicate_code
    when none
        when_none_code
endfor
```

The problem is that we will not be allowed to use an expression in the unique clause. We can only place attributes, as is clear from the syntax.

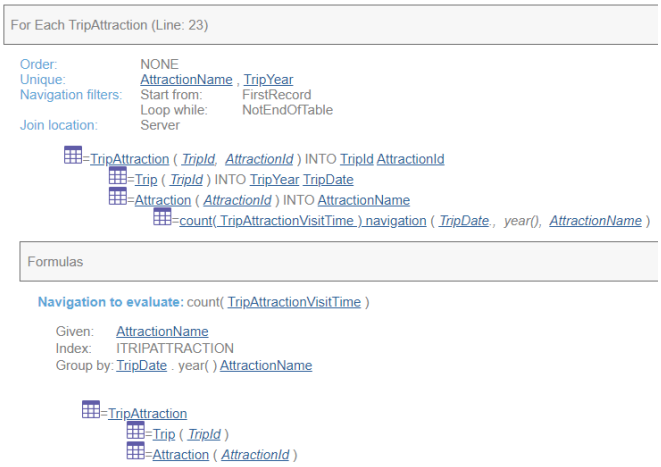
But those attributes may well be formula attributes.



TripId*	TripDate	TripDescription
1	1/1/2023	...
2	4/4/2023	...
3	1/1/2023	...
4	5/5/2023	...

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
2	1	200
1	3	120
3	6	180
4	6	240
3	8	60

```
for each Trip.Attraction
   unique       TripYear , AttractionName
      &tripYear = TripDate.Year()
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //&tripYear, AttractionName, &qty
endfor
```



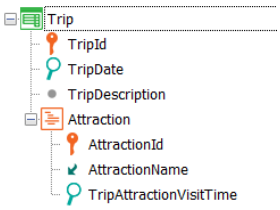
Therefore, if the example had a TripYear attribute—formula—and we used it in the unique clause, everything would work as expected, as shown in the navigation list.

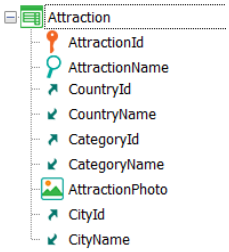
Restrictions

```
For each    BaseTrn1, ... , BaseTrnn
        skip expression1 count expression2
        order  att1, att2, ... , attn [when condition]
        order att1, att2, ... , attn [when condition]
        order none [when condition]
        unique att1, att2, ... , attn
        using DataSelector ( parm1, parm2, ... , parmn )
        where  condition [when condition]
        where  condition [when condition]
        where  att  IN DataSelector ( parm1, parm2, ... , parmn )
        blocking n
                main_code
        when duplicate
                when_duplicate_code
        when none
                when_none_code
endfor
```

A restriction we saw is that only attributes (which can be formulas) but not expressions can be used.

Another restriction: only attributes that have unique values for those in the unique clause can be included in the main code or body of the For each.






```
for each Trip.Attraction
   unique AttractionId
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //AttractionName, &qty
endfor
```

Louvre Museum 2

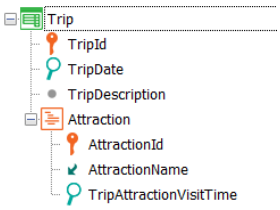
Louvre Museum 1

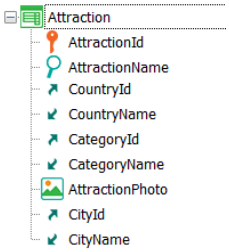
TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
2	1	200
1	3	120
3	6	180
4	6	240
3	8	60

AttractionId*	AttractionName	...
3	Eiffel Tower	...
1	Louvre Museum	...
8	Louvre Museum	....
6	Matisse Museum	....

In this example, where we are asking for unique tripattraction values according to AttractionId, we see that these two records will be processed once and Louvre Museum will be displayed together with 2 as the count result. On the other hand, this other record will be processed alone, showing Louvre Museum and 1 in the output.

In the printblock it was possible to put AttractionName because for each AttractionId of the unique clause its value is unique. We could also place CountryName, CityName, CategoryName; that is, unique attributes for AttractionId. But if we had placed TripAttractionVisitTime or TripDate, we would get an error.






```
for each Trip.Attraction
   unique AttractionName
      &qty = Count(TripAttractionVisitTime)
      print AttractionInfo //AttractionName, &qty, AttractionId
endfor
```

Louvre Museum 3

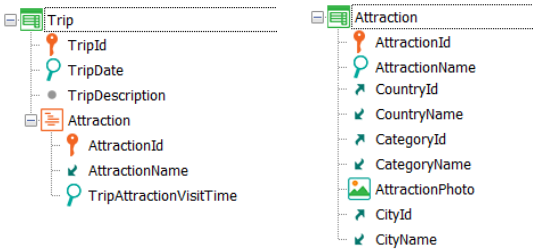
TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
2	1	200
1	3	120
3	6	180
4	6	240
3	8	60

AttractionId*	AttractionName	...
3	Eiffel Tower	...
1	Louvre Museum	...
8	Louvre Museum	....
6	Matisse Museum	....

There are more subtle cases that can mislead us. For example, what would happen if instead of AttractionId we placed AttractionName in the unique clause?

With this code there will be no problem, but it will show something different than the previous one if there are attractions with repeated names, as in this case.
The reason is that it will group these 3 records and will show 3 as the result of the count.

What would happen if out of distraction we put AttractionId in the printblock? We would get the same error as if we put TripId or TripDate.
That is because from an AttractionName you don't get a single AttractionId.

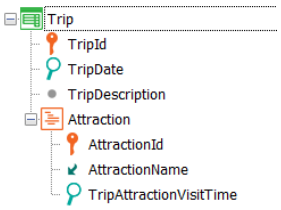


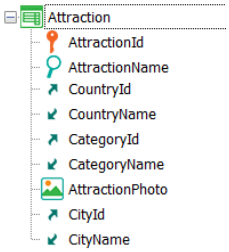

```
for each Trip.Attraction
   order AttractionId
   unique AttractionName
   Where TripDate > &today
      &qty = Count(TripAttractionVisitTime, TripDate>&today)
      print AttractionInfo //AttractionName, &qty
endfor
```

```
For each BaseTrn1, ... , BaseTrnn
    skip expression1 count expression2
    order att1, att2, ... , attn [when condition]
    order att1, att2, ... , attn [when condition]
    order none [when condition]
    unique att1, att2, ... , attn
    using DataSelector ( parm1, parm2, ... , parmn )
    where condition [when condition]
    where condition [when condition]
    where att IN DataSelector ( parm1, parm2, ... , parmn )
    blocking n
            main_code
    when duplicate
            when_duplicate_code
    when none
            when_none_code
endfor
```

The restriction only applies to the body of the For each, not to the other clauses. In particular, it doesn't apply to the filters. That is, it applies to what happens after the records have been sorted and filtered.

So, for example, we might want to list every attraction name included in trips after today's date, together with the number of trips they are in. And with the query sorted by AttractionId.






```
for each Trip.Attraction
   order AttractionId
   unique AttractionName
   Where TripDate > &today
      &qty = Count(TripAttractionVisitTime, TripDate>&today)
      print AttractionInfo //AttractionName, &qty
endfor
```

&today: 3/3/2023

TripId*	TripDate	TripDescription
1	1/1/2023	...
2	4/4/2023	...
3	1/1/2023	...
4	5/5/2023	...

Louvre Museum 2 Louvre Museum 4

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
2	1	200
1	3	120
3	8	60
4	8	240

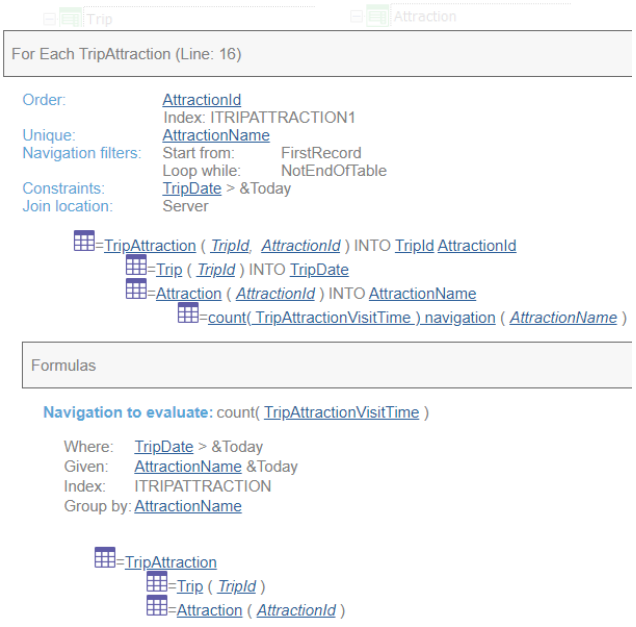
AttractionId*	AttractionName	...
1	Louvre Museum	...
3	Eiffel Tower	...
8	Louvre Museum	....

If this is the data and the date of the &today variable, let's think about what should be the result of the query.

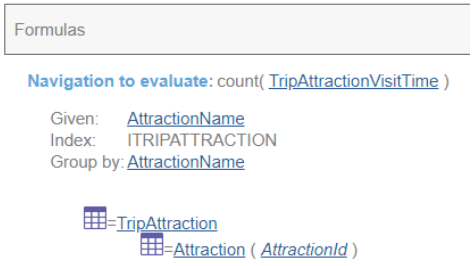
The TripAttraction table is run through by AttractionId, but also the records that share the same AttractionName are considered only once. In this case, for the first record there will be these four. But of those, how many will pass the filter? The first one does not, the second one does, the third one does not, and the fourth one does.

If the Count formula also includes the same condition, then the output will show Louvre Museum, and 2.
If we had not added the same filter condition for the formula, Louvre Museum and 4 would be displayed.

Next, we go to the next record to process in the For each. It is the only one left, and its date doesn't meet the filter, so nothing else is processed. The final result will be this (depending on whether or not the filter condition was added to the formula).




```
for each Trip.Attraction
   order AttractionId
   unique AttractionName
   Where TripDate > &today
      &qty = Count(TripAttractionVisitTime, ~~TripDate>&today~~)
      print AttractionInfo //AttractionName, &qty
endfor
```



In fact, if we look at the navigation list, we can clearly see that the formula is calculated as we want. Let's look at the Group by and how the Where shows the filter on the records to be counted.

If we remove the Count condition, then the navigation list will inform this for the formula.

Restrictions

For each *BaseTrn$_1$, … , BaseTrn$_n$*

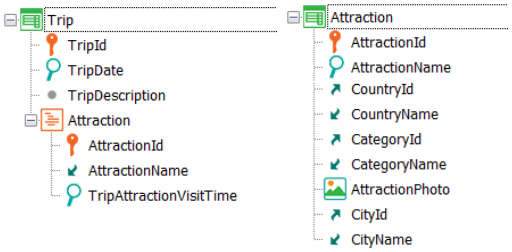
skip *expression$_1$* **count** *expression$_2$*
order *att$_1$, att$_2$, … , att$_n$* [**when** *condition*]
order *att$_1$, att$_2$, … , att$_n$* [**when** *condition*]
order none [**when** *condition*]
unique *att$_1$, att$_2$, … , att$_n$*
using *DataSelector* (*parm$_1$, parm$_2$, … , parm$_n$*)
where *condition* [**when** *condition*]
where *condition* [**when** *condition*]
where *att* **IN** *DataSelector* (*parm$_1$, parm$_2$, … , parm$_n$*)
blocking *n*
main_code
when duplicate
when_duplicate_code
when none
when_none_code

endfor

For each **≠ Base table**

endfor

Finally, let's mention the last restriction: if we use a unique clause, it only makes sense to nest another For each if it doesn't have the same base table. That is to say, we cannot use unique in control breaks, as one might think at first.




```
For each Trip.Attraction
   order AttractionName
      print AttractionInfo //AttractionName
      For each Trip.Attraction
         print TripAttractionInfo //TripDate TripAttractionVisitTime
      endfor
endfor
```

Eiffel Tower

01/01/2023 120

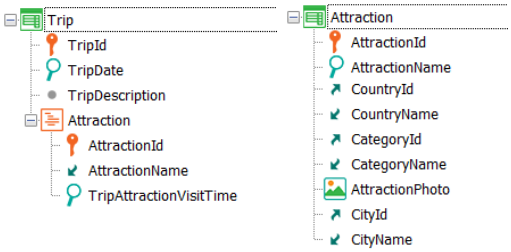
TripId*	TripDate	TripDescription
1	1/1/2023	...
2	4/4/2023	...
3	1/1/2023	...
4	5/5/2023	...

TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
2	1	200
1	3	120
3	8	60
4	8	240

AttractionId*	AttractionName	...
3	Eiffel Tower	...
1	Louvre Museum	...
8	Louvre Museum	....

So, for example, if we want a list of the attractions included in trips, with the duration of the visit to the attraction in each of those trips, we will have no alternative but to implement it as the typical control break.

We run through TripAttraction sorted by AttractionName and, for the first TripAttraction record with the first AttractionName, we print the attraction name. Then we iterate through the records with the same AttractionName, here only this one. We print the date of the trip and the length of the visit, and move on to the next group...




```
For each Trip.Attraction
   order AttractionName
      print AttractionInfo //AttractionName
      For each Trip.Attraction
         print TripAttractionInfo //TripDate TripAttractionVisitTime
      endfor
endfor
```

Eiffel Tower

01/01/2023 120

Louvre Museum

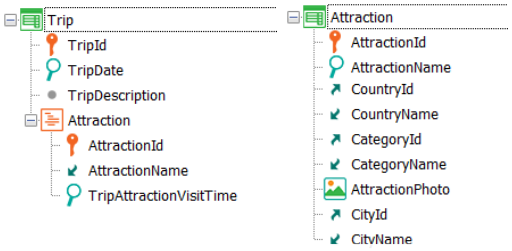
01/01/2023 180
4/4/2023 200
1/1/2023 60
5/5/2023 240

TripId*	TripDate	TripDescription
1	1/1/2023	...
2	4/4/2023	...
3	1/1/2023	...
4	5/5/2023	...

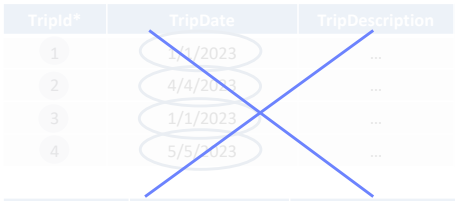
TripId*	AttractionId*	TripAttractionVisitTime
1	1	180
2	1	200
1	3	120
3	8	60
4	8	240

AttractionId*	AttractionName	...
3	Eiffel Tower	...
1	Louvre Museum	...
8	Louvre Museum	....

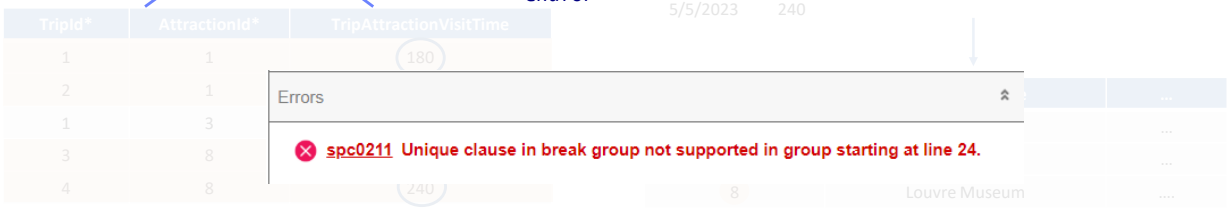
...which is the one corresponding to these records with the same name in Attraction. We print the name, and again, iterate with the nested For each as long as the AttractionName doesn't change. And so the output is...



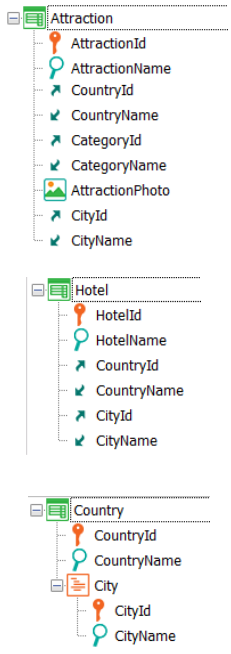

```
For each Trip.Attraction
   order AttractionName
      print AttractionInfo //AttractionName
      For each Trip.Attraction
         print TripAttractionInfo //TripDate TripAttractionVisitTime
      endfor
endfor
```



```
For each Trip.Attraction
   unique AttractionName
      print AttractionInfo //AttractionName
      For each Trip.Attraction
         print TripAttractionInfo //TripDate TripAttractionVisitTime
      endfor
endfor
```



If we wanted to implement this with the unique clause, GeneXus would not allow it. The navigation list would show this error.




```
For each Attraction
   order CountryName
   unique CountryName
      &qty = count(AttractionName)
      print MainInfo //CountryName, &qty
      for each Hotel
         print HotelInfo //HotelName
      endfor
endfor
```

Brazil **1**

France **3**

Oh la la

Liberte

Cinque Terre **1**

Imperio

AttractionId*	AttractionName	CountryId	...
2	Christ	5	...
3	Eiffel Tower	2	...
1	Louvre Museum	2	...
8	Matisse Museum	2	....
4	Cinque Terre	15	...

CountryId*	CountryName
5	Brazil
2	France
15	Italy

HotelId*	HotelName	CountryId	...
1	Oh la la	2	...
3	Imperio	15	....
4	Liberte	2	...

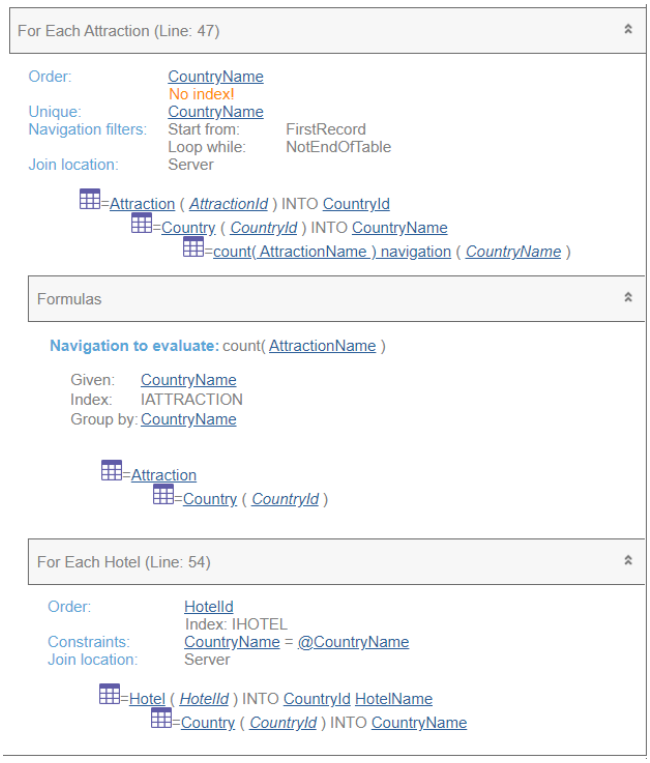
But we can nest a For each that navigates another table.

For example, let's see this case in which we are navigating the attractions table sorting by CountryName, from the extended one, and asking to process only once all the records that repeat the value of CountryName.

For them, we want to count the attractions of the same country, print that country with the number of attractions, and navigate the Hotel table printing the names of hotels in the same country.

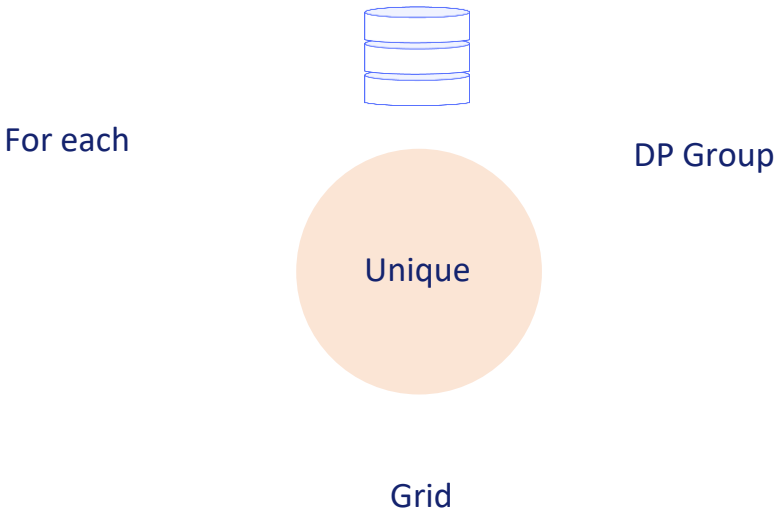
So, with this data, the output will look like this. Here we have the Attraction table sorted by CountryName.
There is only one record for the country of the first record: its country is then listed and 1 for the count. Since there is no hotel in Brazil, it will go on to the next record in Attraction, which will be 3, corresponding to France. There are 3 records with the country France, so in the output you will see... Then the nested For each is run, and it will print the hotels in France. Therefore, the output will show...

And finally we will have...




```
For each Attraction
   order CountryName
   unique CountryName
      &qty = count(AttractionName)
      print MainInfo //CountryName, &qty
      for each Hotel
         print HotelInfo //HotelName
      endfor
endfor
```

The navigation list will clearly show that the implementation is as we wanted. Note the Constraint of the nested For each by CountryName.



Finally, let's mention again that although we focused on the unique clause for the For each command, its logic applies to all other forms of queries.

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