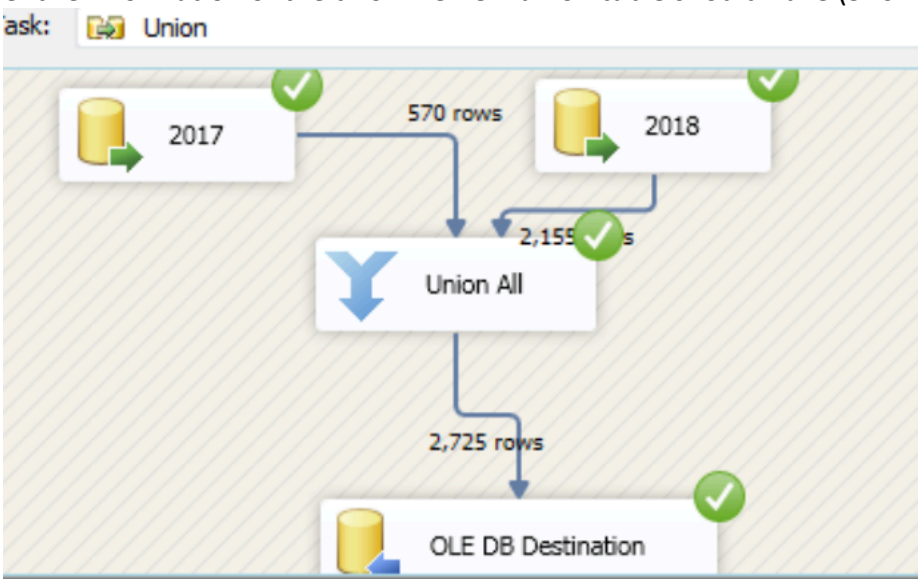
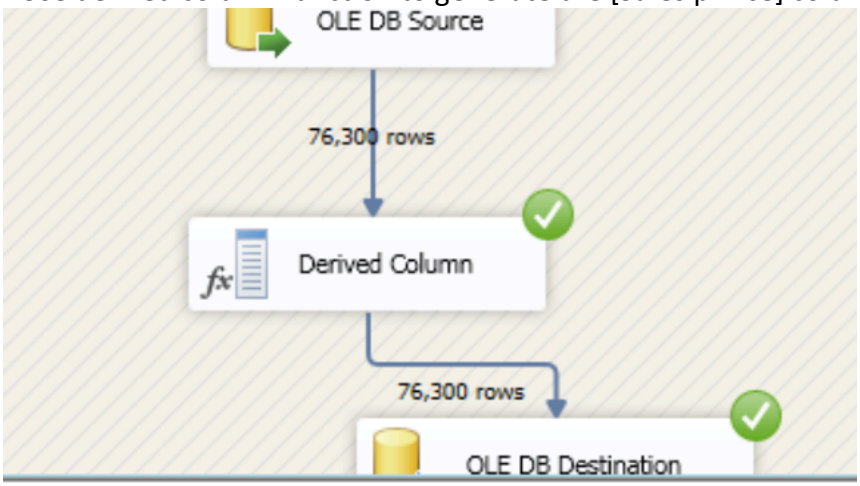
<BI Report>

## Task 1:

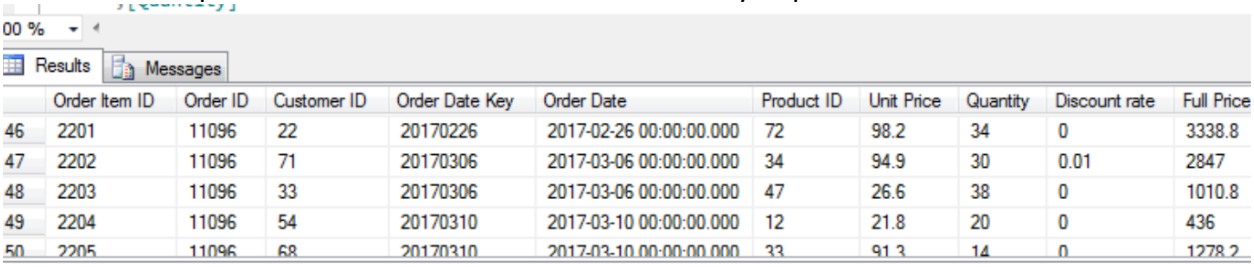
ETL Process:
Applying Union function to the Order tables of 2017 and 2018, to form one table that has the entire information of the two. The new union table should have (570+2155 = 2725 rows).




*Use derived column function to generate the [Sales prince] column.



*Check the output table schema to find out if there is any duplicate fields that can be removed:



00 %

Results | Messages

| | Order Item ID | Order ID | Customer ID | Order Date Key | Order Date | Product ID | Unit Price | Quantity | Discount rate | Full Price |
|---|---|---|---|---|---|---|---|---|---|---|
| 46 | 2201 | 11096 | 22 | 20170226 | 2017-02-26 00:00:00.000 | 72 | 98.2 | 34 | 0 | 3338.8 |
| 47 | 2202 | 11096 | 71 | 20170306 | 2017-03-06 00:00:00.000 | 34 | 94.9 | 30 | 0.01 | 2847 |
| 48 | 2203 | 11096 | 33 | 20170306 | 2017-03-06 00:00:00.000 | 47 | 26.6 | 38 | 0 | 1010.8 |
| 49 | 2204 | 11096 | 54 | 20170310 | 2017-03-10 00:00:00.000 | 12 | 21.8 | 20 | 0 | 436 |
| 50 | 2205 | 11096 | 68 | 20170310 | 2017-03-10 00:00:00.000 | 33 | 91.3 | 14 | 0 | 1278.2 |

*After investing the table schema above, we do not find any exact duplicate fields (columns titles).

*Normalization: In the Union Order table above, [Order Date] depends only on [Order Date Key], where [Order Date key] is part of the primary key of this table. As the process of the 2nd normalization, should put the [Order Date] attribute back to the 'Date table'.

*The schema of this company's DM I designed is : Snowflake Schema
With "Orders of 2017&2018" being the fact table.
And Customer, Date and product table directly connected to the fact table.
Furthermore, with City table connected to Customer table; Supplier table connected to Product table. Together forming a snowflake schema.

*Data selection:
The attributes we have for this data mart is **: unselected data are marked with ---**

Union table: [Order item ID], [Order ID],[Customer ID],[Order date key],[Product ID],[Unit price],[Quantity],[Discount rate],[Full price],[Shipping]

Customer table: [Customer ID],[Customer name],[City Code],[Customer Type],[Age],[Gender]

City table:[City code],[Customer City],[Customer state~~],[State full name]~~

Product table:[Product ID],[Product Name],[Color],[size],[weight],[type],[product model],[record level],[units in stock],[supplier ID]

Date table:[Order date key~~],[order date~~],[semester],[quarter],[month],[year],[day]

Supplier table: [supplier ID],[Supplier name],[supplier bank code],[supplier account code]

*Stability Analysis:

**Seldom changes:** :[Supplier name],[Customer name], [City Code],[Customer City],[Customer state] ,[Age],[Gender],[State Full name],[Product name] ],[supplier bank code],[supplier account code]

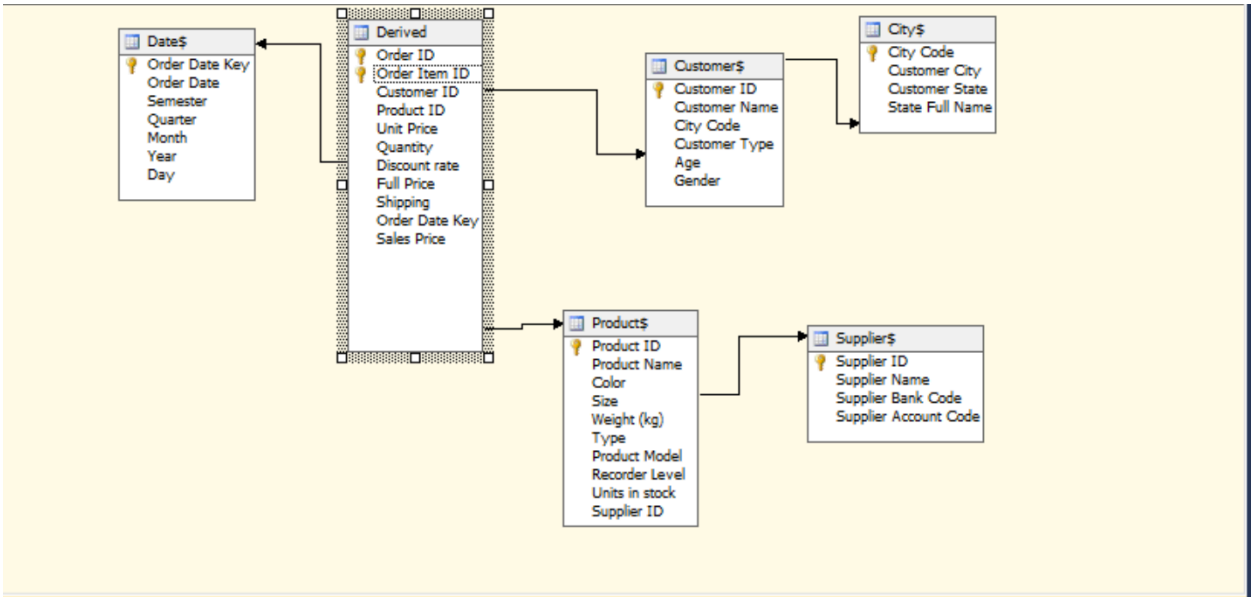
**Sometimes changes:** [Record level] ,[Color],[size],[weight],[type], [product model],[Customer type]

**Frequently changes**: [Unit price],[Quantity],[Discount rate],[Full price],[Shipping],[Order date],[Order date key] ,[semester],[quarter],[month],[year],[day],[Unit in stock]

Schema design explanation: The reason why the data mart is in a snow-flake schema is because not all the dimensional tables (attributes) in this dataset are directly related to the fact table, they may related to other dimensional tables.

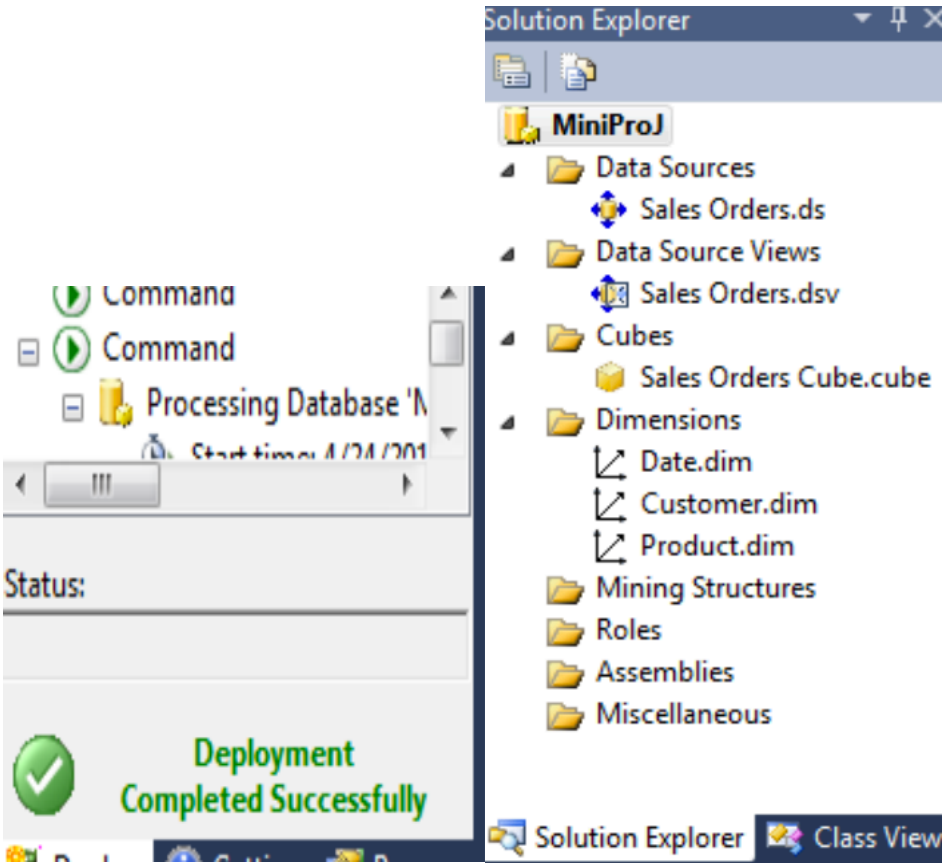
## Task 2:

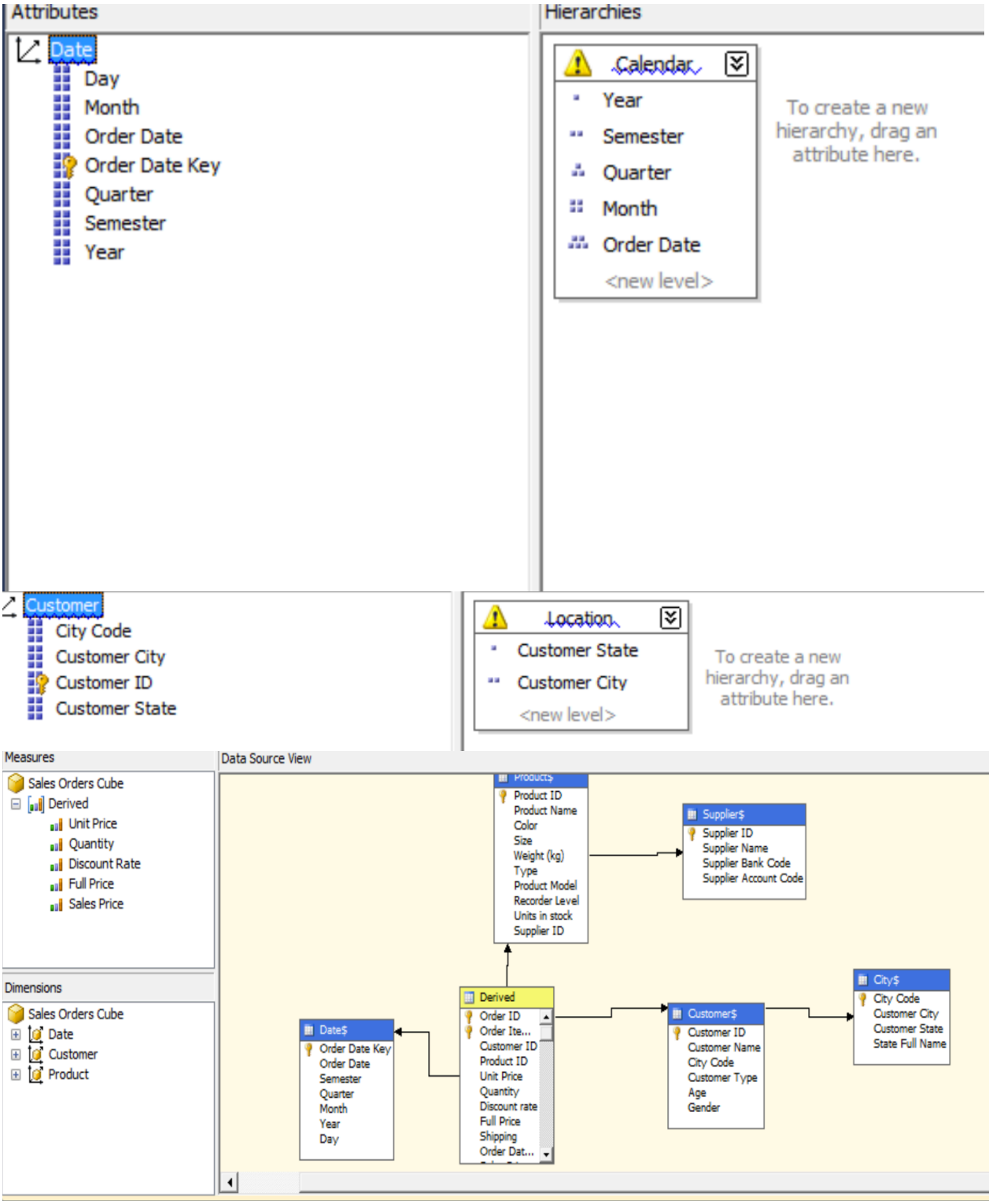
Data Source view:



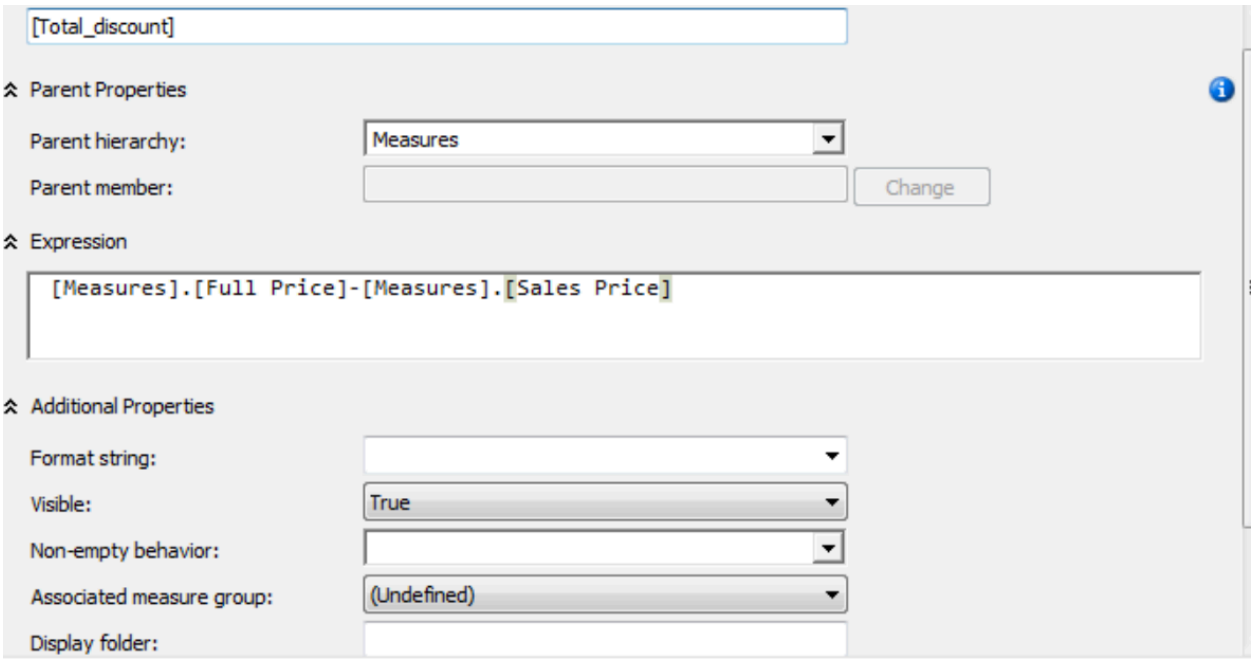
Deployment message & Cube & Other details:

```
Done
Sending deployment script to the server...
Done
Deploy complete -- 0 errors, 0 warnings
========== Build: 1 succeeded or up-to-date, 0 failed, 0 skipped ==========
========== Deploy: 1 succeeded, 0 failed, 0 skipped ==========
```




Attributes
Hierarchies
Date
Day
Month
Order Date
Order Date Key
Quarter
Semester
Year
Calendar
Year
Semester
Quarter
Month
Order Date
<new level>
To create a new hierarchy, drag an attribute here.
Customer
City Code
Customer City
Customer ID
Customer State
Location
Customer State
Customer City
<new level>
To create a new hierarchy, drag an attribute here.
Measures
Sales Orders Cube
Derived
Unit Price
Quantity
Discount Rate
Full Price
Sales Price
Dimensions
Sales Orders Cube
Date
Customer
Product
Data Source View
Product$
Product ID
Product Name
Color
Size
Weight (kg)
Type
Product Model
Recorder Level
Units in stock
Supplier ID
Supplier$
Supplier ID
Supplier Name
Supplier Bank Code
Supplier Account Code
Derived
Order ID
Order Ite...
Customer ID
Product ID
Unit Price
Quantity
Discount rate
Full Price
Shipping
Order Dat...
Date$
Order Date Key
Order Date
Semester
Quarter
Month
Year
Day
Customer$
Customer ID
Customer Name
City Code
Customer Type
Age
Gender
City$
City Code
Customer City
Customer State
State Full Name

## Task 3:


[Total_discount]
Parent Properties
Parent hierarchy:
Measures
Parent member:
Change
Expression
[Measures].[Full Price]-[Measures].[Sales Price]
Additional Properties
Format string:
Visible:
True
Non-empty behavior:
Associated measure group:
(Undefined)
Display folder:

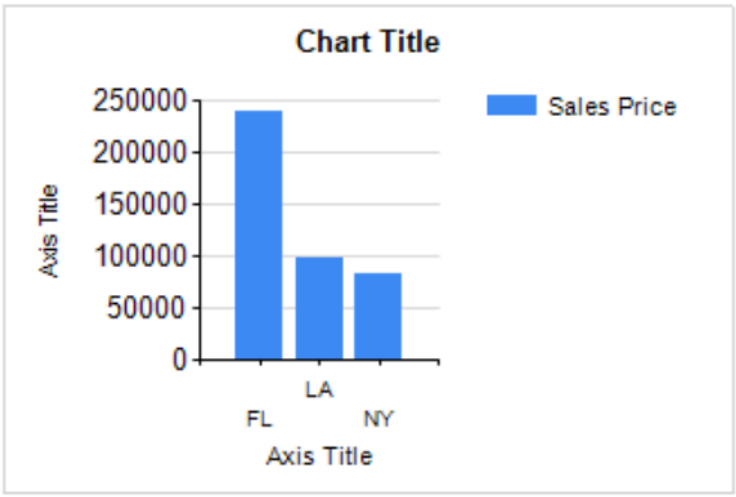
## Task 4:

1. SELECT NON EMPTY
   [Measures].[sales price] on 0,

   { [customer].[customer state].[FL],
   [customer].[customer state].[LA],
   [customer].[customer state].[NY] } on 1
   from [Sales Orders Cube]

| Customer State | Sales Price |
|---|---|
| FL | 240899.633 |
| LA | 97568.556... |
| NY | 82367.904 |

| Customer State | Sales Price |
|---|---|
| FL | $240899.63 |
| LA | $97568.56 |
| NY | $82367.90 |

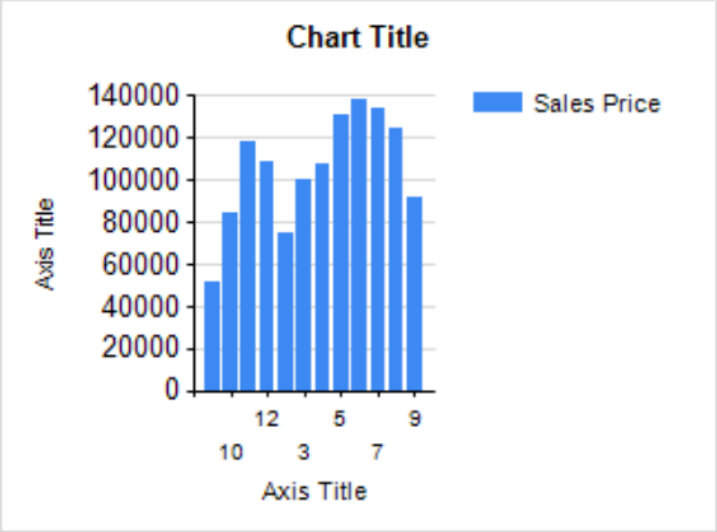


2.

```
Select [Measures].[Sales Price] on columns,
non empty
order([Date].[Month].children,[Measures].[Sales Price], DESC) on rows
from [Sales Orders Cube]
where [date].[year].[2018]
```

Report1

| Month | Sales Price |
|---|---|
| 6 | 138157.345 |
| 7 | 134546.881 |
| 5 | 131364.8825 |
| 8 | 125132.18 |
| 11 | 118146.4875 |
| 12 | 109164.760500034 |
| 4 | 107479.575 |
| 3 | 100298.06 |
| 9 | 91377.6605 |
| 10 | 84079.5525 |
| 2 | 74586.085 |



3.

Select [Measures].[Sales Price] on 0,

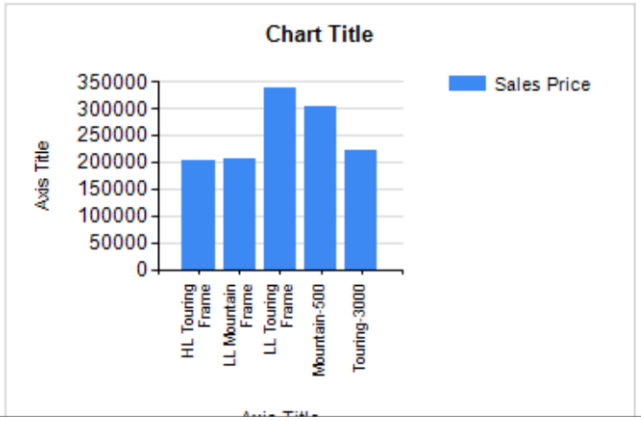
topcount ([Product].[Product Model].children, 5 , [Measures].[Sales Price]) on 1

from [Sales Orders cube]

| Product Model | Sales Price |
|---|---|
| LL Touring Fra... | 336538.28... |
| Mountain-500 | 304497.23... |
| Touring-3000 | 222482.19... |
| LL Mountain F... | 207009.89... |
| HL Touring Fra... | 203110.937 |

Report2

| Product Model | Sales Price |
|---|---|
| L Touring Frame | 336538.2885 |
| Mountain-500 | 304497.235000016 |
| Touring-3000 | 222482.1925 |
| L Mountain Frame | 207009.8925 |
| HL Touring Frame | 203110.937 |



4.

Select [Measures].[Sales Price] on columns,

non empty

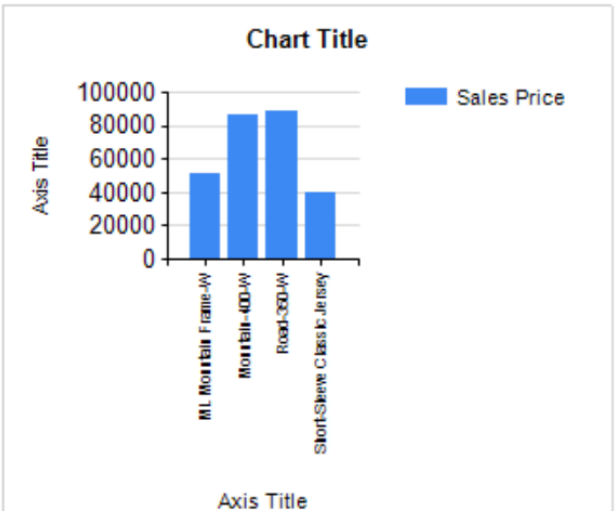
Head (order ([Product].[Product Model].children, [Measures].[Sales Price], Asc),5) on 1

from [Sales Orders cube]

| Product Model | Sales Price |
|---|---|
| Short-Sleeve C... | 39792.99 |
| ML Mountain ... | 51455.269... |
| Mountain-400... | 86667.1 |
| Road-350-W | 88312.759... |

Report3

| Product Model | Sales Price |
|---|---|
| Short-Sleeve Classic Jersey | 39792.99 |
| ML Mountain Frame-W | 51455.2690000112 |
| Mountain-400-W | 86667.1 |
| Road-350-W | 88312.7590000067 |



5.
Select [Measures].[Sales Price] on columns,

{([Customer].[Customer State].[NY],[Date].[year].[2017],[Date].[month].[4]),

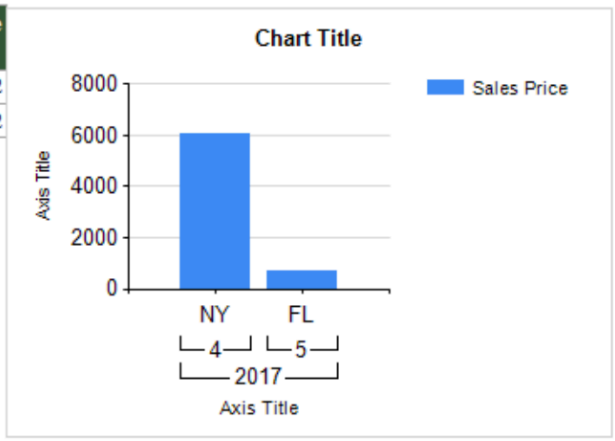
([Customer].[Customer State].[FL],[Date].[year].[2017],[Date].[month].[5])}
on rows

from [Sales Orders cube]

| Customer State | Year | Month | Sales Price |
|---|---|---|---|
| NY | 2017 | 4 | 6040.32 |
| FL | 2017 | 5 | 720.72 |

Report4

| Customer State | Year | Month | Sales Price |
|---|---|---|---|
| NY | 2017 | 4 | 6040.32 |
| FL | 2017 | 5 | 720.72 |



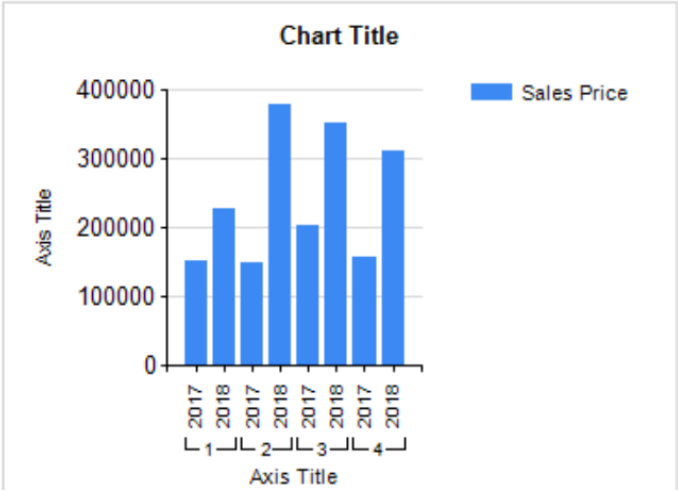
6.

```
Select [Measures].[Sales Price] on 0,

non empty ([Date].[Year].children,[Date].[Quarter].children)

 on 1

from [sales orders cube]
```

| Year | Quarter | Sales Price |
|---|---|---|
| 2017 | 1 | 152403.864 |
| 2017 | 2 | 149467.826 |
| 2017 | 3 | 203495.858 |
| 2017 | 4 | 156284.764 |
| 2018 | 1 | 226284.765 |
| 2018 | 2 | 377001.80... |
| 2018 | 3 | 351056.72... |
| 2018 | 4 | 311390.80... |

Report5

| Year | Quarter | Sales Price |
|---|---|---|
| 2017 | 1 | 152403.864 |
| 2017 | 2 | 149467.826 |
| 2017 | 3 | 203495.858 |
| 2017 | 4 | 156284.764 |
| 2018 | 1 | 226284.765 |
| 2018 | 2 | 377001.8025 |
| 2018 | 3 | 351056.7215 |
| 2018 | 4 | 311390.800500034 |

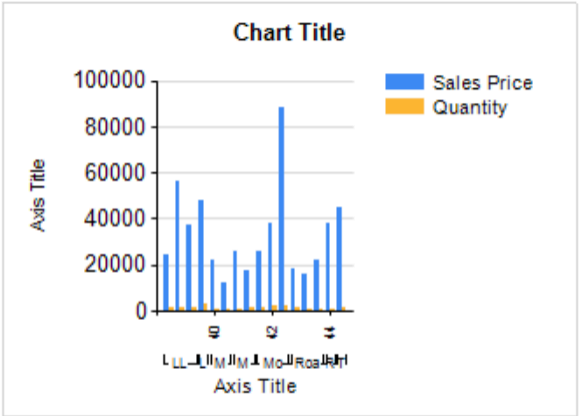


7.

```
select {[Measures].[Sales Price],[Measures].[Quantity]} on 0,

non empty

[Product].[Product Model].children*

{[Product].[Size].[40]:[Product].[Size].[44]} on 1

from [sales orders cube]
```

| Product Model | Size | Sales Price | Quantity |
|---|---|---|---|
| LL Mountain F... | 40 | 24694.984 | 1383 |
| LL Mountain F... | 42 | 56428.138 | 1712 |
| LL Mountain F... | 44 | 36969.605 | 1782 |
| LL Touring Fra... | 44 | 48089.836 | 2786 |
| ML Mountain ... | 40 | 22262.236... | 615 |
| ML Mountain ... | 42 | 11934.74 | 259 |
| Mountain-400... | 40 | 25506.56 | 461 |
| Mountain-400... | 42 | 17824.496 | 1240 |
| Mountain-500 | 40 | 25801.598... | 1200 |
| Mountain-500 | 42 | 37897.9935 | 2136 |

| roduct Model | Size | Sales Price | Quantity |
|---|---|---|---|
| L Mountain rame | 40 | 24694.984 | 1383 |
| L Mountain rame | 42 | 56428.138 | 1712 |
| L Mountain rame | 44 | 36969.605 | 1782 |
| L Touring Frame | 44 | 48089.836 | 2786 |
| /L Mountain rame-W | 40 | 22262.2360000112 | 615 |
| /L Mountain rame-W | 42 | 11934.74 | 259 |
| /lountain-400-W | 40 | 25506.56 | 461 |
| /lountain-400-W | 42 | 17824.496 | 1240 |



8.

select [measures].[quantity] on 0,

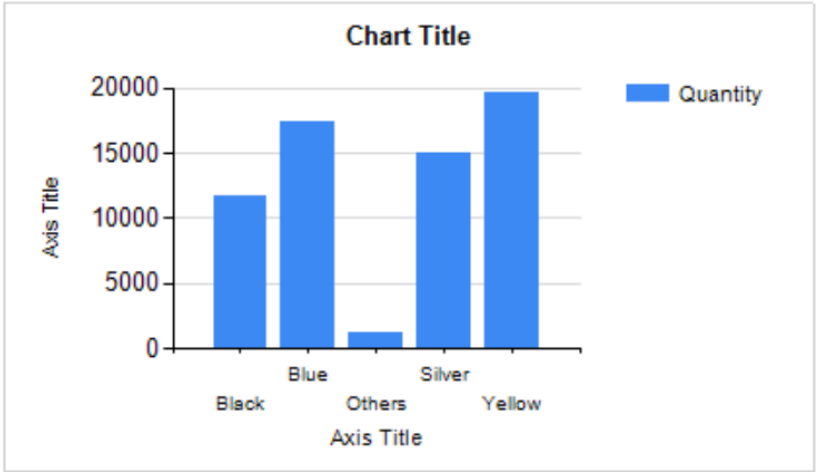
non empty [product].[color].children on 1

from [sales orders cube]

| Color | Quantity |
|---|---|
| Black | 11752 |
| Blue | 17444 |
| Others | 1160 |
| Silver | 15006 |
| Yellow | 19595 |

Report7

| Color | Quantity |
|---|---|
| Black | 11752 |
| Blue | 17444 |
| Others | 1160 |
| Silver | 15006 |
| Yellow | 19595 |

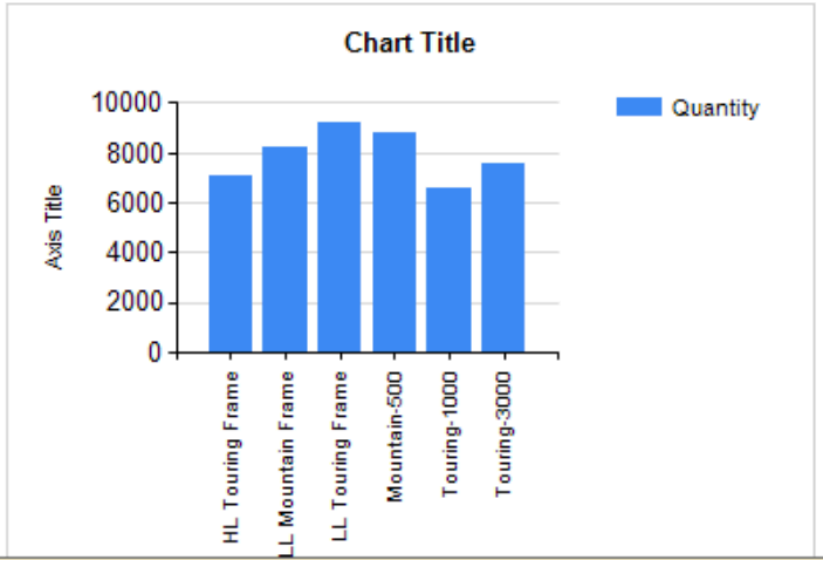


9.

```
select [Measures].[Quantity] on 0,
non empty
filter ([Product].[Product Model].children,[Measures].[Quantity]>6000) on 1
from [sales orders cube]
```

| Product Model | Quantity |
|---|---|
| HL Touring Fra... | 7099 |
| LL Mountain F... | 8225 |
| LL Touring Fra... | 9208 |
| Mountain-500 | 8798 |
| Touring-1000 | 6558 |
| Touring-3000 | 7579 |

| Product Model | Quantity |
|---|---|
| HL Touring Frame | 7099 |
| LL Mountain Frame | 8225 |
| LL Touring Frame | 9208 |
| Mountain-500 | 8798 |
| Touring-1000 | 6558 |
| Touring-3000 | 7579 |

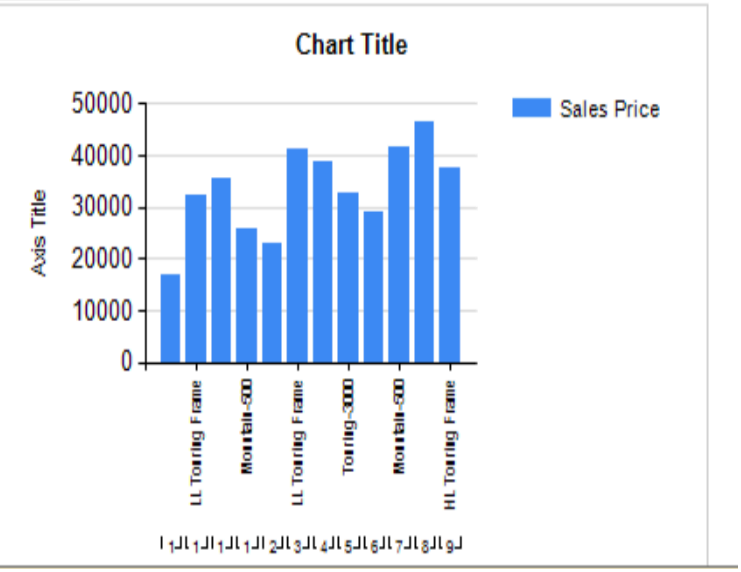


10.

```
select [Measures].[Sales Price] on 0,
non empty
generate(
[Date].[Month].children,
topcount([Date].[Month].currentmember*[Product].[Product
Model].children,1,[Measures].[Sales Price])
) on 1
from [sales orders cube]
```

| Month | Product Model | Sales Price |
|---|---|---|
| 1 | Road-350-W | 16953.84 |
| 10 | LL Touring Fra... | 32205.468 |
| 11 | Mountain-500 | 35354.922 |
| 12 | Mountain-500 | 25709.267... |
| 2 | Touring-3000 | 22836.37 |
| 3 | LL Touring Fra... | 41119.128 |
| 4 | LL Touring Fra... | 38739.878 |
| 5 | Touring-3000 | 32446.74 |
| 6 | LL Mountain F... | 28850.6385 |
| 7 | Mountain-500 | 41711.214 |

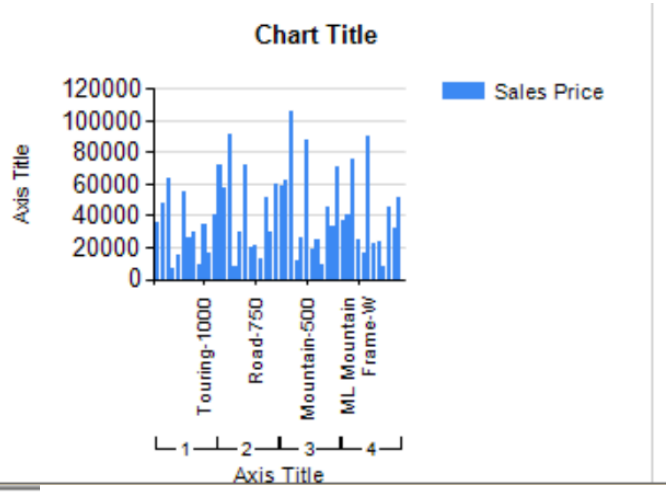
| Month | Product Model | Sales Price |
|---|---|---|
| 1 | Road-350-W | 16953.84 |
| 10 | LL Touring Frame | 32205.468 |
| 11 | Mountain-500 | 35354.922 |
| 12 | Mountain-500 | 25709.2675000161 |
| 2 | Touring-3000 | 22836.37 |
| 3 | LL Touring Frame | 41119.128 |
| 4 | LL Touring Frame | 38739.878 |
| 5 | Touring-3000 | 32446.74 |
| 6 | LL Mountain Frame | 28850.6385 |
| 7 | Mountain-500 | 41711.214 |



11.

```
select [Measures].[Sales Price] on 0,

non empty

order (

([Product].[Product Model].children, [Date].[quarter].children),

[measures].[sales price],BDESC) on 1

from [sales orders cube]
```

| Product Model | Quarter | Sales Price |
|---|---|---|
| LL Touring Frame | 3 | 105586.486 |
| LL Touring Frame | 2 | 91739.5355 |
| Mountain-500 | 4 | 90040.8975000161 |
| Mountain-500 | 3 | 87763.522 |
| LL Touring Frame | 4 | 76014.871 |
| HL Touring Frame | 2 | 71982.435 |
| Mountain-500 | 2 | 71913.7035 |
| Touring-3000 | 3 | 70160.946 |
| LL Touring Frame | 1 | 63197.396 |
| LL Mountain | 3 | 61880.6315 |




| Product Model | Quarter | Sales Price |
|---|---|---|
| LL Touring Fra... | 3 | 105586.486 |
| LL Touring Fra... | 2 | 91739.5355 |
| Mountain-500 | 4 | 90040.897... |
| Mountain-500 | 3 | 87763.522 |
| LL Touring Fra... | 4 | 76014.871 |
| HL Touring Fra... | 2 | 71982.435 |
| Mountain-500 | 2 | 71913.7035 |
| Touring-3000 | 3 | 70160.946 |
| LL Touring Fra... | 1 | 63197.396 |
| LL Mountain F... | 3 | 61880.6315 |

12.
select [Measures].[Quantity] on 0,

non empty

Head (order([Customer].[Customer Name].children,
[Measures].[Quantity],desc),5) on 1

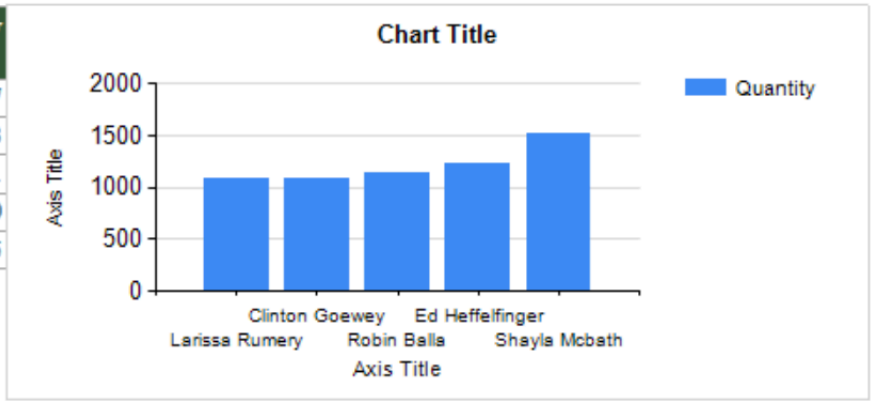
from(select ([Customer].[Age].[30]:[Customer].[Age].[34]) on 0

from [sales orders cube])

| Customer Name | Quantity |
|---|---|
| Shayla Mcbath | 1517 |
| Ed Heffelfinger | 1223 |
| Robin Balla | 1131 |
| Clinton Goewey | 1080 |
| Larissa Rumery | 1075 |

Report12

| Customer Name | Quantity |
|---|---|
| Shayla Mcbath | 1517 |
| Ed Heffelfinger | 1223 |
| Robin Balla | 1131 |
| Clinton Goewey | 1080 |
| Larissa Rumery | 1075 |



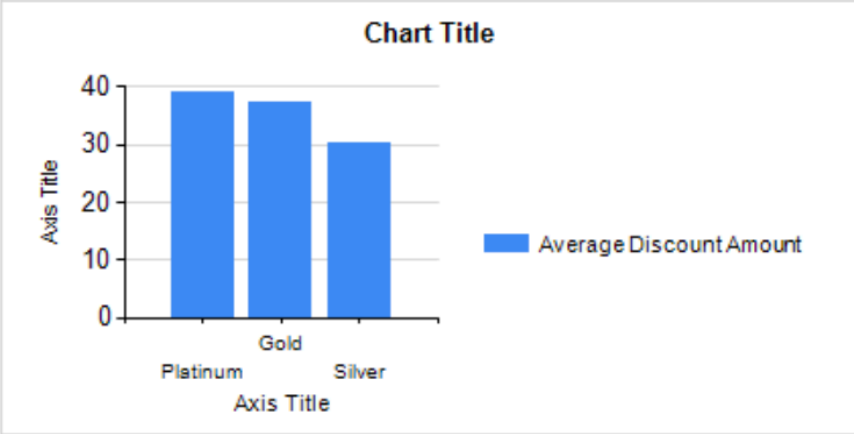
13.

```
with member [Average Discount Amount] AS

[Measures].[total_discount]/[Measures].[result Count]

select [Average Discount Amount] on 0,

non empty

[Customer].[Customer Type].children on 1

from[sales orders cube]
```

| Customer Type | Average Discou... |
|---|---|
| Gold | 37.2954552372... |
| Platinum | 39.0631581769... |
| Silver | 30.1009849187... |

## Report13

| Customer Type | Average Discount Amount |
|---|---|
| Gold | $37.30 |
| Platinum | $39.06 |
| Silver | $30.10 |



14.

```
with
member [Sales Price in March] AS
([Date].[Month].[4].prevmember,[Measures].[Sales Price])
member [Sales Price in April] AS
([Date].[Month].[3].nextmember,[Measures].[Sales Price])
Member[Difference] AS
[Sales Price in April]-[Sales Price in March]
select{[Sales Price in March],[Sales Price in April],[Difference]} on 0,
non empty
([Date].[Year].[2018], [Customer].[Customer City].[Philadelphia]) on 1
from [sales orders cube]
```

| Year | Customer City | Sales Price in M... | Sales Price in Ap... | Difference |
|---|---|---|---|---|
| 2018 | Philadelphia | 2536.4 | 7985.46 | 5449.06 |

| Year | Customer City | Sales Price in March | Sales Price in April | Difference |
|---|---|---|---|---|
| 2018 | Philadelphia | 2536.4 | 7985.46 | 5449.06 |