DataMgmtLab4

authors: Massimo Stefani, Eva Ray

Remark

Technically, we could have done a group by for most of the exercises, but since we wanted to try the features of superset, we chose to instead use the "metrics" feature of the charts to aggregate the data.

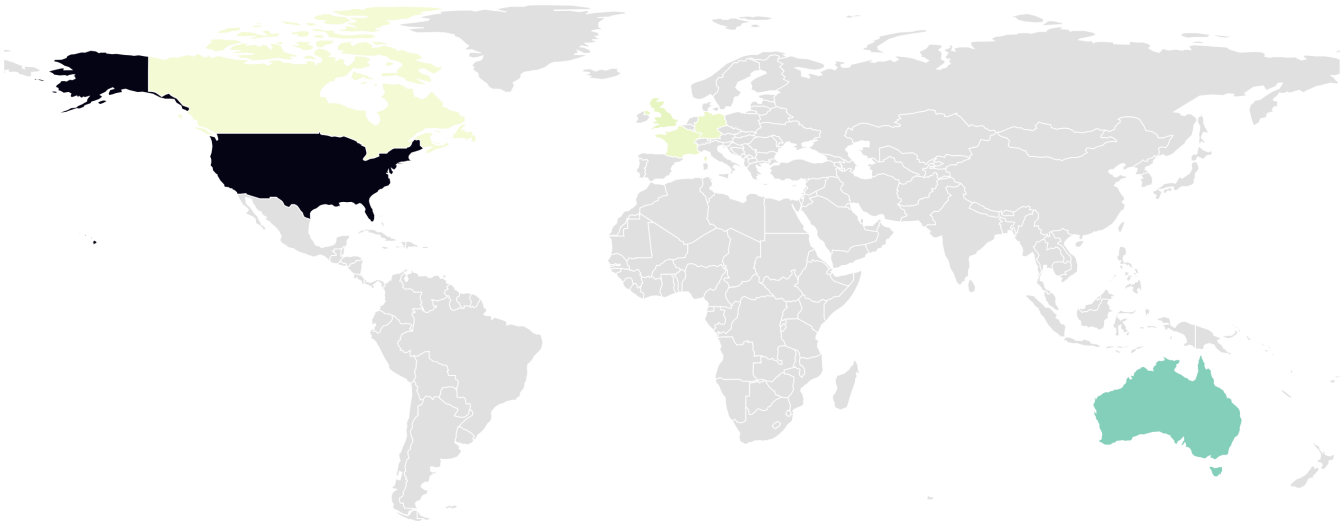
Exercise 1

```sql
SELECT *
FROM dimcustomer AS c
INNER JOIN dimgeography AS g
ON c.GeographyKey = g.GeographyKey
WHERE g.FrenchCountryRegionName = 'France';
```

Exercise 2

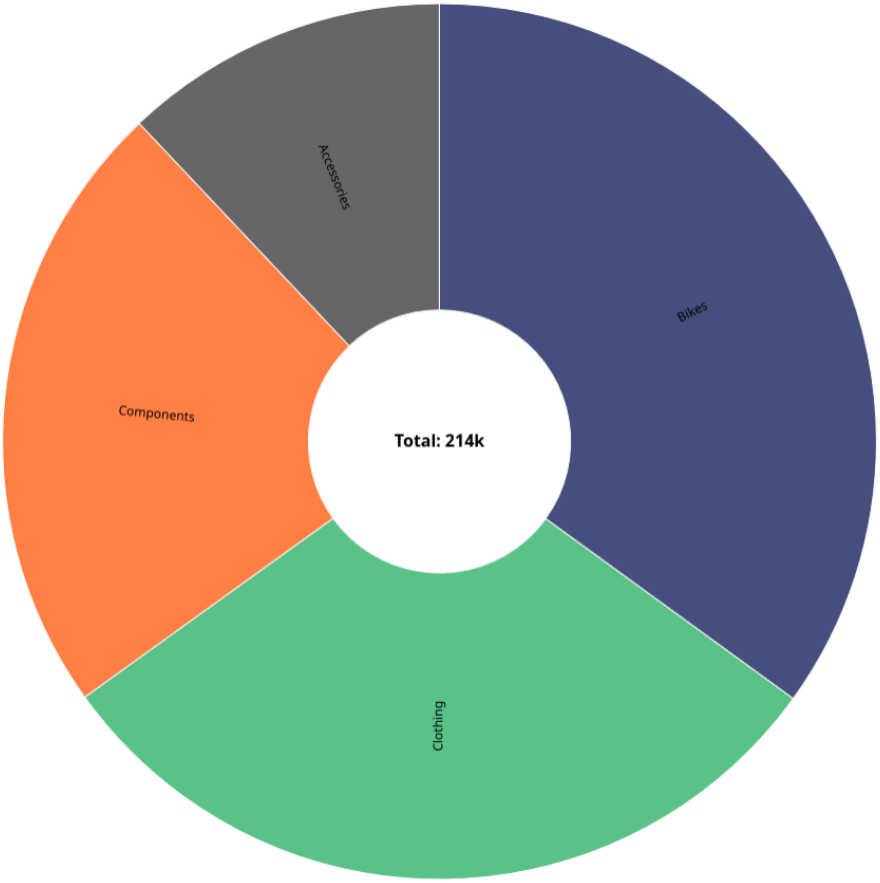
```sql
SELECT dg.EnglishCountryRegionName
FROM dimcustomer dc
JOIN dimgeography dg
ON dc.GeographyKey = dg.GeographyKey
```

Ex2



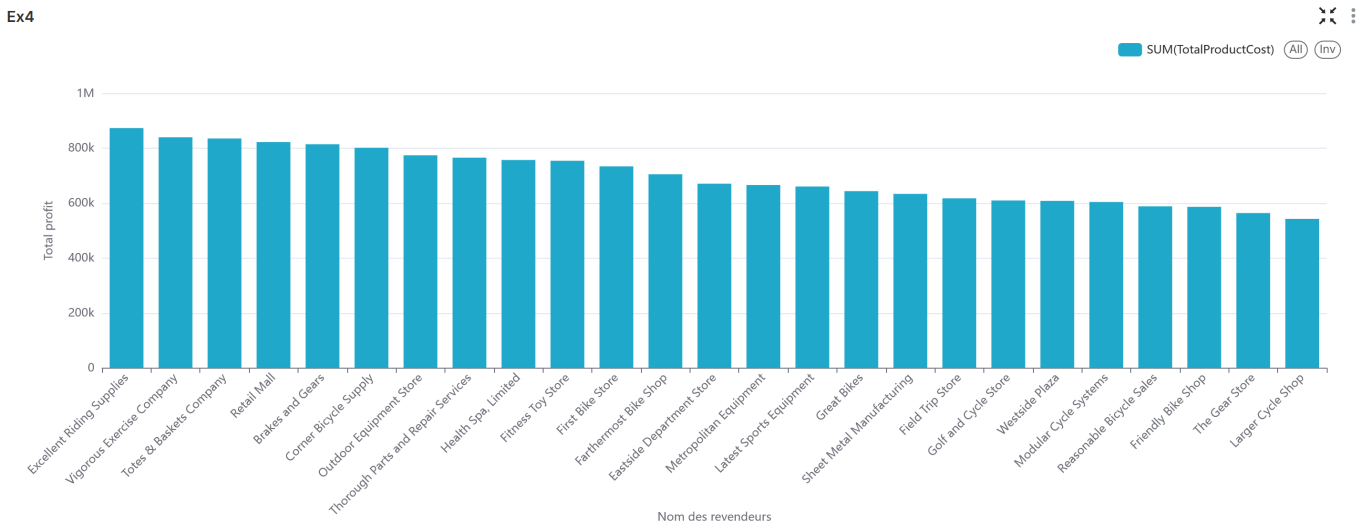
Exercise 3

```
SELECT dpc.EnglishProductCategoryName, fs.OrderQuantity
FROM factresellersales fs
JOIN dimproduct dp
ON dp.ProductKey = fs.ProductKey
JOIN dimproductsubcategory dpsc
ON dp.ProductSubcategoryKey = dpsc.ProductSubcategoryKey
JOIN dimproductcategory dpc
ON dpsc.ProductCategoryKey = dpc.ProductCategoryKey
```



Exercise 4

```
SELECT ds.ResellerName, frs.TotalProductCost
FROM dimreseller ds
JOIN factresellersales frs
ON ds.ResellerKey = frs.ResellerKey
```



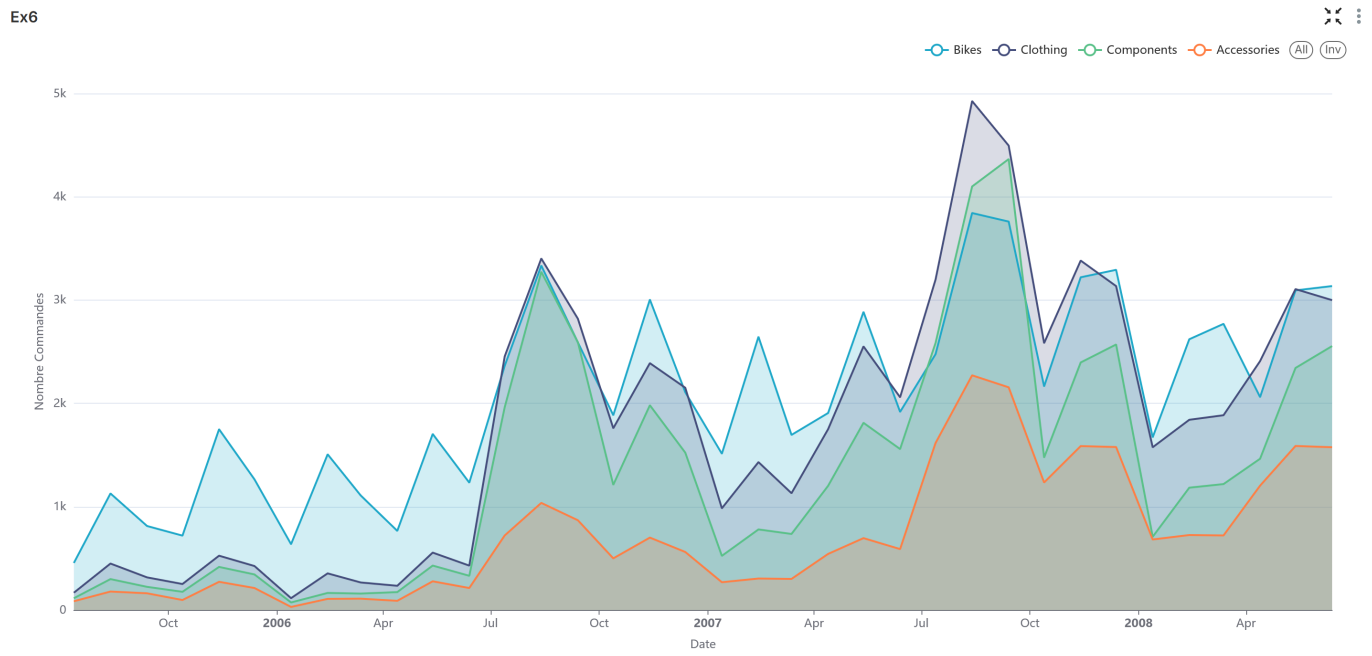
4

Exercise 5

```
SELECT dt.FullDateAlternateKey AS sale_date, fs.OrderQuantity
FROM factresellersales fs
JOIN dimdate dt
ON fs.DueDateKey = dt.DateKey
```

Exercise 6

```
SELECT frs.OrderQuantity, d.FullDateAlternateKey AS SaleDate,
pc.EnglishProductCategoryName AS Category
FROM factresellersales frs
JOIN dimdate d
ON frs.DueDateKey = d.DateKey
JOIN dimproduct p
ON frs.ProductKey = p.ProductKey
JOIN dimproductsubcategory psc
ON p.ProductSubcategoryKey = psc.ProductSubcategoryKey
JOIN dimproductcategory pc
ON psc.ProductCategoryKey = pc.ProductCategoryKey
```



Exercise 7

```sql
SELECT
    d.FullDateAlternateKey AS SaleDate,
    f.CustomerKey,
    SUM(f.SalesAmount) OVER (
        PARTITION BY f.CustomerKey
        ORDER BY d.FullDateAlternateKey
        ROWS BETWEEN UNBOUNDED PRECEDING AND CURRENT ROW
    ) AS CumulativeSales
FROM factinternetsales f
JOIN dimdate d
ON f.DueDateKey = d.DateKey
ORDER BY f.CustomerKey, d.FullDateAlternateKey;
```

SaleDate	CustomerKey	SUM(CumulativeSales)
2008-06-13 00:00:00	11420	55.8k
2007-12-19 00:00:00	12333	53.9k
2008-03-03 00:00:00	11241	53.5k
2008-05-01 00:00:00	12300	52.8k
2008-05-09 00:00:00	12296	52.6k
2008-03-03 00:00:00	17221	50.7k
2008-06-23 00:00:00	15614	47.7k
2007-10-05 00:00:00	12335	45k
2007-12-05 00:00:00	12321	43.2k
2007-12-21 00:00:00	12631	43.1k
2007-11-14 00:00:00	12307	43k
2007-08-29 00:00:00	12132	42.7k
2008-01-16 00:00:00	13600	42.1k
2007-12-21 00:00:00	12655	41.9k
2008-07-08 00:00:00	11429	41.8k
2008-01-02 00:00:00	13263	41.8k
2008-01-29 00:00:00	14940	41.7k
2007-12-19 00:00:00	14775	41.7k
2008-01-23 00:00:00	13591	41.6k
2008-02-10 00:00:00	12118	41.6k
2008-01-15 00:00:00	12079	41.6k
2007-12-29 00:00:00	11854	41.5k
2008-01-23 00:00:00	11766	41.2k
2008-02-06 00:00:00	11343	40.9k
2007-11-16 00:00:00	11000	40.9k
2007-12-15 00:00:00	11457	40.8k
2008-03-07 00:00:00	11914	40.6k
2008-07-10 00:00:00	12302	40.2k
2008-02-24 00:00:00	11032	40.2k
2007-09-29 00:00:00	11439	40.2k

Exercise 8

```
SELECT fis.OrderQuantity AS 'Order Quantity', d.FullDateAlternateKey AS 'Delivery
Date', fis.CustomerKey AS 'Customer Id'
FROM factinternetsales fis
JOIN dimdate d
ON fis.DueDateKey = d.DateKey
```

Ex8

Metric	SUM(Order Quantity)													
Delivery Date	Jul 2007	Aug 2007	Sep 2007	Oct 2007	Nov 2007	Dec 2007	Jan 2008	Feb 2008	Mar 2008	Apr 2008	May 2008	Jun 2008	Jul 2008	Aug 2008	Total (Sum)
Customer Id															
11000		2			5										7
11001		6										4			10
11003	4				4										8
11004		3													3
11005		4													4
11006	3														3
11007		5													5
11008	4														4
11009		2													2
11012			3												3
11013														3	3
11014					4										4
11015		3													3
11016		3													3
11017	2														2
11018		2									4				6
11019		3	4		3	3					4	6	4		27
11020	2														2
11021		3													3
11022		2													2
11023			4												4
11024							3	3							6
11025		3													3
11026				3						3					6
11027						4					4				8

And another screenshot that shows values > 7.

11088	3										4			7
11089	3											4		7
11090		3												3
11091		3	5	8	5	4	3	10	4		6		7	55
11092	2													2
11093	4													4

Exercise 9

1. Give the main advantage of performing a visualization on the Web compared to a document (printed report for example). Then describe at least two examples of this advantage. A Web visualization is dynamic and allows the user to manipulate the data, unlike a printed or static report.

- Example 1: Users can zoom, filter, highlight data points, change time ranges, and navigate through dimensions that cannot be shown in a fixed document.

- Example 2: A Web dashboard can refresh automatically using APIs or data streams. A printed document cannot reflect continuous or live changes.

2. Explain what the Shannon communication model (1948) has indirectly brought to the field of data visualization

The Shannon-Weaver model is one of the foundational theories of communication. It describes how information is transmitted from a sender to a receiver through a channel, with potential noise that can distort the message.

It emphasizes the need to minimize noise (misinterpretation or confusion) and ensure that the intended message is accurately conveyed to the audience. This has led to the development of best practices in data visualization, such as choosing appropriate chart types, using clear labels, and designing for accessibility, all aimed at enhancing the clarity and effectiveness of visual communication.

- Noise reduction. The model highlights the need to eliminate unnecessary elements. In visualization, removing visual clutter (chartjunk, redundant markers) increases the “capacity” of the graphic to convey information clearly.

- Efficient encoding of information. As Shannon focuses on optimal encoding for maximum transmission, visualization must choose perceptually efficient encodings (position - length - angle - color) to minimize information loss.
- Receiver-centric design. The model stresses correct decoding by the receiver. In data visualization, this translates to designing clear, interpretable graphics aligned with human perception.

Source: https://en.wikipedia.org/wiki/Shannon%E2%80%93Weaver_model

3. A scale has been applied to the time series data of the frst diagram in Figure 4, resulting in the display of the second diagram. Explain what this scale is and describe what information it gives compared to the frst diagram.

The second diagram results from applying a logarithmic scale to the values of the original time series.

A logarithmic transformation (typically log(x) or log10(x)) is applied to the y-axis. Instead of representing raw values, the graph displays their logarithm.

Information gained compared to the first diagram

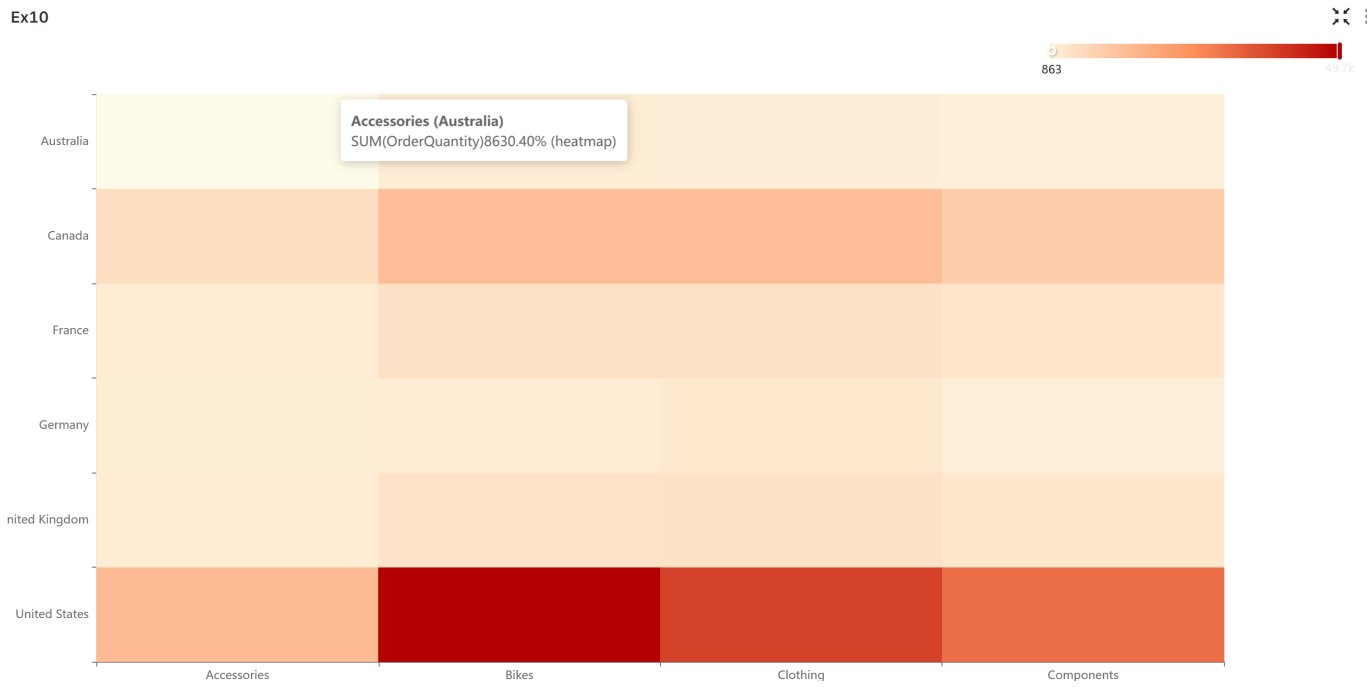
- On a linear scale, very large values dominate the chart and compress the smaller ones against the baseline. A logarithmic scale redistributes the space so both small and large values become interpretable. This prevents the graph from being visually distorted when data vary by factors of hundreds or thousands.
- Exponential or multiplicative processes form straight lines on a log scale. This transformation exposes patterns, consistency, or deviations that remain hidden on a linear axis, where the curve rapidly increases and becomes unreadable. It allows analysts to detect structure and assess growth behaviour more accurately.

Source: https://www.forbes.com/sites/naomirobbins/2012/01/19/when-should-i-use-logarithmic-scales-in-my-charts-and-graphs/

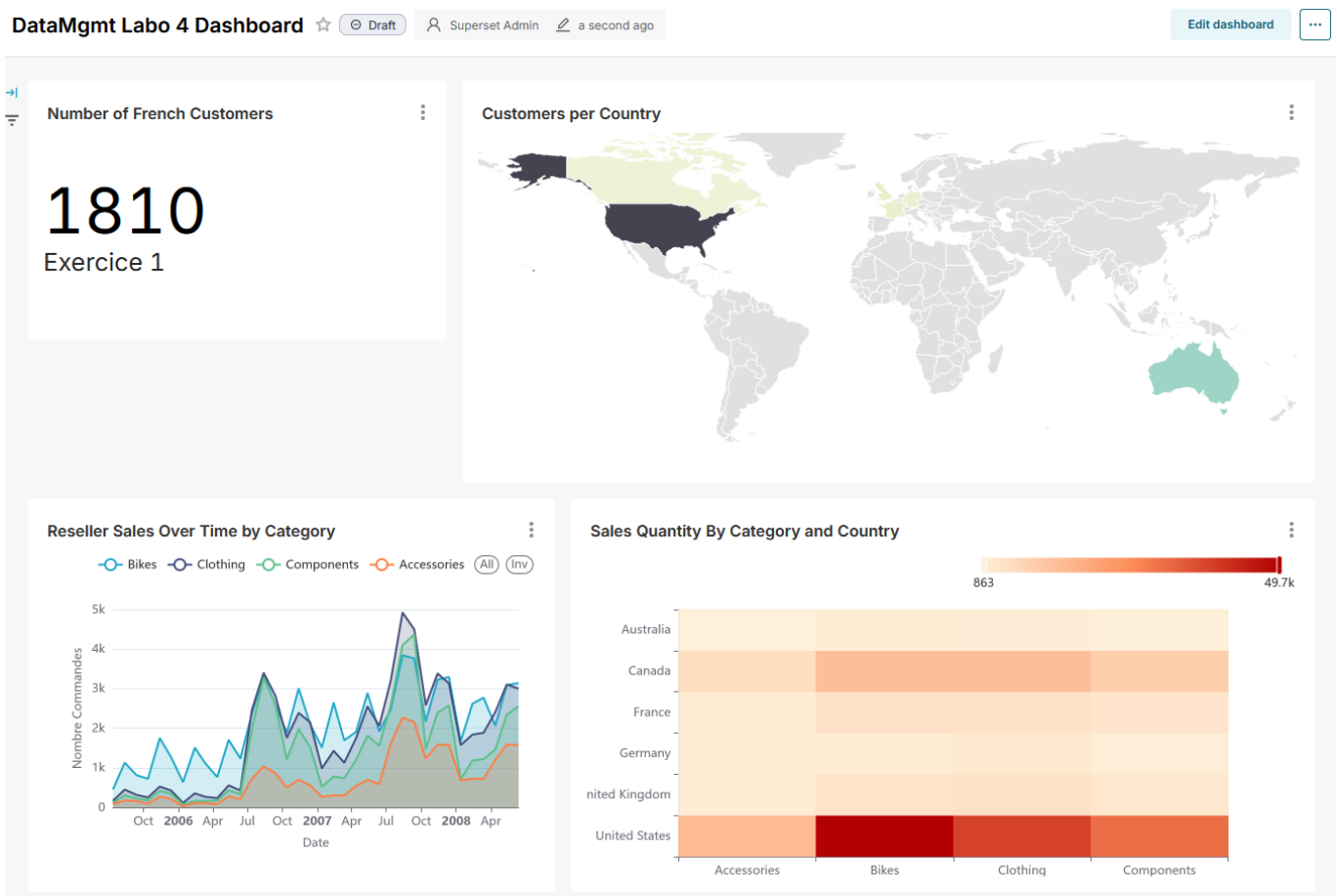
Exercise 10

Let's create a heatmap that shows the number of sales per categories by country.

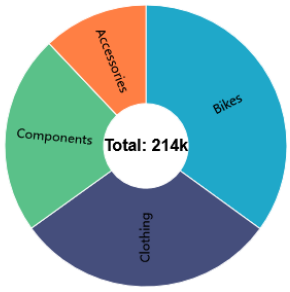
```
SELECT pc.EnglishProductCategoryName AS Category, g.EnglishCountryRegionName AS
Country, frs.OrderQuantity
FROM factresellersales frs
JOIN dimproduct p
ON frs.ProductKey = p.ProductKey
JOIN dimproductsubcategory psc
ON p.ProductSubcategoryKey = psc.ProductSubcategoryKey
JOIN dimproductcategory pc
ON psc.ProductCategoryKey = pc.ProductCategoryKey
JOIN dimreseller dr
ON dr.ResellerKey = frs.ResellerKey
JOIN dimgeography g
ON dr.GeographyKey = g.GeographyKey
```



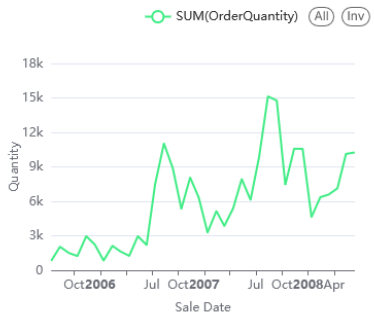
Here is a final display with a practical layout.



Reseller Sales by Product Category



Reseller Sales Over Time



Cumulative Online Sales per Customer

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2008-06-13	11420	55.8k
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2008-03-03	11241	53.5k
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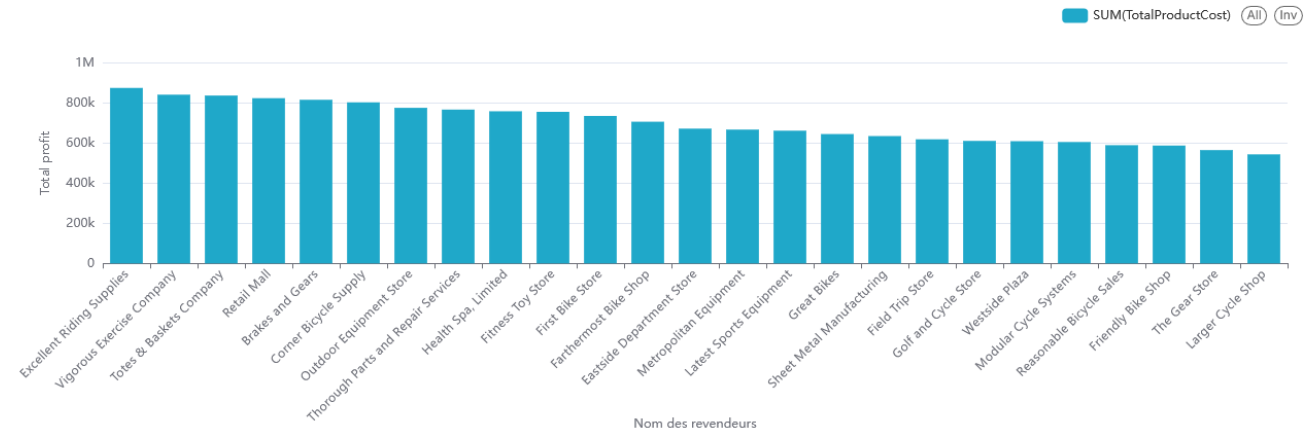
2008-06-23	15614	47.7k
2007-10-05	12335	45k
2007-12-05	12321	43.2k
2007-12-21	12631	43.1k
2007-11-14	12307	43k

Total Product Cost by Reseller



Order Quantities by Customer and Delivery Month

	Metric	SUM(Order Quantity)														
	Delivery Date	Jul 2007	Aug 2007	Sep 2007	Oct 2007	Nov 2007	Dec 2007	Jan 2008	Feb 2008	Mar 2008	Apr 2008	May 2008	Jun 2008	Jul 2008	Aug 2008	Total (Sum)
Customer Id																
11000			2			5										7
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11005			4													4
11006		3														3
11007			5													5
11008		4														4