

Information Visualization

Course Module IN6221

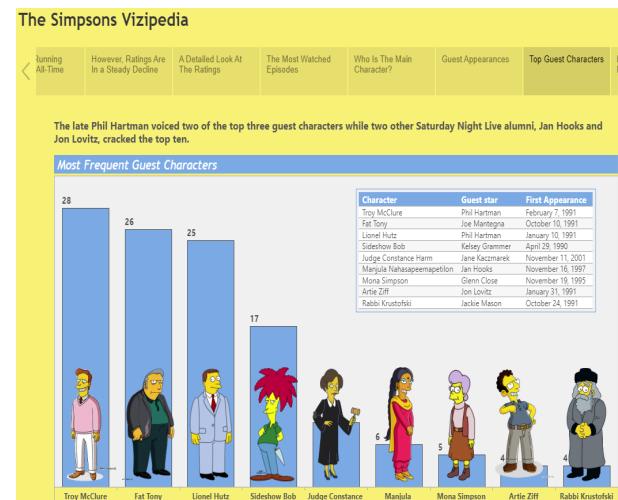
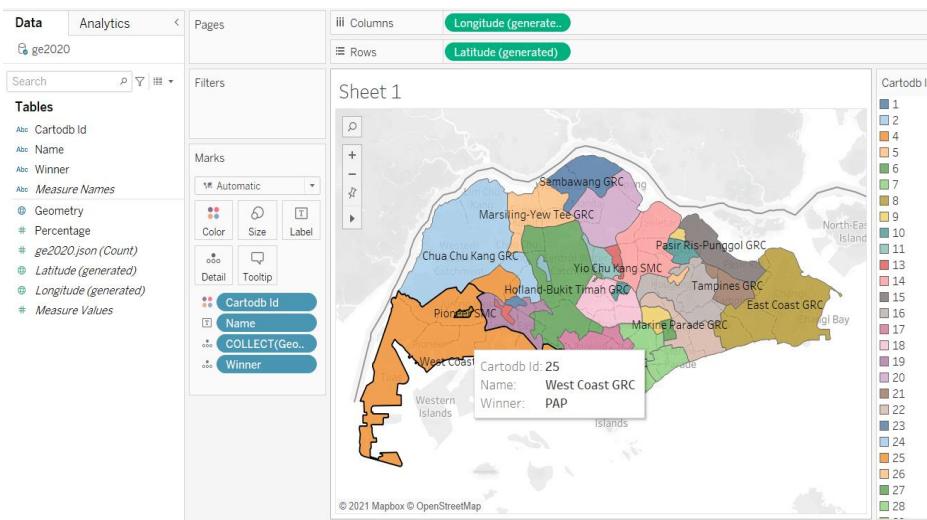
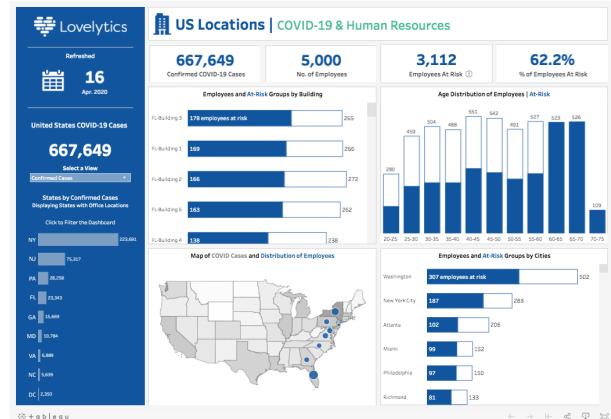
Introduction to Tableau Part II

WKW School of Communication and Information,
NTU

- Creating Calculated Fields
- Dashboarding
- Storytelling
- Map Visualization

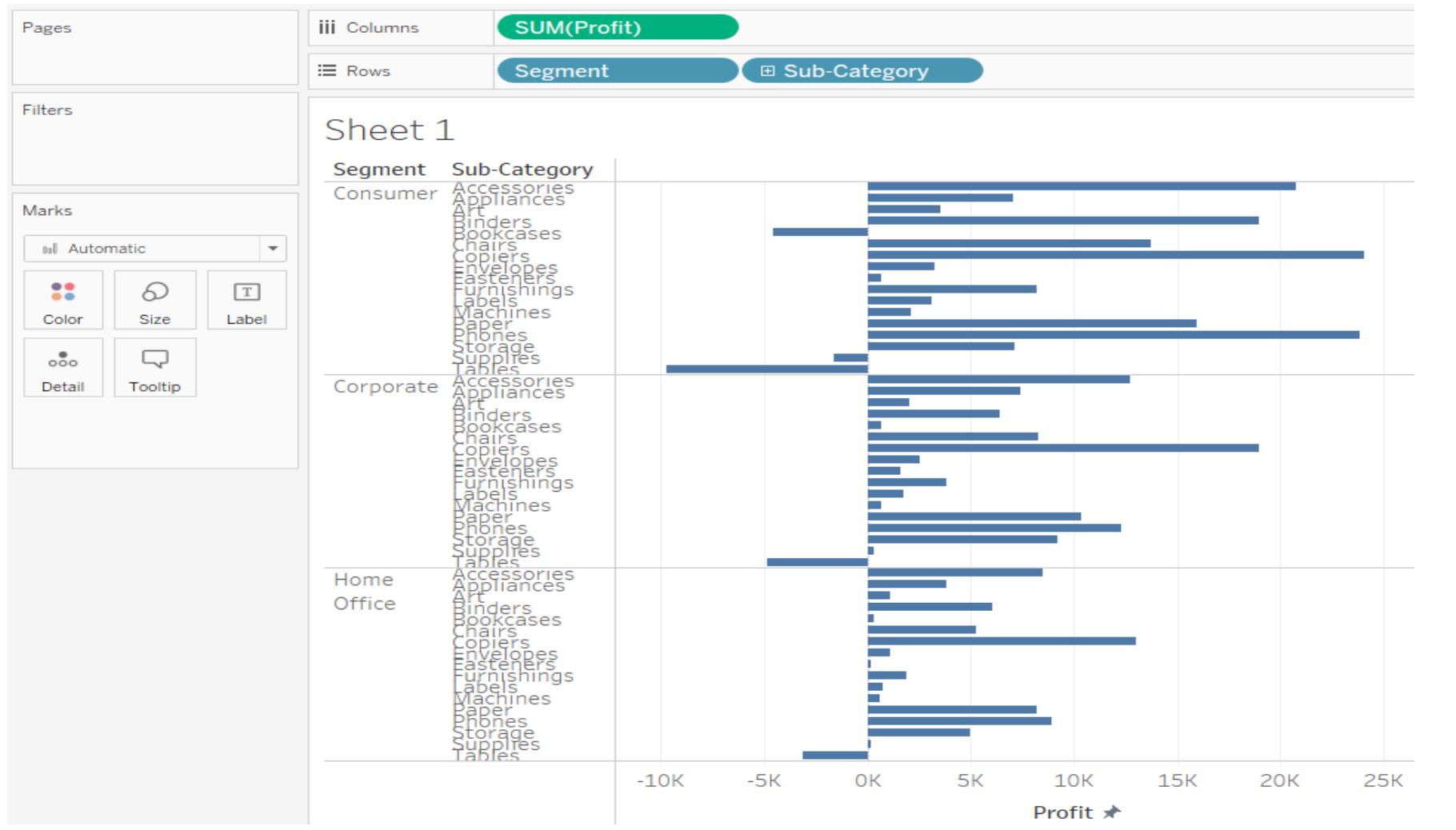
Cost

$$\text{SUM}([\text{Sales}]) - \text{SUM}([\text{Profit}])$$



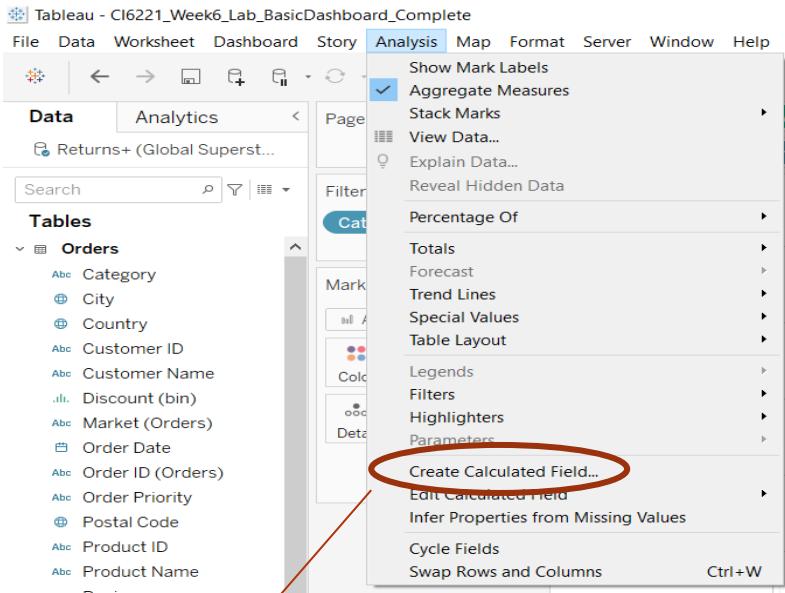
Calculated Fields – Data Prep

Start with **Sample Superstore.xls**. Create a new Worksheet – **Profit** to **Columns**, **Segment** and **Subcategory** to **Rows**.



Calculations in Tableau – Distinct Color (Pos/Neg)

- What if we want, for **emphasis**, to have one **distinct color** for **positive** and one for **negative**? We **define a formula** by creating **Calculated Fields**.
- Click **Analysis... Create Calculated Field**. Name it "**Sign of profit**".
- **IF SUM([Profit]) > 0 THEN "positive" ELSE "negative" END**

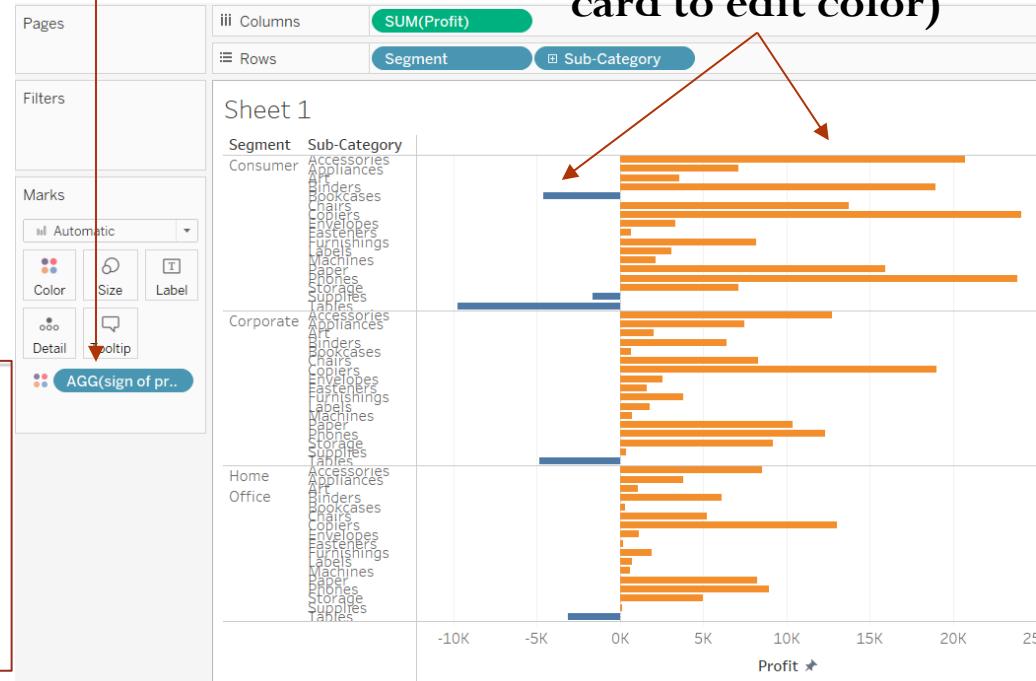


```
sign of profit
//Comments - implement sign of profit
IF SUM([Profit])>0 THEN "positive" ELSE "negative" END
```

Abc *Measure Names*
=# Margin
=Abc sign of profit

Little **equal sign** in front of field indicates it's a **calculated field**

Bring calculated field to color (click on color card to edit color)



Create Calculated Field – “Sign of Profit”

Tableau - Global Superstore 10-3

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Show Me

Data Analytics Pages Columns SUM(Profit)

Rows Market Sub-Category

Global Superstore

Dimensions

- Customers
 - Customer ID
 - Customer Name
 - Segment
- Orders
 - Order Date
 - Order ID
 - Order Priority
- Shipping
 - Ship Date
 - Ship Mode
- Location
 - Market
 - Region
 - Country
 - State
 - City
 - Postal Code
- Products
 - Category
 - Sub-Category
 - Product Name

Filters

Category: Furniture

Marks

Automatic

Color Size Label

Detail Tooltip

Market Sub-Category

Market	Sub-Category	Profit
Africa	Bookcases	\$5,000
	Chairs	\$2,000
	Furnishings	\$1,000
	Tables	\$3,000
APAC	Bookcases	\$65,000
	Chairs	\$15,000
	Furnishings	\$12,000
	Tables	\$2,000
Canada	Bookcases	\$2,000
	Chairs	\$1,000
	Furnishings	\$500
	Tables	\$1,000
EMEA	Bookcases	\$7,000
	Chairs	\$2,000
	Furnishings	\$1,000
	Tables	\$2,000
EU	Bookcases	\$55,000
	Chairs	\$20,000
	Furnishings	\$12,000
	Tables	\$2,000
LATAM	Bookcases	\$25,000
	Chairs	\$30,000
	Furnishings	\$22,000
	Tables	\$2,000
US	Bookcases	\$10,000
	Chairs	\$25,000
	Furnishings	\$12,000
	Tables	\$2,000

Measures

- Discount
- Profit
- Quantity
- Sales
- Shipping Cost
- Latitude (generated)
- Longitude (generated)

28 RECORDED WITH 1 column SUM(Profit): \$285,205

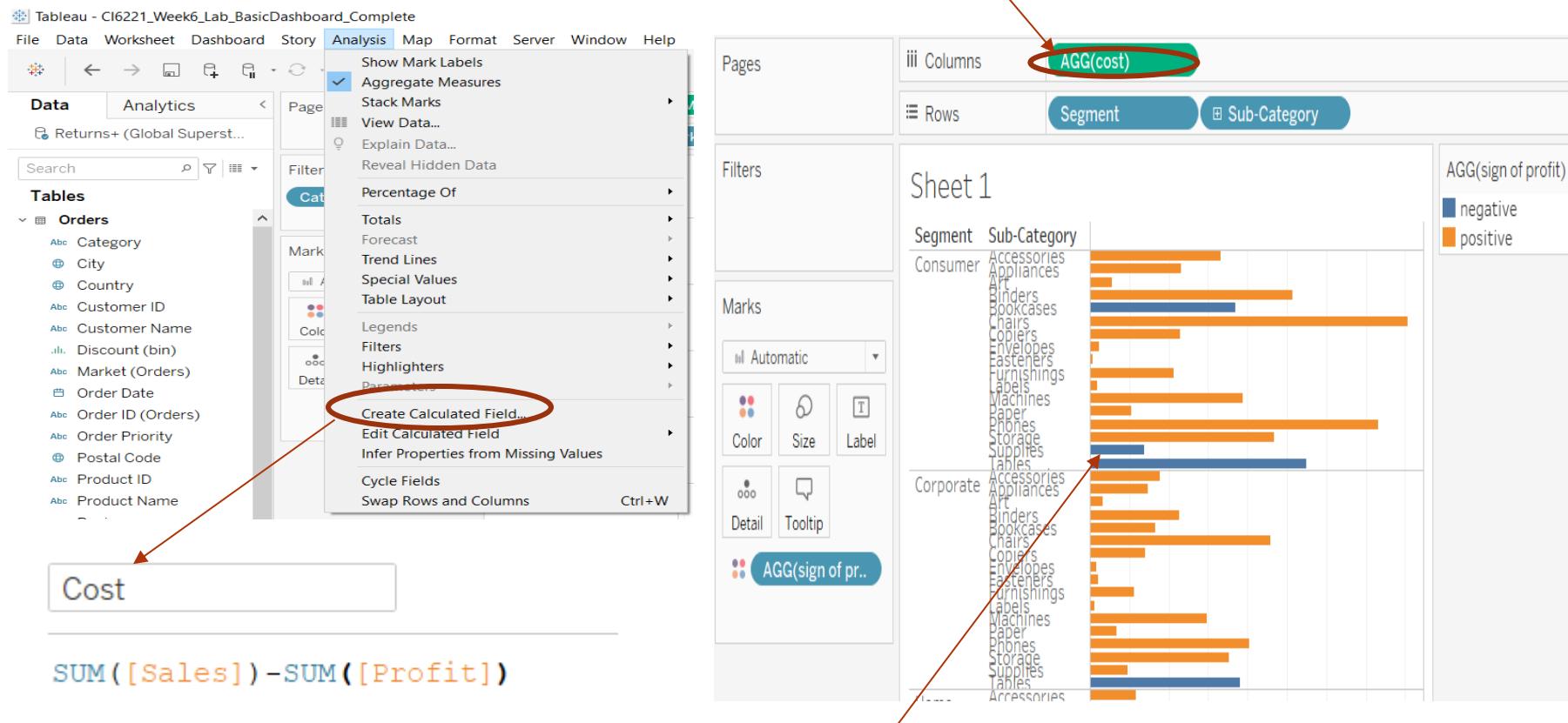
SCREENCAST MATIC

2:42 PM 7/28/2017

The screenshot shows a Tableau dashboard with a bar chart comparing profit across different markets (Africa, APAC, Canada, EMEA, EU, LATAM, US) for four furniture sub-categories: Bookcases, Chairs, Furnishings, and Tables. The profit values are displayed as horizontal bars extending from a central zero line. The chart uses a color gradient where bars extending to the right are blue and bars extending to the left are red. The 'Profit' measure is highlighted with a yellow circle in the Measures shelf, and the 'Detail' button in the Marks shelf is also highlighted with a yellow circle.

Create Calculated Field – “Cost”

- There might be a **field of interest that is not in the data**. E.g., visualize **Cost** defined as **Sales-Profit** => Add a Calculated field for: **SUM([Sales]) - SUM([Profit])**. Name it “**Cost**”, drag Profit out of view and replace with Cost.



Sum(Sales) minus (negative profit) = positive cost (color stays as negative blue due to “sign of profit” calculated field)

Calculations in Tableau

Tableau - Global Superstore 10-3

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Show Me

Dimensions

- Customers
 - Customer ID
 - Customer Name
 - Segment
- Orders
 - Order Date
 - Order ID
 - Order Priority
- Shipping
 - Ship Date
 - Ship Mode
- Location
 - Market
 - Region
 - Country
 - State
 - City
 - Postal Code
- Products
 - Category
 - Sub-Category
 - Product Name

Measures

- Discount
- Profit
- Quantity
- Sales
- Shipping Cost
- =ABC_Sign of Profit
- =Latitude (generated)

Pages

Columns: SUM(Profit)

Rows: Market, Sub-Category

Filters: Category: Furniture

Marks: Automatic, Color, Size, Label, Detail, Tooltip, AGG(Sign of P..)

AGG(Sign of Profit)

- negative
- positive

Market Sub-Category

Market	Sub-Category	Profit
Africa	Bookcases	\$10,000
	Chairs	\$2,000
	Furnishings	\$1,000
	Tables	\$3,000
APAC	Bookcases	\$65,000
	Chairs	\$62,000
	Furnishings	\$15,000
	Tables	\$18,000
Canada	Bookcases	-\$15,000
	Chairs	\$1,000
	Furnishings	\$1,000
	Tables	\$1,000
EMEA	Bookcases	\$12,000
	Chairs	\$1,000
	Furnishings	\$1,000
	Tables	\$1,000
EU	Bookcases	\$55,000
	Chairs	\$20,000
	Furnishings	\$12,000
	Tables	\$15,000
LATAM	Bookcases	\$25,000
	Chairs	\$28,000
	Furnishings	\$10,000
	Tables	\$10,000
US	Bookcases	-\$10,000
	Chairs	\$25,000
	Furnishings	\$12,000
	Tables	\$10,000

Profit

Data Source

28 RECORDED WITH 1 column SUM(Profit): \$285,205

SCREENCASTOMATIC

2:44 PM
7/28/2017

Calculation - Time between Dates

- A common question could be “**How much time did something take?**” when there is a start and an end date in the data => Use **date calculation** to handle that.
- Let’s look at the average time it takes for an order to ship. **Create a new sheet**.
 - Add a **Calculated field**. Name it “**Time to Ship**” => use **DATEDIFF** function to get the **amount of time between** Order Date and Shipping Date =>
 - **DATEDIFF('day', [Order Date], [Ship Date])**

The screenshot shows the Tableau Data Source pane on the left, listing various dimensions and measures. The 'Order Date' dimension is selected. A context menu is open over the 'Order Date' dimension, with the 'Create' option highlighted. A sub-menu is displayed, showing 'Calculated Field...' as the selected option. To the right, the 'Time to Ship' calculated field is defined in the formula editor, using the DATEDIFF function with 'day' as the unit, and specifying the Order Date and Ship Date fields.

Tables

- Abc Category
- ⊕ City
- ⊕ Country
- Abc Customer ID
- Abc Customer Name
- Abc Discount (bin)
- Abc Market (Orders)
- ⊕ Order Date
- Abc Order ID (C)
- Abc Order Priorit
- ⊕ Postal Cod
- Abc Product ID
- Abc Product Na
- Abc Region
- # Row ID
- Abc Segment
- ⊕ Ship Date
- Abc Ship Mode
- ⊕ State
- Abc Sub-Categ
- # Discount
- # Profit
- ⊕ Quantit

Add to Sheet

- Duplicate
- Rename
- Hide
- Create
- Transform
- Convert to Continuous
- Change Data Type
- Default Properties
- Group by
- Folders
- Hierarchy
- Replace References...
- Describe...

Marks

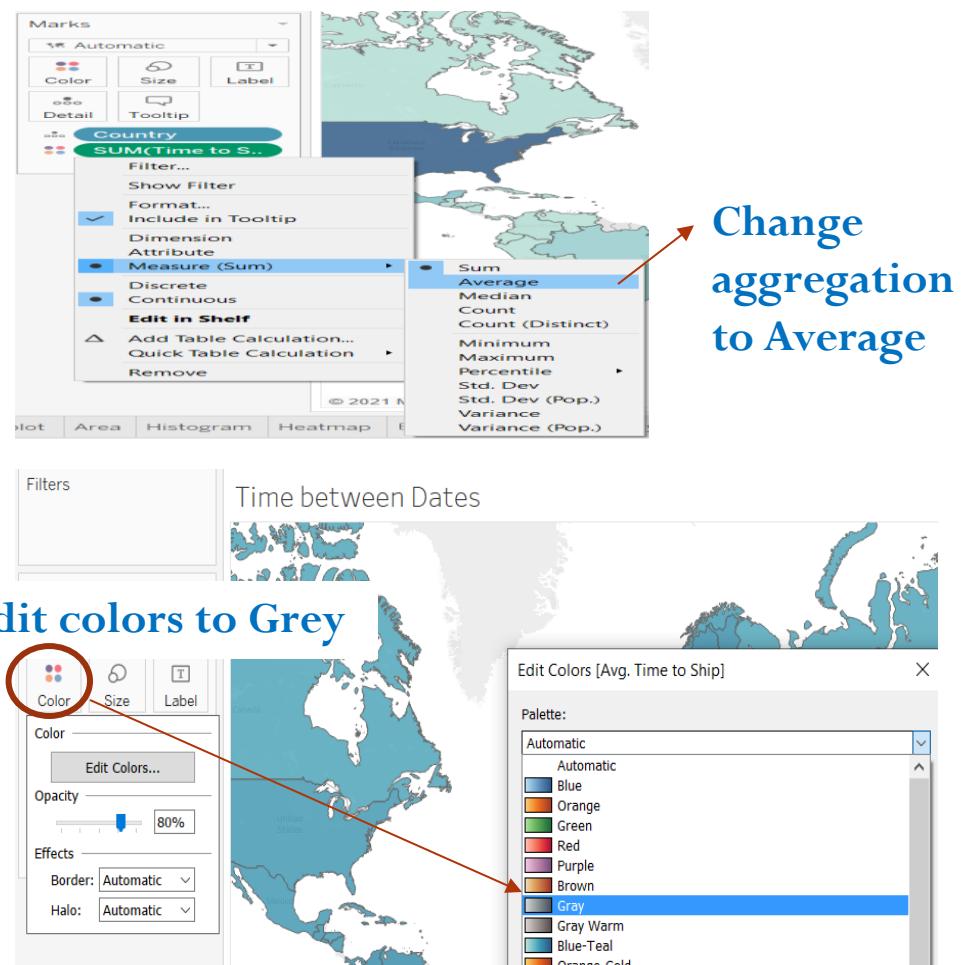
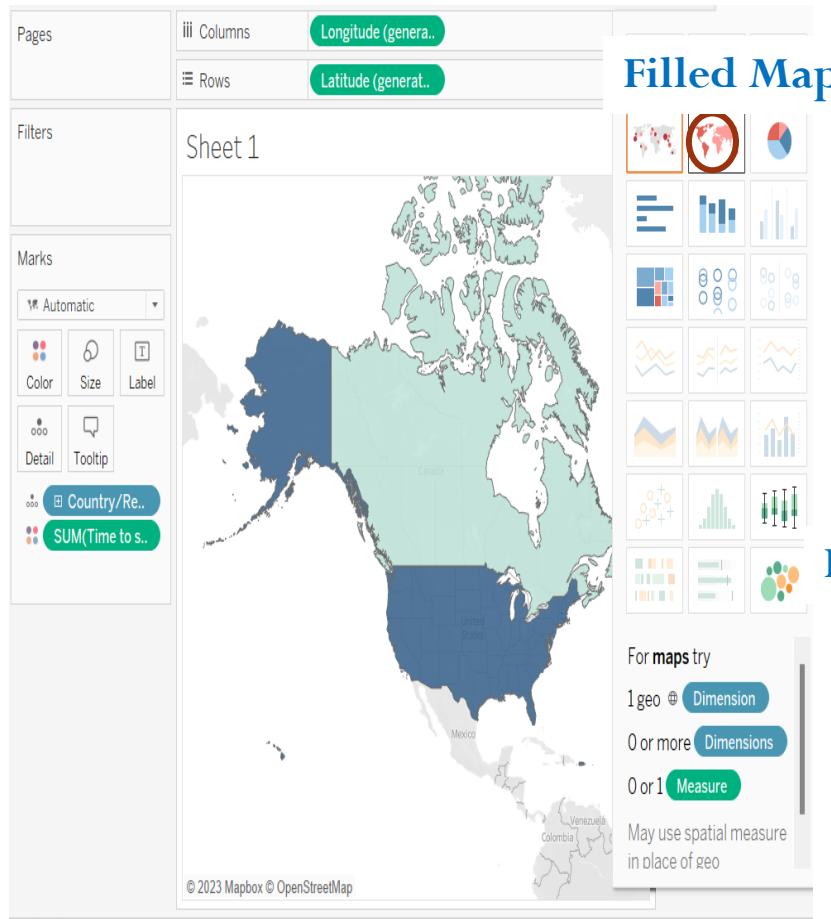
- Automatic
- Color
- Size
- Text

Time to Ship

DATEDIFF('day', [Order Date], [Ship Date])

Calculation: Time between Dates

- Color countries by using Time to Ship
 - Select **Country** and **Time to Ship**, select **Filled Map** from Show Me
 - Change the aggregation to **Average**. Edit colors to Grey as interpretation of “darker is worse”



Calculation: Time between Dates

Tableau - Global Superstore 10-3

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Show Me

Data Analytics

Global Superstore

Dimensions

- Customers
 - Customer ID
 - Customer Name
 - Segment
- Orders
 - Order Date
 - Order ID
 - Order Priority
- Shipping
 - Ship Date
 - Ship Mode
- Location
 - Market
 - Region
 - Country
 - State
 - City
 - Postal Code
- Products
 - Category
 - Sub-Category
 - Product Name

Marks

- Automatic
- Color
- Size
- Text
- Detail
- Tooltip

Sheet 2

Drop field here

Drop field here

Drop field here

Measures

- Shipping Cost
- Sign of Profit
- Time to Ship
- Latitude (generated)
- Longitude (generated)
- Number of Records
- Measure Values

Data Source Sheet 1 Sheet 2

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2:51 PM 7/28/2017

Table Calculations – Pre-defined Computations

- Table Calculation => **secondary calculation** that is **performed on top of a returned result set**. **Quick Table Calculations** => set of **pre-defined**, commonly used computations. E.g., Running Total, Percent of Total, etc
- Create New Sheet, move **Category** to Columns, **Sales** to Rows. **Order Date** to Columns => expand to **Quarters** (make Date **continuous**). **Sales to Rows again**, drop-down and select Quick Table Calculation => **Running Total** => display quarterly sales and running total graphs.

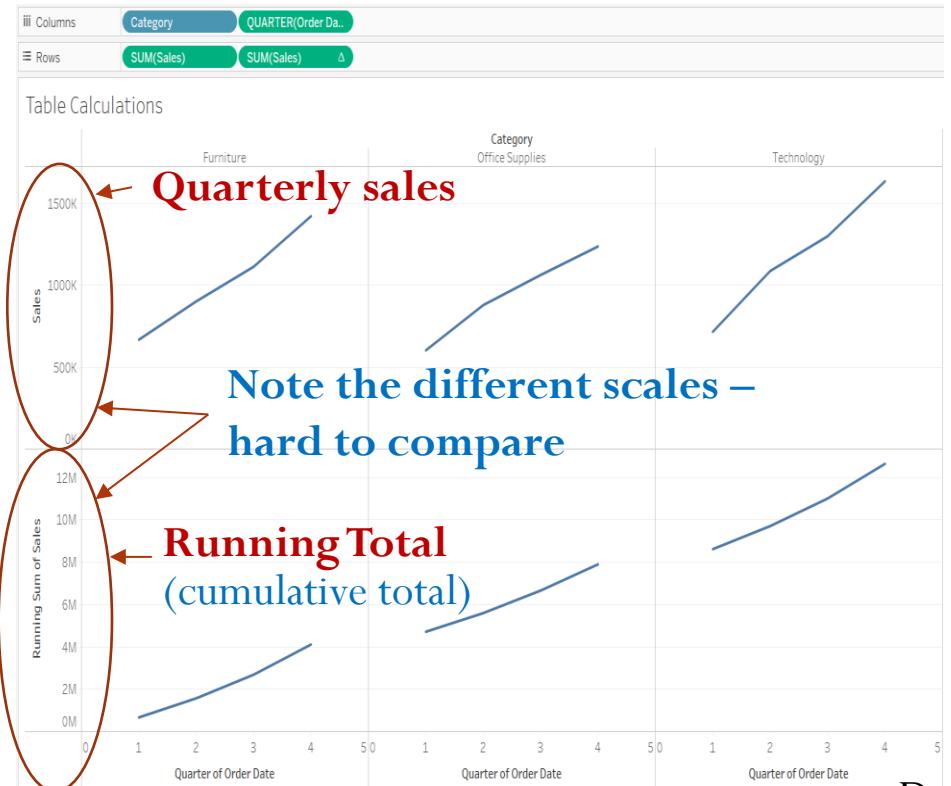
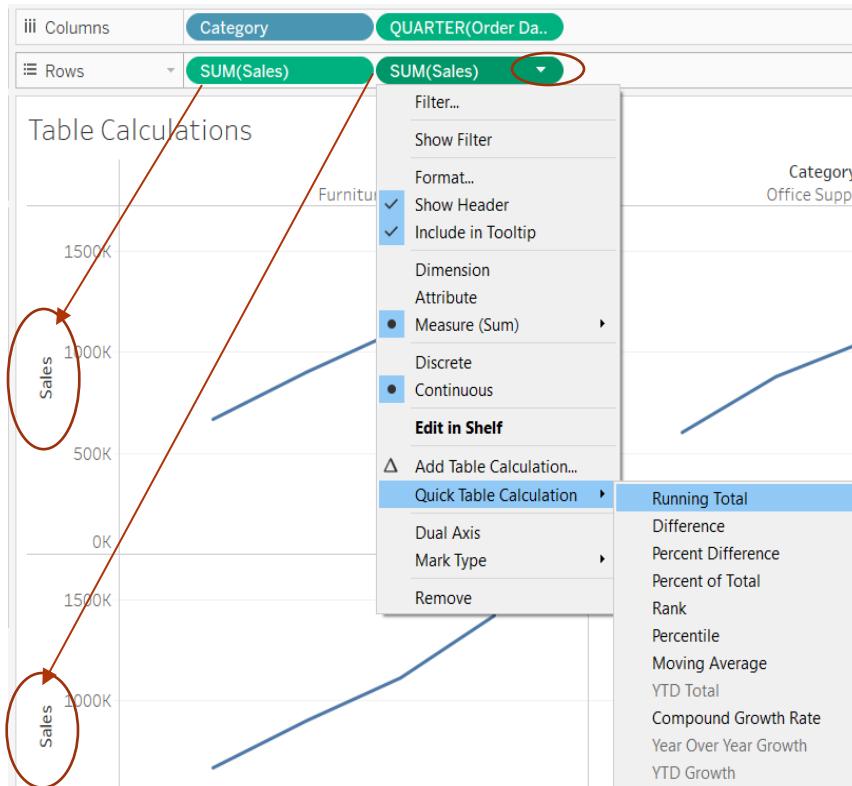


Table Calculations

Tableau - Global Superstore 10-3

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Data Analytics Pages Columns Longitude (generated)

Rows Latitude (generated)

Global Superstore

Dimensions

- Customers
 - Customer ID
 - Customer Name
 - Segment
- Orders
 - Order Date
 - Order ID
 - Order Priority
- Shipping
 - Ship Date
 - Ship Mode
- Location
 - Market
 - Region
 - Country
 - State
 - City
 - Postal Code
- Products
 - Category
 - Sub-Category
 - Product Name

Marks

Automatic

Color Size Label

Detail Tooltip

Country AVG(Time to S..)

Sheet 2

© OpenStreetMap contributors

Show Me

For symbol maps try

- 1 geo Dimension
- 0 or more Dimensions
- 0 to 2 Measures

May use spatial measure in place of geo dimension

14 RECORDED WITH 1 column SUM of AVG(Time to Ship): 575.339

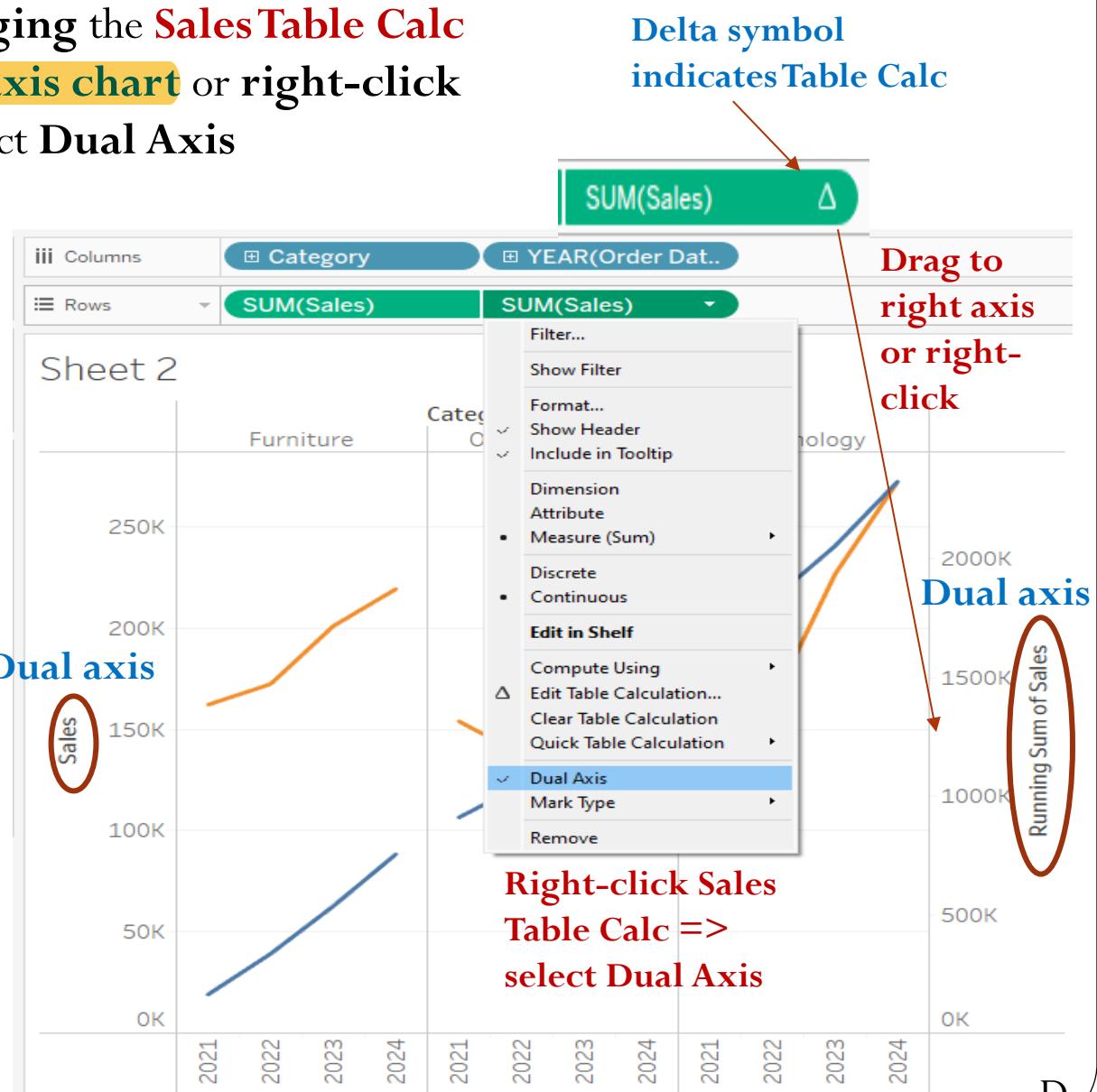
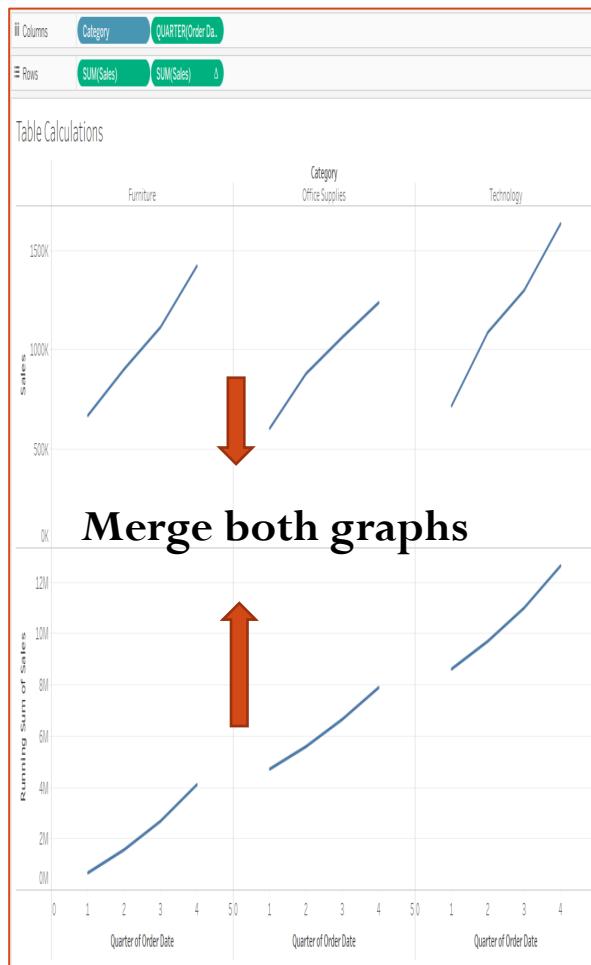
SCREENCASTOMATIC

14 RECORDED WITH 1 column SUM of AVG(Time to Ship): 575.339

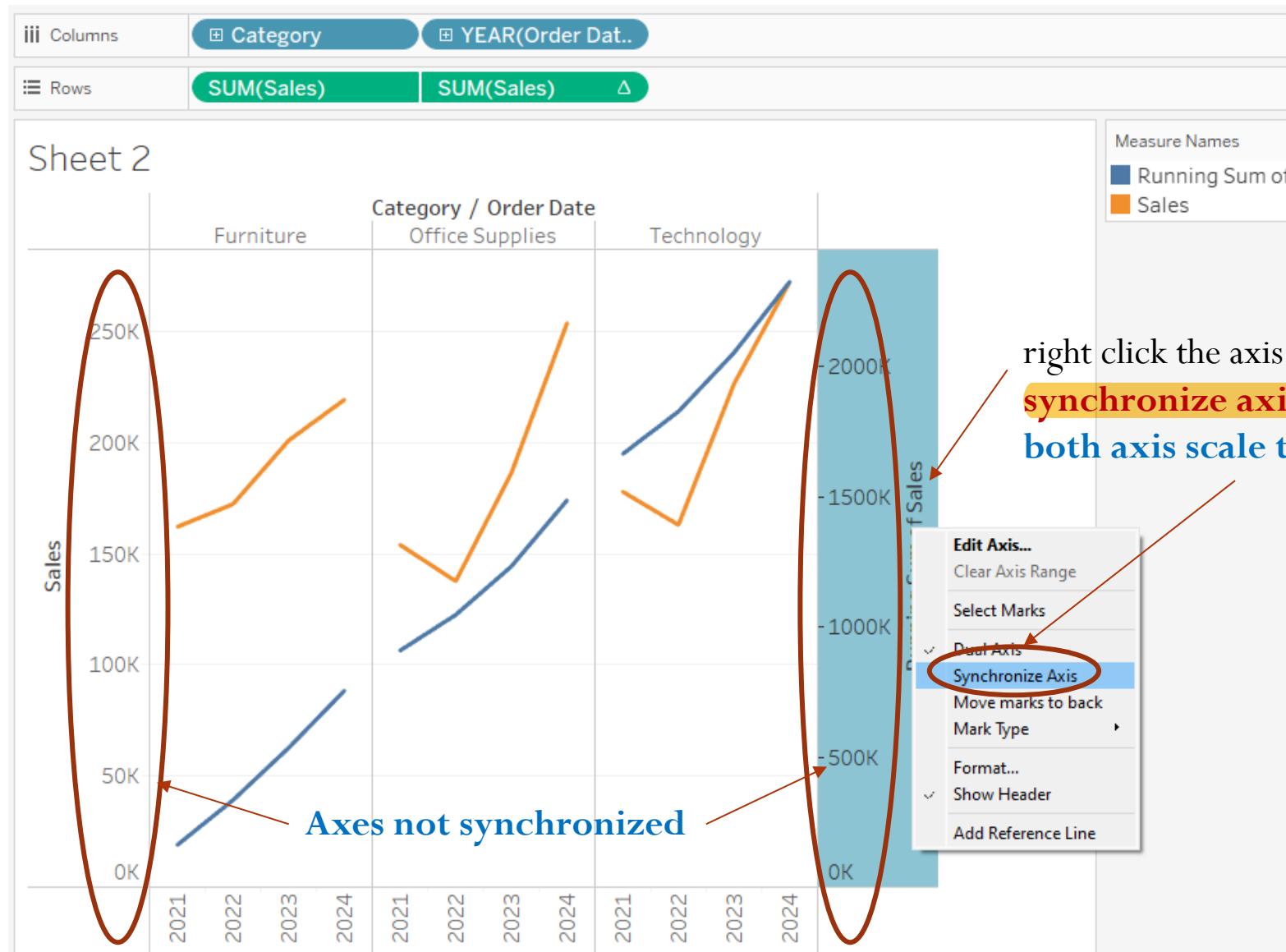
7/28/2017 2:53 PM

Synchronize the axis for easy comparison

- Merge both graphs by dragging the **Sales Table Calc** to the **right axis** for a **dual axis chart** or right-click the **Sales Table Calc** and select **Dual Axis**



Synchronize the axis for easy comparison



Synchronize the axis for easy comparison

Table Calculations



Synchronize the axis for easy comparison

Tableau - Global Superstore 10-3

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Show Me

Data Analytics Pages

Global Superstore

Dimensions

- Customers
 - Customer ID
 - Customer Name
 - Segment
- Orders
 - Order Date
 - Order ID
 - Order Priority
- Shipping
 - Ship Date
 - Ship Mode
- Location
 - Market
 - Region
 - Country
 - State
 - City
 - Postal Code
- Products
 - Category
 - Sub-Category
 - Product Name

Marks

- All
- Sum(Sales)
- Sum(Sales) △

Color Size Label

Detail Tooltip Path

Filters

Sheet 3

Furniture

Office Supplies

Technology

Sales

Running Sum of Sales

Quarter of Order Date

Category

Office Supplies

Technology

Quarter of Order Date

Quarter of Order Date

24 RECORDED WITH 3 columns Running Sum of SUM(Sales): \$75,871,074

SCREENCASTOMATIC Type here to search

2:55 PM 7/28/2017

Quarter	Furniture Sales	Office Supplies Sales	Technology Sales	Running Sum of Sales
1	\$750,000	\$500,000	\$500,000	\$500,000
2	\$1,000,000	\$800,000	\$1,000,000	\$1,300,000
3	\$1,400,000	\$1,100,000	\$1,200,000	\$2,600,000
4	\$1,500,000	\$1,200,000	\$1,400,000	\$3,800,000

Interactivity (Search Box)

- Add **interactivity** to encourage exploration
- **Filters** help users **specify which data to show** in the view.
- **Customize** each filter for different types of data. E.g., show filters as **single-select** check boxes, **multi-select** radio buttons, or **drop-down** lists, etc. Include a **search** button, the option to **show all fields**, null controls, and more. **Edit the filter title** to give viewers clear instructions for interacting with the data.

The screenshot shows a Tableau dashboard titled "Sheet 1". On the left, there's a sidebar with "Pages", "Filters", and "Marks" sections. The "Filters" section contains buttons for "Segment", "Sub-Category", and "Category: Furni.". The "Marks" section includes buttons for "Square", "Color", "Size", "Label", "Detail", and "Tooltip". The main area displays a heatmap where rows represent "State/Province" and columns represent "Category". A tooltip for the cell at the intersection of "Furniture" and "California" shows the value "100". To the right of the heatmap is a context menu with the following items:

- Edit Filter...
- Remove Filter
- Apply to Worksheets
- Format Filter and Set Controls...
- Show Title
- Edit Title...
- Single Value (list) (radio button selected)
- Single Value (dropdown)
- Single Value (slider)
- Multiple Values (list) (checkbox selected)
- Multiple Values (dropdown)
- Multiple Values (custom list)
- Wildcard Match
- Only Relevant Values
- All Values in Database (radio button selected)
- Include Values
- Exclude Values
- Include all values when empty (checkbox selected)
- Hide Card

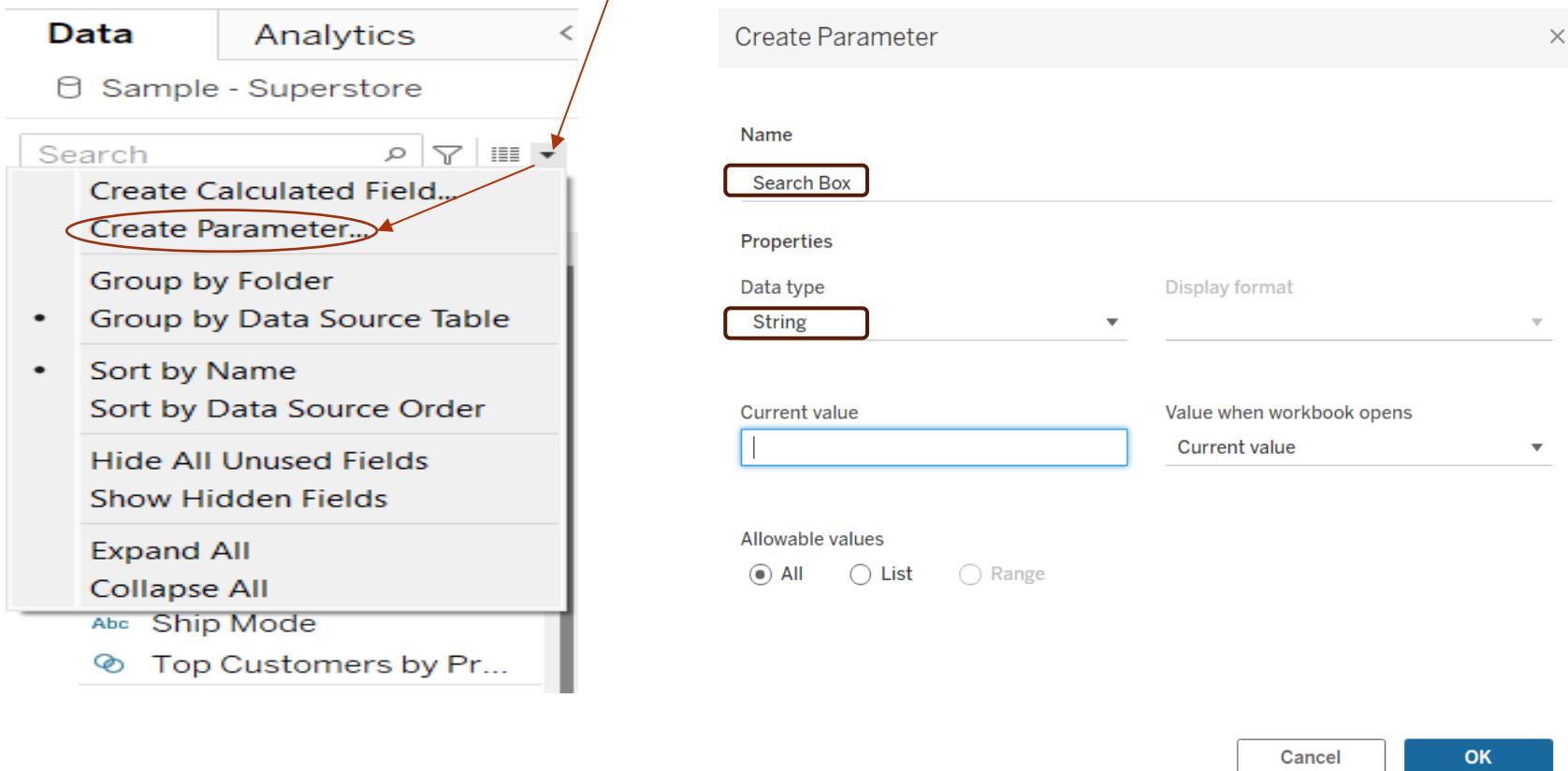
Annotations on the right side of the menu:

- A red arrow points from the word "Click" to the top-left corner of the context menu.
- A red arrow points from the "Search box" label to the "Search box" icon in the "Format Filter and Set Controls..." item.
- A bracket labeled "Options to show values" groups the "Single Value" and "Multiple Values" items under the "Format Filter and Set Controls..." heading.

Search Box

- Create a Search Box to allow users to perform search for their required data => Click drop down list at top of **Data tab** => **Create a Parameter called “Search Box”**

Click “Drop down List”



Search Box

- Next **create a calculated field called “Search Filter”** – click **Analysis Tab** followed by **“Create Calculated Field”**

Search Filter

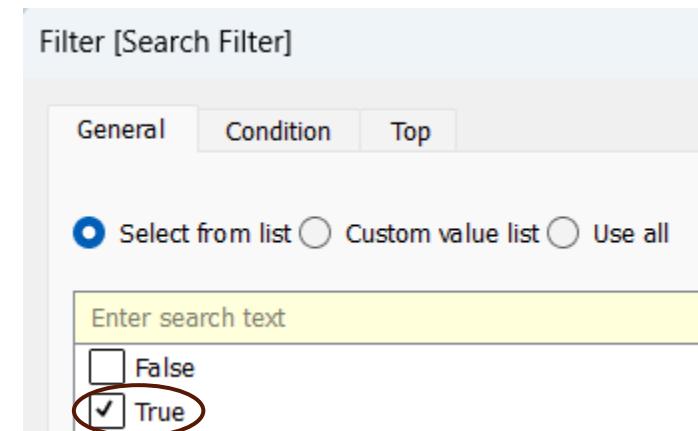
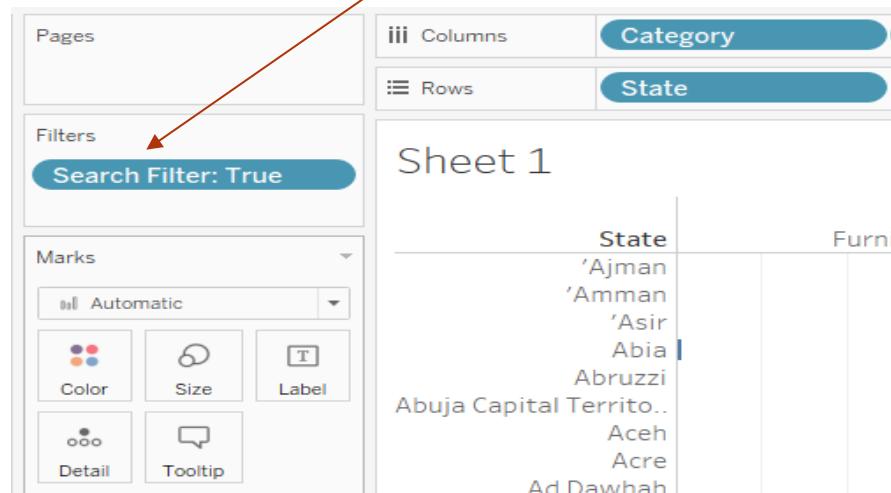
If Search Box parameter matches State/Province

CONTAINS([State/Province], [Search Box])

OR

CONTAINS([Category], [Search Box])

Add the calculated field created to filters card



Show when Search Filter is “True”

Search Box

Click on **Search Box** parameter then click on “Show Parameter”

The screenshot shows the Tableau interface with the 'Search Box' parameter selected. A context menu is open, with the 'Show Parameter' option highlighted in blue. Other options in the menu include Add to Sheet, Cut, Copy, Edit..., Duplicate, Rename, Hide, Delete, Create, Default Properties, Folders, Replace References..., and Describe... .

Calculated Field – Search Filter

If Search Box parameter matches **State/Province**

Search Filter

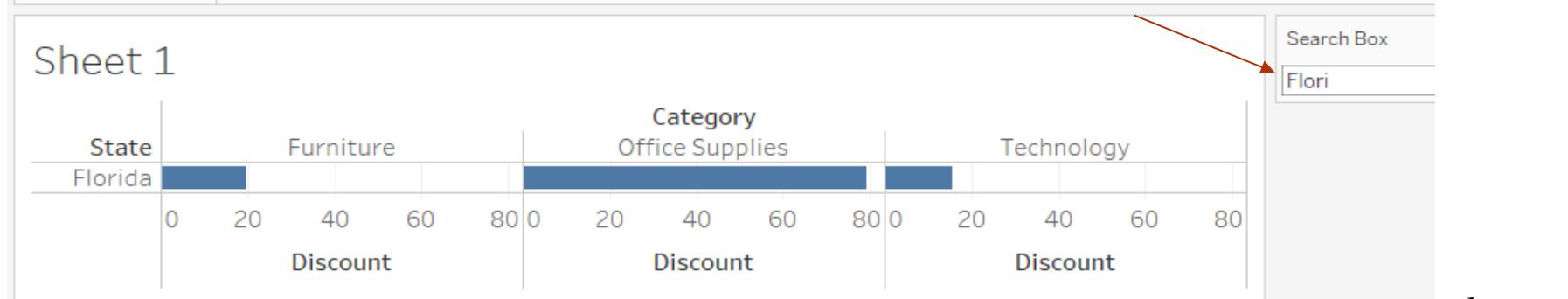
CONTAINS([State/Province], [Search Box])

OR

CONTAINS([Category], [Search Box])

The screenshot shows the Tableau interface with the 'Columns' and 'Rows' sections of a query editor. The 'Columns' section has 'Category' and 'SUM(Discount)' selected. The 'Rows' section has 'State' selected.

Perform a search for “Florida”



Do demo

Data Validation - Nulls to Zeroes

- Common issue with datasets is the presence of **null values**, or **blanks** in the data.
- Open the **1_IN6221_Week6_Lab_Sales_Quotas_Student.twbx** file => there are sales quotas for some, but not for all countries. **Double-click Country** => Right-click in the map => **View data** => see there are **several nulls for Quotas**.

Tableau - CI6221_Week6_Lab_Sales_Quotas

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Data Analytics <

Sales Quotas

Search

Tables

- Country (circled)
- Measure Names
- # Quotas
- # Sales
- Latitude (generated)
- Longitude (generated)
- # Migrated Data (Count)
- # Number of Records
- # Measure Values

Marks

- Automatic
- Color
- Size
- Label
- Detail
- Tooltip
- Country (selected)

Pages

iii Columns Longitude (generate..)

Rows Latitude (generated)

Map showing sales quota data by country. A callout box points to the 'View Data' window for 'Corrected Quotas' with the text: 'Click Show Fields -> Select (All)'. The 'Show Fields' dropdown shows several items selected, including '(All)', 'Corrected Quota', 'Country', 'Number of Records', 'QuotaCompare', 'Quotas', and 'Sales'.

View Data: Corrected Quotas

Full Data 15 rows 6 fields

Country	Corrected Quota	Number of Records	QuotaCompare	Quotas	Sales
Guatemala	225,000	1	16,567		
Hong Kong	275,000	1	-382		
Italy	500,000	1	24,616		
Mexico	250,000	1	32,289	250,000	282,289
New Zealand			10,418	250,000	260,418
Pakistan			-35,338	195,000	159,662
Peru			8,818	275,000	283,818
Portugal	0	1	274,986	Null	274,986
Taiwan	0	1	321,454	Null	321,454

Null values

D

Data Validation - Nulls to Zeroes

Tableau - Sales_Quotas10dot3

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Show Me

Data Analytics Pages Columns Rows

Sales Quotas

Dimensions Country Measure Names

Marks Automatic Color Size Text Detail Tooltip

Measures Quotas Sales Latitude (generated) Longitude (generated) Number of Records Measure Values

Corrected Quotas

Drop field here

Drop field here

Drop field here

Data Source Corrected Quotas Difference from Quota

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The screenshot shows a Tableau desktop interface with a 'Sales_Quotas10dot3' workbook open. In the center, there's a 'Corrected Quotas' shelf with three 'Drop field here' placeholder boxes. To the left, the 'Measures' shelf lists various metrics like Quotas, Sales, and generated coordinates. A yellow circle highlights the cursor over the first 'Drop field here' box on the 'Corrected Quotas' shelf. At the bottom, the 'Data Source' tab is selected, and the 'Difference from Quota' shelf is partially visible. The bottom navigation bar includes icons for various applications like Microsoft Word, Excel, and Adobe Photoshop.

Data Validation - Nulls to Zeroes

- Compare sales to their quotas, but we cannot compare a number to a null. **Convert nulls to zeros so that we can do a comparison.**
- Right-click in the **data window** (or go to **Analysis** menu) and select **create calculated field**.
- Name it “**Corrected Quota**” and type **ZN([Quotas])** ***Double-click new field** to view

The screenshot shows the Tableau Data Window interface. On the left, the 'Tables' shelf lists various dimensions and measures. A red circle highlights the 'Create Calculated Field...' option in the context menu, which is being used to create the 'Corrected Quota' field. The main workspace shows a single calculated field named 'Corrected Quota' with the formula 'ZN([Quotas])'. A red arrow points from this formula to a explanatory text: 'Is there a quota for this country? If not, give it a zero.' Below this, a 'View Data: Corrected Quotas' pane displays a table with 15 rows, showing the 'Country' column and the 'Corrected Quota' column. The 'Corrected Quota' column contains values like 275,000, 0, 300,000, etc., with the '0' value highlighted by a red oval. The table also includes columns for 'Number of Records', 'Quotas', and 'Sales'.

Country	Corrected Quota	Number of Records	Quotas	Sales
Australia	275,000	1	275,000	190,550
Austria	0	1	Null	320,128
Belgium	300,000	1	300,000	283,860
Denmark	115,000	1	115,000	162,881
Guatemala	225,000	1	225,000	241,567
Hong Kong	275,000	1	275,000	274,618
Italy	500,000	1	500,000	524,616
Mexico	250,000	1	250,000	282,289
New Zealand	250,000	1	250,000	260,418
Pakistan	195,000	1	195,000	159,662
Peru	275,000	1	275,000	283,818
Portugal	0	1	Null	274,986
Taiwan	0	1	Null	321,454
United Kingdom	125,000	1	125,000	132,488
United States of America	195,000	1	195,000	279,163

Data Validation - Nulls to Zeroes

Tableau - Sales_Quotas10dot3

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Show Me

Data Analytics Pages Columns Longitude (generated)

Sales Quotas Rows Latitude (generated)

Dimensions Country Measure Names

Marks Automatic Color Size Label Detail Tooltip Country

Measures # Quotas # Sales @ Latitude (generated) @ Longitude (generated) # Number of Records # Measure Values

Corrected Quotas

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Data Source Corrected Quotas Difference from Quota

15 RECORDED WITH column

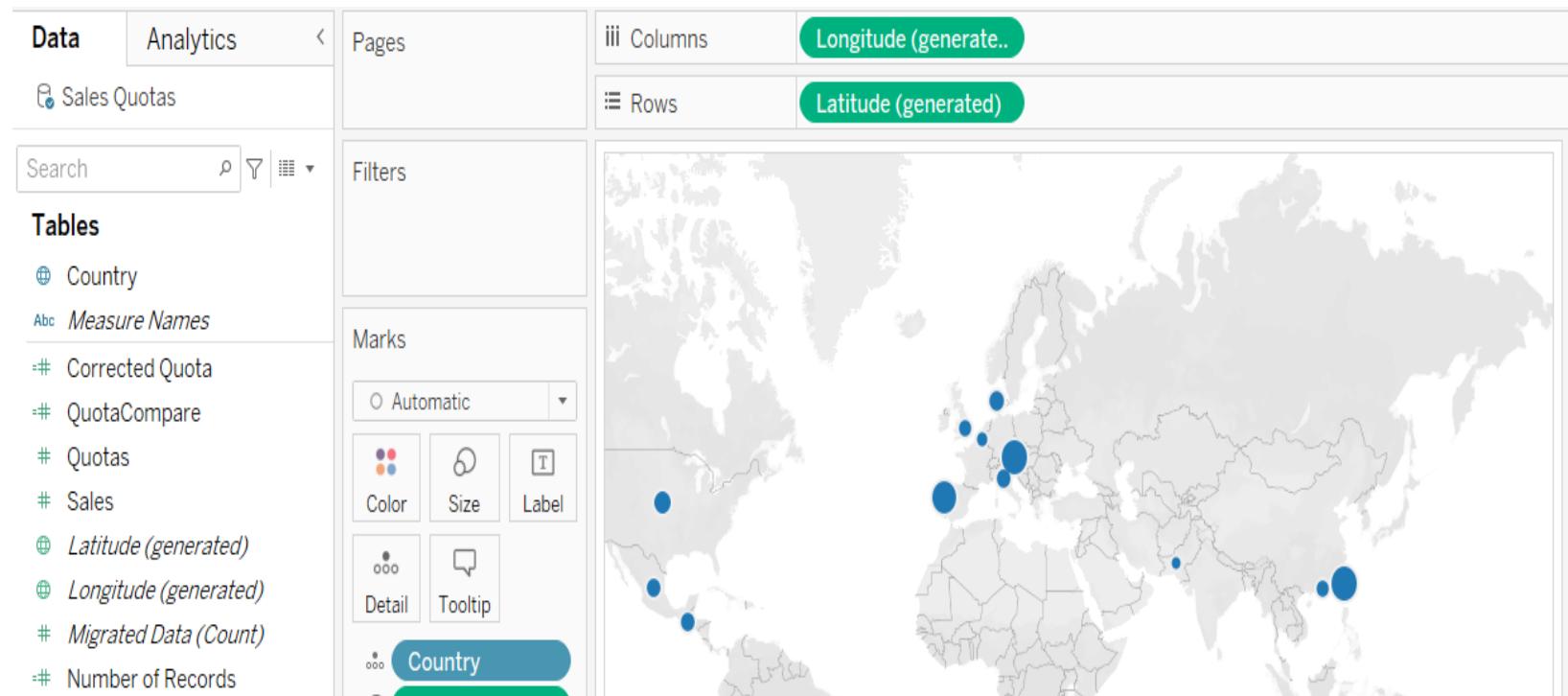
SCREENCASTOMATIC

3:00 PM 7/28/2017

In-class Exercise

- Using the **1_IN6221_Week6_Lab_Sales_Quotas_Student.twbx** file, create a visual to show **how different sales are from quotas**.

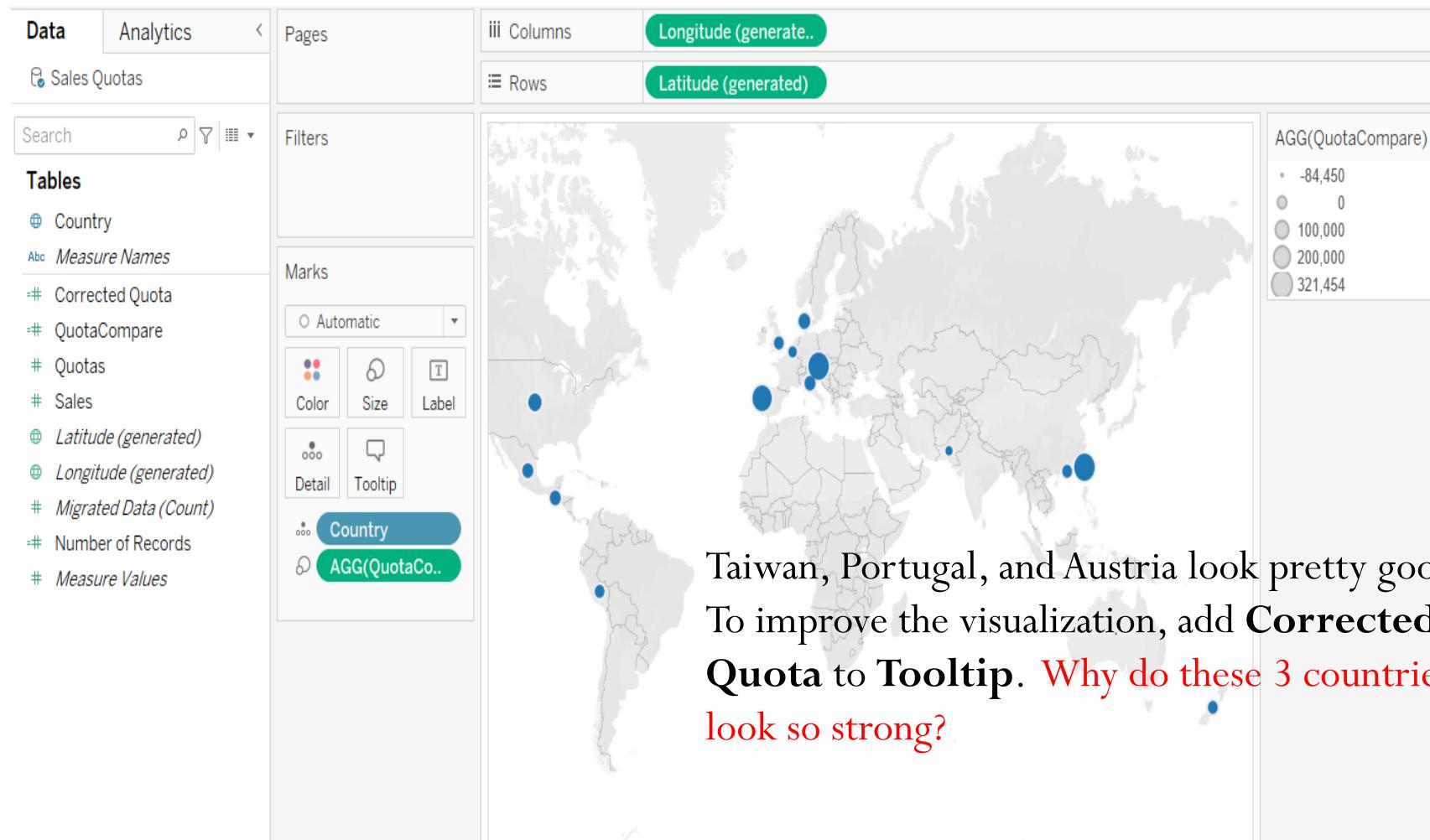
*Hint – use calculated field



In-class Exercise - Solution

- Visualize how different sales are from quotas. Right-click and create a **Calculated Field** called “**QuotaCompare**” => **SUM(Sales)-SUM([Corrected Quota])**. Double-click **QuotaCompare** to bring it into the view

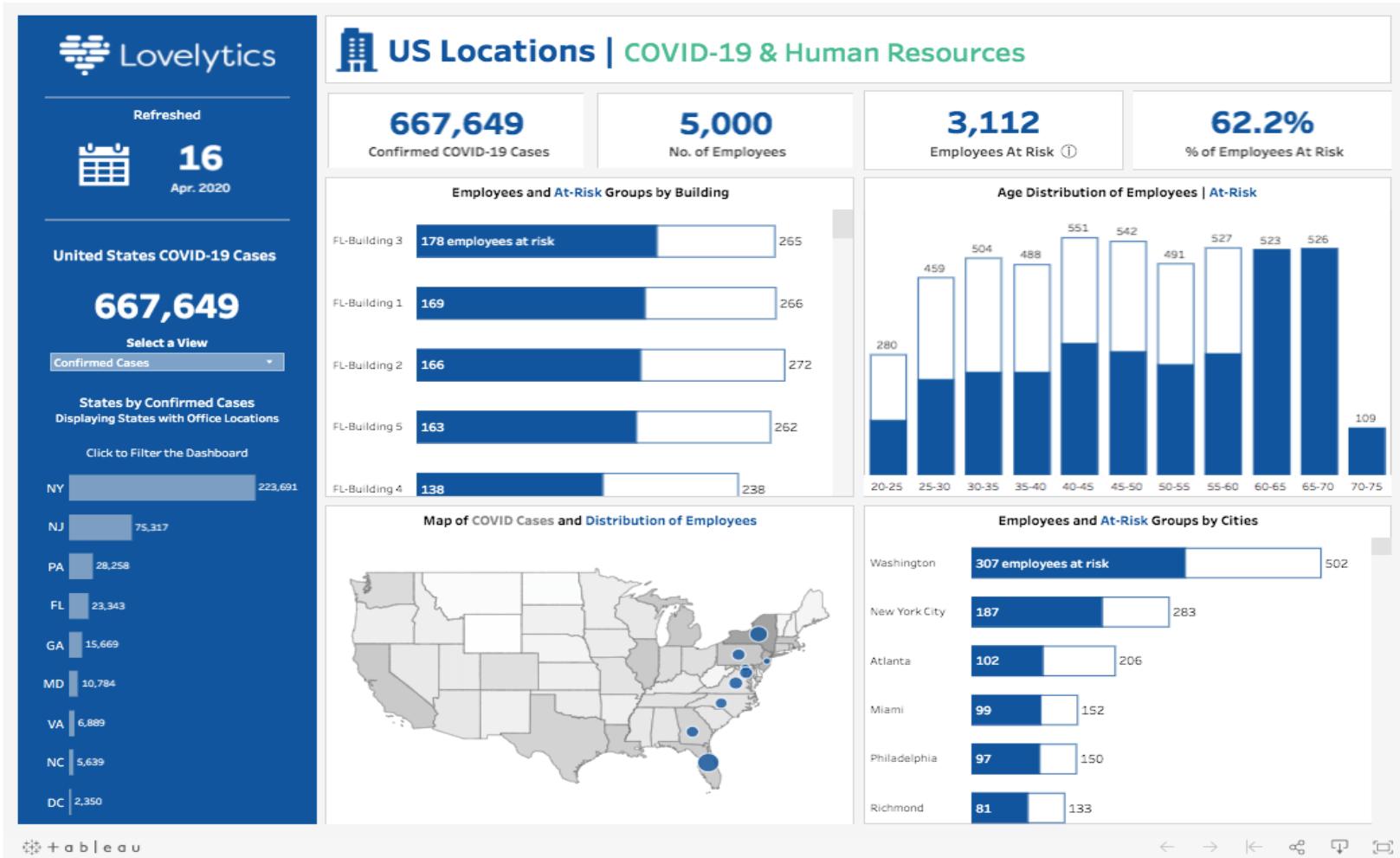
ZN(Quota)



CREATING DASHBOARDS

Creating Dashboards

- A dashboard is a **collection of several views**, which allows users to **compare a variety of data simultaneously**.



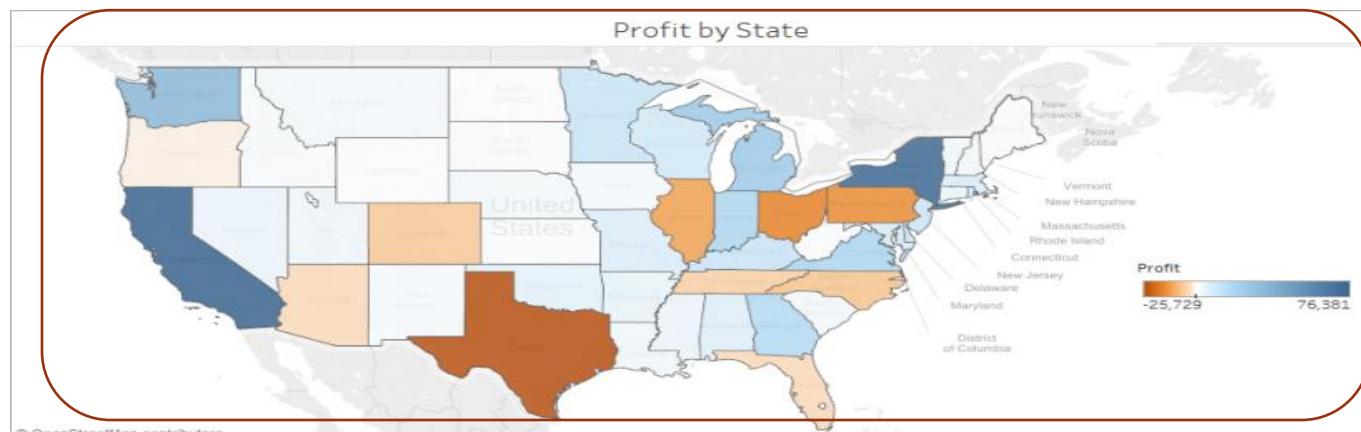
Dashboard Design Considerations

Have a clear **purpose**. What will you be trying to say with this dashboard? Are you presenting a conclusion or a key question?

Know who you're saying it to. Does the **audience** know the subject matter well or will it be new to them? What kind of cues will they need?

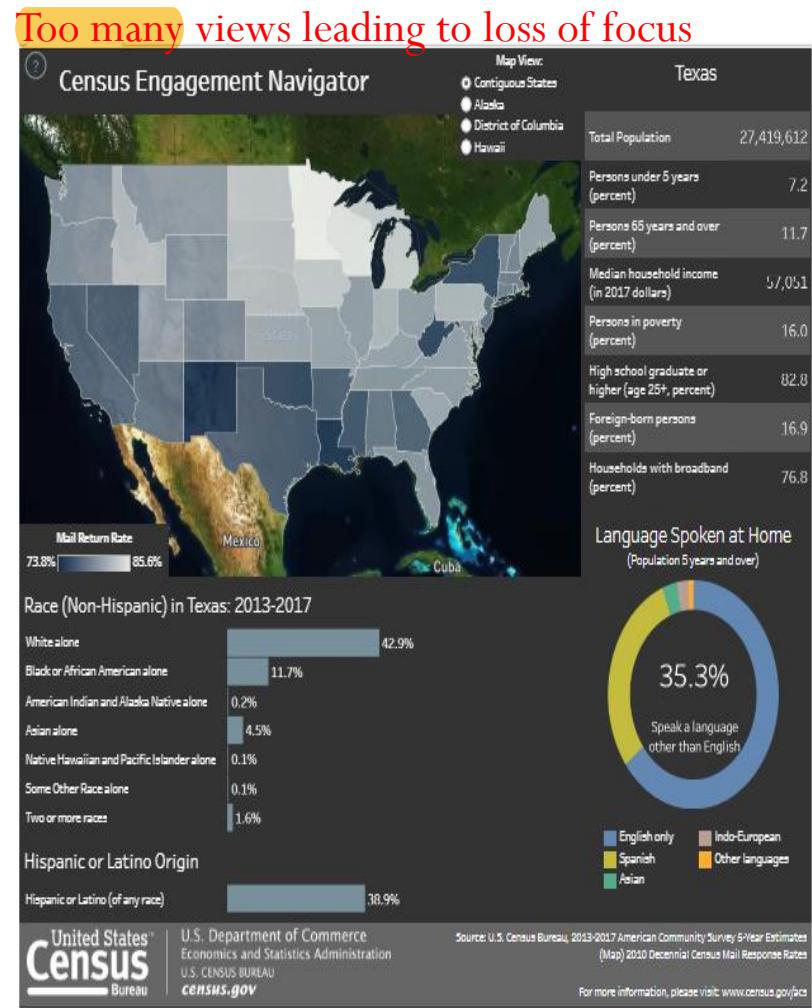
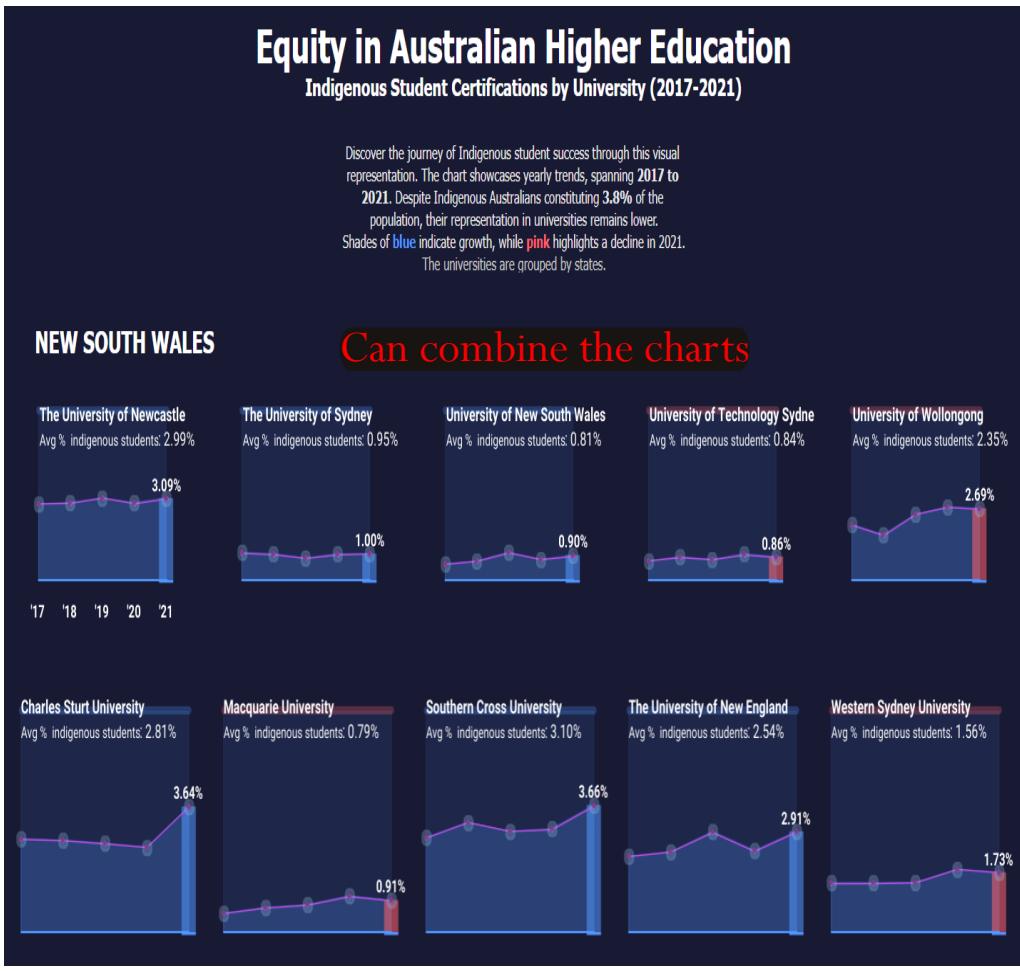
Leverage the most-viewed spot (saccadic movement) - Most viewers scan web content starting at the top left of a web page. Place the most important view so that it occupies or spans the significant part of the dashboard.

Provides quick overview of profit by state



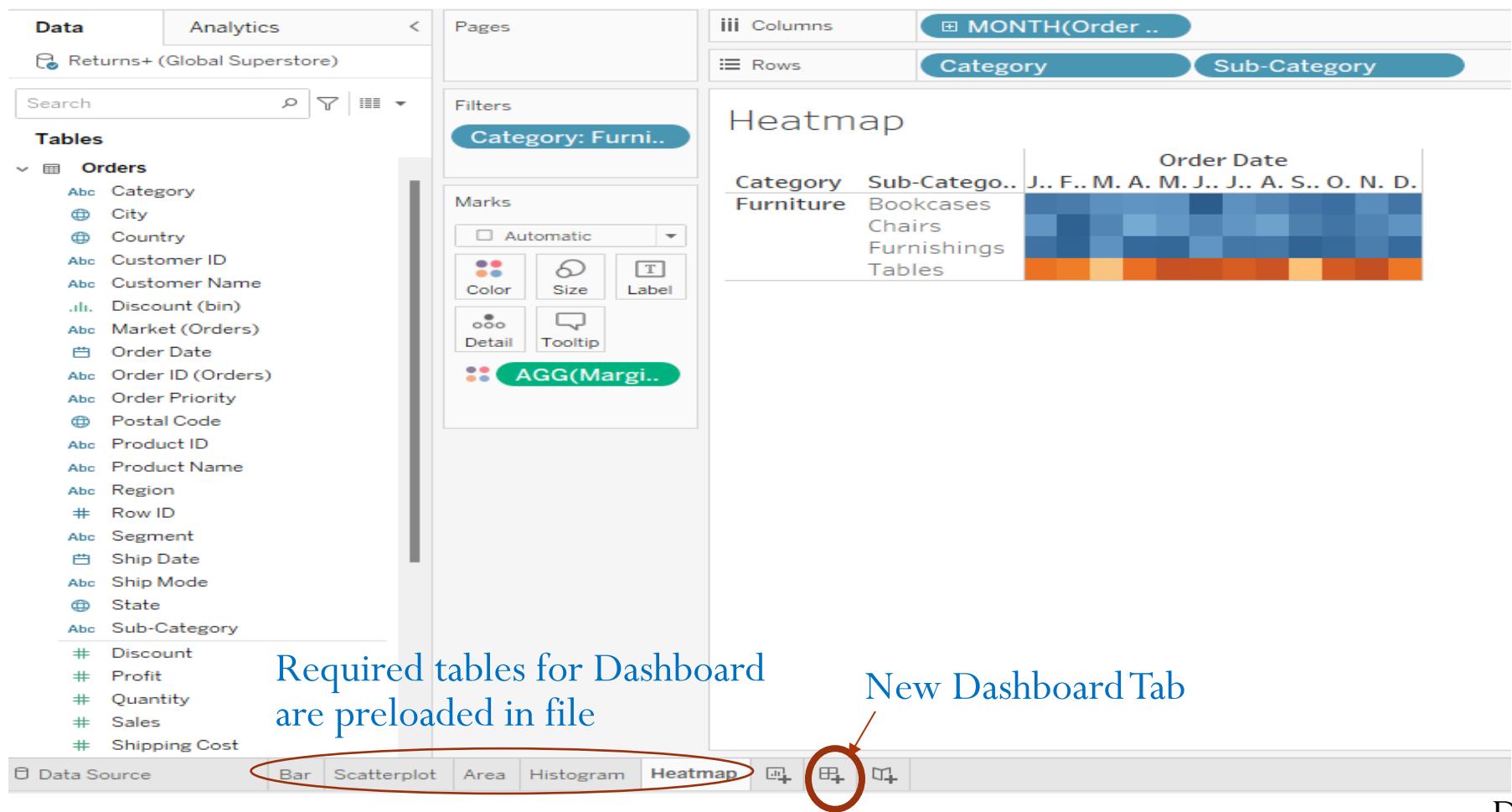
Dashboard Design Considerations

- **Limit the number of views** in the dashboard (guideline **three to five**). Too many views lead to visual clarity problem and the big picture **getting lost** in details.
- If the scope of the story needs to grow => create **more dashboards**.



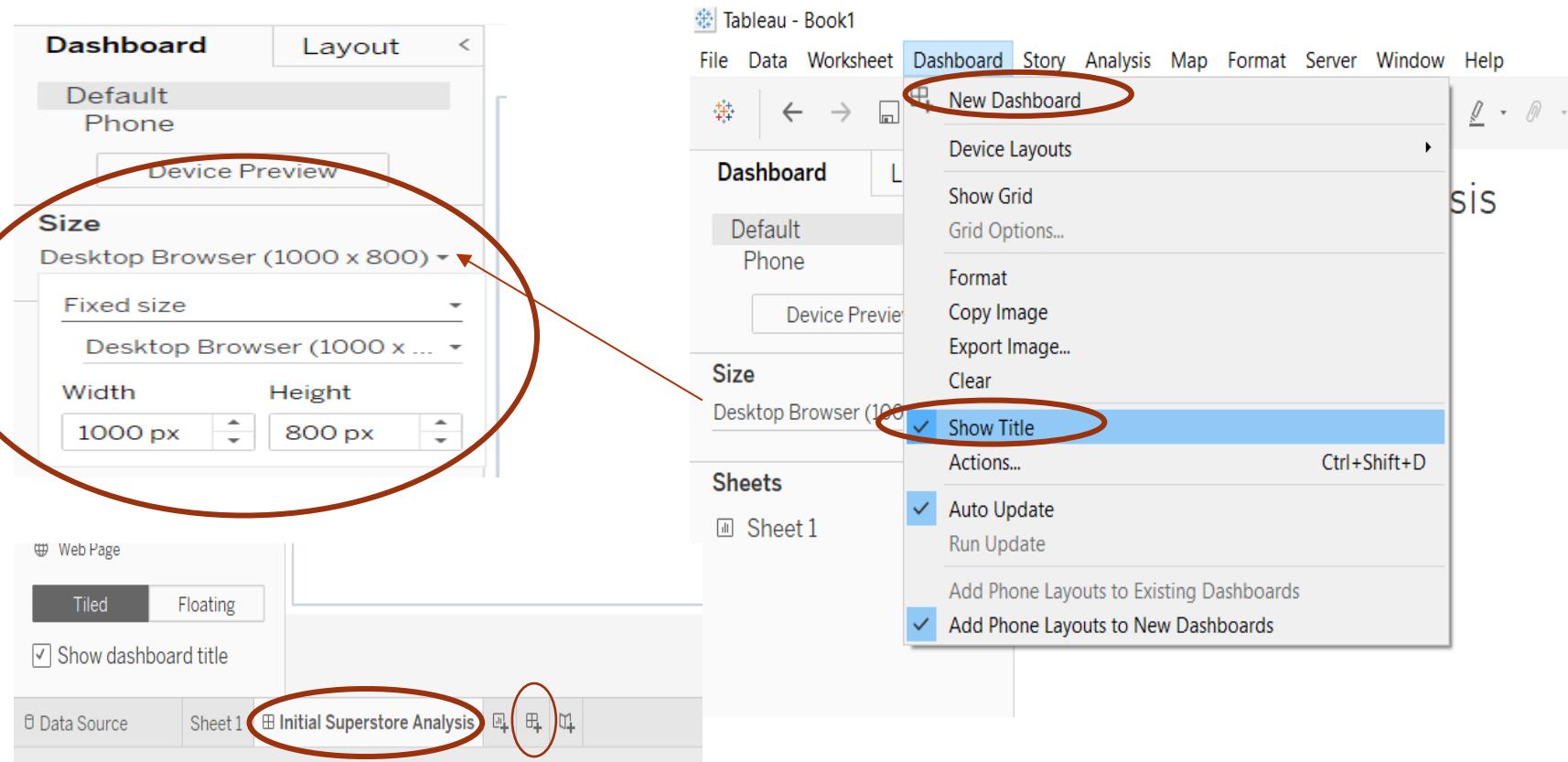
Creating a Dashboard - Connect to Data

- Open the **2_IN6221_Week6_Lab_BasicDashboard_Student.twb** file
- Click on “**New Dashboard**” tab. Right-click on tab and rename to **Initial Superstore Analysis**.



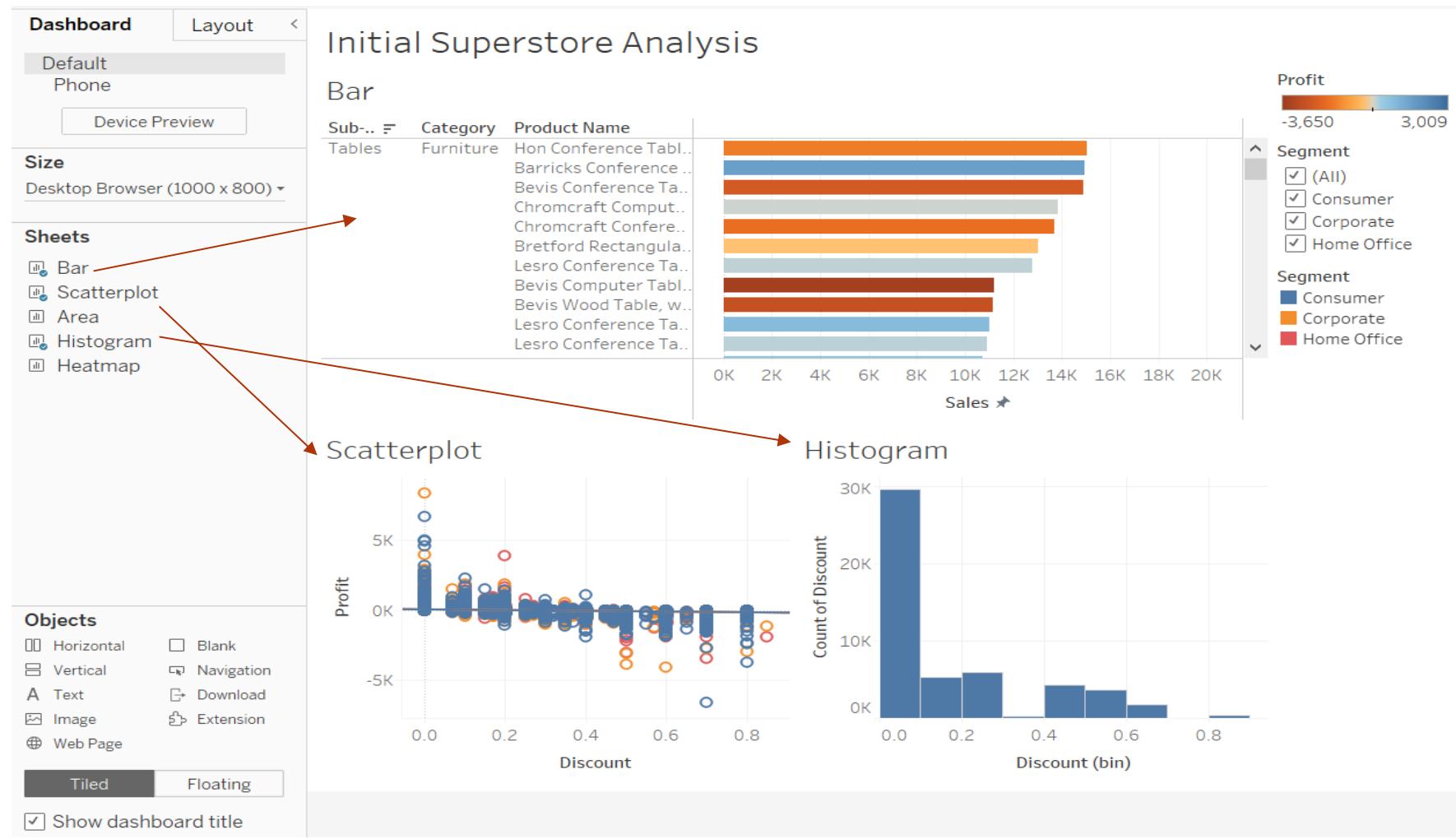
Creating a Basic Dashboard

- Go to the **Dashboard** drop-down and **Show Title**.
- Notice the **Dashboard options** at the lower-left (settings for dashboard size). Set to **Desktop** or **Laptop Browser**. If under “**Automatic**”, the **canvas view will scale** accordingly as the screen resizes.



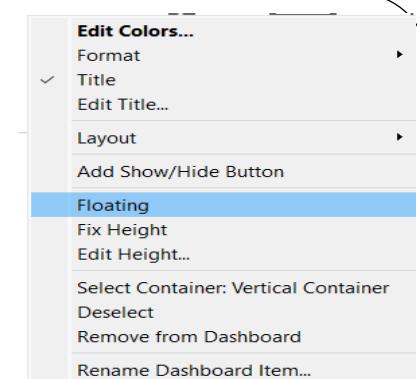
Creating a Basic Dashboard

- Populate the dashboard. Drag in the **Bar**, add the **Scatterplot** below it, and add the **Histogram** on the lower right.



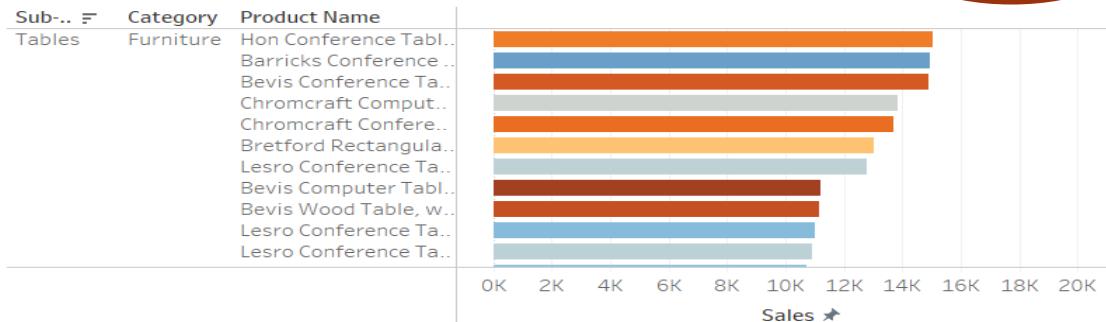
Creating a Basic Dashboard

- Float the Bar chart **Profit color legend** => Right-click Profit legend and select “**Floating**”. Select legend and drag to float it over the Bar Chart .
- Repeat steps to float the **Segment color legend** over the Scatterplot Chart.
- Set the **Segment filter** to a **single-value drop down**.



Initial Superstore Analysis

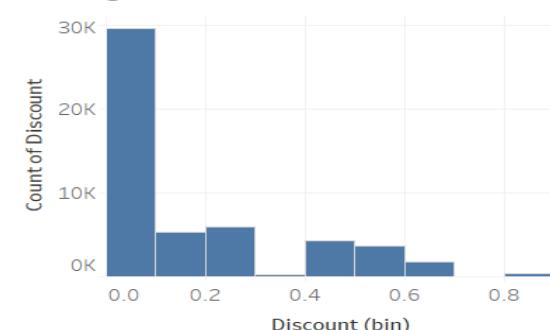
Bar



Scatterplot



Histogram



A screenshot of the floating filter settings for the 'Segment' dropdown. The dropdown currently shows '(All)'. The 'Edit Filter...' button is highlighted. The 'Single Value (dropdown)' option is selected and circled in red. Other options include 'Single Value (list)', 'Multiple Values (list)', 'Multiple Values (dropdown)', 'Multiple Values (custom list)', 'Wildcard Match', 'Only Relevant Values', 'All Values in Database', 'Include Values', 'Exclude Values', 'Format Filter and Set Controls...', 'Customize', 'Show Title', and 'Edit Title...'. A red arrow points from the 'Single Value (dropdown)' section back to the 'Floating' option in the dashboard context menu.

Creating a Basic Dashboard

Tableau - Book1

File Data Worksheet Dashboard Story Map Format Server Window Help

Dashboard Layout Device Preview

Size Desktop Browser (1000 x 800)

Sheets

- Sheet 1
- Sheet 2
- Sheet 3
- Sheet 4
- Sheet 5
- Sheet 6
- Sheet 7
- Bar
- Scatterplot
- Area
- Histogram
- Heat Map

Objects

- Horizontal
- Vertical
- Text
- Image
- Web Page
- Blank

Tiled Floating

Show dashboard title

Initial Superstore Analysis

Bar

Sub-Catego... Category Product Name

Sub-Catego...	Category	Product Name
Tables	Furniture	Hon Conference Table, Adj...
		Barricks Conference Table...
		Bevis Conference Table, F...
		Chromcraft Computer Tab...
		Chromcraft Conference Ta...
		Bretford Rectangular Con...
		Lesro Conference Table, w...
		Bevis Computer Table, Ful...
		Bevis Wood Table, with B...
		Lesro Conference Table, R...
		Lesro Conference Table, A...
		Lesro Round Table, Recta...

Profit

-3,650 3,009

Segment

- (All)
- Consumer
- Corporate
- Home Office

Segment

- Consumer
- Corporate
- Home Office

Scatterplot

Profit

Scatterplot

Histogram

Count of Discount

12:51 PM 7/28/2017

RECORDED WITH SCREENCASTOMATIC

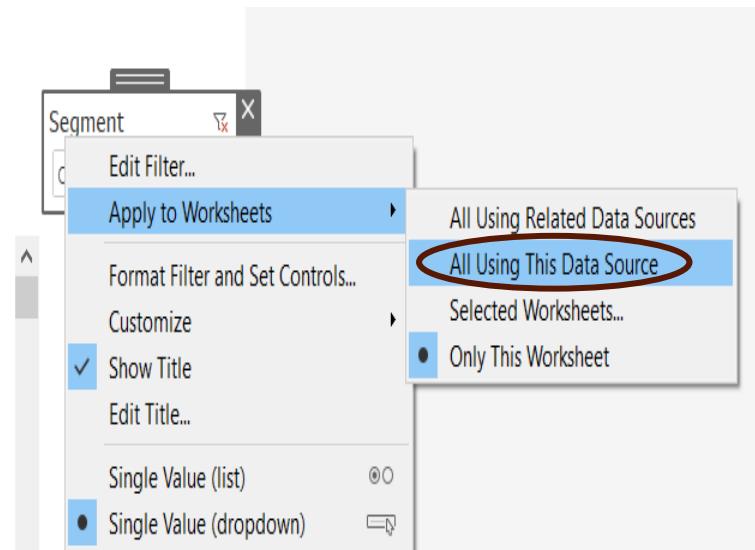
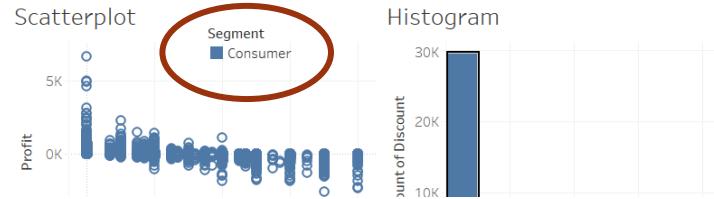
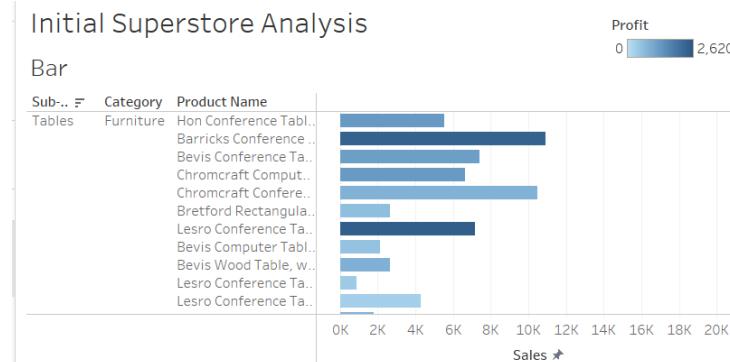
Data Source Sheet 1 Sheet 2 Sheet 3 Sheet 4 Sheet 5 Sheet 6 Sheet 7 Bar Scatterplot Area Histogram Heat Map Initial Superstore Analysis

Creating a Basic Dashboard

When a change is made to the Segment filter, it **only changes the worksheet that it was tied to**. What if I want the **entire dashboard** to update based on my selection?

Select the menu on the **Segment filter**, select **Apply to Worksheets....All Using This Data Source => synchronized view of all charts**

Change Segment selections to show how the **change applies to the entire dashboard**, finish with “All” categories selected.



Creating a Basic Dashboard

Tableau - Book1

File Data Worksheet Dashboard Story Map Format Server Window Help

Show Me

Dashboard Layout Device Preview

Size Custom size (1000 x 700)

Sheets

- Sheet 1
- Sheet 2
- Sheet 3
- Sheet 4
- Sheet 5
- Sheet 6
- Sheet 7
- Bar
- Scatterplot
- Area
- Histogram
- Heat Map

Objects

- Horizontal
- Vertical
- Text
- Image
- Web Page
- Blank

Tiled Floating

Show dashboard title

Initial Superstore Analysis

Segment (All)

Profit

-3,650 3,009

Bar

Sub-Catego.. Category Product Name

Tables	Furniture	Product Name
		Hon Conference Table, Adj...
		Barricks Conference Table...
		Bevis Conference Table, F...
		Chromcraft Computer Tab...
		Chromcraft Conference Ta...
		Bretford Rectangular Con...
		Lesro Conference Table, w...
		Bevis Computer Table, Ful...
		Bevis Wood Table, with B...
		Lesro Conference Table, R...

Sales

0K 2K 4K 6K 8K 10K 12K 14K

Scatterplot

Segment

- Consumer
- Corporate
- Home Office

Profit

5K 0K -5K

Discount

0.0 0.2 0.4 0.6 0.8

Histogram

Count of Discount

30K 20K 10K 0K

Discount (bin)

0.0 0.2 0.4 0.6 0.8

Initial Superstore Analysis

RECORDED WITH SCREENCASTOMATIC

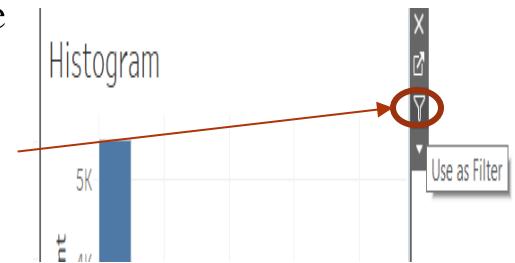
12:53 PM 7/28/2017

The screenshot shows the Tableau desktop application with a dashboard titled "Initial Superstore Analysis". The dashboard includes three main visualizations: a horizontal bar chart showing sales for various conference tables, a scatterplot of profit vs. discount by segment, and a histogram of the count of discounts. The bar chart has a color scale from -3,650 (dark orange) to 3,009 (blue). The scatterplot uses a color legend for segments: Consumer (blue), Corporate (orange), and Home Office (red). The histogram shows a peak at 0.0 discount. On the left, there's a sidebar with options for device preview, size, sheets, objects, and dashboard settings. At the bottom, there's a navigation bar with tabs for different sheets and a toolbar with various icons.

Creating a Basic Dashboard

In addition to interacting with **drop down filters**, we can use the **worksheets themselves as filters**.

E.g., to zero in on different discount levels: **Click on Histogram** and select the ‘**use as a filter**’ icon => **click on the bars** to select different discount values and observe discounts where the respective categories were applied.



A screenshot of the Tableau software interface. The left sidebar shows the dashboard structure with sections for "Size", "Sheets", and "Objects". The "Objects" section includes icons for Horizontal, Vertical, Text, Image, Web Page, and Blank objects. The main workspace displays the "Initial Superstore Analysis" dashboard with three visualizations: a Bar chart, a Scatterplot, and a Histogram. The Bar chart shows Sales vs Profit. The Scatterplot shows Profit vs Discount with data points colored by Segment (Consumer, Corporate, Home Office). The Histogram shows the distribution of Discounts. A yellow circle highlights the "Tiled" button at the bottom left of the dashboard area. The bottom of the screen shows the Windows taskbar with various application icons.

Formatting Dashboards

- Open the **3_IN6221_Week6_Lab_Dashboard_Formatting_Student.twbx** file (**Tableau Packaged Workbook** - contain the workbook along with a copy of any **local file data sources and background images**)

Dynamic Titles



Improve user-friendliness of dashboard by adding a **dynamic value for the view's title**.

- Go to **Shipping Dashboard => Shipping Cost bar chart => Right Click => Edit Title.**
- Clicking on **Insert** will get a list of things that can be put in the title. This depends on what **fields** are in use in the view. Select **Ship Mode** as an option.
- In edit box add “**Average Cost for**” then **insert Ship Mode** and follow up with “**Shipping**”.
- The **title dynamically changes** as we change the **Ship Mode filter**.

Edit Title

Trebuchet MS 12 **Insert** X

Average Cost for <Ship Mode> Shipping

Reset OK Cancel

Fields used in the view



Dynamic Titles

Tableau - dashboard_formatting_example 10dot3

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help



Dashboard

Layout

Device Preview

Size

Automatic

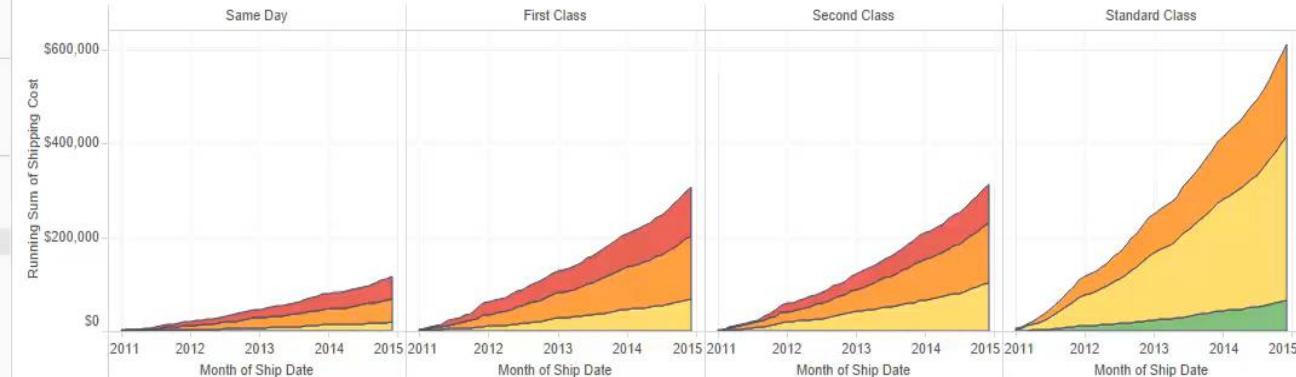
Sheets

Average Shipping C...

Shipping Cost

Running Total Shippi...

Running Total Shipping Costs

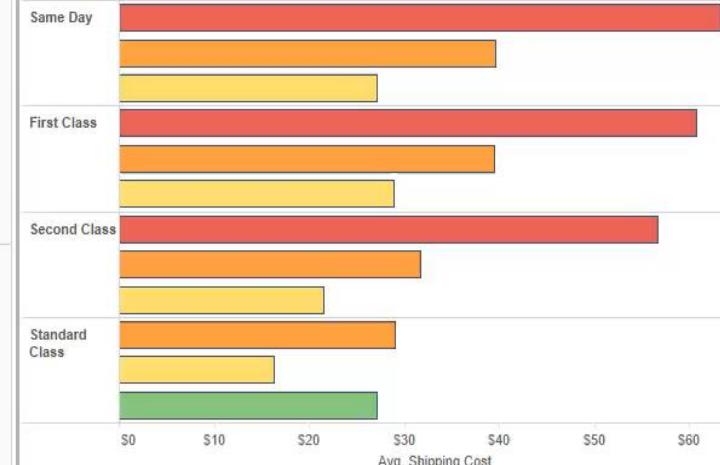


Priority
Critical
High
Medium
Low

Ship Mode
(All)

Market
(All)

Shipping Cost



Average Shipping Cost by Country



© OpenStreetMap contributors

Data Source: Average Shipping Cost by Count... Shipping Cost: Running Total Shipping Costs: Shipping Dashboard: Tiled Floating Show dashboard title

12 RECORDED WITH 1 column SUM OF AVG(Shipping Cost): \$441 Highlighting on Order Priority

SCREENCASTOMATIC



2:00 PM

7/28/2017

Format Menu

- Select **Dashboard...Format** from the top menus to open the format pane.
- Change the shading, say to yellow => dashboard **background** color changes

Tableau - CI6221_Week6_Lab_Dashboard_Formatting

File Data Worksheet **Dashboard** Story Analysis Map Format Server Window

New Dashboard
Device Layouts
Show Grid
Grid Options...

Format

Copy Image
Export Image...
Clear
Show Title
Actions... **Ctrl+Shift+D**

Average Shipping
Shipping Cost
Running Total S.

Auto Update **✓**
Run Update
Add Phone Layouts to Existing Dashboards
Add Phone Layouts to New Dashboards

Format Dashboard

Running Total Shipping Costs

Same Day First Class Second Class Standard Class

Default: **Yellow**

Dashboard Shading

Font: **Black**

Alignment:

Shading:

Border: More colors...

Worksheet

Average Cost for All Shipping

Same Day First Class Second Class Standard Class

Font: Trebuchet M...
Shading: None

Text Objects

Font: Arial, 9pt
Alignment: Left

Average Shipping Cost by Country

Map of the world showing shipping costs by country.

Note: views still white, only background color changed

Priority: Critical, High, Medium, Low
Ship Mode: (All)
Market: (All)

© 2021 Mapbox © OpenStreetMap

Format Menu

- Views have own formatting, to have everything yellow, **edit each view individually**.
- Right-click on “Average Cost for All Shipping” **canvas area** and select **Format**. Select yellow box at Worksheet shading to shade view yellow.

The screenshot shows the Tableau interface with the 'Format Shading' dialog open on the left. The 'Worksheet' tab is selected under the 'Default' section. A red arrow points from the 'Worksheet' tab to a color swatch in the 'Header' pane, which is highlighted with a red oval. Another red arrow points from the 'Header' pane to the 'Running Total Shipping Costs' view, where the background is shaded yellow. A callout bubble with a red arrow points to the yellow-shaded header area with the text 'Dashboard background shaded in yellow'. The 'Running Total Shipping Costs' view displays a stacked area chart of shipping costs over time. The 'Average Cost for All Shipping' view displays a horizontal bar chart of average shipping costs by class. A callout bubble with a red arrow points to the green bar in this chart with the text 'View shaded yellow'.

Format Shading

Fields ▾

Sheet Rows Columns

Default

Worksheet: (highlighted with a red oval)

Pane: None

Header: (color swatch highlighted with a red oval)

Total

Pane: None

Header: More colors...

Grand Total

Pane: None

Header: None

Row Banding

Pane: None

Header: (color swatch)

Band Size: (slider)

Clear

Running Total Shipping Costs

Same Day First Class

\$600,000
\$400,000

Month of Ship Date: 2012 2014

Average Cost for All Shipping

First Class Second Class Standard Class

\$0 \$10 \$20 \$30 \$40 \$50 \$60

Avg. Shipping Cost

View shaded yellow

© 2

Images, Blank Objects, & Web Pages

Create a **new Dashboard**. Add an image (e.g., logo) by dragging out **Image** from the left and navigate to where the image is stored. You also have the option through the menu to choose the **image from a folder** or make the image be a **hyperlink to a URL**

The screenshot shows the Tableau interface for creating a new dashboard. On the left, the 'Objects' palette is open, with the 'Image' icon circled in red. A large orange arrow points from this icon towards the center of the screen. In the center, a 'Dashboard' window is open, showing a blank white area with the placeholder text 'Choose an image using the object menu.' To the right of the dashboard is the 'Edit Image Object' dialog box. This dialog contains several sections: 'Image' (with a file path 'tableaulogo.svg' and a 'Choose' button), 'Options' (with checked boxes for 'Fit Image' and 'Center Image'), 'Target URL' (with a text input field), and 'Alt Text' (with a text input field). At the bottom of the dialog are 'Apply' and 'OK' buttons. The overall interface has a clean, modern design with a light gray background and white panels for the windows.

Images, Blank Objects, & Web Pages

- Blank objects are useful in adding space to the visualization, push an item to one side, etc.

The screenshot shows the Tableau interface with a dashboard titled "dashboard_formatting_example 10dot3". The dashboard has a "Size" of "Custom size (1000 x 700)". The "Sheets" pane lists three sheets: "Average Shipping C...", "Shipping Cost", and "Running Total Shippi...". The "Objects" pane shows categories: Horizontal, Vertical, Text, and Blank. Under "Blank", there are two options: "Tiled" (selected) and "Floating". A checkbox for "Show dashboard title" is checked. A yellow circle highlights the "Show dashboard title" checkbox. The main workspace contains a tiled object composed of nine plus signs in various colors (orange, blue, red, purple). The bottom taskbar shows the system tray with icons for battery, signal, volume, and date/time (2:09 PM, 7/28/2017).

Images, Blank Objects, & Web Pages

- To add a web page, bring out the **web page** part. For the URL, use <https://www.ntu.edu.sg> => this is treated just like any other part of the dashboard (drag out a worksheet, resize things)

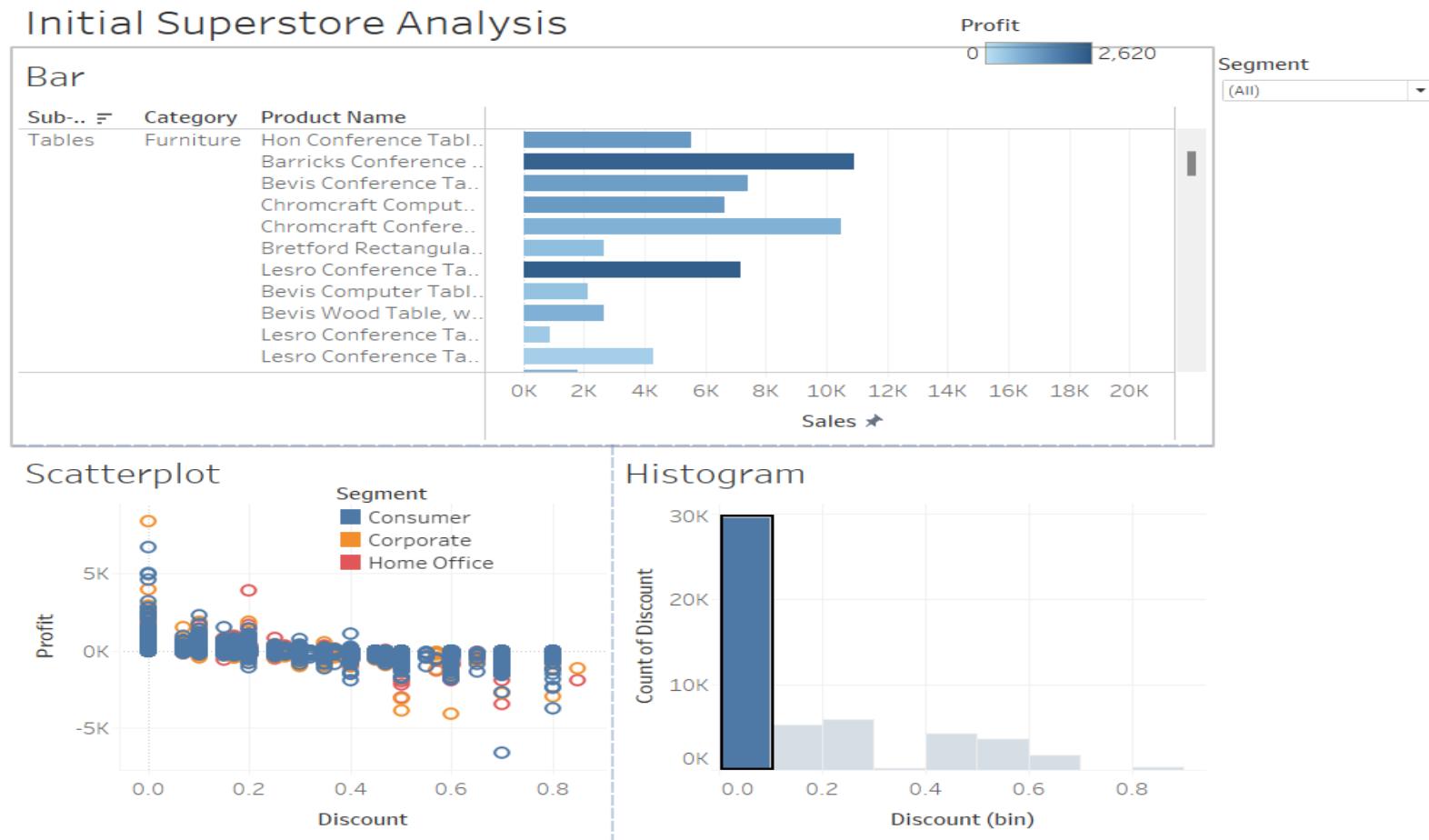
The screenshot shows the Tableau dashboard editor interface. On the left, there's a sidebar with 'Dashboard' and 'Layout' tabs, and sections for 'Default', 'Phone', and 'Device Preview'. Below that is a 'Size' section with 'Desktop Browser (1000 x 800)'. Under 'Sheets', there are three items: 'Average Shipping...', 'Shipping Cost', and 'Running Total S...'. At the bottom, the 'Objects' section is expanded, showing options for 'Horizontal', 'Vertical', 'Text', 'Image', and 'Web Page'. The 'Web Page' option is selected and highlighted with a red arrow. A modal dialog box titled 'Edit URL' is open in the center, containing the URL 'https://www.ntu.edu.sg' and buttons for 'OK' and 'Cancel'. Below the dialog, a message says 'Choose an image using the object menu.'

Web page added

The screenshot shows the same dashboard after the 'NTU' website has been added as a web page object. The 'Edit URL' dialog is no longer present. The main dashboard area now displays a thumbnail preview of the NTU website, which includes the university's logo, a search bar, and a view of its campus buildings. A large orange arrow points from the 'Edit URL' dialog in the previous screenshot to this preview in the current one. To the right of the preview, there is a callout text: 'Add a worksheet here, resize to fit into dashboard'.

In-Class Exercise – Create a Dashboard

Using the **2_IN6221_Week6_Lab_BasicDashboard_Student.twb** file create the following dashboard with changes in other elements (e.g., color, font, etc) setting.

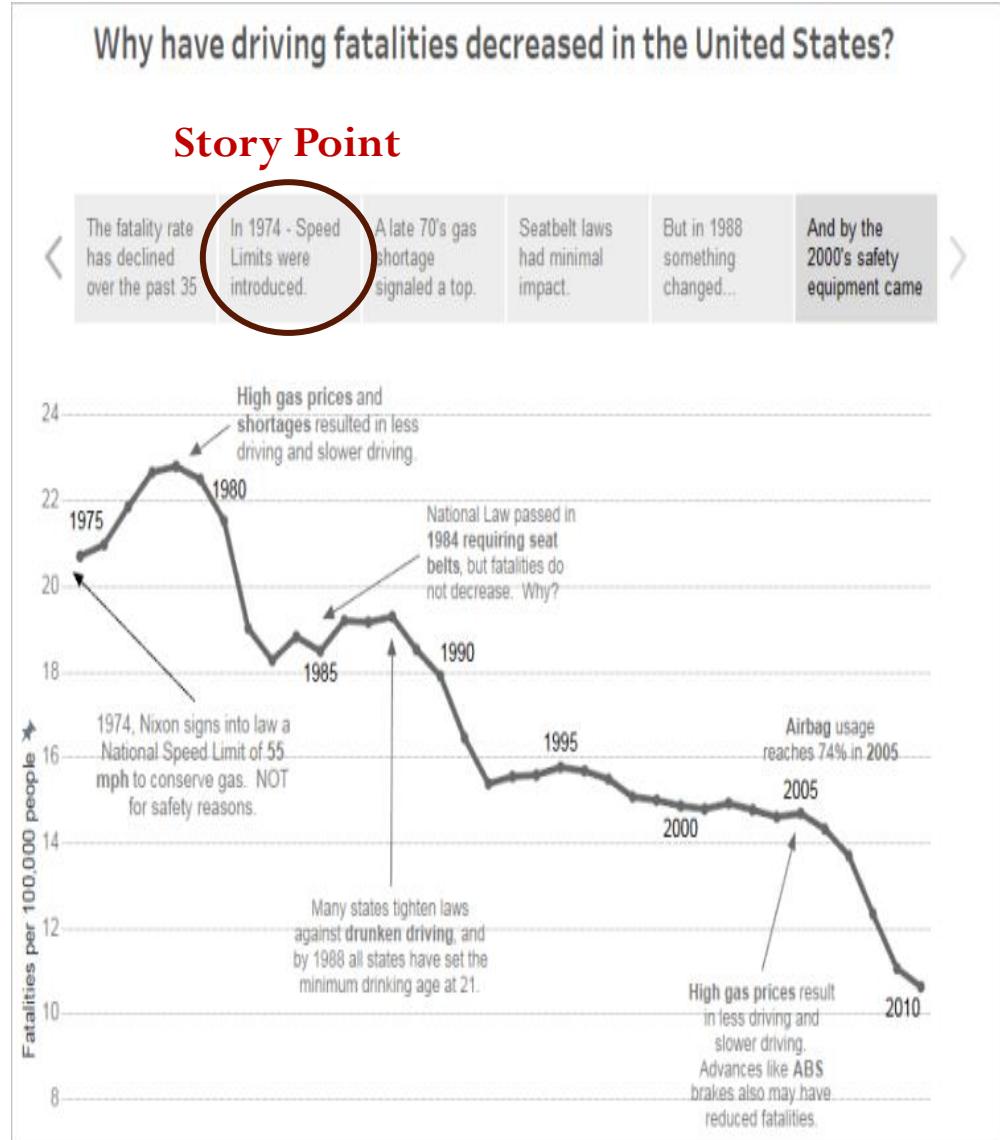


Creating a Story

- In Tableau, a story is a **sequence of visualizations** that work together to convey information.

- Create stories to tell a **data narrative**, provide **context**, demonstrate how **decisions** relate to **outcomes**, or to simply make a **compelling case**....

- Each individual **sheet** in a **story** is called a **story point**.



Creating a Story

- In designing a story - think through the **purpose** - call to **action**, simple **narrative**, or **presenting** a case?
- If you're **presenting a case**, decide whether you want to present data points that **lead up** to a **conclusion** at the **end**, or **start** with a **conclusion** then show the supporting data points. The latter approach works well for a **busy audience**.



Today, there is a total number of
8,700,000 million SPECIES (excluding bacteria)
on PLANET EARTH

-
of which 86% are on land and
91% of those in the seas have
yet to be discovered, described
and catalogued...

Lead Up

THE PYRAMIDS OF EGYPT

Massive Efforts Your House vs. Pharaoh's Tomb Great Pyramid vs. The Luxor Monumental Achievements Sources and Notes

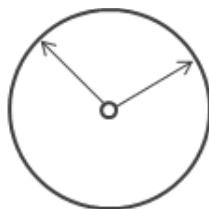
The **Great Pyramid** was built over 10-20 years by 200,000 workers. **Wikipedia** was built by 50 million contributors over 13 years (and counting).
To understand the scale of these efforts, let's look at some comparisons using Wikipedia data.

Use the navigation menu above to find out more.

Concluding Start
- navigate further to
find out more

Story Design Consideration – Change Over Time

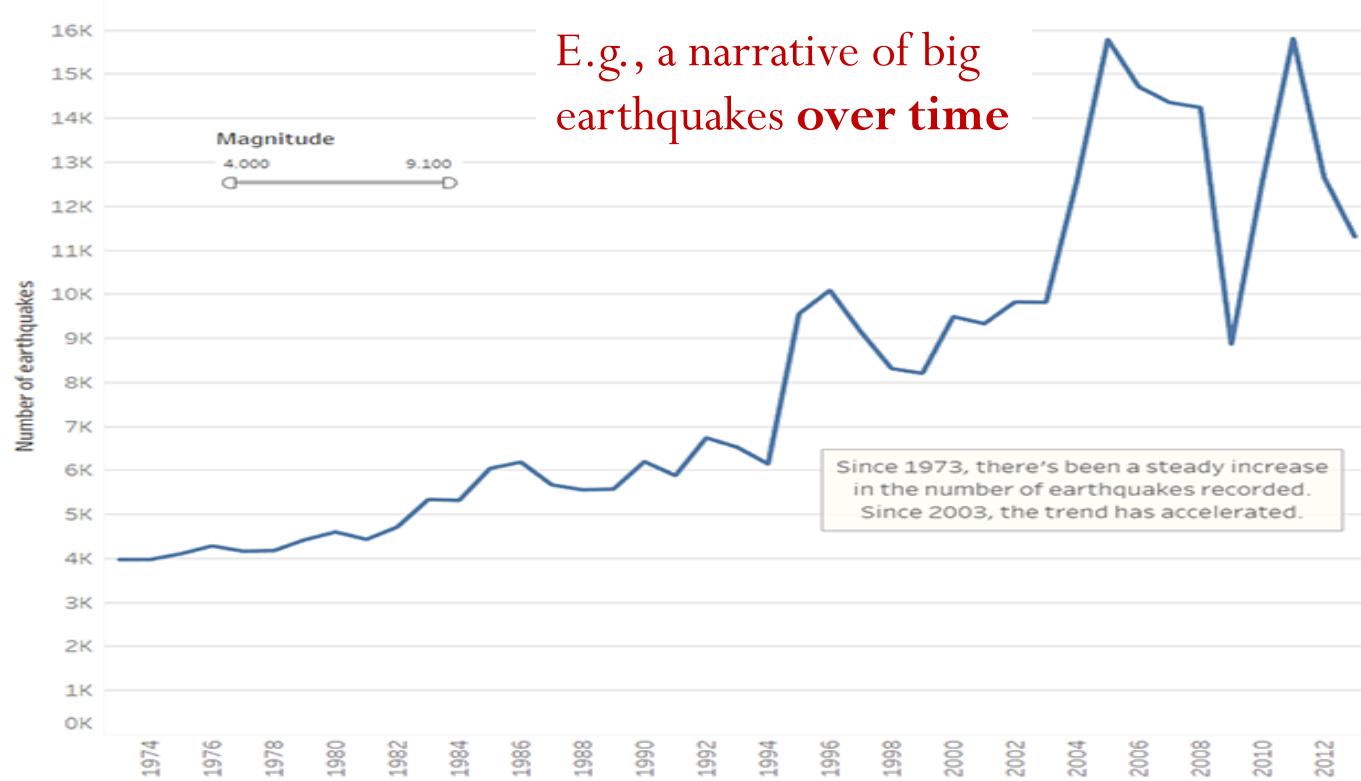
Change Over Time



- **What it does:** Uses a chronology to **illustrate a trend.**
- **Discussions it starts:** **Why** did this happen, or why does it **keep happening?** What can we do to **manage the situation?**

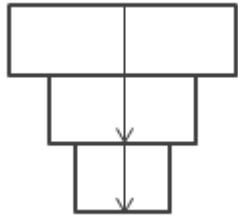
Are big earthquakes on the rise?

< Thousands of earthquakes are recorded every year. About two quakes each year qualify as "major". These megaquakes have drawn a lot of attention. The Indian Ocean earthquake and tsunami of 2004. The Japanese earthquake and tsunami of 2011. More and more earthquakes are being detected >



Story Design Consideration – Drill Down

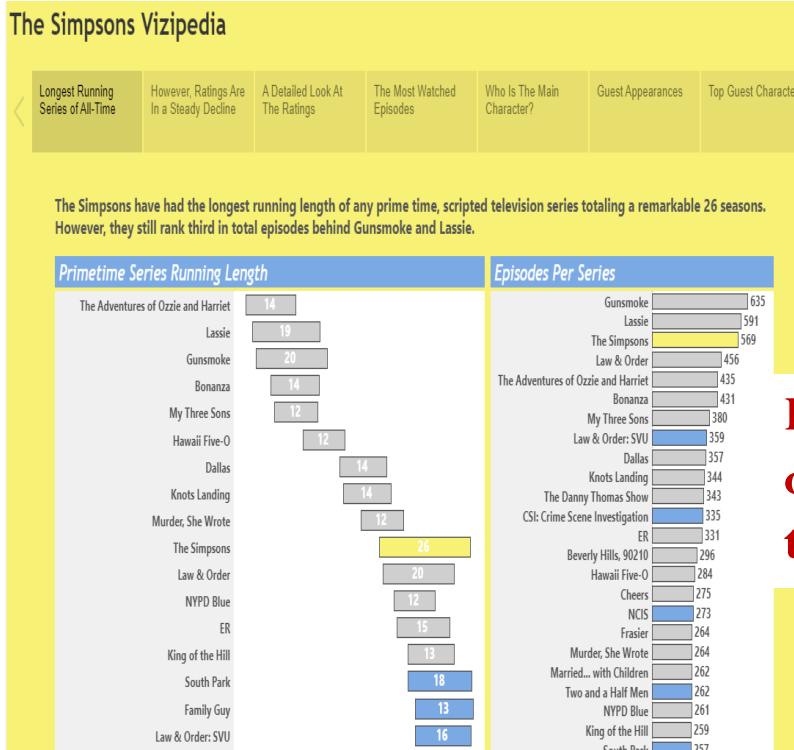
Drill Down



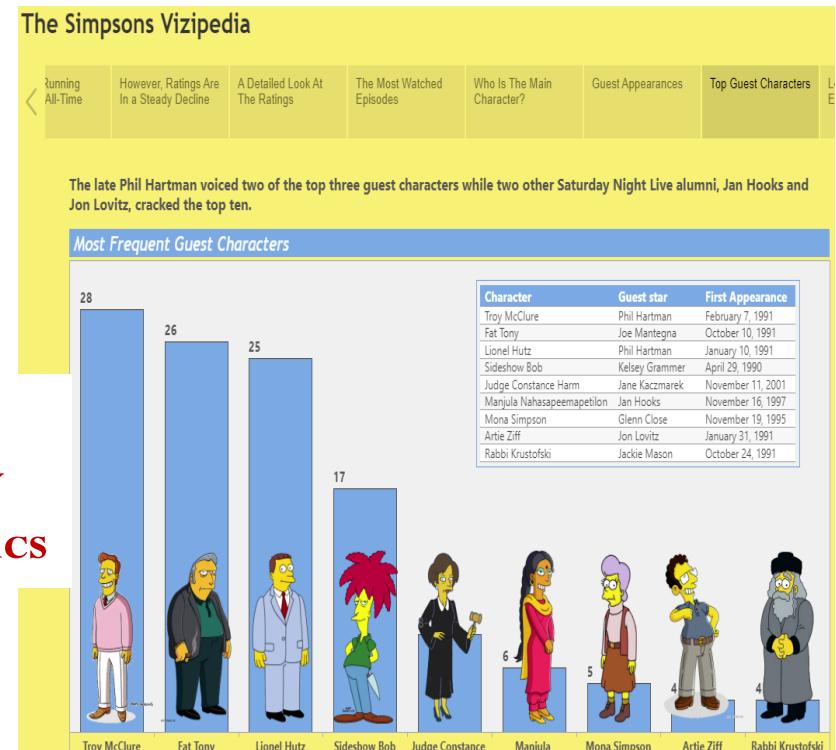
What it does: Sets context so that your audience better understands what's going on in a particular category. 设置上下文，以便您的受众更好地了解特定类别中发生了什么。

Discussions it starts: Why is this person, place or thing different? How does the performance of this person, place, or thing compare?

Broad context to specific category



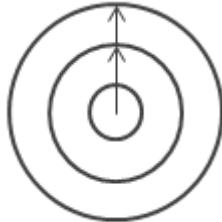
From
overview
to specifics



https://public.tableau.com/en-us/gallery/visualizing-simpsons?_fsi=f1rPbYqb

Story Design Consideration – Zoom Out

Zoom Out



Vancouver cyclists

Vancouver Cyclists	I once visited an emergency department...	Vancouver embraces bike lanes	Are cyclists wearing helmets?	Are cyclists following the rules of the roads?	Stop means C
--------------------	---	-------------------------------	-------------------------------	--	--------------

VANCOUVER CYCLISTS

A Glimpse Into Their Traffic Habits



Relate topic of interest (cyclists) to wider information (about cyclists habits)

将感兴趣的话题（骑自行车的人）与更广泛的信息（关于骑自行车的人的习惯）相关

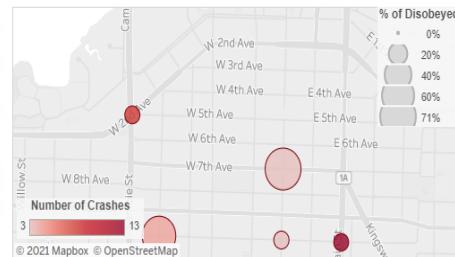
- **What it does:** Describes how something **your audience cares about relates to the bigger picture.** 描述你的观众关心的东西与大局的关系。
- **Discussion it starts:** What effect does **one area** have on the **bigger picture?**

Are cyclists following the rules...

Vancouver Cyclists	I once visited an emergency department...	Vancouver embraces bike lanes	Are cyclists wearing helmets?	Are cyclists following the rules of the roads?	Stop means C
--------------------	---	-------------------------------	-------------------------------	--	--------------

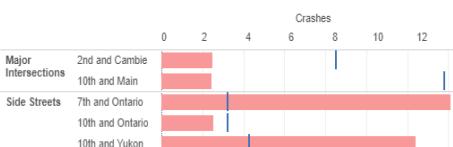
I observed 4 intersections with various traffic controls like 2-way stop signs, 4-way stop signs, traffic light intersections and roundabouts. I chose ones that had high volumes of crashes involving cyclists from 2009 to 2013.

The size of the circles over each intersection reflects the percentage of drivers disobeyed for the specific traffic control. For example, failing to stop at a stop sign would be deemed disobeying.



36%

of cyclists disobeyed a traffic control but it varied greatly depending on the type of traffic control.



Cyclists were more inclined to disobey traffic controls if they were on side streets compared to major intersections with lots of vehicle traffic. Disobeying didn't correlate to higher numbers of crashes

Story Design Consideration - Contrast

Contrast

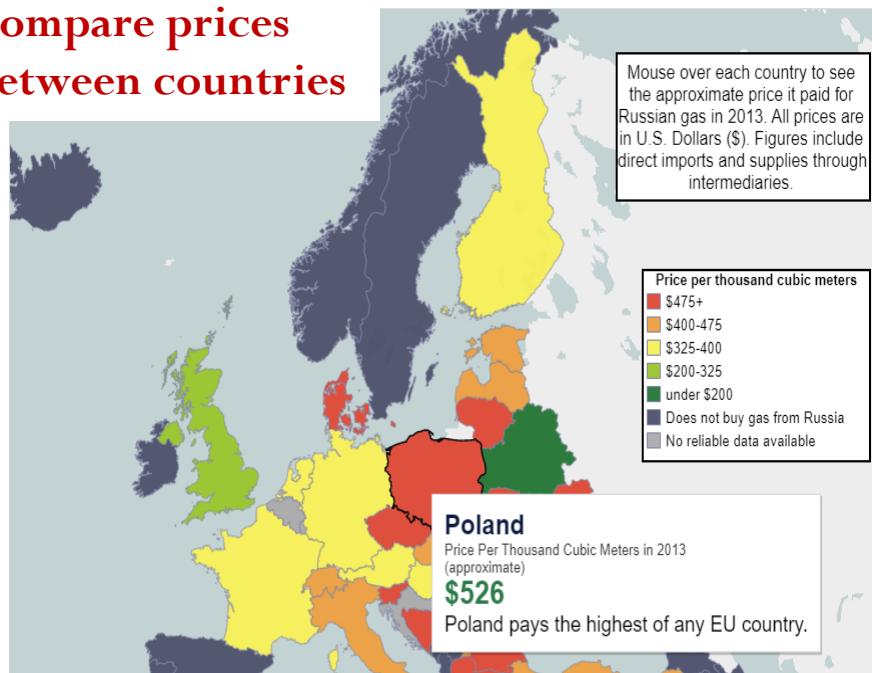


- **What it does:** Shows how two or more subjects **differ**.
显示两个或两个以上科目的差异
- **Discussions it starts:** Why are these items different? Which **area** should we **focus on** and which area is **doing fine**?
为什么这些项目不同？我们应该关注哪个领域，哪个领域做得很好？

Gazprom's Grip: Russia's Leverage Over Europe



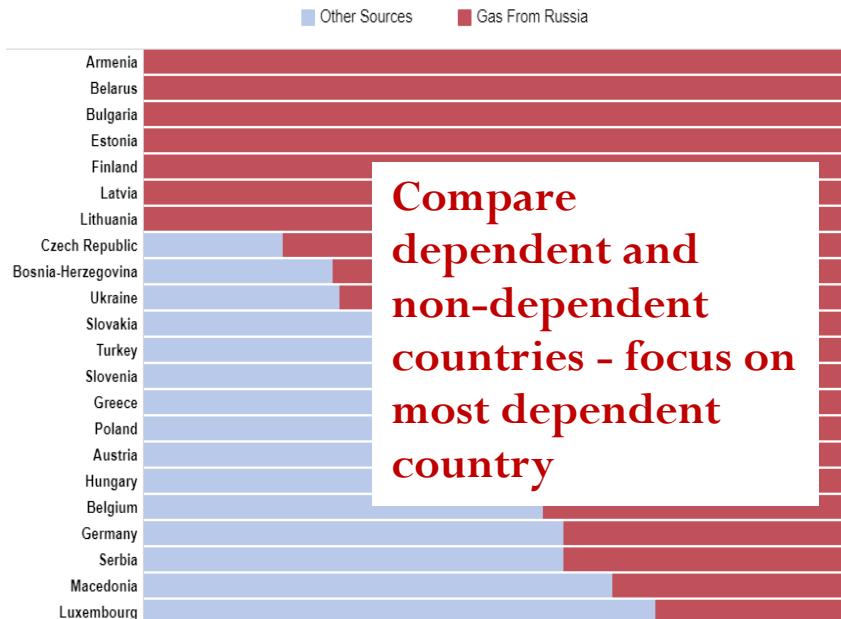
Compare prices between countries



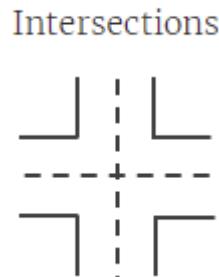
Gazprom's Grip: Russia's Leverage Over Europe



Russia dominates the natural gas market of many European countries. This graph shows which are most dependent on Russia for their gas.



Story Design Consideration - Intersections



What it does: Highlights **important shifts** when one category overtakes another. 当一个类别超过另一个类别时，突出了重要的转变。

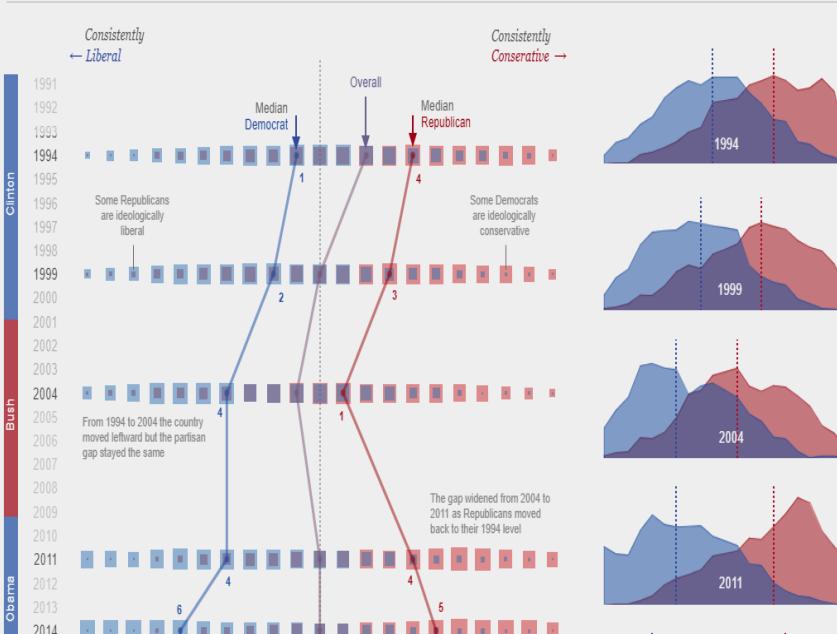
Discussions it starts: What **causes** these shifts? Are these shifts **good or bad?** How do these shifts **affect** other aspects of our plan?

Shift between Liberal and Conservative – impact on key issues. 2014 – overall moved from center – more extreme

US vs. THEM

From 1994 to 2015, Pew Research Center scored survey respondents on a 10-point ideological scale. In the past decade, members of both parties moved further away from the center.

Choose a Segment
 General Population
 Politically Engaged

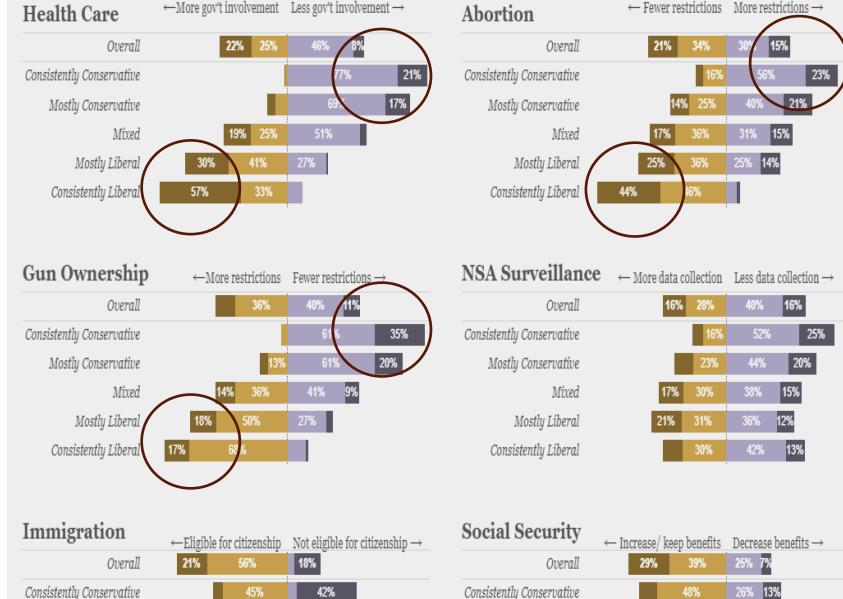


https://public.tableau.com/en-us/gallery/political-polarization-us?_fsi=f1rPbYqb

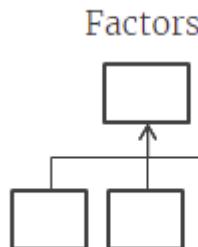
KEY ISSUES

Responses from Pew's 2014 survey

2014 survey – extreme at both ends

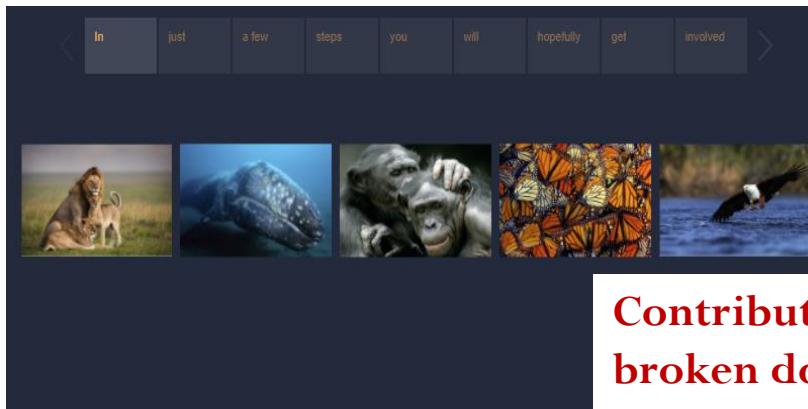


Story Design Consideration - Factors



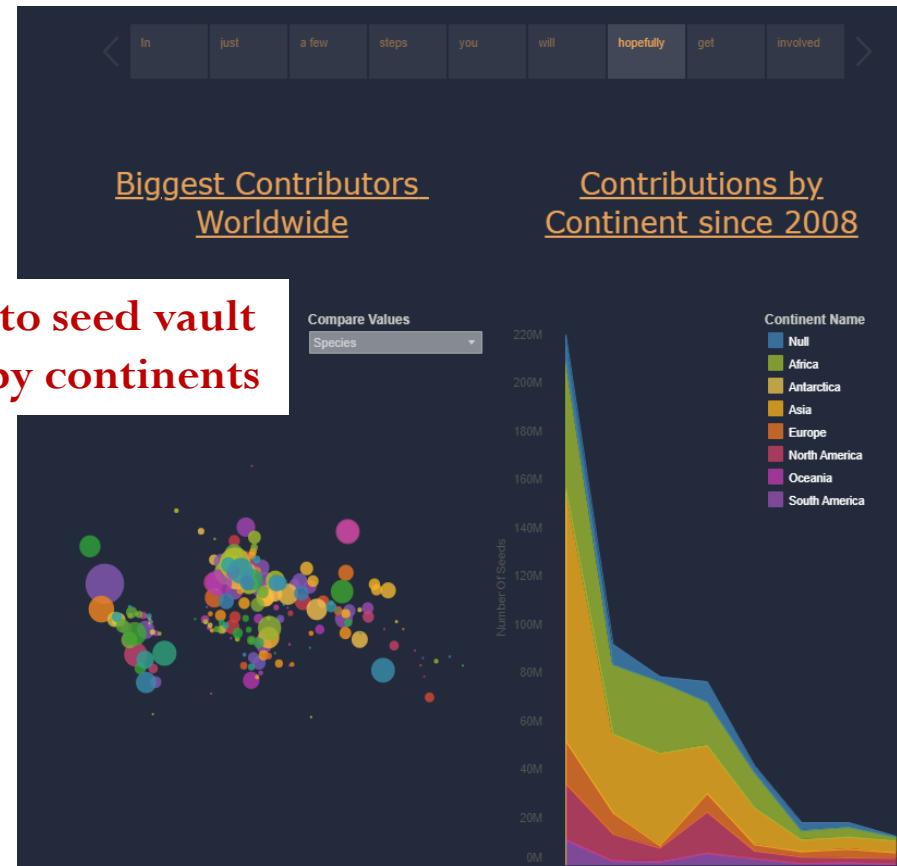
- **What it does:** Explains a **subject** by **dividing** it into **types** or **categories**.
- **Discussions it starts:** Is there a particular category we should **focus** on more? How much do these items **affect** the metric we care about?

有什么特定类别我们应该更多地关注吗？这些项目对我们关心的指标有多大影响？



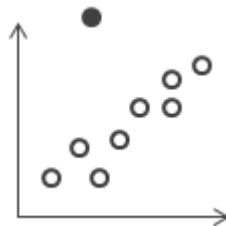
Today, there is a total number of 8,700,000 million SPECIES (excluding bacteria) on PLANET EARTH

of which 86% are on land and 91% of those in the seas have yet to be discovered, described and catalogued...



Story Design Consideration - Outliers

Outliers



- **What it does:** Shows **anomalies** or where things are exceptionally different. 显示异常或事物异常不同的地方。
- **Discussions it starts:** Why is this item different?



Many children aren't even able to write a wish list!



Color gradient indicates percentage range of primary school attendance (light blue – considered outliers)

Click on a country to see the primary school attendance rate.

颜色渐变表示小学出勤率的百分比范围（浅蓝色-被视为异常值）

https://public.tableau.com/app/profile/steph.baranya/viz/AdultVersion_final/SOSChildrensVillagesX-MasCampaignSantaGetInvolvedDonate

Creating a Story

- A. Options for adding a new story point: Choose **Blank** to add a new point or **Duplicate** to use current story point as starting place for next point.

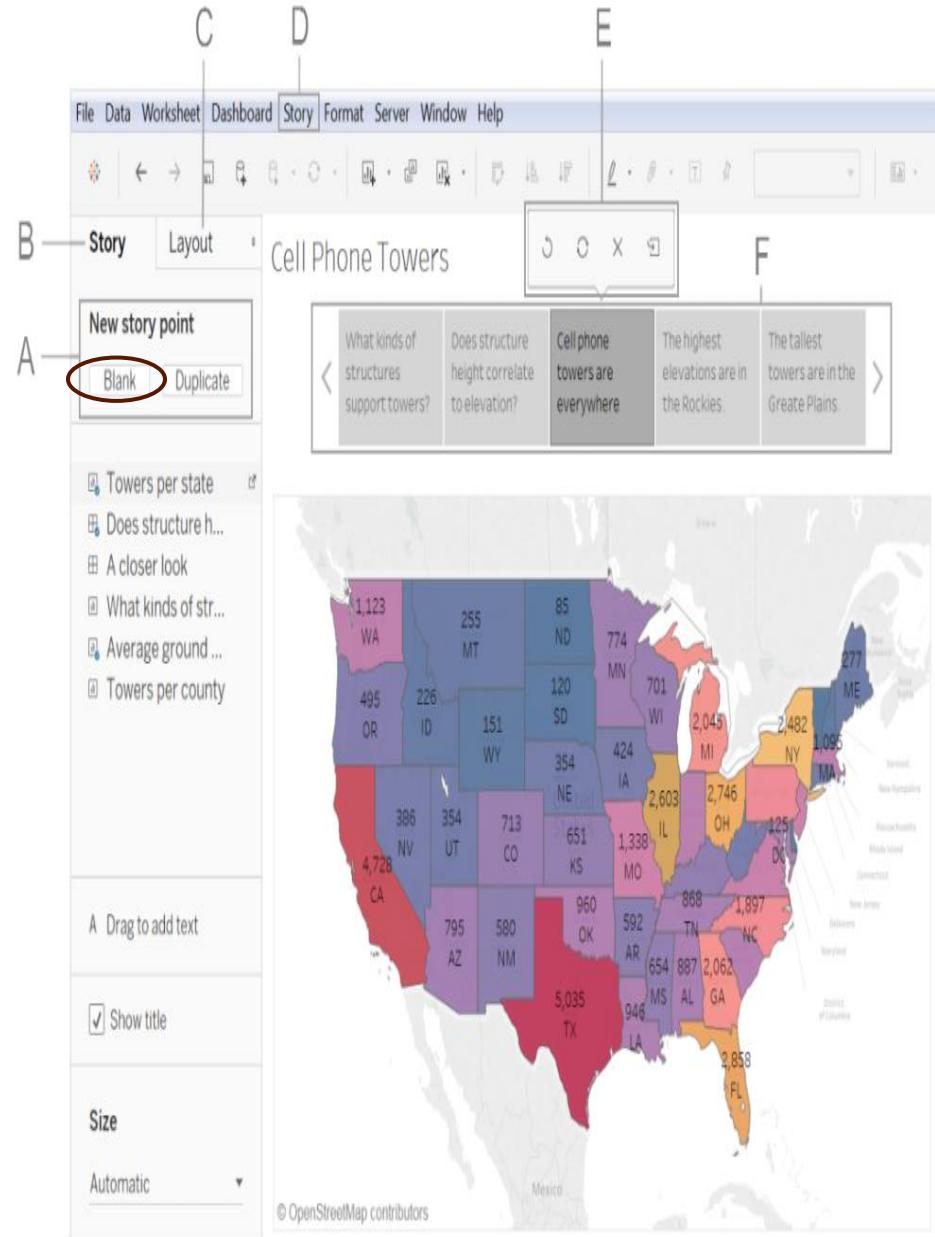
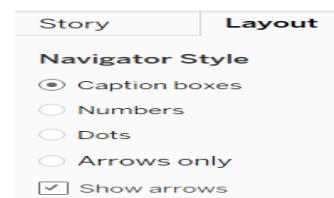
添加新故事点的选项：选择空白以添加新点，或选择复制以使用当前故事点作为下一个点的起点。

- B. The Story pane: Use this pane to **drag dashboards, sheets, and text** descriptions to the story sheet. This is also where you set the size of the story and display or hide the title.

故事窗格：使用此窗格将仪表板、工作表和文本描述拖到故事工作表上。这也是您设置故事大小并显示或隐藏标题的地方。

- C. The Layout pane: This is where you choose your **navigator style** and display or hide the forward and back arrows.

布局窗格：这是您选择导航器样式并显示或隐藏前进和后退箭头的地方。



Creating a Story

D. The Story menu: to **format the story** or copy or export the current story point as an image. Can also clear entire story or show or hide the navigator and story title.

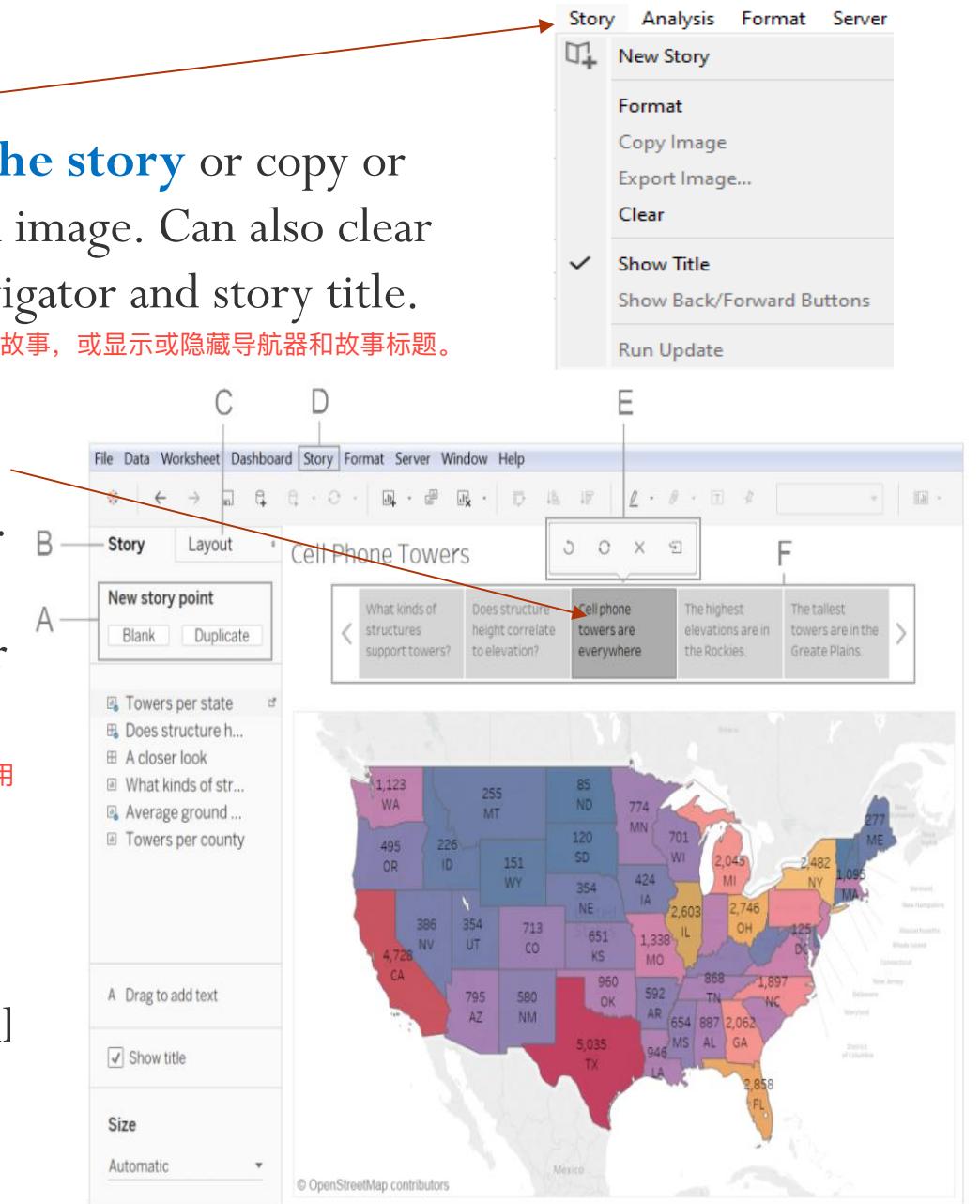
格式化故事或将当前故事点复制或导出为图像。也可以清除整个故事，或显示或隐藏导航器和故事标题。

- E. The Story toolbar: appears when mouse-over the navigator area. Use it to **revert** changes, apply **updates** or **delete** a story point, or create a **new** story point out of the current one.

将鼠标悬停在导航器区域上时出现。使用它来恢复更改、应用更新或删除故事点，或从当前故事点创建新故事点。

- F. The navigator: allows you to **edit** and **organize** your story points. It's also how the audience will step through the story. To change the style of the navigator, use the Layout pane.

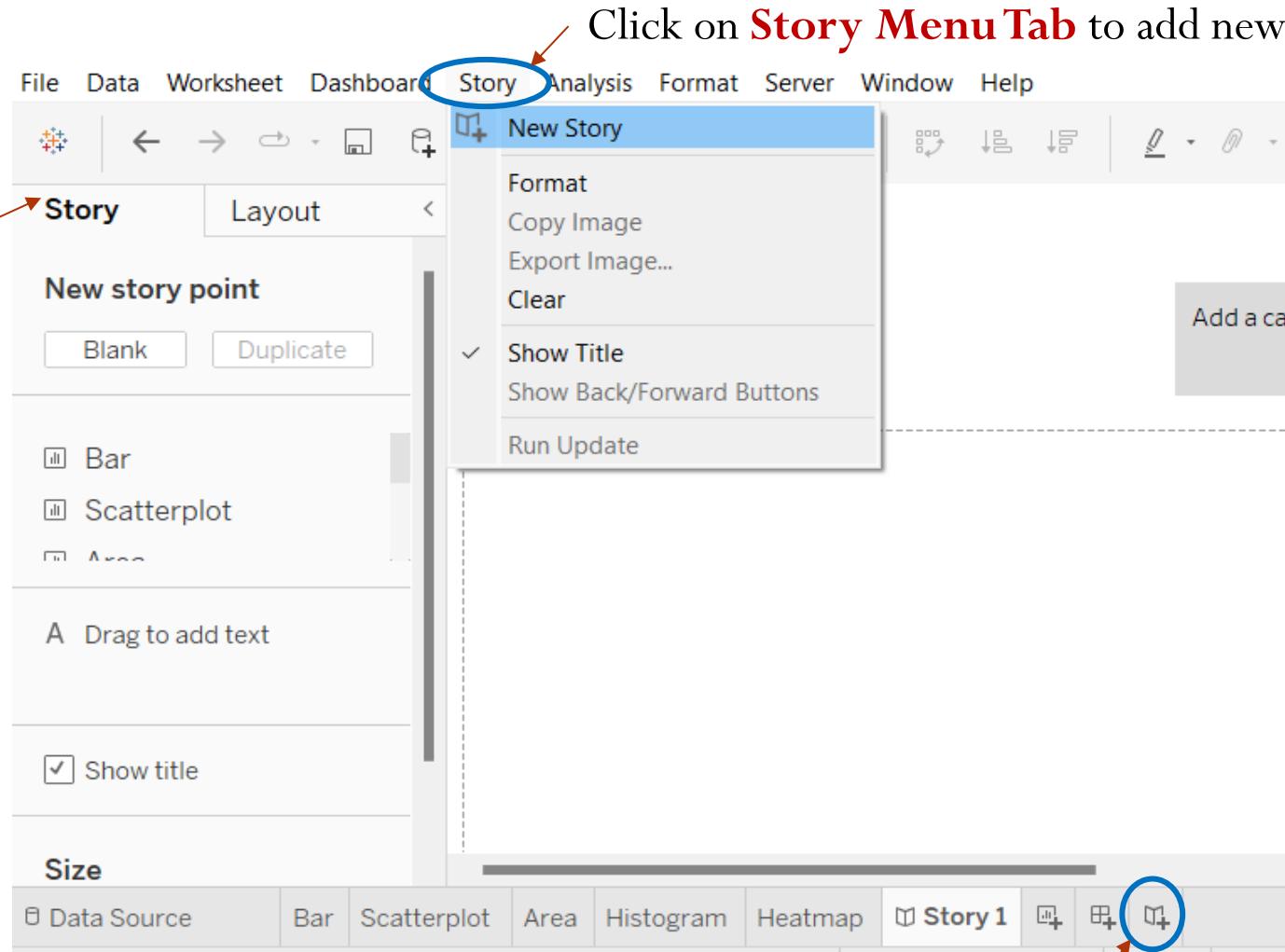
允许您编辑和组织您的故事要点。这也是观众如何完成故事。要更改导航器的样式，请使用布局窗格。



Creating a Story

Using the **2_IN6221_Week6_Lab_BasicDashboard_Student.twb** file

Story panel
will be
displayed



Click on **Story Menu Tab** to add new story

Alternatively, click on **Create Story tab**

Creating a Story

At the Story Canvas see how **sheets** or **dashboards** can be dragged in, captions written, etc. to develop a **sequential walk** through the analysis.

Click **Blank/Duplicate** “New story point” to create **new story page**

The screenshot shows the Tableau Story Canvas interface. On the left, there's a sidebar with a 'Story' tab and a 'Layout' tab. Below the tabs are buttons for 'New story point' (highlighted with a red oval), 'Blank', and 'Duplicate'. A list of available stories includes 'Average Shipping...', 'Shipping Cost', 'Running Total S...', 'Bar', 'Scatterplot', 'Histogram', 'Initial Superstor...', 'Shipping Dashb...', and 'Dashboard 2'. A red arrow points from the 'Initial Superstore Analysis' dashboard towards the 'New story point' button, with the text 'Drag dashboard to story' overlaid. In the center, the 'Initial Superstore Analysis' dashboard is displayed. It features a bar chart titled 'Bar' showing profit by product name, a scatterplot titled 'Scatterplot' showing count vs discount, and a histogram titled 'Histogram' showing the count of discounts. A red oval highlights the caption area of the dashboard, with the text 'Caption - write description of charts in dashboard' overlaid. On the right, there's a 'Caption' section with a red oval around it. At the bottom, there's a 'Show title' checkbox and a 'Size' dropdown menu with options: 'Generic Desktop (1366 x 768)', 'Desktop Browser (1000 x 800)', 'Full Screen (1024 x 768)', 'Laptop Browser (800 x 600)', and 'Web Page Embedded (800 x 800)'. A red arrow points from the 'Size' dropdown towards the 'Add Text' area, which contains a red-bordered box with the text 'A Drag to add text'.

Creating a Story

- To format a story => Click **Story Tab** => **Format** the story using similar configurations as dashboards
- Each page of a story can **contain only one sheet or one dashboard**. To add multiple sheets on a story point, **put them on a dashboard, then add dashboard to story**

The screenshot shows the Tableau Story interface. At the top, the menu bar includes File, Data, Worksheet, Dashboard, Story (which is highlighted), Map, Format, Server, Window, and Help. Below the menu is a toolbar with various icons. A context menu is open over a text input field, with the 'Format' option circled in red. The main area displays a story titled 'Initial Superstore Analysis Story'. This story contains two pages: 'Initial Superstore Analysis' and 'Second Dashboard...'. A text input field on the first page contains the placeholder 'This is a text input'. On the left, a 'Format Story' dialog is open, showing settings for Shading, Title, Alignment, Shading, Border, Navigator, and Text Objects. Arrows from the text 'Story background shading color' point to the shading dropdowns in the Format Story dialog and the shading of the story page. Another arrow points from the text 'Each page of story can contain only one sheet or one dashboard' to the second page of the story.

File Data Worksheet Dashboard Story Map Format Server Window Help

New Story

Format

Copy Image

Export Image...

Clear

Show Title

Show Back/Forward Buttons

Run Update

Format Story

Shading

Default:

Title

Font: Tableau Regu...

Alignment: Center

Shading:

Border: None

Navigator

Font: Tableau Book...

Shading:

Text Objects

Font: Tableau Book...

Alignment: Center

Shading: 85%

Border:

Story background shading color

Initial Superstore Analysis Story

Initial Superstore Analysis

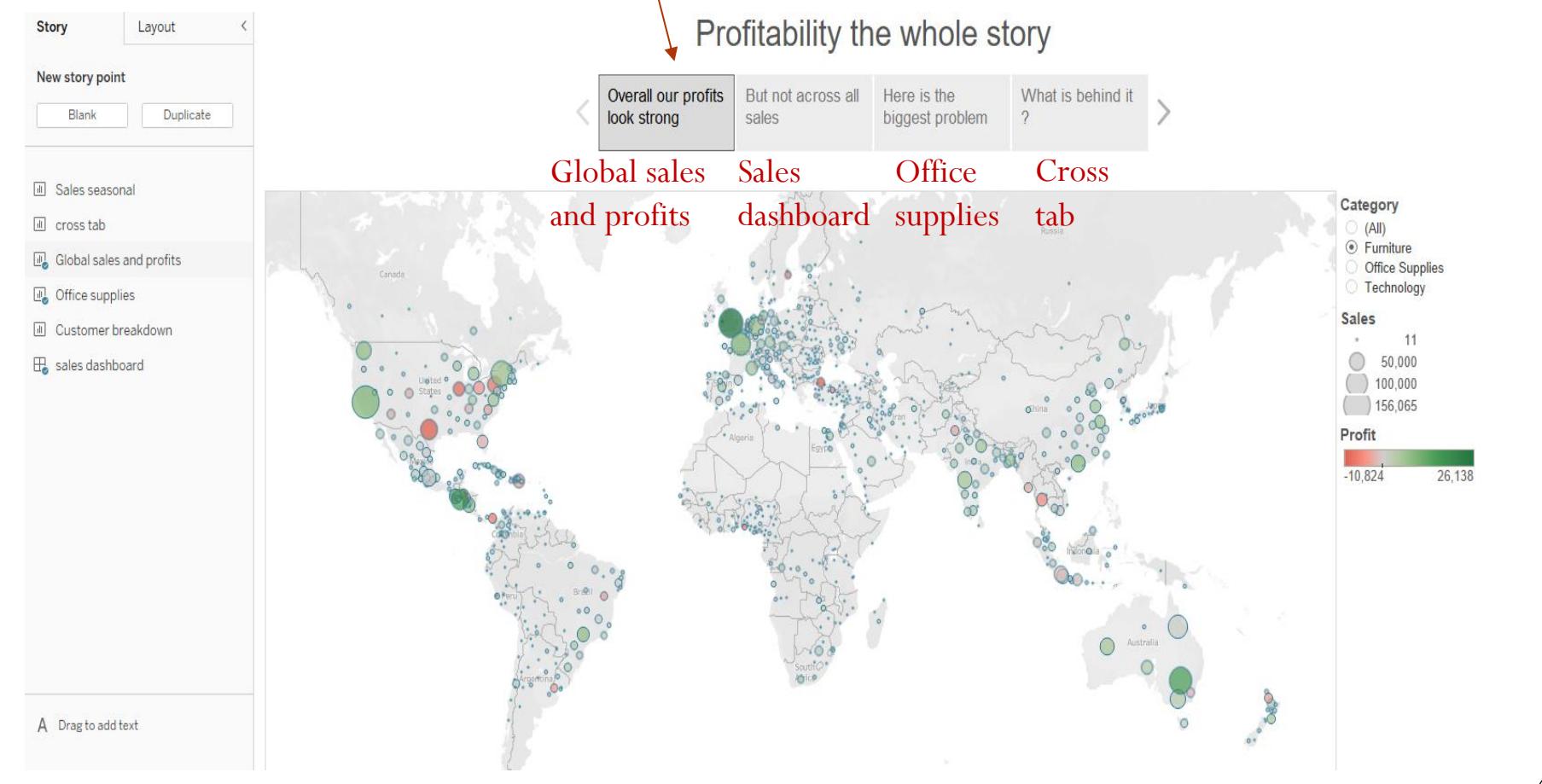
Second Dashboard...

This is a text input

Each page of story can contain only one sheet or one dashboard

In-class Exercise

Open **4_IN6221_Week6_Lab_Storytelling_Student.twb** file, create a **report (story)** on the analysis of shipping costs for Global Superstore with the following Story Points:



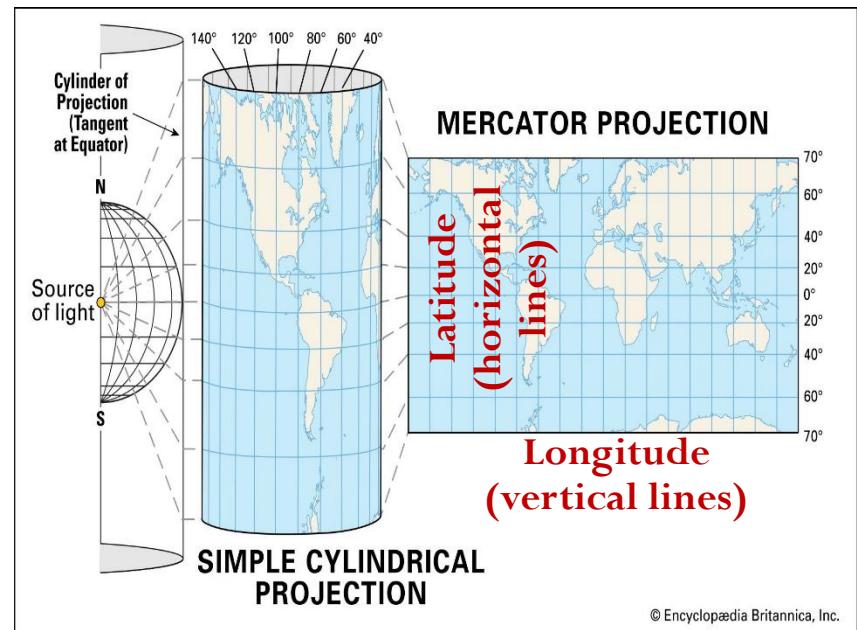
Working with Maps - Projections



Mercator projection – distorts the relative size of landmasses.

Why still being used? – Mercator projection laid out the globe as a flattened cylinder, where navigators could use **latitude** and **longitude** to plot a **straight route**.

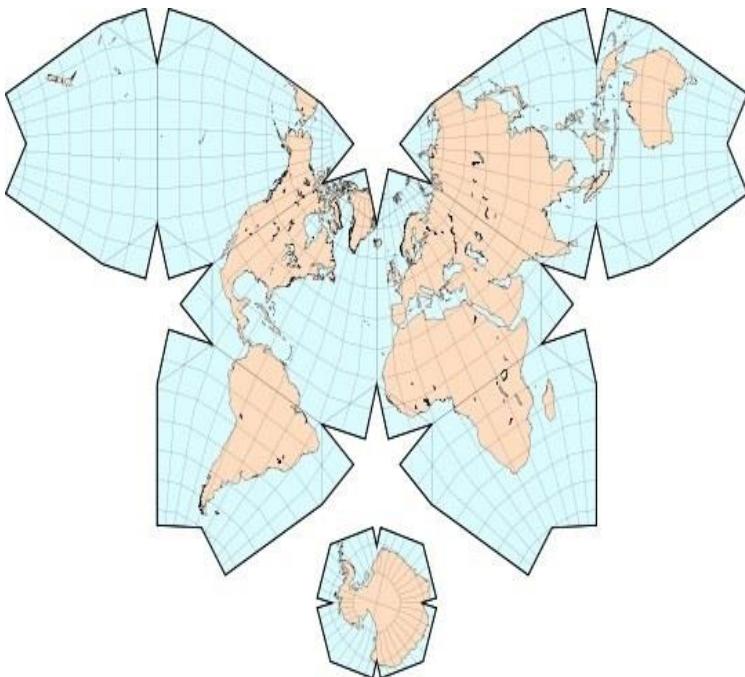
墨卡托投影将地球仪布置成一个扁平的圆柱体，导航员可以使用纬度和经度来绘制一条直线路线。



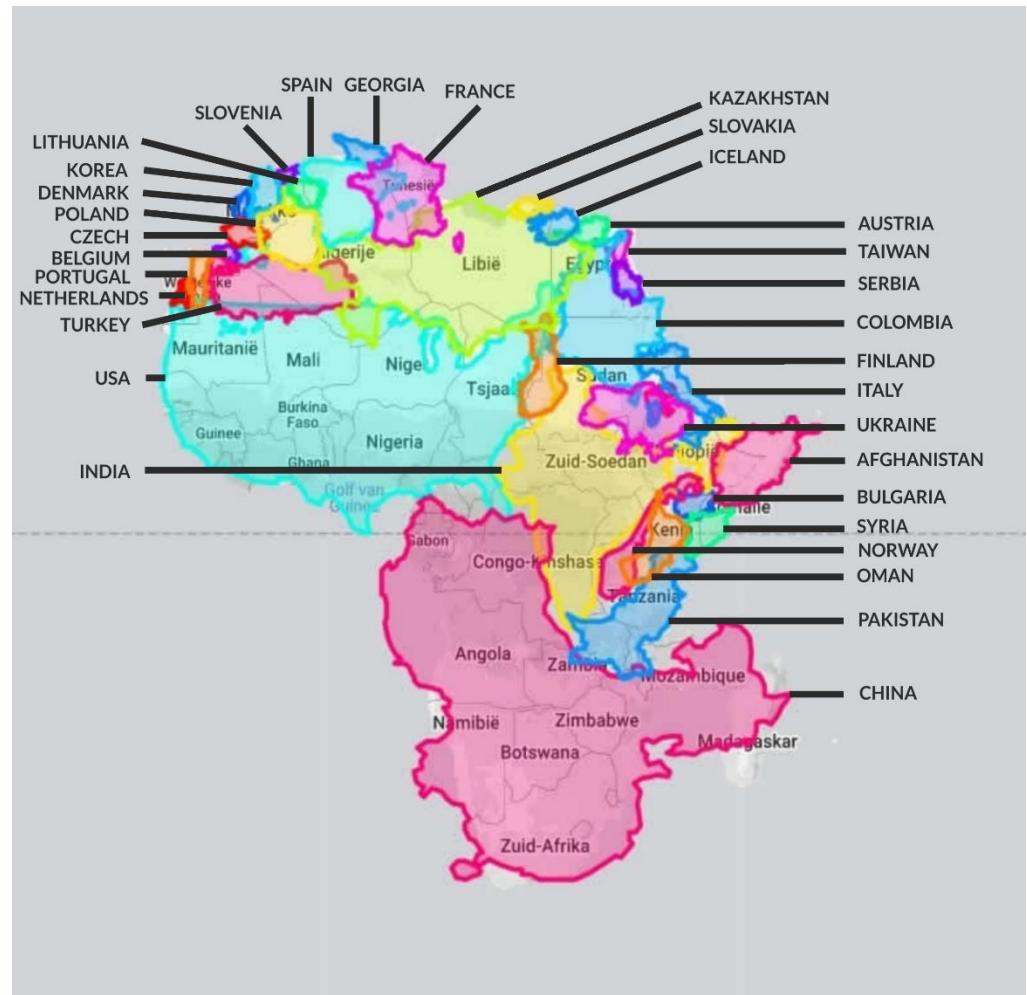
© Encyclopædia Britannica, Inc.

Working with Maps - Projections

Waterman Butterfly
projection - **reflect relative
size** of land masses

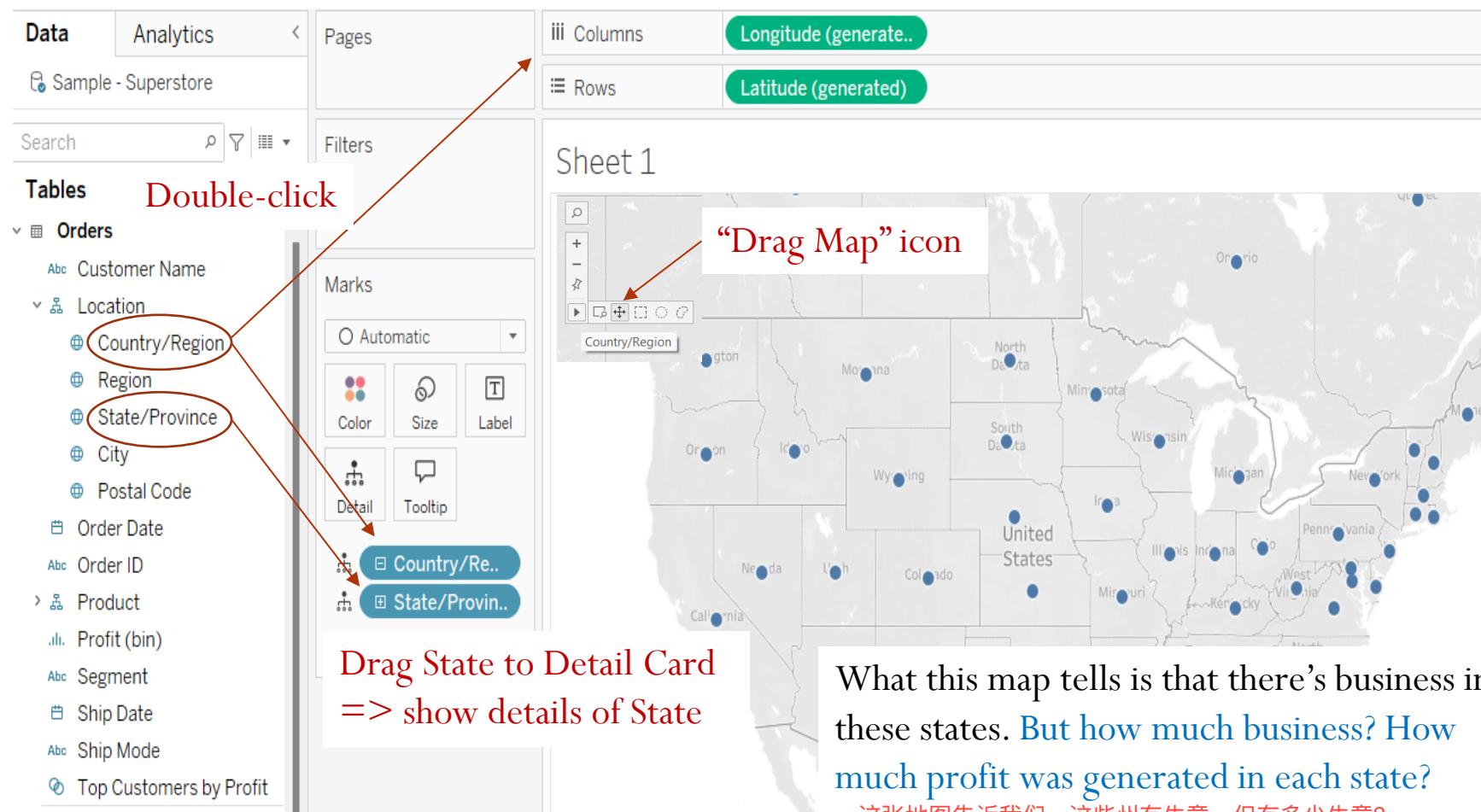


Africa relative to other countries



Working with Maps

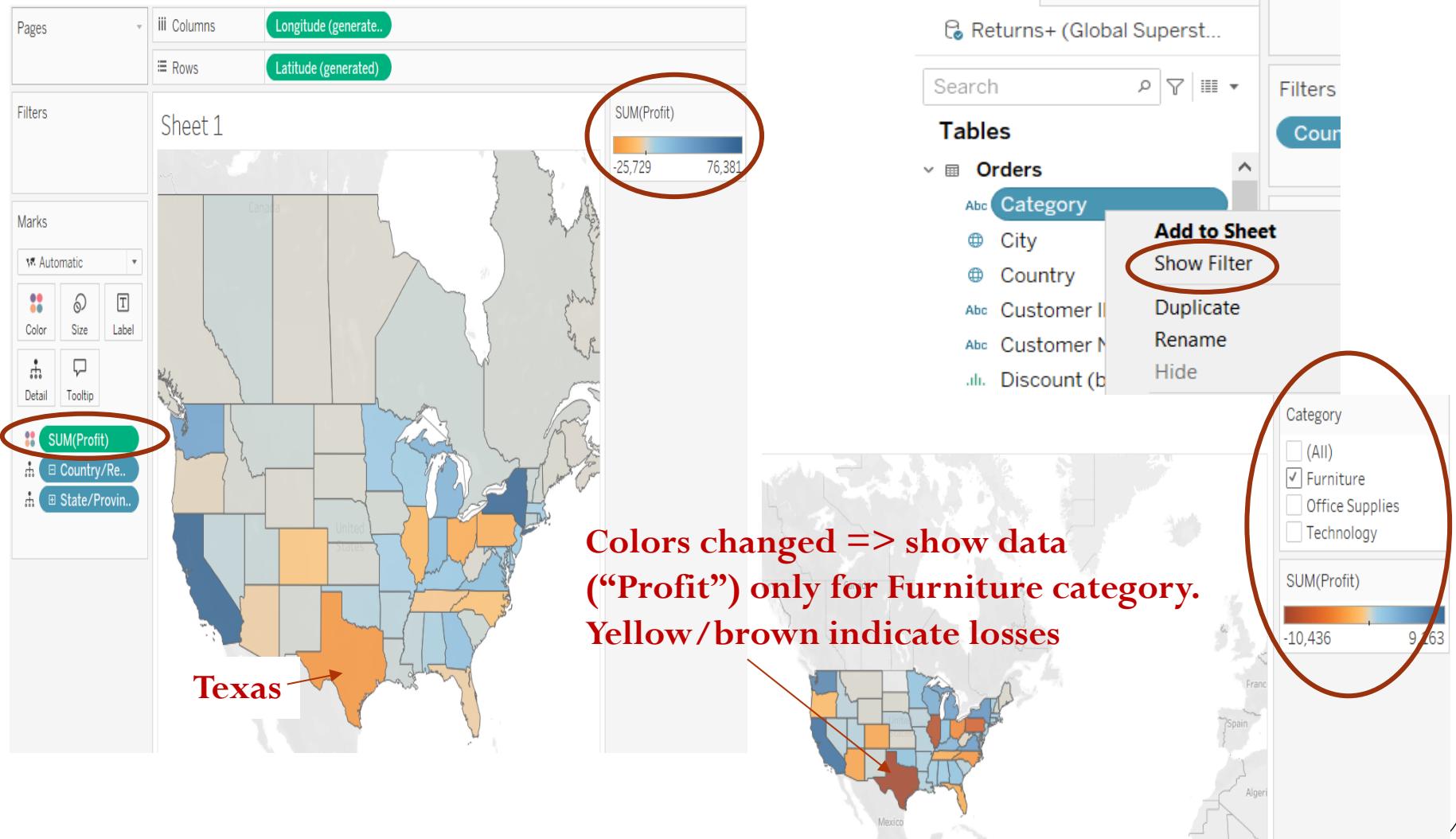
- Open **Sample Superstore** file. Create **new worksheet**. **Double click** **Country/Region** to display geospatial visual and country details. **Drag State/Province** to **Details** card to show State information.



Working with Maps

- Drag **Profit** field to **Color** card => Texas looks like a challenging market. Drill down and just look at the furniture category: **Right-Click on Category....Show Filter**. Select just the **Furniture** category

将利润字段拖到彩色卡片=>德克萨斯州看起来像一个具有挑战性的市场。深入研究并查看家具类别：右键单击类别.....显示过滤器。只选择家具类别。

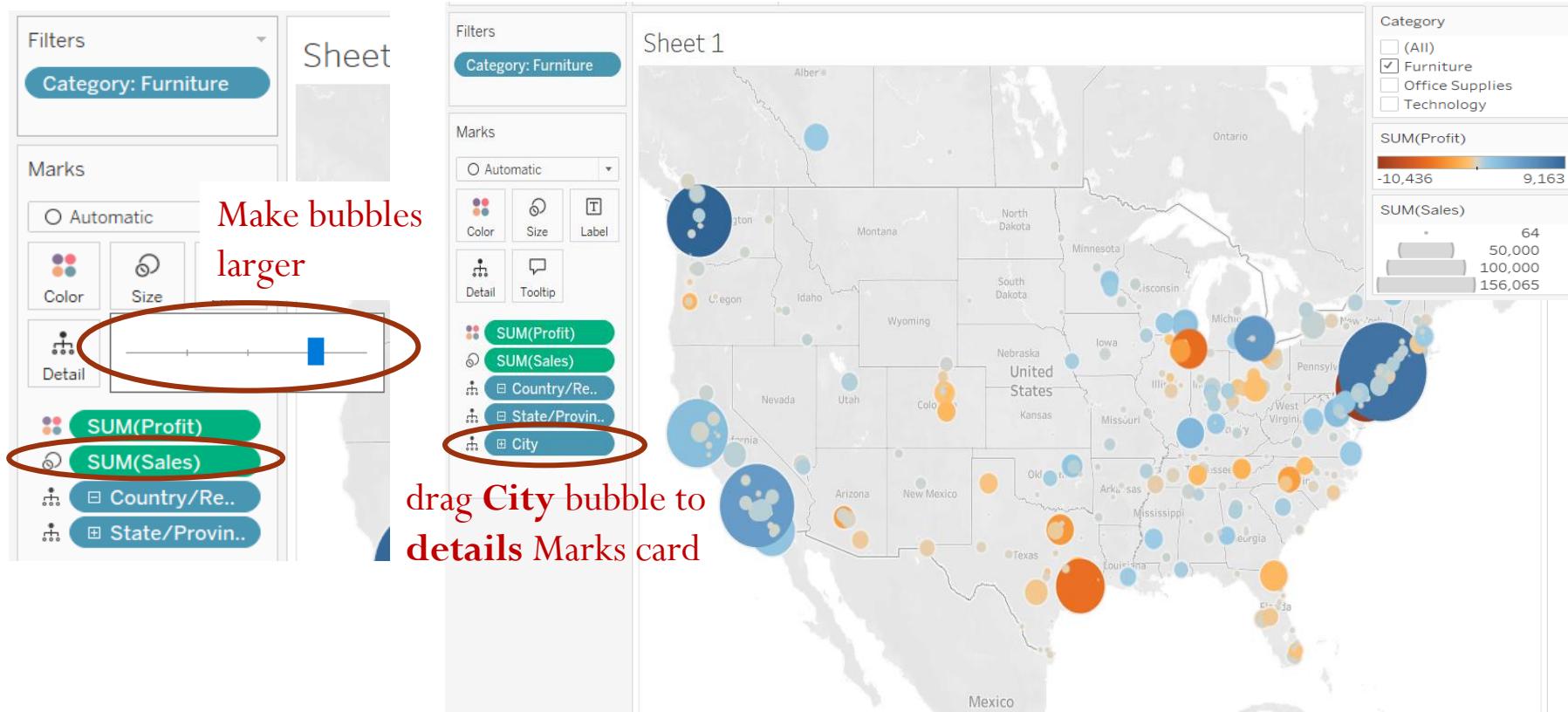


Working with Maps

Filled maps are great when you just want to see one measure on your map. **But to see both profits and sales?**

Only one attribute can be on color, drag **Sales** to **Size** on the Marks card. Now we see profit and sales together (click **Size** to make the bubbles larger).

To explore different levels of geography (State & City): drag **City** bubble to **Detail** Marks card.



Map Options

- Drop down **Map** tab => select **Background Layers**.
- Opens left pane as a formatting pane.
 - Background style/washout** –
 - Light/Normal/Dark/Streets/Outdoor/Satellite
 - Background Map layers** - control layers such as borders and names.
 - At top-left of map click **play button** => zoom area, pan, selections

Analysis Map Format Server Wi

Background Maps >
Background Images >
Geocoding >
Edit Locations...

Map Legend
Background Layers...
Map Options...

Light
Normal
Dark
✓ Streets
Outdoors
Satellite

Background Layers

Style Streets

Washout (%) 0

Repeat Background

Background Map Layers

Base
 Terrain
 Streets, Highways, Routes
 Country/Region Borders
 Country/Region Names
 State/Province Borders
 State/Province Names
 Water Labels
 Cities
 Points of Interest
 Neighborhoods
 Subway and Train Stations
 Building Footprints
 House Numbers

Pages iii Columns Longitude (generate...)
Rows Latitude (generated)

Category: Furniture

Marks

Automatic

Color Size Label

Detail Tooltip

SUM(Profit)
SUM(Sales)
Country/Re...
State/Prov...

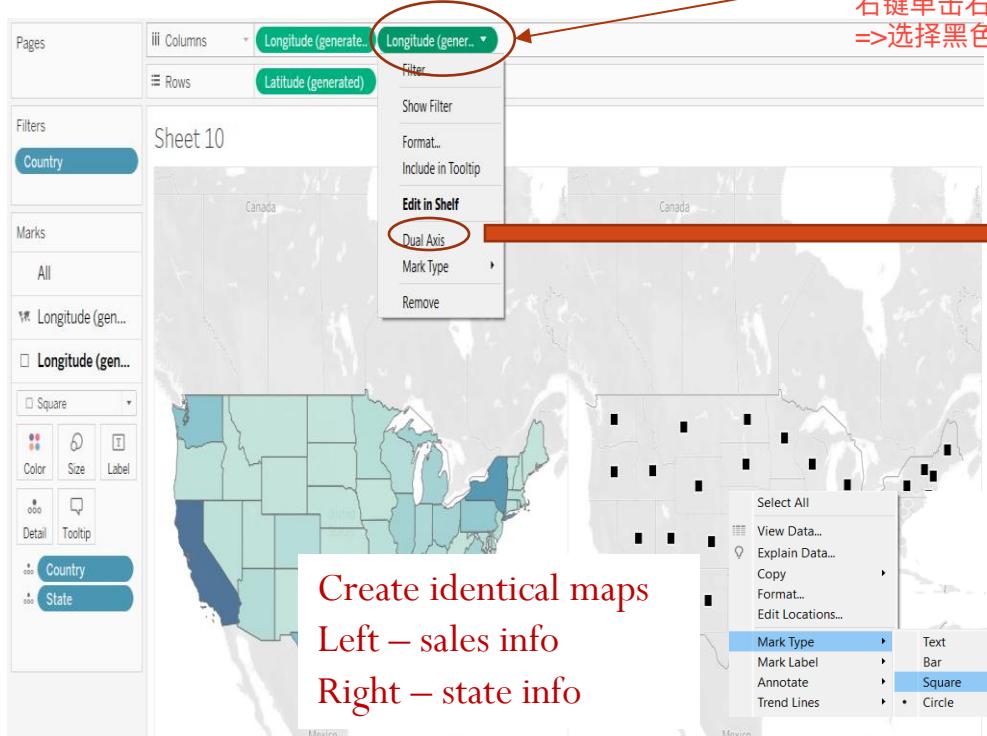
Sheet 1

zoom area, pan, selections

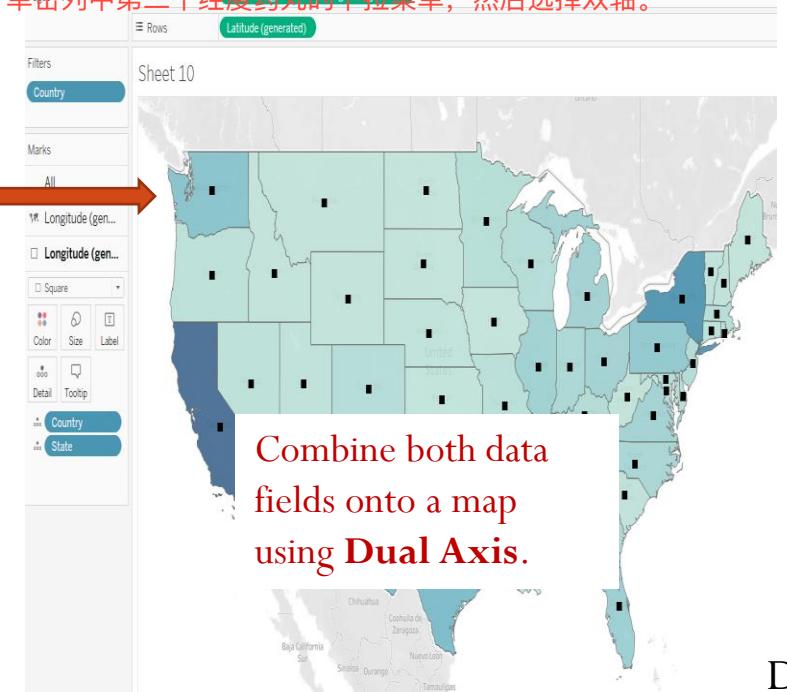
Play button

Dual Axis Maps

- To put **multiple data fields** onto the map => create a **dual axis** map.
- Open **new sheet**. Recreate map with a simple dot for each state in the US => drag **Country/Region, State/Province** to **Marks Card**.
- Drag **Longitude** to **Columns** again => **create two identical maps**.
- **Select a point** on the **left** map, then drag **Sales** to **Color** – map is shaded by sales
- **Right-click** a point on **right** map, change **Mark Type** to **Square**. Click on **Color** Mark => choose **Black**. Click drop-down on second **Longitude** pill in **Columns** and select **Dual Axis**.



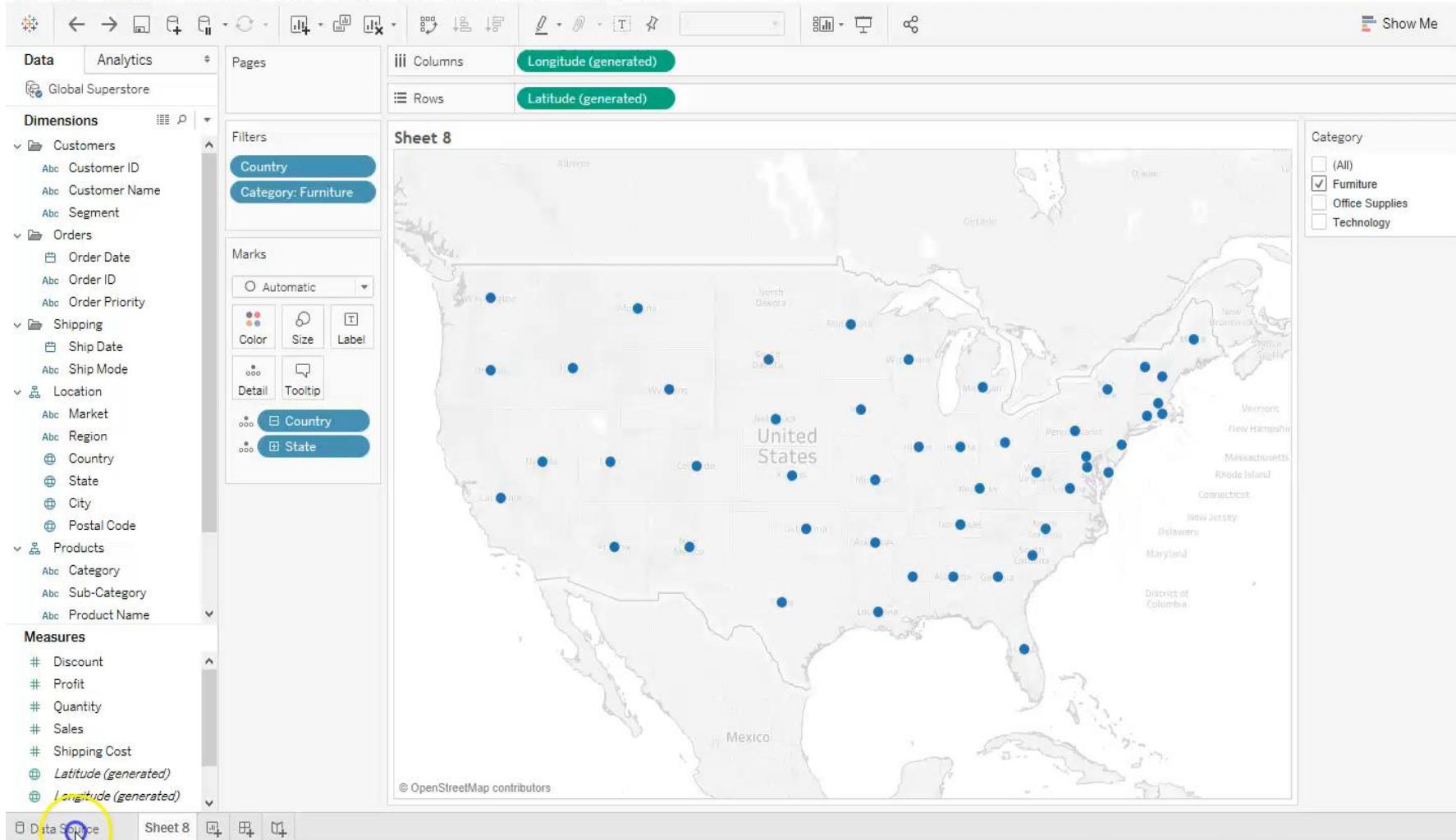
右键单击右侧地图上的一个点，将标记类型更改为正方形。单击颜色标记
=>选择黑色。单击列中第二个经度药丸的下拉菜单，然后选择双轴。



Dual Axis Maps

Tableau - Global Superstore 10-3

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help



- □ X



Tableau Public Gallery

- <https://public.tableau.com/app/discover/viz-of-the-day>

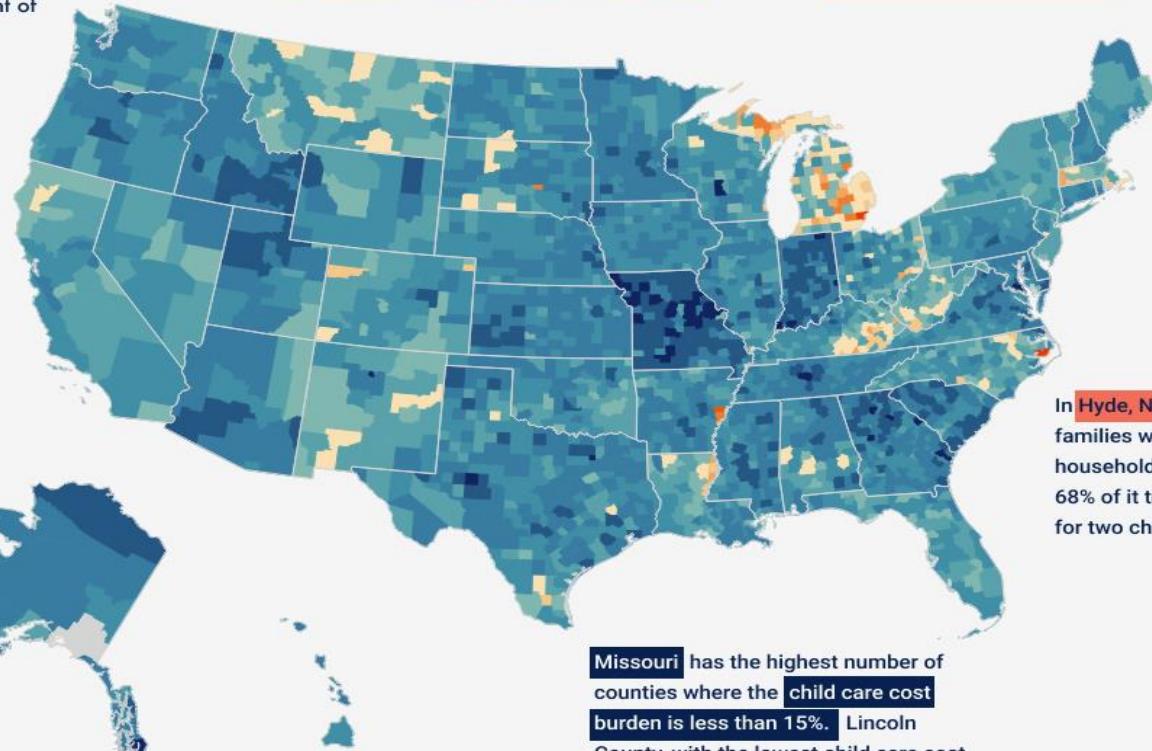
The Burden of Child Care Costs Across the United States

This map shows the child care cost burden, which is defined as the cost of child care for a household with two children as a percent of median household income, by county.

The Department of Health and Human Services considers child care affordable when it costs less than 10% of household income. In 2022, not a single county in the United States met that threshold for households with a median household income. In 29 counties, child care costs consumed over 50% of a median household income.

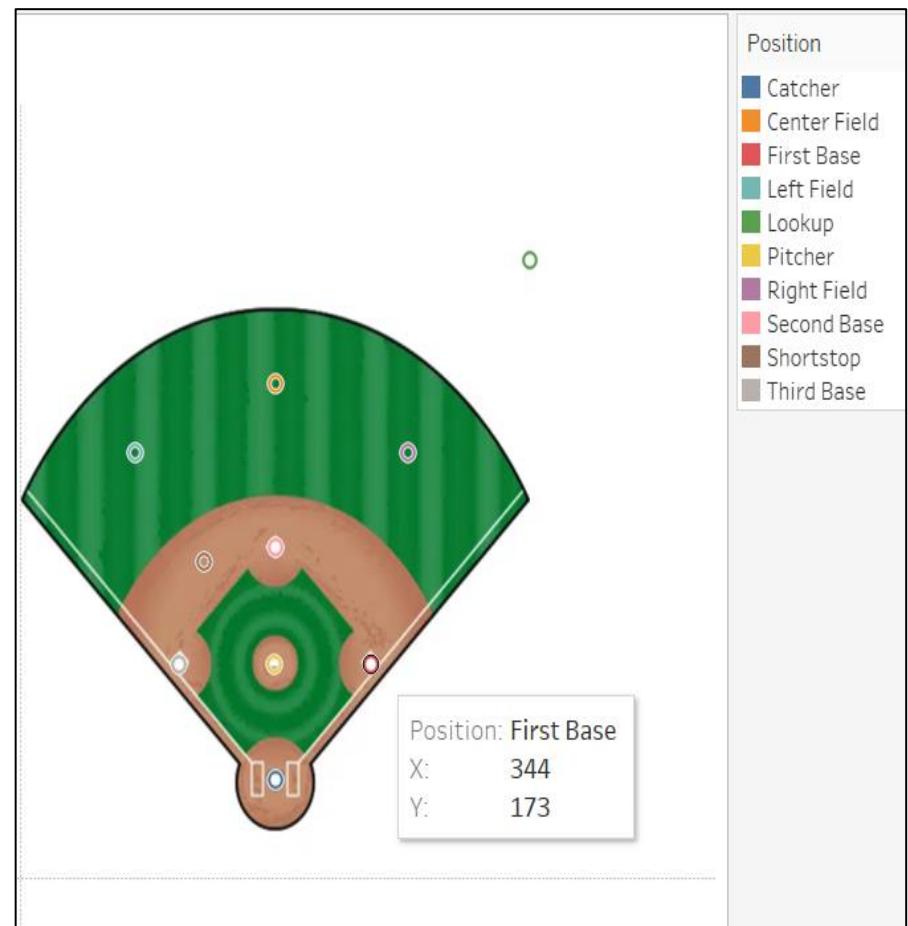
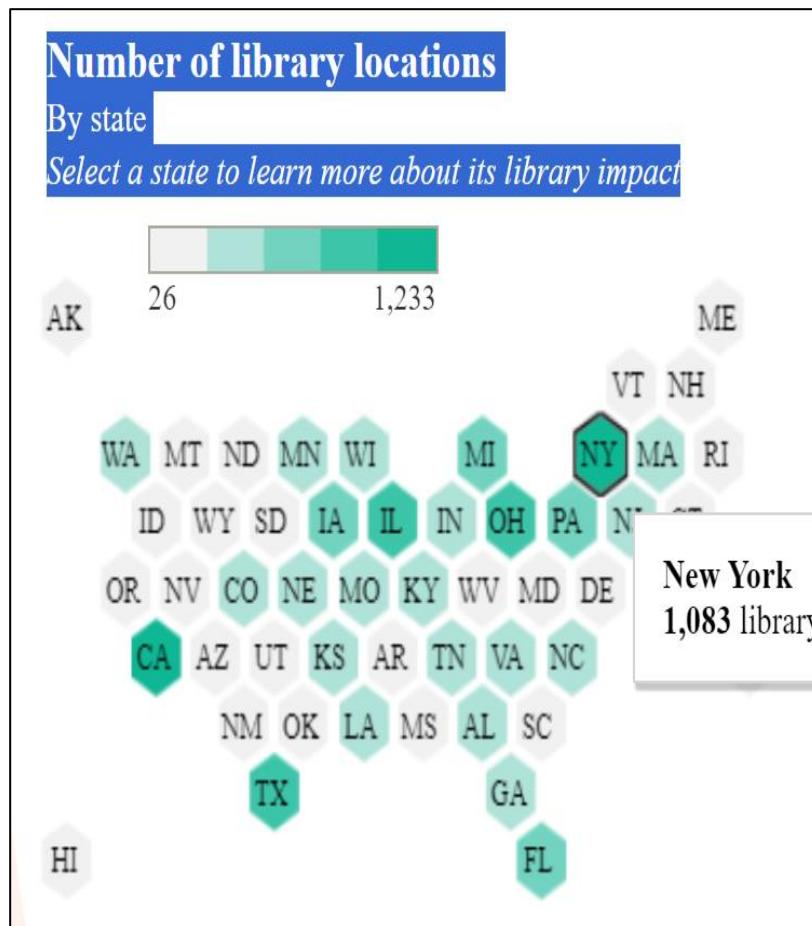
Lower
Higher
No Data

Fifteen of the twenty-nine counties where the child care cost burden is over 50% are in Michigan.



Mapping Background Image

Use **customized image mapping** to enhance the visualization



Mapping Background Image

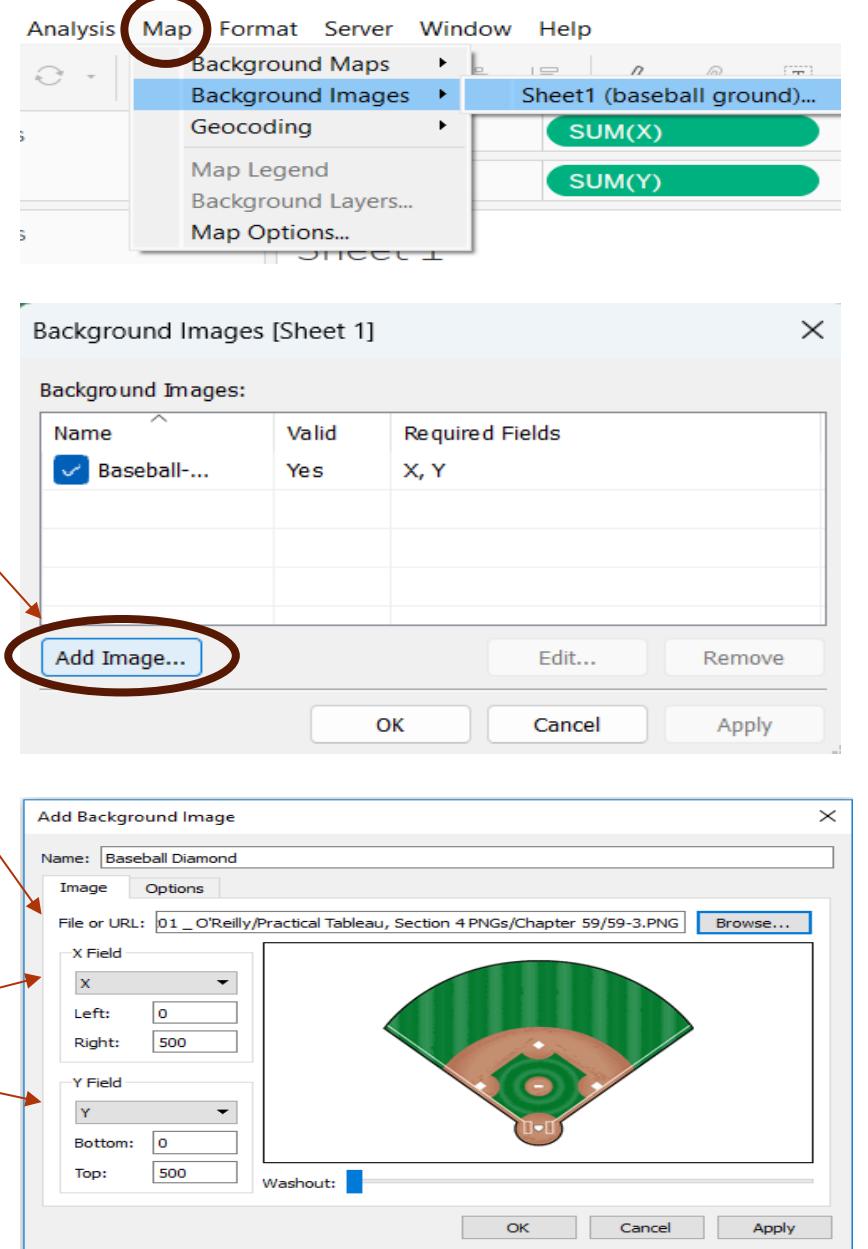
Open the **baseball ground.xlsx** file

Adding a background image.

Start a New sheet => Navigate to **Map** =>
Background Images and click on the
data source => choose “**Add Image**”.

Select the following file in the lab folder:
Baseball-Custom-Background-Image.png

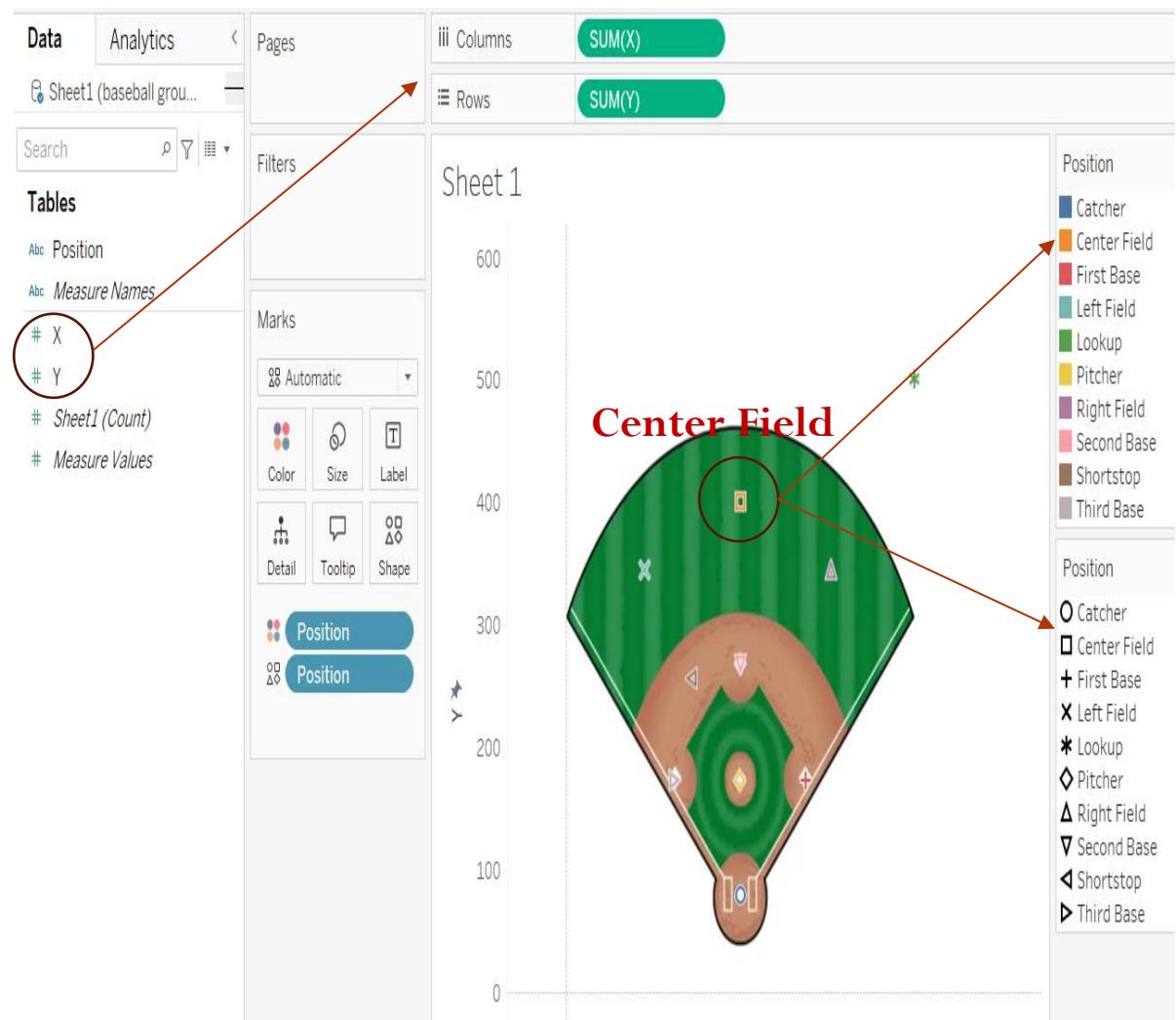
Input the **maximum** value for the **X** and **Y**
coordinates. If the image is **500 wide by**
500 high, use the following entries:
X Position: 0 Left, **500 Right**
Y Position: 0 Bottom, **500 Top**



Mapping Background Image

Data points given in file:
baseball ground.xlsx

Position	X	Y
Lookup	500	500
Pitcher	249	173
Catcher	250	79
First Base	344	173
Second Base	250	268
Shortstop	180	256
Third Base	155	173
Left Field	113	344
Center Field	250	400
Right Field	380	344



In-Class Exercise – Draw GE2020 Map

- Draw Singapore GE Map – using given GE information (ge2020.json)

```
"type": "FeatureCollection",
"features": [
    {
        "type": "Feature",
        "geometry": {
            "type": "MultiPolygon",
            "coordinates": [
                [
                    [
                        [
                            [
                                [
                                    [
                                        103.760108,
                                        1.379161
                                    ],
                                    [
                                        103.761288,
                                        1.37974
                                    ]
                                ]
                            ]
                        ]
                    ]
                ]
            ]
        }
    }
]
```

Bottom of each feature

```
],
"properties": {
    "cartodb_id": 1,
    "name": "Bukit Batok SMC",
    "winner": "PAP",
    "percentage": 54.80
}
```

Understanding the Data

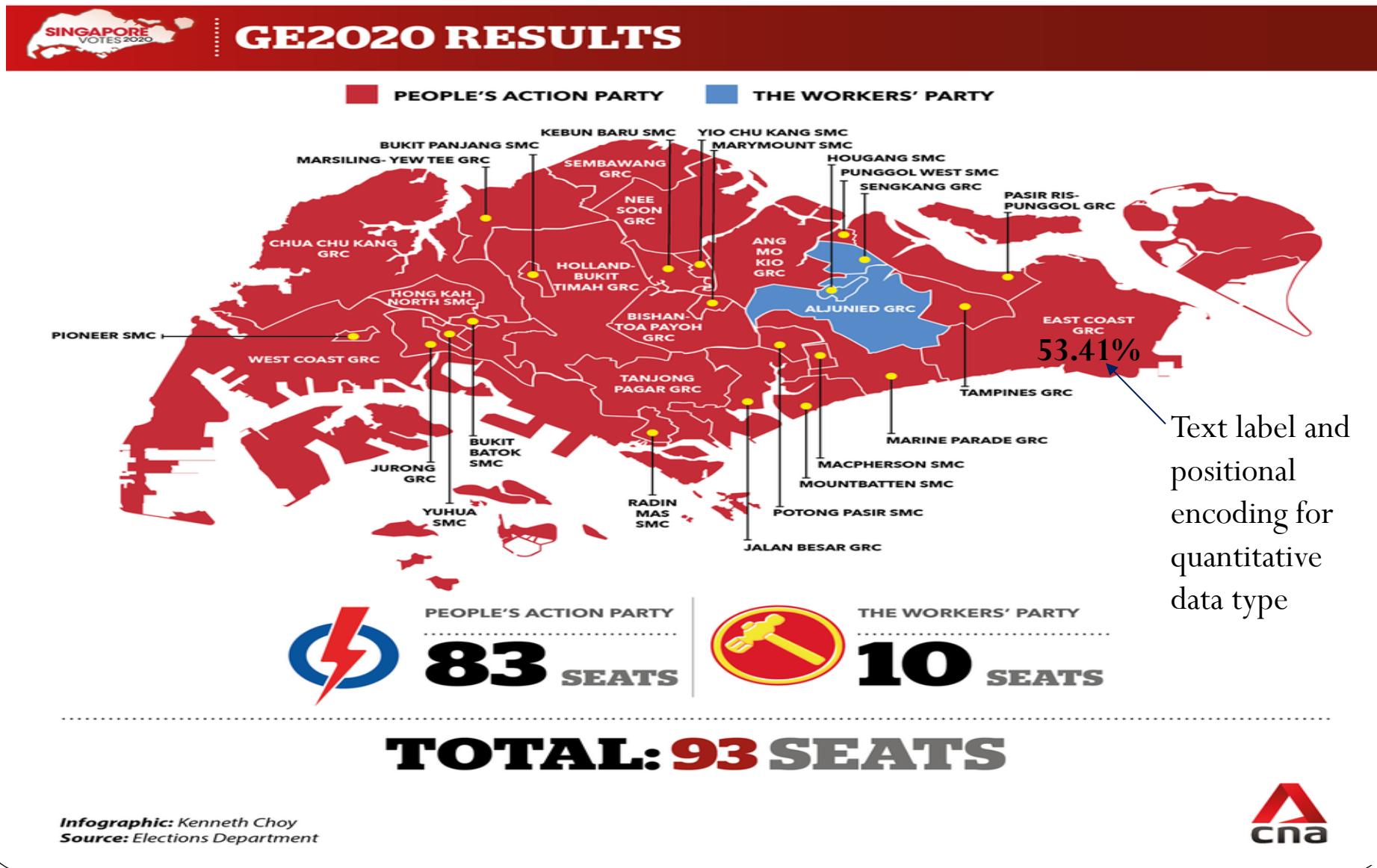
Number of dimensions (5) – GRC, Political Party, Sample Count, Final Result, Who Won?

- **Numerical (Quantitative) Data (2)** – Sample Count and Final Result
- **Categorical Data (3)** – GRC, Political Party, Who Won?

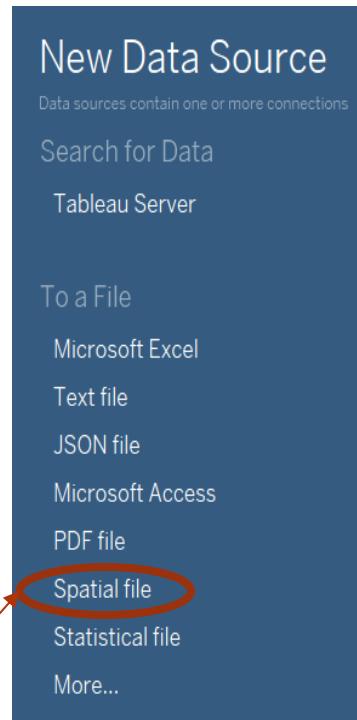
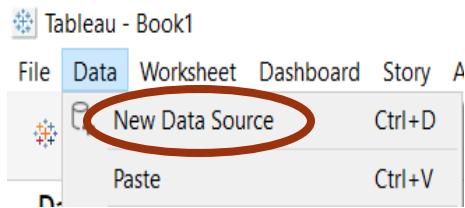
(How Distinct?) Variables – GRC (17), SMC (14), Political Party (12), Who Won? (2)

GRG	Political Party	Sample Count	Final Result	Who Won?
GE2020 Results for GRGs				
Aljunied	Workers' Party	60%	59.93% (85,603 votes)	Workers' Party
	People's Action Party	40%	40.07% (57,244 votes)	
Ang Mo Kio	People's Action Party	72%	71.91% (124,430 votes)	People's Action Party
	Reform Party	28%	28.09% (48,600 votes)	
Bishan- Toa Payoh	People's Action Party	67%	67.26% (62,853 votes)	People's Action Party
	Singapore People's Party	33%	32.74% (30,594 votes)	
Choa Chu Kang	People's Action Party	59%	58.64% (59,462 votes)	People's Action Party
	Progress Singapore Party	41%	41.36% (41,942 votes)	
East Coast	People's Action Party	54%	53.41% (61,009 votes)	People's Action Party
	Workers' Party	46%	46.59% (53,228 votes)	

Goal – to provide visualization for GE2020 results
Useful data – GRC, Who Won?



In-Class Exercise – GE2020 Map

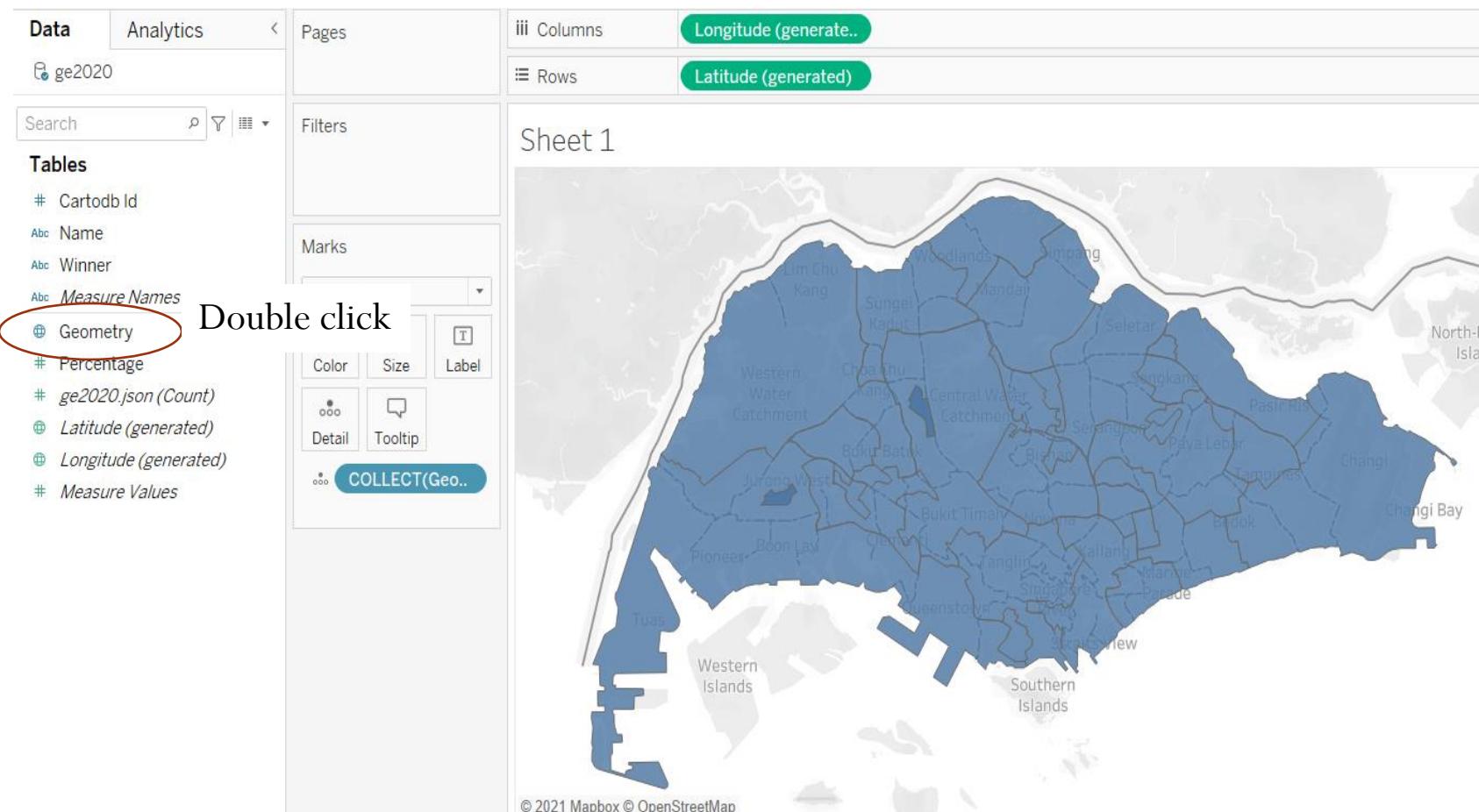


Specify as Spatial and not JSON file

The screenshot shows the Tableau Data Source editor. The 'Connections' section lists 'ge2020' as a spatial file. The 'Files' section shows 'ge2020.json' selected. The main area displays a data preview with columns: '#', 'Abc', 'Abc', '#', 'Abc', 'Name', 'Winner', 'Percentage', and 'Geometry'. The 'Geometry' column is circled in red.

#	Abc	Abc	#	Abc	Name	Winner	Percentage	Geometry
27	Holland-Bukit Ti...	PAP	66.3600	MultiPolygon				
25	West Coast GRC	PAP	51.6800	MultiPolygon				
6	MacPherson SMC	PAP	71.7400	Polygon				
13	Yuhua SMC	PAP	70.5400	Polygon				
23	Sembawang GRC	PAP	67.2900	Polygon				

In-Class Exercise – GE2020 Map



In-Class Exercise – GE2020 Map

Double click

Longitude (generate..)

Latitude (generated)

Cartodb Id

1
2
4
5
6
7
8
9
10
11
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

Sheet 1

Cartodb Id: 25
Name: West Coast GRC
Winner: PAP

© 2021 Mapbox © OpenStreetMap

Individual Project 2

- Create **Storyboard** to visualize how **Singapore overcame Covid-19**
- Style and objectives of storyboard is open to student's creativity
- No restrictions on number of pages/dashboards/charts/images
- Students are to collect data from public domain sources - possible reference <https://data.gov.sg/search?groups=health>
- **Tableau** must be used to create the storyboard
- To submit a **min 1000 words report (no max limit)** along with the Tableau workbook package (with attached images) => compress files into a single zip file
- Submission Deadline – **11 Oct 2024, 11:59PM**

Schedule

Week	Date	Topic to be covered	Remarks
1	16/08/24	Course introduction. What is information visualization?	
2	23/08/24	Elements of Visual Design	
3	30/08/24	Theory of Information Visualization I	Formation of Project Groups
4	06/09/24	Theory of Information Visualization II	
5	13/09/24	Information Visualization using Tableau I	
6	20/09/24	Information Visualization using Tableau II	Assignment 1 Due
7	27/09/24	Visualization Tools Fundamentals	
	04/10/24	Recess Week	
8	11/10/24	Visualization Tools (D3 Part I)	Assignment 2 Due
9	18/10/24	Visualization Tools (D3 Part II)	
10	25/10/24	Visualization Tools - Network Visualization and Analysis	
11	01/11/24	Group Project Presentation	Assignment 3 Due
12	08/11/24	Revision	
13	15/11/24	Class Assessment	

References

- Tableau training materials (<https://www.tableau.com/academic/teaching>)