

GROUND UP SERIES



(V-10.x)



Syed Awase Khirni

RESEARCHER | ENTREPRENEUR | TECHNOLOGY COACH

@sak008 | sak@sycliq.com/sak@territorialprescience.com | +91. 9035433124

Syed Awase earned his PhD from University of Zurich in GIS, supported by EU V Framework Scholarship from SPIRIT Project (www.geo-spirit.org). He currently provides consulting services through his startup www.territorialprescience.com and www.sycliq.com. He empowers the ecosystem by sharing his technical skills worldwide, since 2008. He provides training in Java Technology Stack, .Net Technology Stack, R, DataScience, Client Side frameworks (Angular, KnockOut, Aurelia, Vue, Ember, Backbone etc..), Node Stack, Machine Learning, Python Stack, Php Stack.

Terms of Use

- You shall not circulate these slides without written permission from **Territorial Prescience Research I Pvt Ltd.**
- If you use any material, graphics or code or notes from these slides, you shall seek written permission from TPRI and acknowledge the author Dr. Syed Awase Khirni
- If you have not received this material, post-training session, you shall destroy it immediately and not use it for unauthorized usage of the material. If any of the material, that has been shared is further used for any unauthorized training by the recipient, he shall be liable to be prosecuted for the damages. Any supporting material that has been provided by the author, shall not be use directly or indirectly without permission.
- If this material, has been shared to any organization prior to the training and the organization does not award the contract to TPRI, it should not use the training material internally. If by any chance, the organization is using this training material without written permission, the organization is liable to pay for the damages to TPRI and is subjected to legal action, jurisdiction being Bangalore. It shall also pay for any expenses, legal, recovery and all applicable damages and costs incurred by TPRI.
- TPRI has right to claim damages ranging from USD 50000 to USD 10,0000 dollars as damages, for unauthorized usage.
- Any organization, which does not intend to go ahead with training or does not agree with the terms and conditions, should destroy the material from its network immediately. The burden of proof lies on the client, with whom this material has been shared.
- Recovery of the damages and all expenses incurred including legal fees will be born by the client organization/candidate/party, which has violated these terms and conditions.
- Only candidates who have attended the training session in person from Dr. Syed Awase Khirni, TPRI are entitled to hold this training material. They cannot further circulate it, or use it or morph it, or change it to provide trainings. This training material cannot be used by any other candidates other than the registered individuals for the class room based session.
- TPRI reserves all the rights to this material and code plays and right to modify them as and when it deems fit.
- If you agree with the terms and conditions, please go ahead with using the training material. Else please close and destroy the slide and inform TPRI immediately.

Slide Version Updates

Please read terms of use for authorized access

Original Series

Last Updated	Version	Release Date	Updated by	Code Plays Done @
	8.0		Syed Awase	
	8.3	June 2014	Syed Awase	
	9.0	Sep2015	Syed Awase	
	9.3	Jan 2017	Syed Awase	
	10.	Sep 2017	Syed Awase	

Pre-requisites

- Basic understanding of SQL programming.
- Basics of Microsoft Excel.
- R Programming Basics.

Structure of Program

- Exploratory Data Analysis
- Workflow based
- Visualization

SYED AWASE

DATA VISUALIZATION FUNDAMENTALS

Visualizations are more than just data,
at best they are about **Story**

It should be about **what story** needs to be told
and not what charts to show!

30-50% of the human brain
is devoted to visual processing.

70% of sensory receptors
are processed through the eyes

Learning through visual images

Increases human performance by 323%

How Visual Information is Processed?: Gestalt Principles

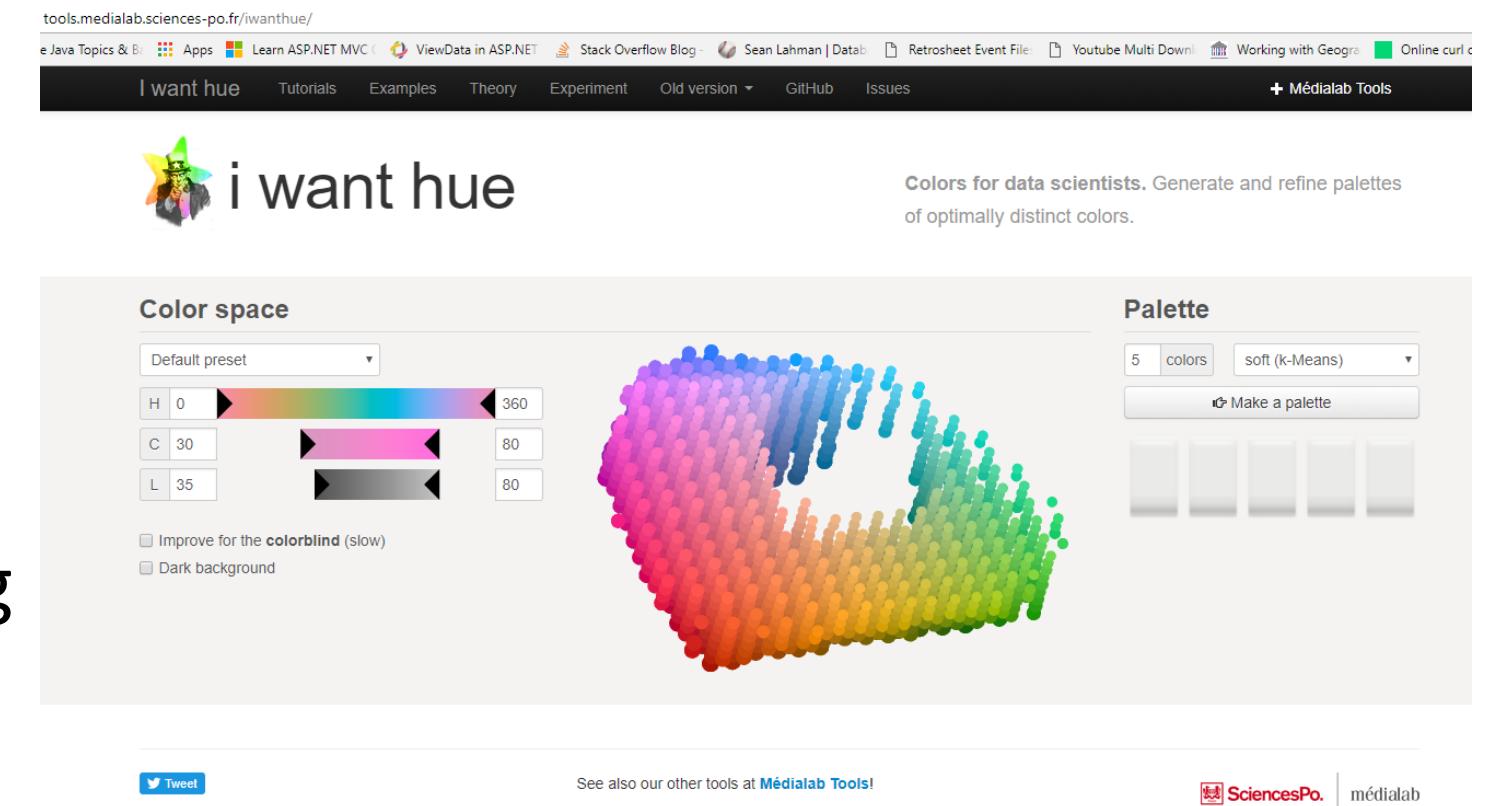
Please read terms of use for authorized access

1. Figure/Ground
2. Proximity
3. Similarity
4. Parallelism
5. Common fate(going together)
6. Closure
7. Continuity

Original Series

Selecting an appropriate color palette

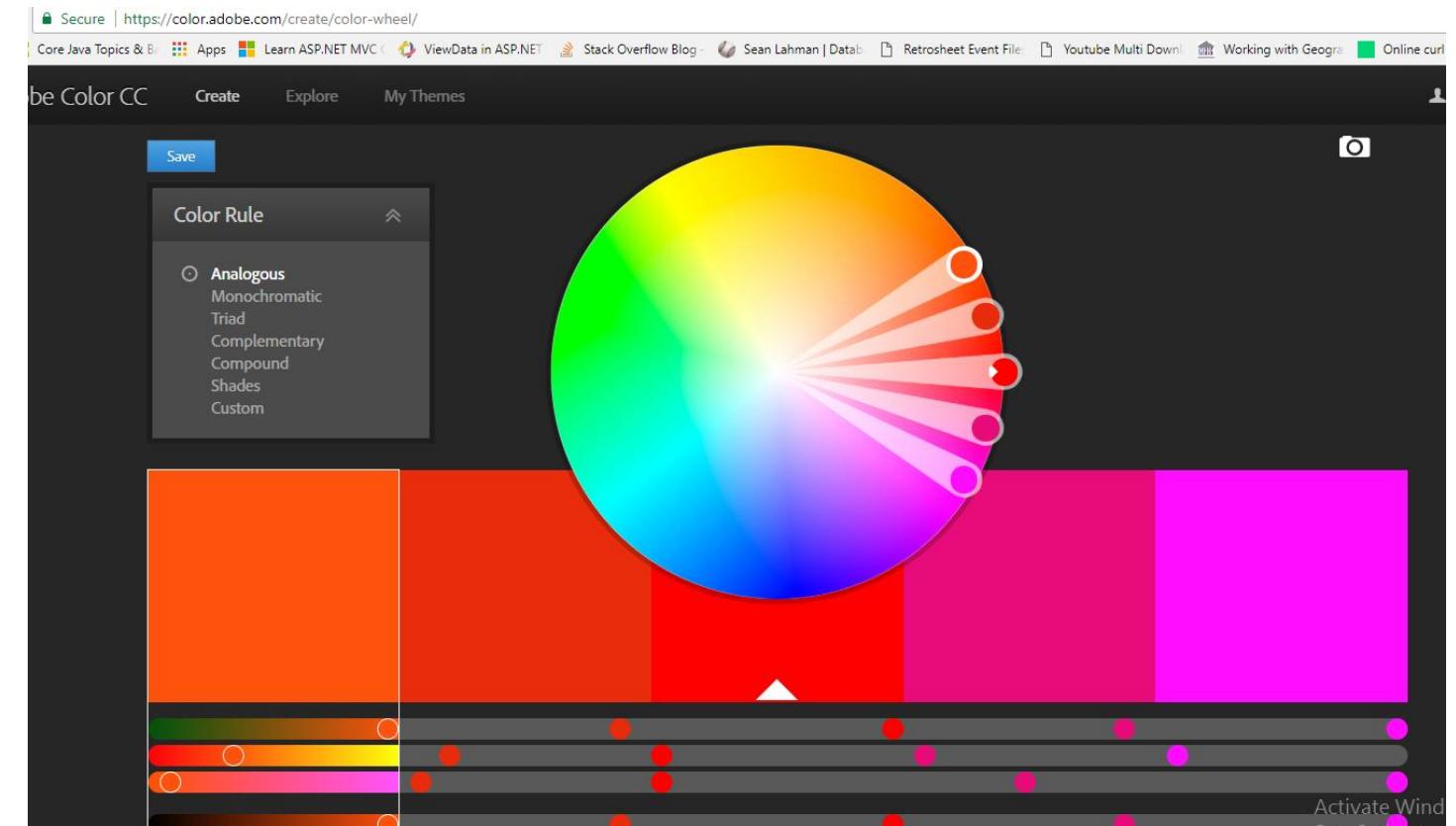
- Colors help us define how **variations stand out**
- Colors help us in **categorization**
- I want hue generating color palette for data visualization



<http://tools.medialab.sciences-po.fr/iwanthue/>

Selecting an appropriate color palette

- Analogous
- Monochromatic
- Triad
- Complementary
- Compound
- Shades
- Custom

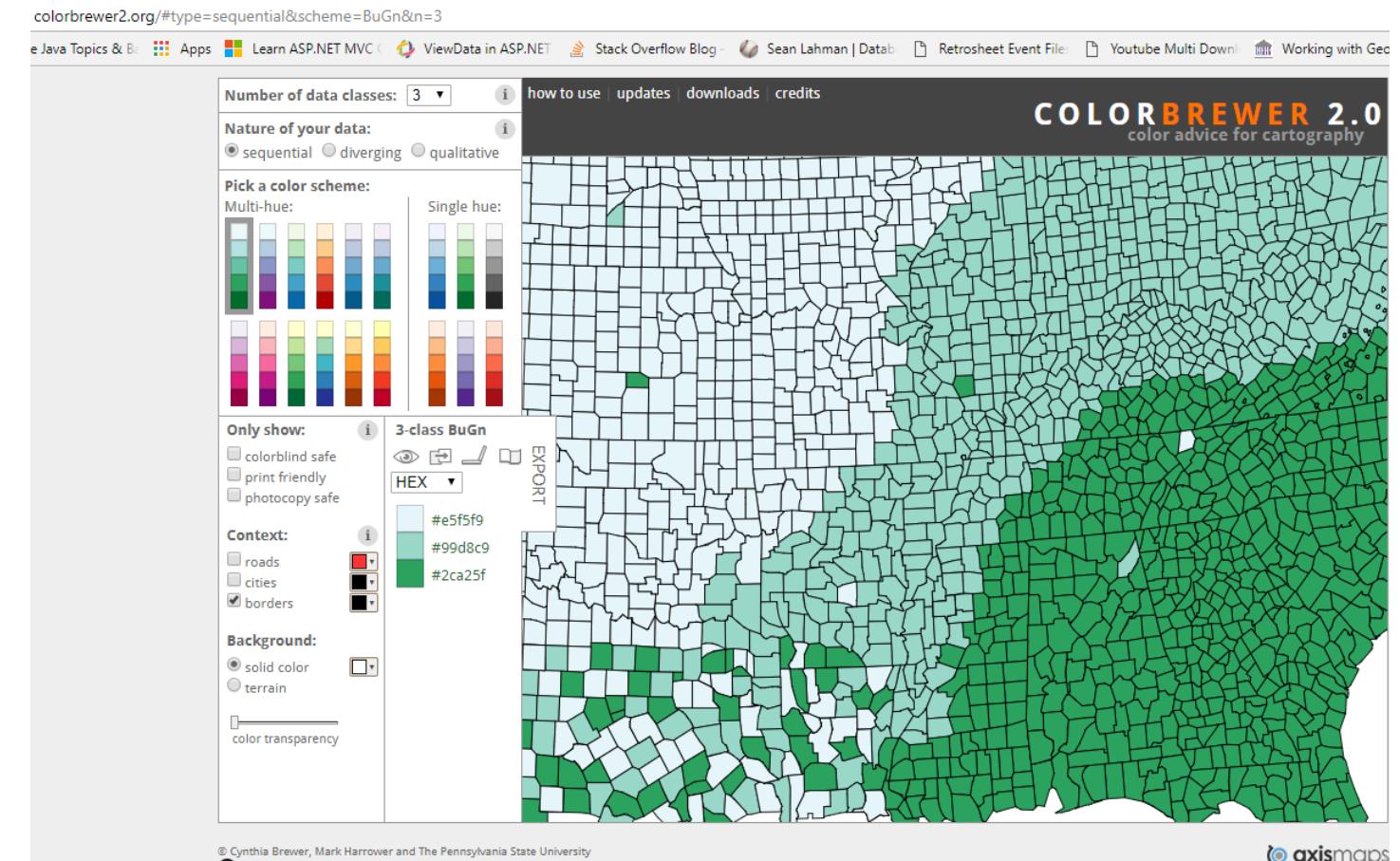


<https://color.adobe.com/create/color-wheel/>

© COPYRIGHT TPRI- SYED AWASE KHIRNI-2014-17 TABLEAU

Selecting an appropriate color palette

- Color brewer 2.0



<http://colorbrewer2.org/#type=sequential&scheme=BuGn&n=3>

SYED AWASE

CRITERIA FOR PICKING THE RIGHT CHART FOR THE STORY?

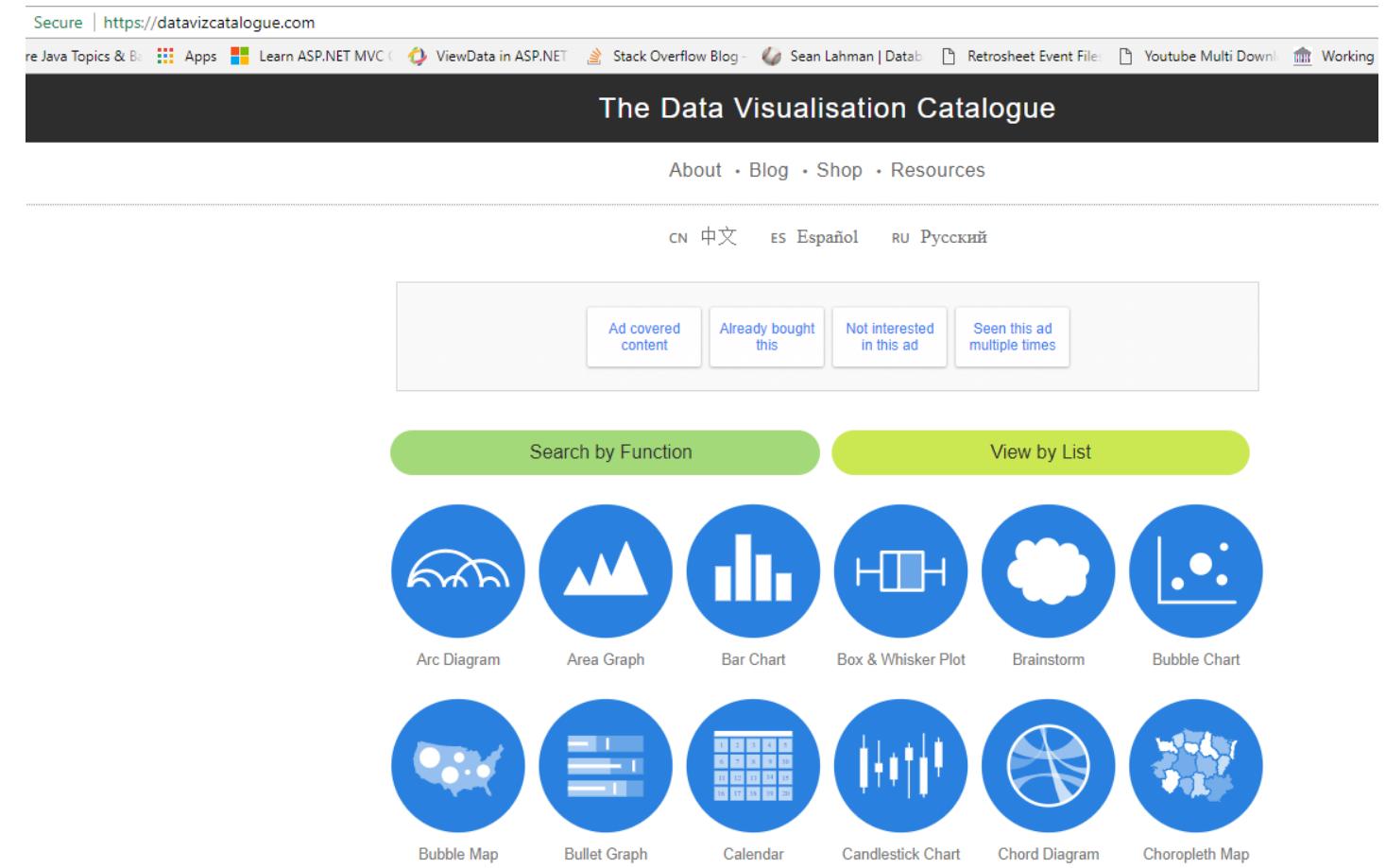
THE GRAPHIC CONTINUUM

- *Jon Schwabish and Severino Ribecca*

Please read terms of use for authorized access

Original Series

<https://datavizcatalogue.com/>



COMPARISONS

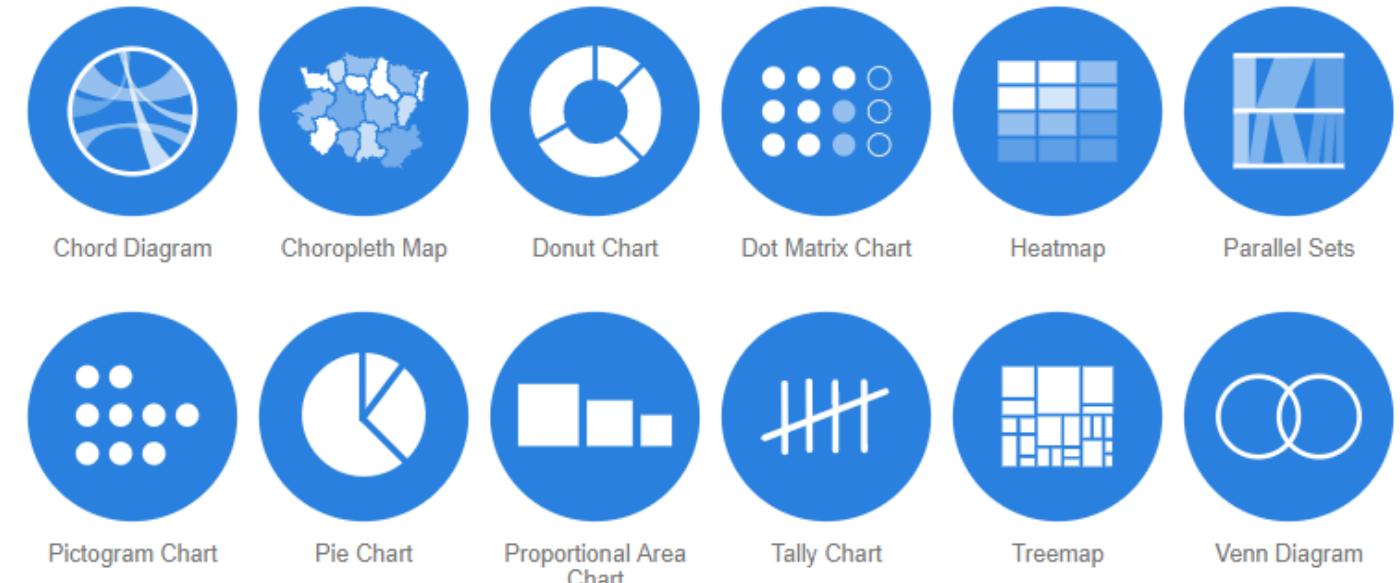
- with an axis
- Visualization methods that help show the differences or similarities between values



Source: <https://datavizcatalogue.com/search/comparisons.html>

COMPARISONS

- without an axis
- Visualization methods that help show the differences or similarities between values



Source: <https://datavizcatalogue.com/search/comparisons.html>

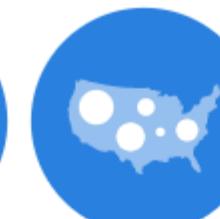
PROPORTIONS

- Visualization methods that use size or area to show differences or similarities between values or for parts to a whole

Proportions between values



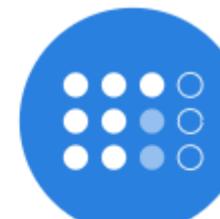
Bubble Chart



Bubble Map



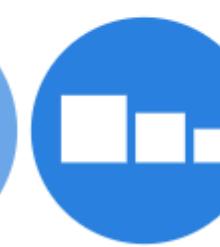
Circle Packing



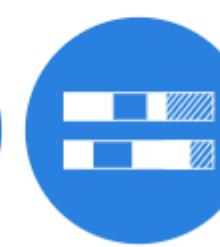
Dot Matrix Chart



Nightingale Rose Chart



Proportional Area Chart



Stacked Bar Graph



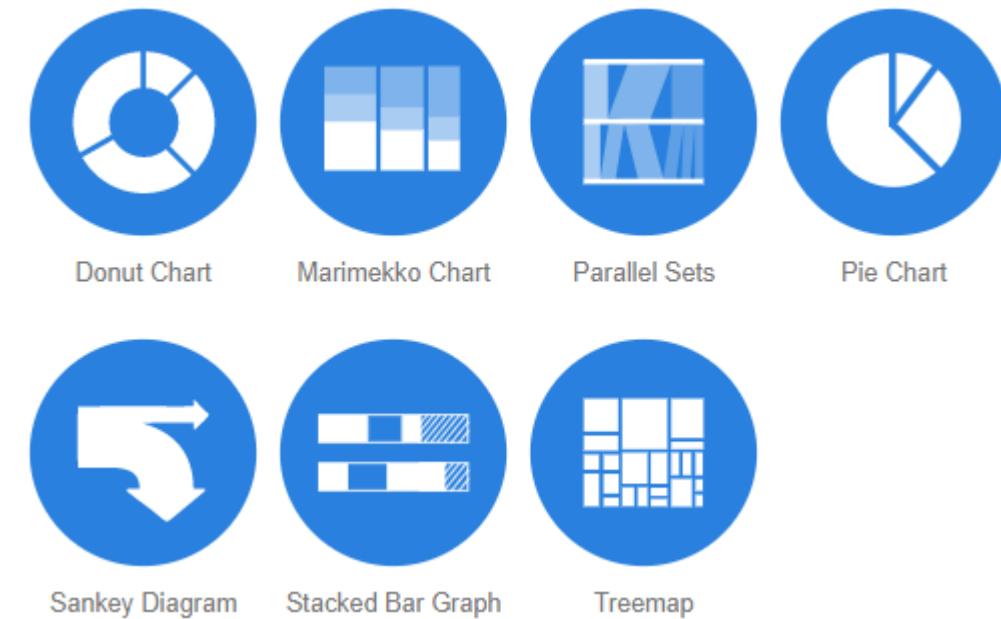
Word Cloud

Source: <https://datavizcatalogue.com/search/proportions.html>

PROPORTIONS

- Visualization methods that use size or area to show differences or similarities between values or for parts to a whole

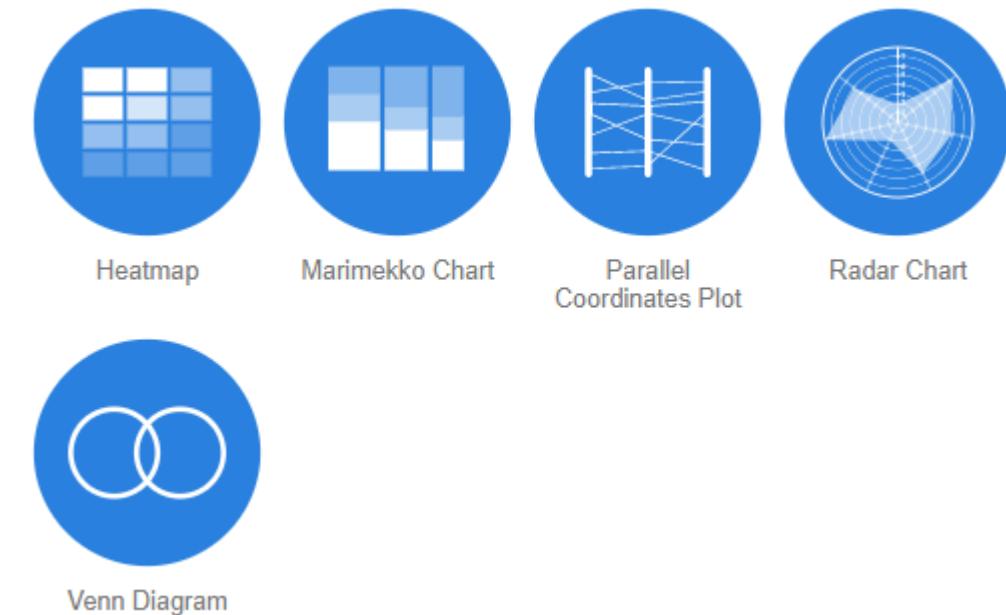
Proportions in parts-to-a-whole relationships



Source: <https://datavizcatalogue.com/search/proportions.html>

RELATIONSHIPS

- Visualization methods that show relationships and connections between the data or show connections between two or more variables.



Source: <https://datavizcatalogue.com/search/proportions.html>

RELATIONSHIPS

- Visualization methods that show relationships and connections between the data or show connections between two or more variables.

For showing connections



Arc Diagram



Brainstorm



Chord Diagram



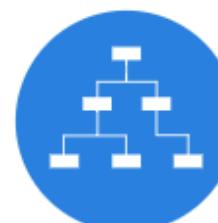
Connection Map



Network Diagram



Non-ribbon Chord Diagram



Tree Diagram

For finding correlations



Bubble Chart



Heatmap



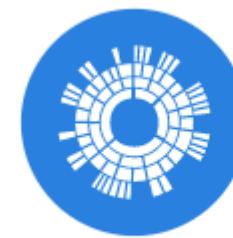
Scatterplot

HIERARCHY

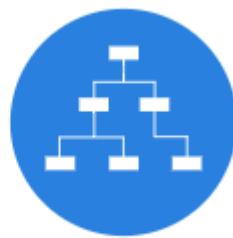
- Visualization methods that show how data or objects are ranked and ordered together in an organization or system.



Circle Packing



Sunburst Diagram



Tree Diagram



Treemap

Comparisons

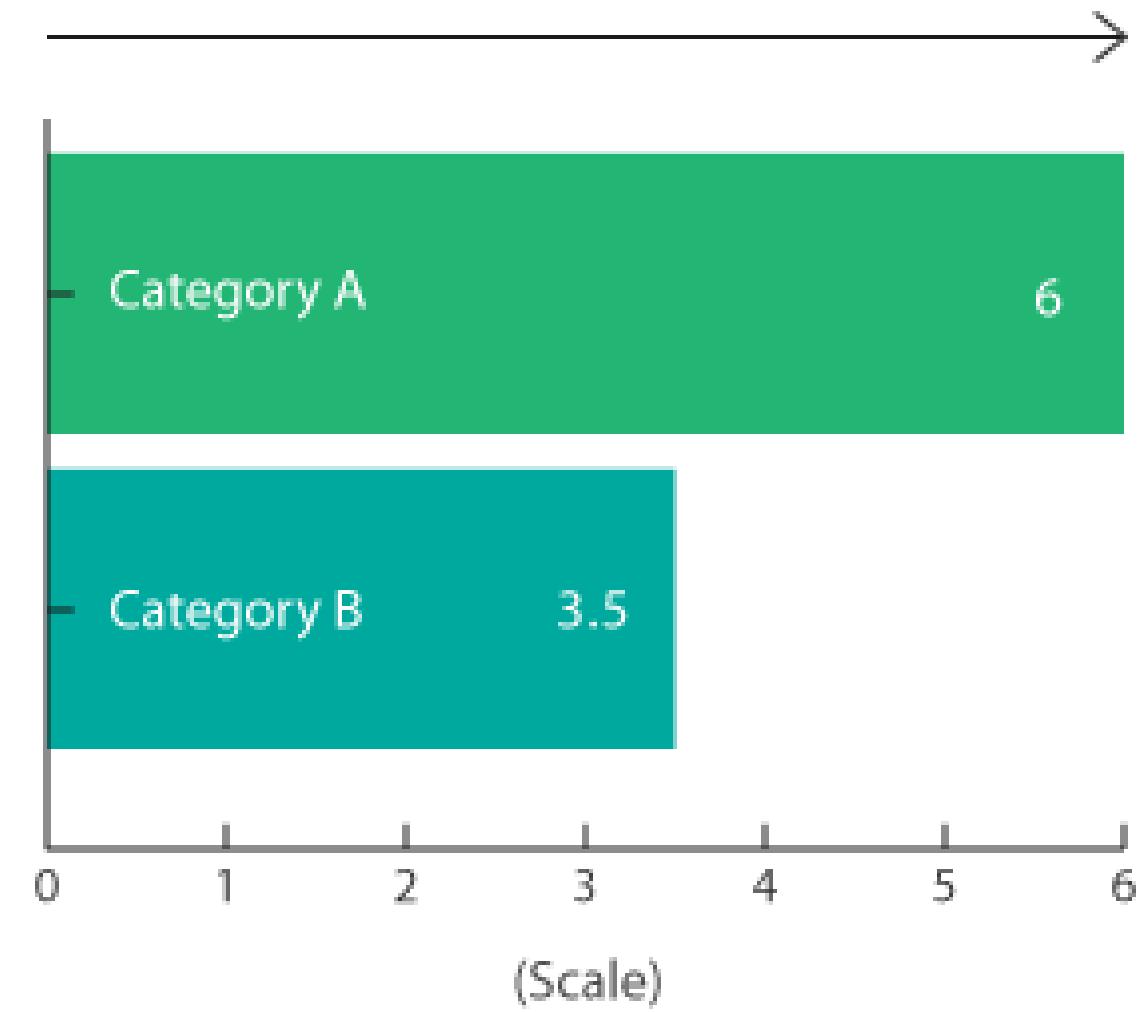
Pattern

Bar Chart

- can be either horizontal or vertical bars
- To show discrete, numerical comparisons across categories being compared
- They do not display continuous developments over an interval.
- **Challenge: labeling for huge data**

Original Series

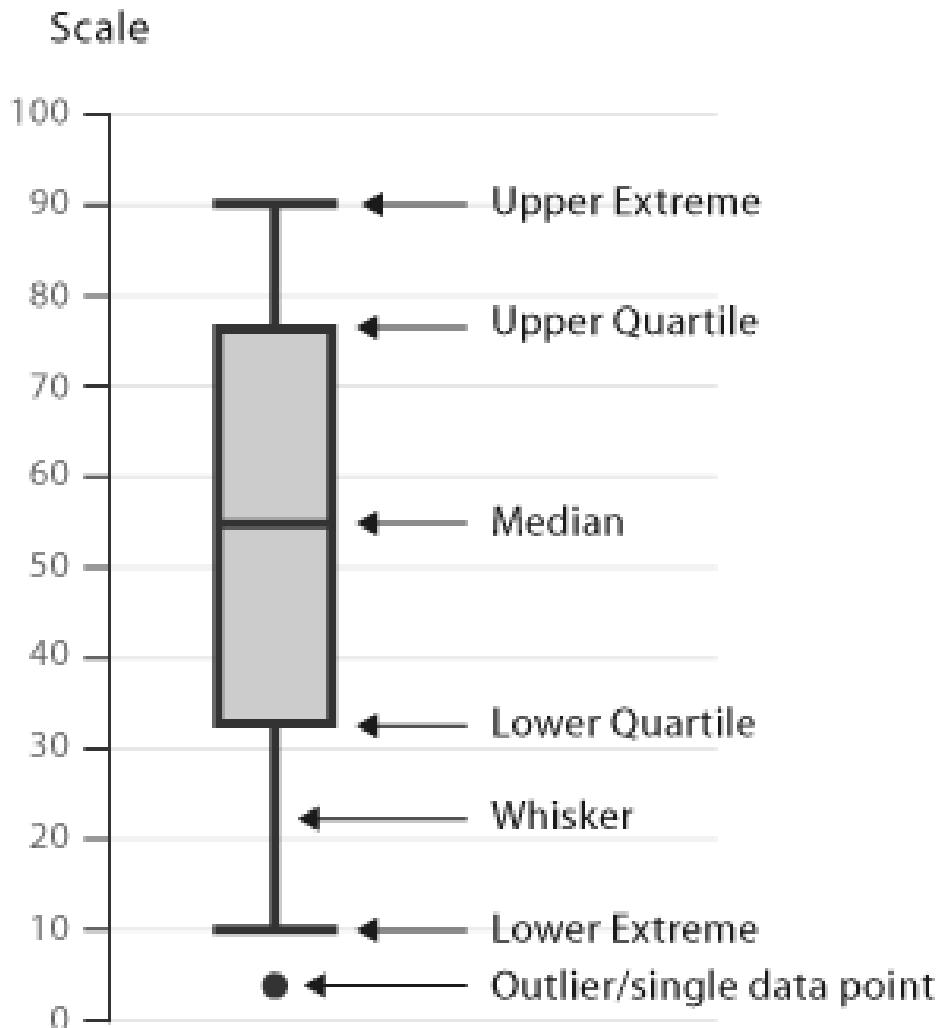
Bar length = value amount



DistributionRange

Box and Whisker Plot

- Used for depicting data through their quartiles.
- Whiskers indicate variability outside the **upper and lower quartiles**.
- Box plot can be drawn either vertically or horizontally.**
- Challenge:**



Distribution

Range

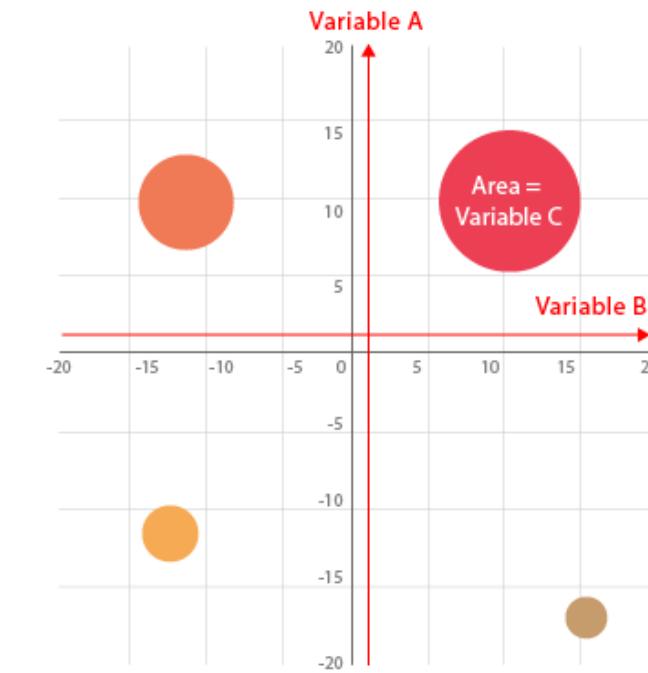
Data Over time

Proportions

Relationships

Bubble Chart

- A multi-variable graph which is a cross between a Scatter plot and Proportional Area Chart
- Used to compare and show the relationships between categorized circles, by using position and proportion.
- **Challenge: too many bubbles can make the chart hard to read.**



■ Label 1	■ Label 2
■ Label 3	■ Label 4

$$\text{Circle Area} = \pi \times \text{Radius}^2$$

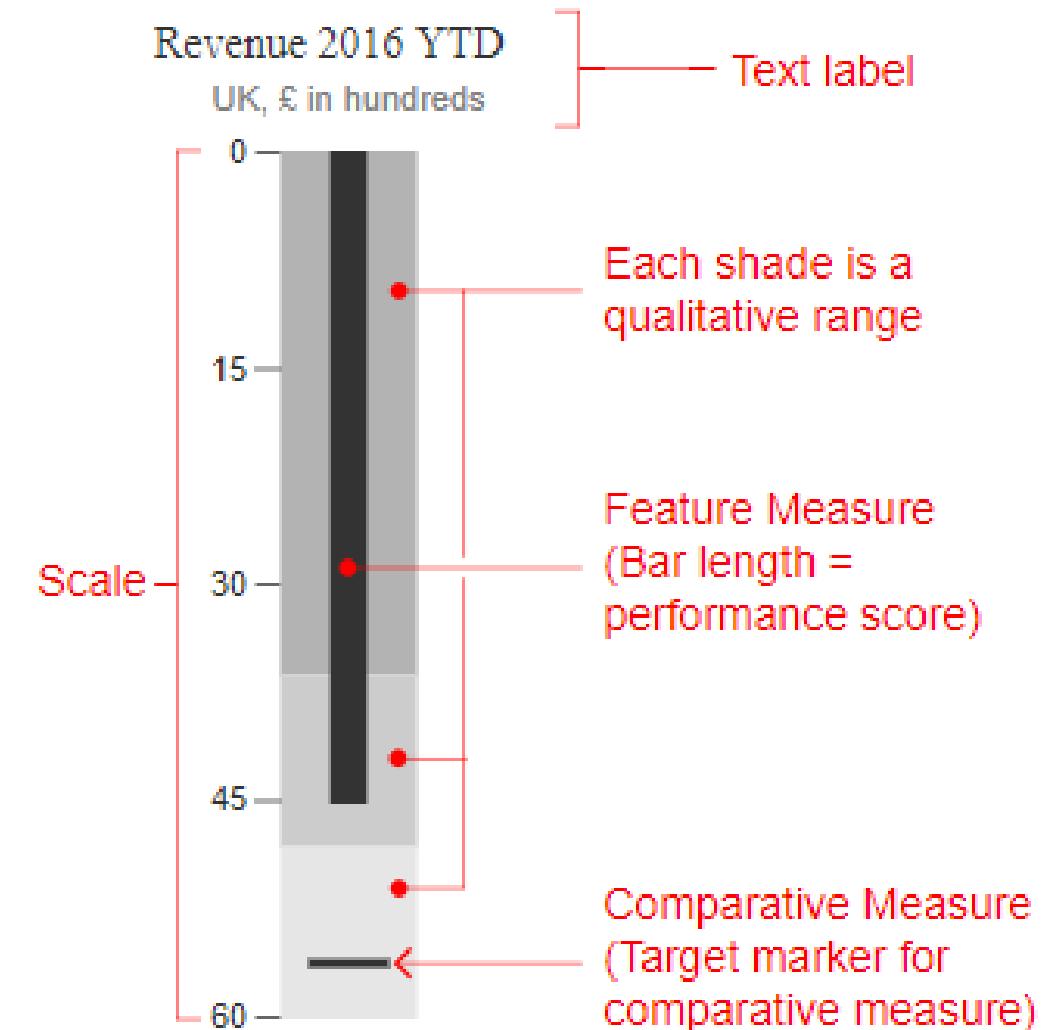
$$\text{Circle Diameter} = (\sqrt{\text{Area} / \pi}) \times 2$$

Comparisons

Range

Bullet Graphs

- used to display performance data.
- Feature Measure is encoded by a length of the main bar in the middle of the chart.
- Comparative Measure is perpendicular line marker to the orientation of the graph and is used as a target marker to compare with feature measure.
- **Challenge: sometimes hard to read.**



Distribution

Range

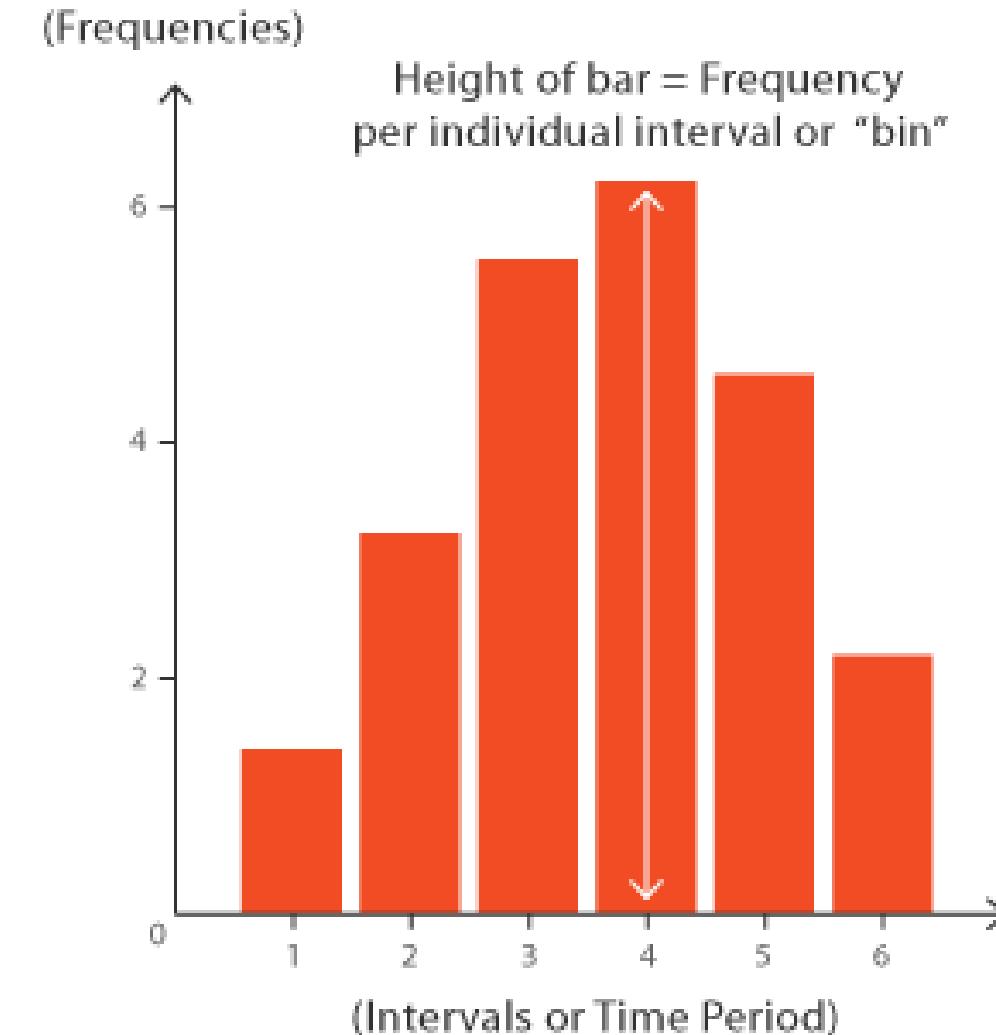
Data Over time

Proportions

Comparisons

Histograms

- used to visualize the distribution of data over a continuous interval or certain time period.
- Tabulated frequency at each interval/bin.
- Give an estimate as to where values are concentrated, what the extremes are and where there are any gaps or unusual values.
- **Challenge: sometimes hard to read.**



Distribution

Range

Data Over time

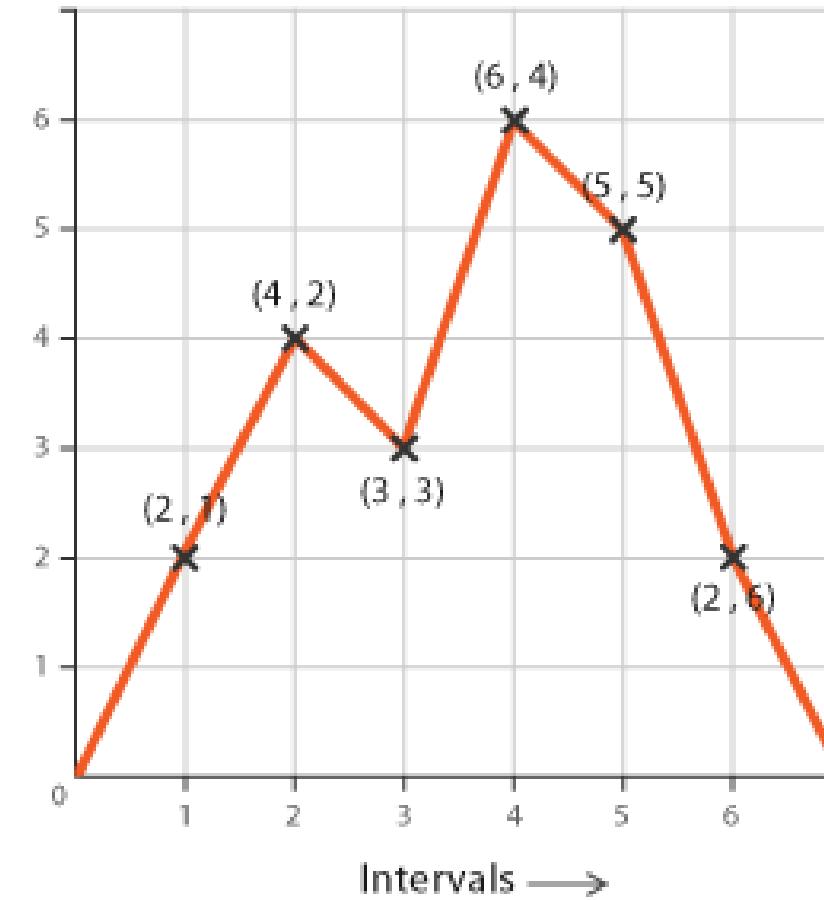
Proportions

Relationships

Line Graph

- used to display quantitative values over a continuous interval or time period.
- show trends and analyse how the data has changed over time.
- Uses Cartesian coordinate grid.
- **Challenge:**

Value Scale



Comparisons

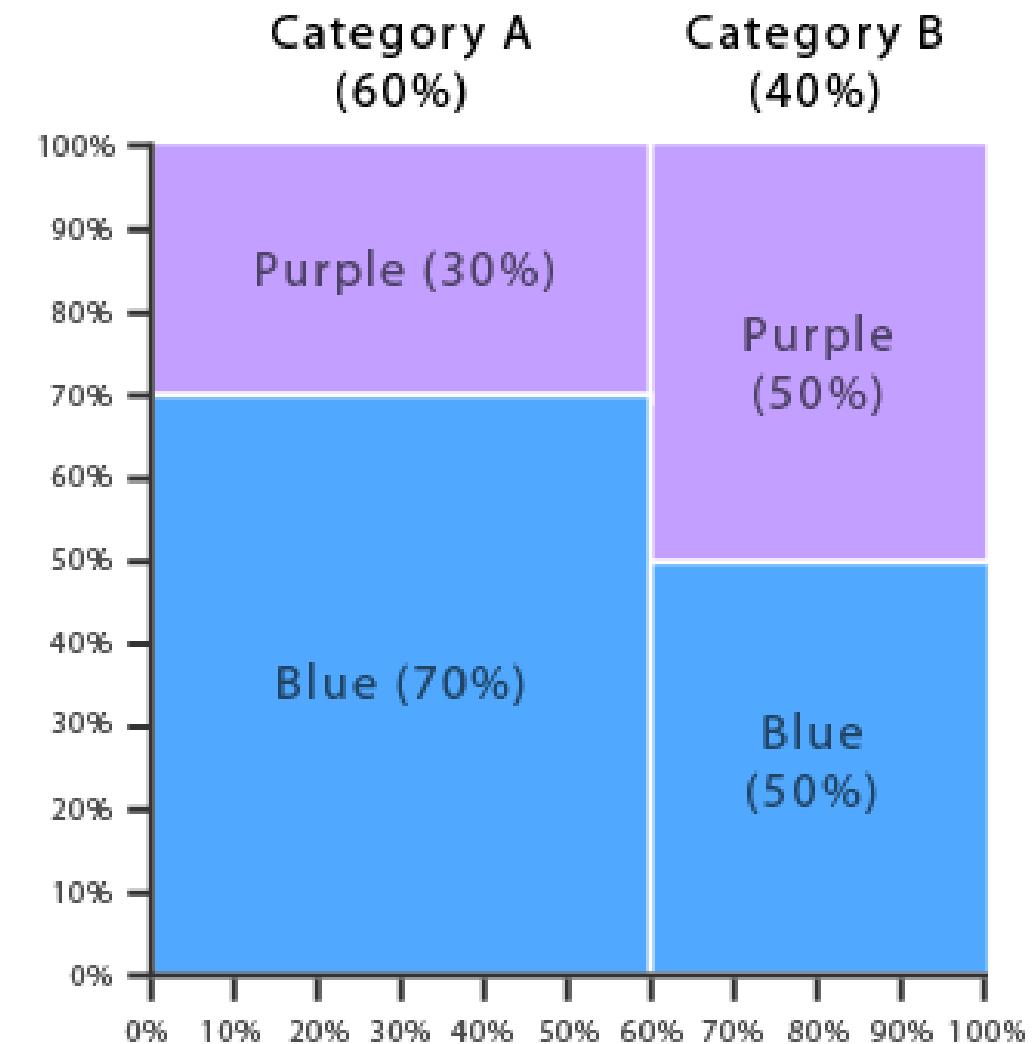
Part-to-a-whole

Proportions

Relationships

MOSAIC PLOT

- used to visualize categorical data over a pair of variables.
- Both axes are variable with percentage scale, that determines both the width and height of each segment.
- Easy to detect relationships between categories and their sub-categories.
- **Challenge: sometimes hard to read, when there are many segments.**



Comparisons

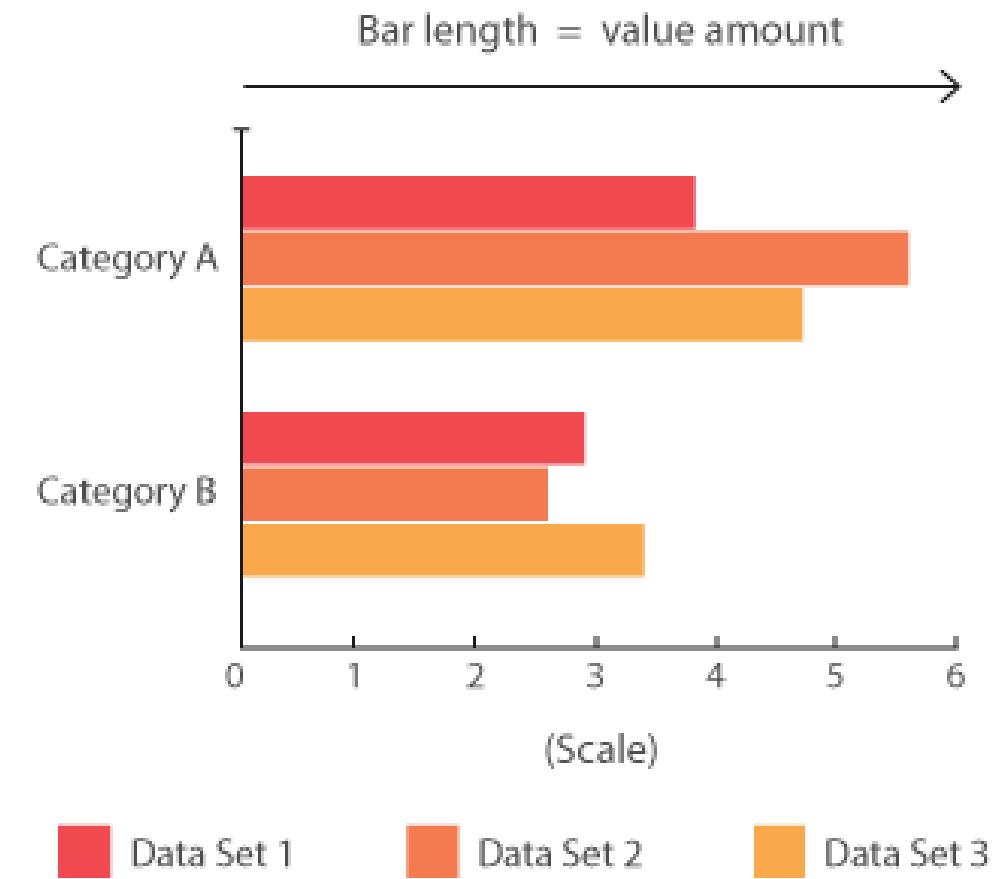
Distribution

Patterns

Relationships

GROUPED BAR CHART

- used when two or more data series are plotted side-by-side and grouped together under categories, all on the same axis.
- To show, discrete, numerical comparisons amongst categories.
- **Challenge: harder to read the more bars we have in one group.**



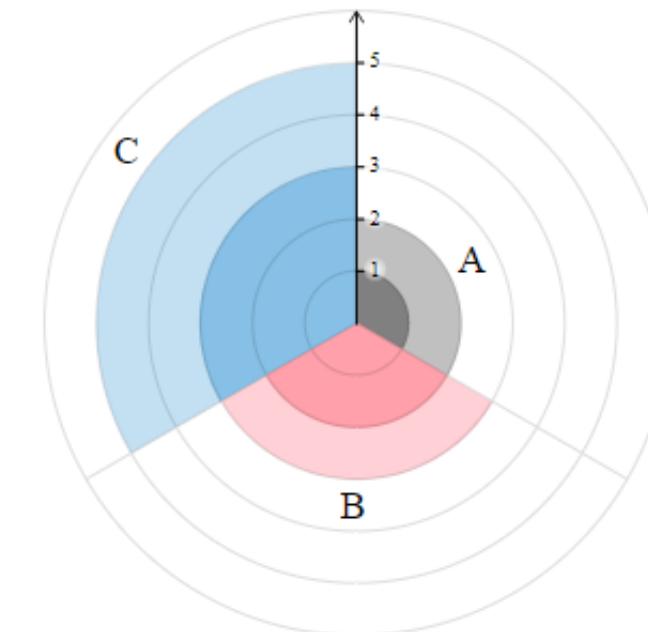
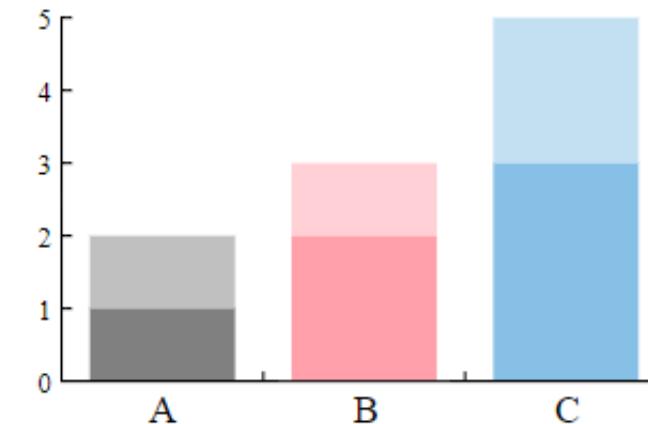
[Comparisons](#)[Data over time](#)[Proportions](#)

Please read terms of use for authorized access

Original Series

POLAR AREA DIAGRAM

- COXCOMB CHART/
NIGHTINGALE ROSE CHART
- drawn on polar coordinate grid. Each category or interval in the data is divided into equal segments on this radial chart.
- **Challenge: The outer segments are given more emphasis due to their larger area size, which disproportionately represents increases in value.**



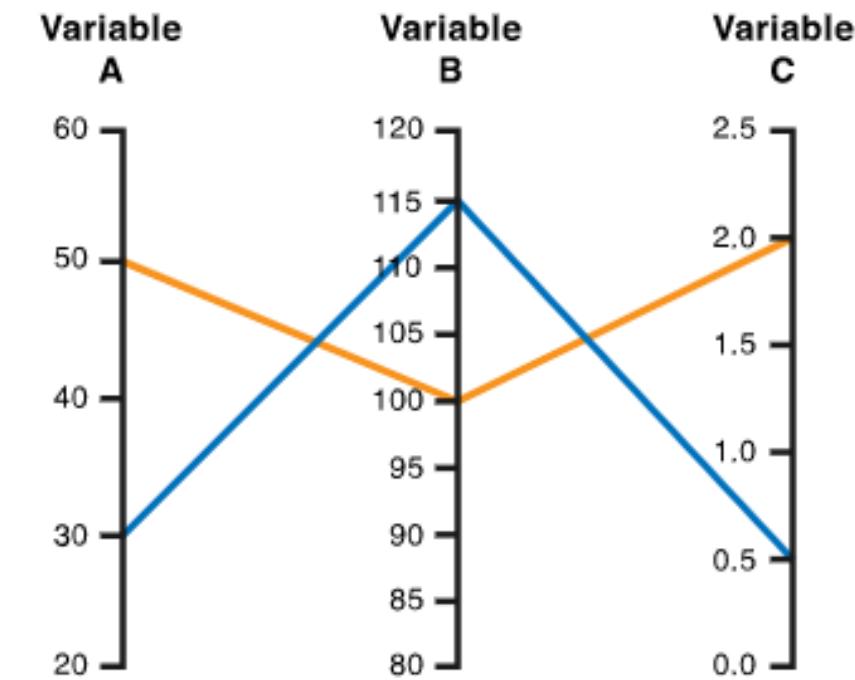
Comparisons

Patterns

Relationships

PARALLEL COORDINATES PLOT

- used for plotting multivariate, numerical data.
- Ideal for comparing many variables together and seeing the relationships between them.
- Each variable is given its own axis and all the axes are placed in parallel to each other.
- **Challenge: can become over-cluttered/ dense**



Data			
	Variable A	Variable B	Variable C
Item 1	50	100	2.0
Item 2	30	115	0.5

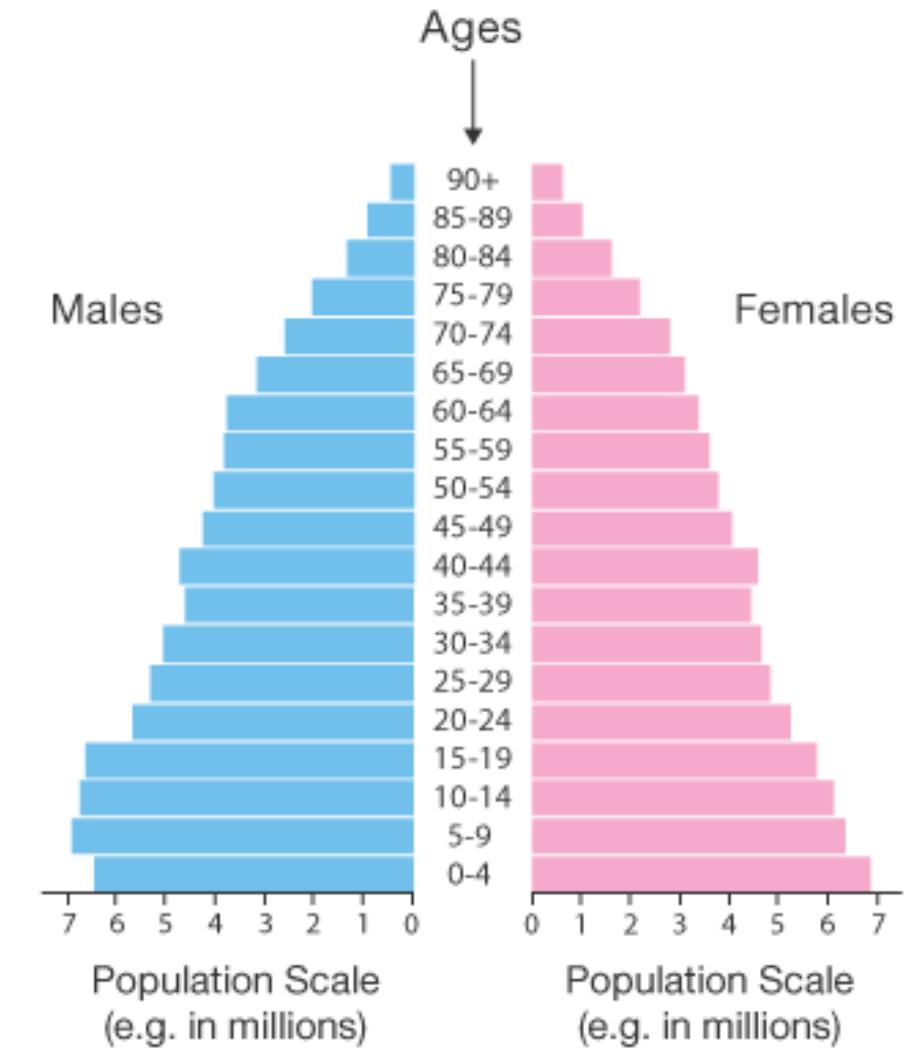
Comparisons

Patterns

Distributions

POPULATION PYRAMID

- they are a pair of back-to-back histograms that displays the distribution of a population in all age groups and in both sexes.
- For detecting changes or difference in population patterns.
- Used to speculate a population's future development.
- **Challenge:**



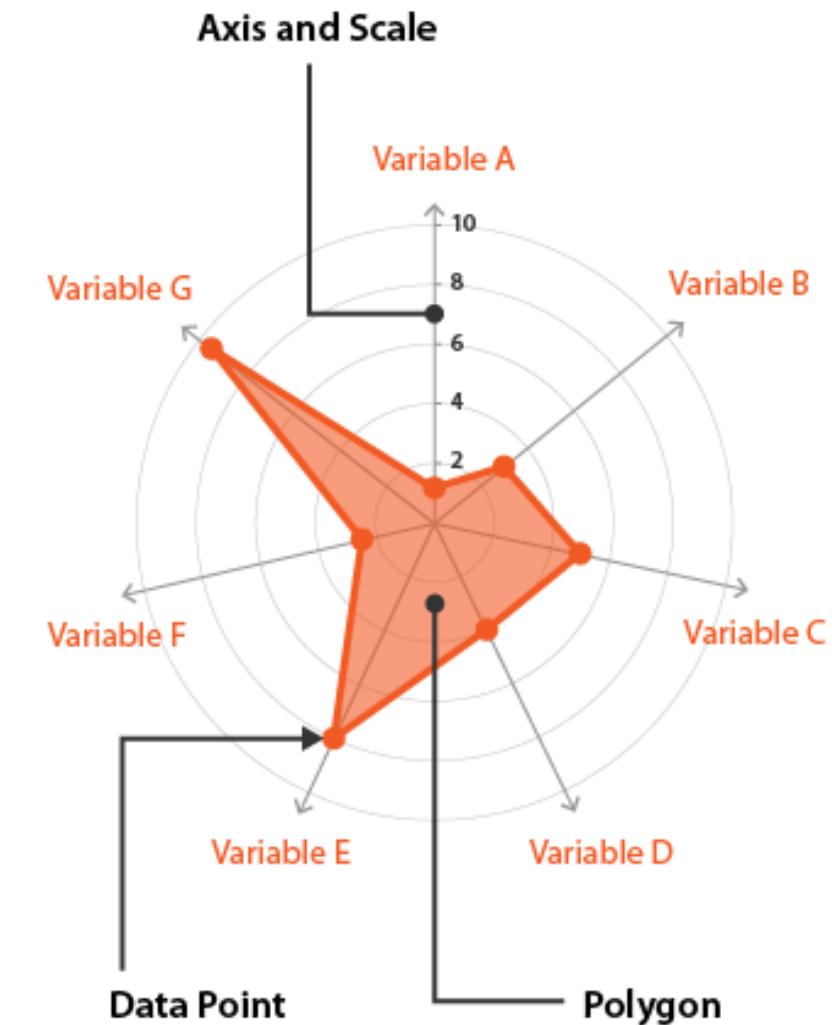
Comparisons

Patterns

Relationships

RADAR CHART

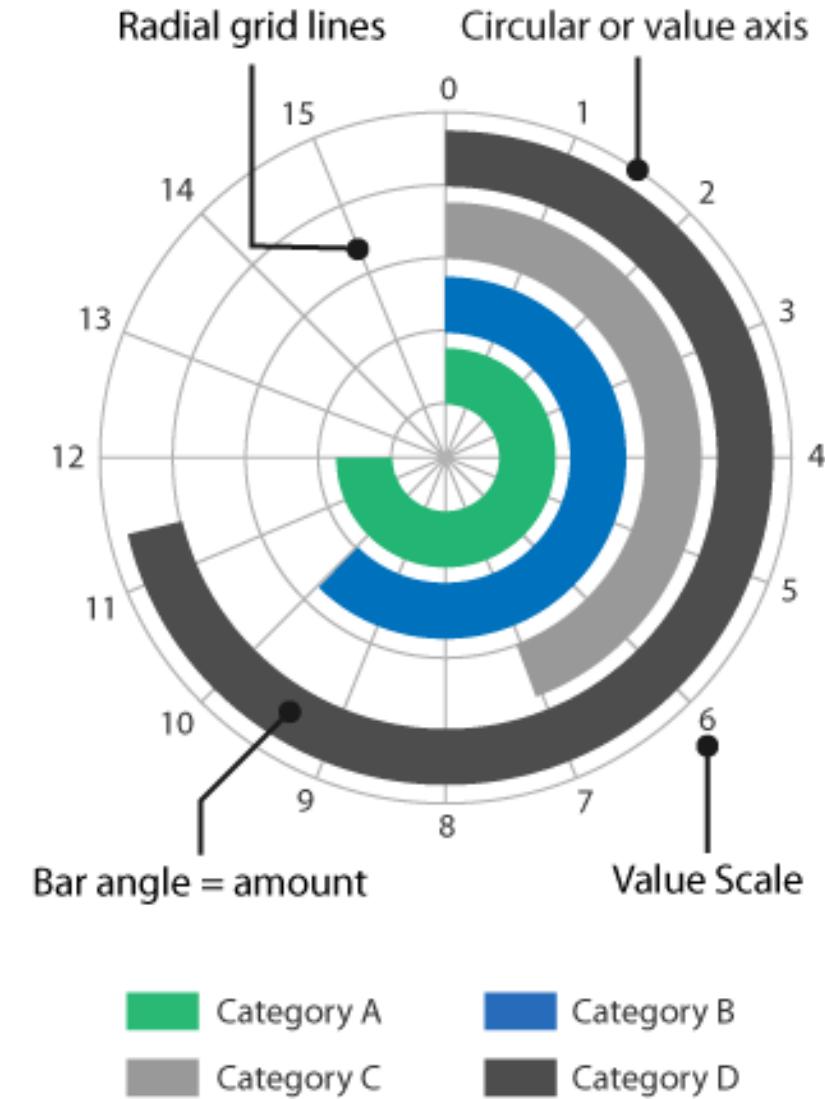
- A way of comparing multiple quantitative variables.
- Useful for visualizing which variables are scoring high or low within a dataset.
- **Challenge: not so good for comparing values across each variable.**



Comparisons

RADIAL BAR CHART

- A bar chart plotted on a polar coordinate system, rather than a cartesian coordinate.
- Used for aesthetic reasons.
- **Challenge:**



Comparisons

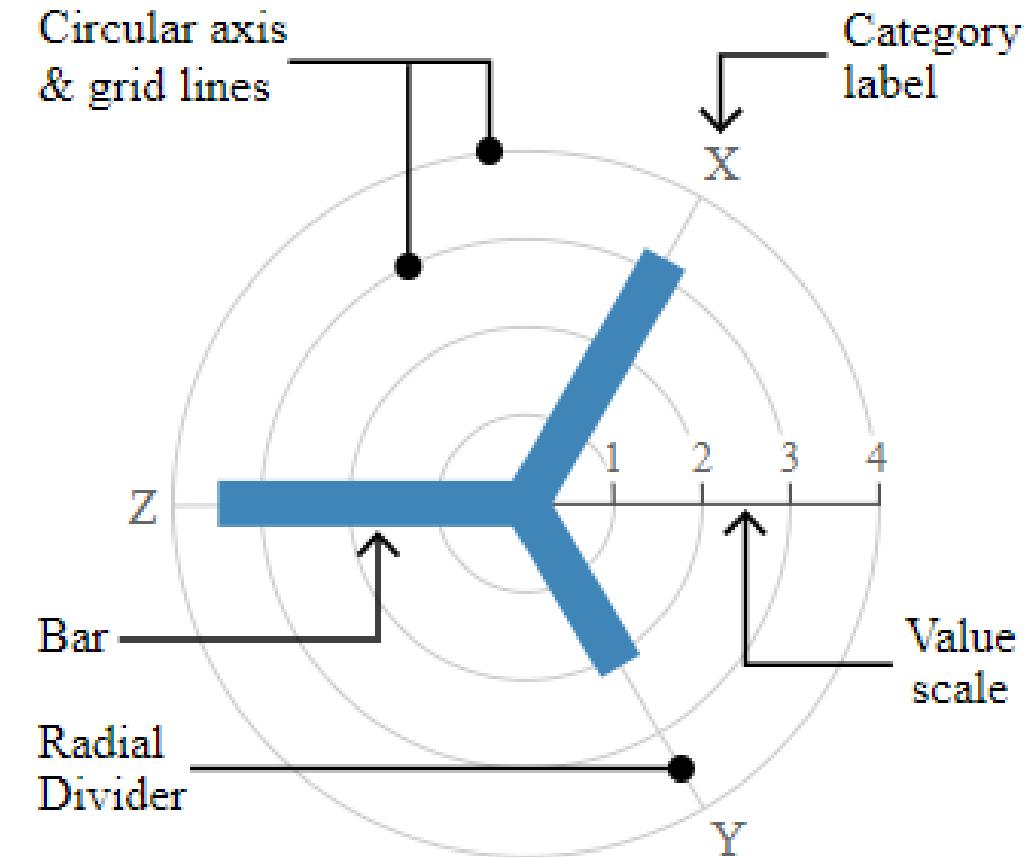
RADIAL COLUMN CHART

- uses a grid of concentric circles to plot bars on them.
Each circle on the graph represents a value on a scale.
- Radial dividers are used for each category or interval.

•Challenge:

Please read terms of use for authorized access

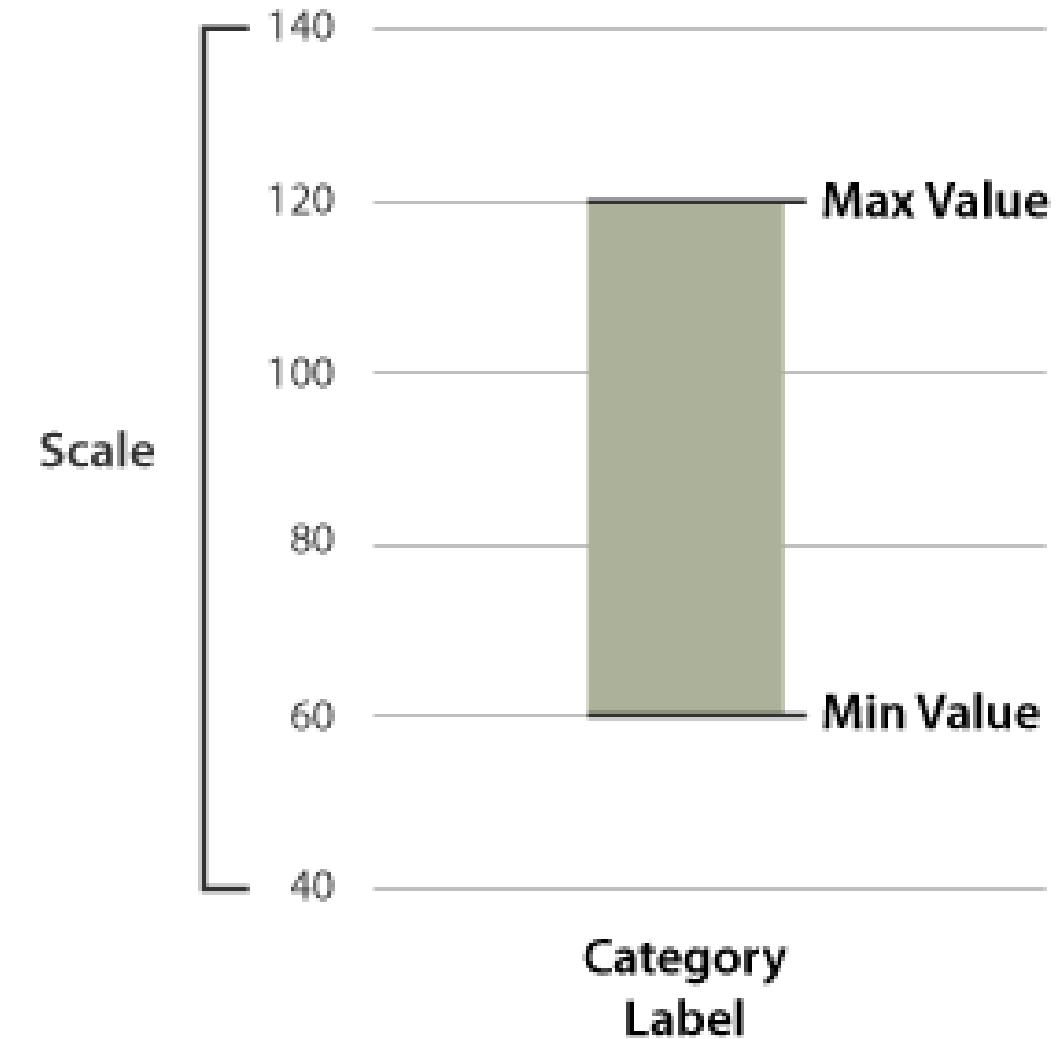
Original Series



[Comparisons](#)[Ranges](#)

SPAN CHART

- Range Bar/Column Graph/Floating Bar Graph.
- Used to display dataset ranges between a minimum value and a maximum value.
- Ideal for comparing ranges/categorized ranges.
- **Challenge: focus is on the extreme values and give no information on the values in between the min and max value or on averages or data distribution.**



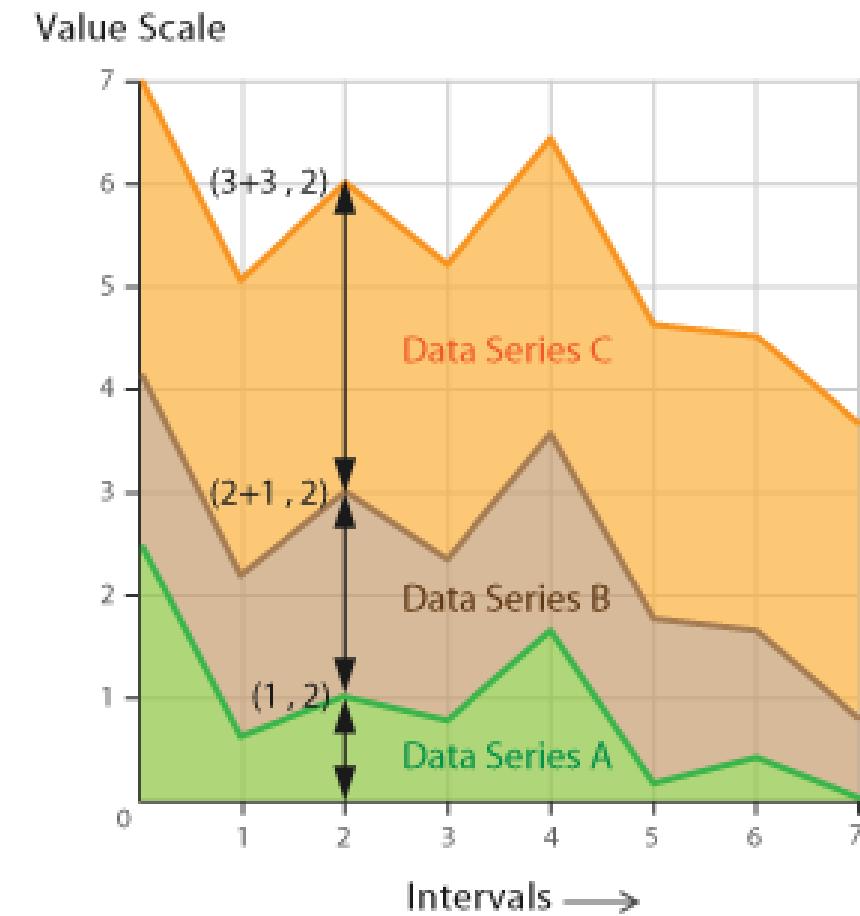
Comparisons Data over time Patterns

STACKED AREA GRAPH

- used to represent the total of all the data plotted.
- Used for comparing multiple variables changing over an interval.
- **Challenge: they do not work for negative values.**

Please read terms of use for authorized access

Original Series



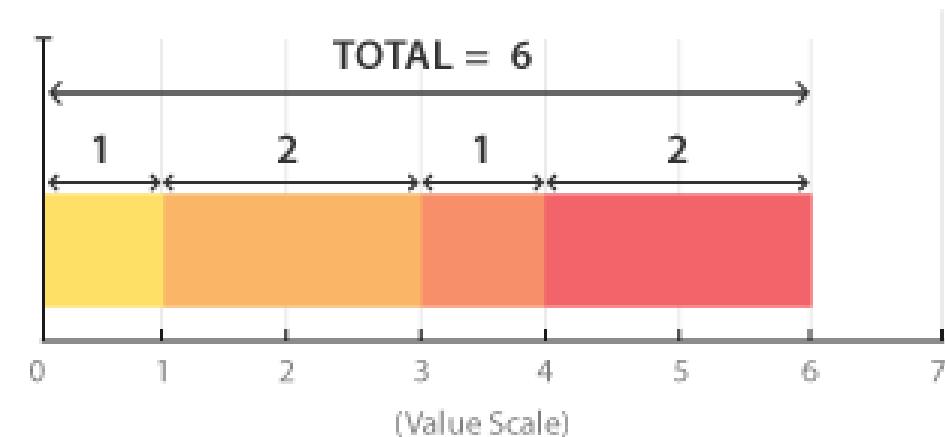
Comparisons

Proportions

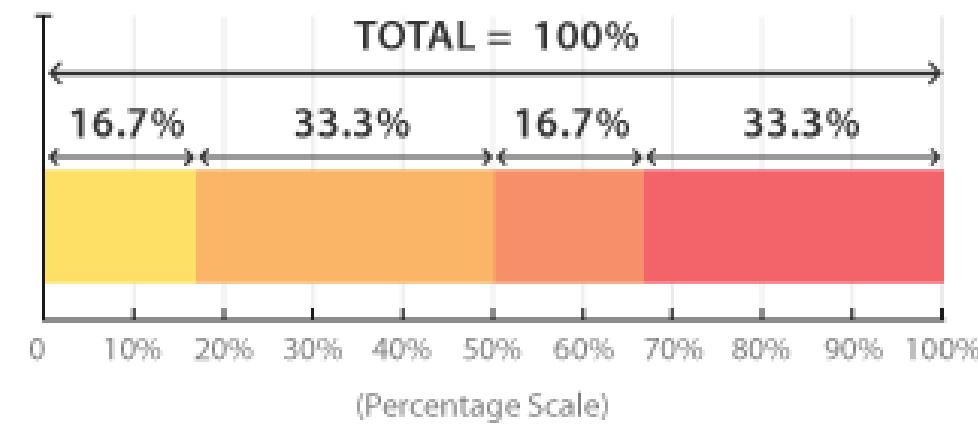
STACKED BAR GRAPH

- They stack the bars of multiple datasets on top of each other.
- Used to show how a larger category is divided into smaller categories
- Used to show the relationship of each part has on the **total amount**.
- **Challenge: harder to read when more segments each bar has. Comparison also becomes difficult.**

Simple



100%

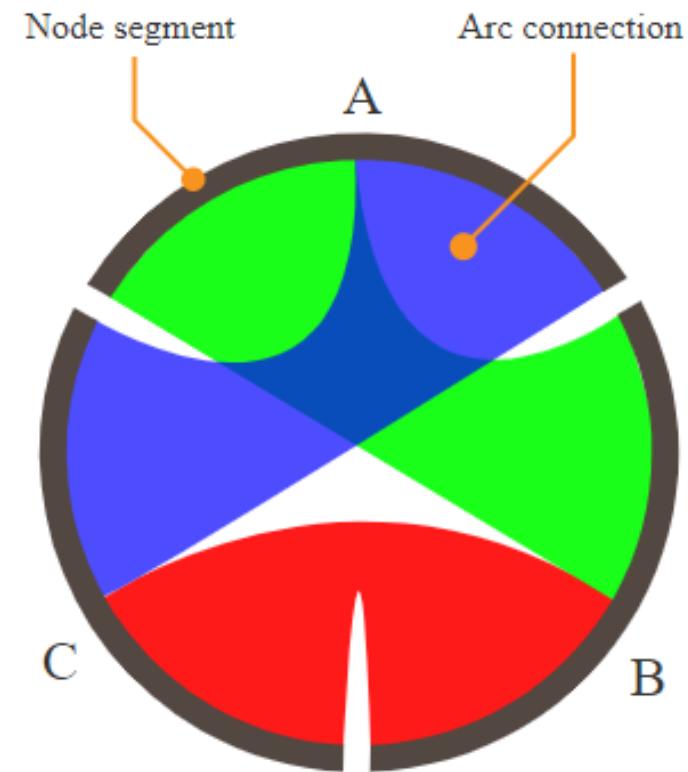


Comparisons

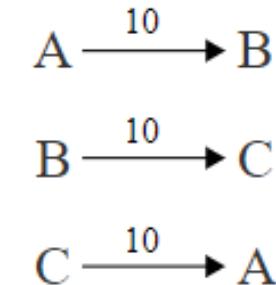
Relationships

CHORD DIAGRAM

- used to visualize the inter-relationships between entities.
- The connections between entities are used to display that they share something in common.
- Ideal for comparing the similarities within a dataset or between different groups of data
- **Challenge: over cluttering**



	A	B	C
A		10	10
B	10		10
C	10	10	



Comparisons

Location

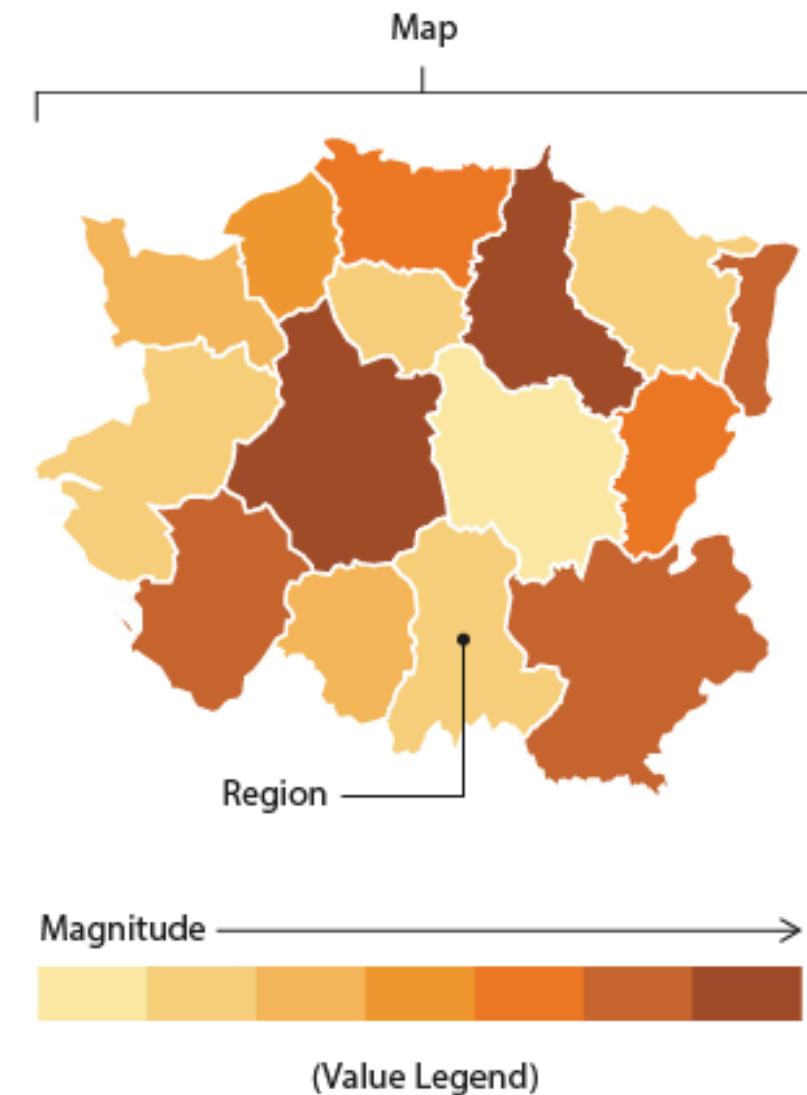
Patterns

CHOROPLETH MAP

- used to display geographical areas or regions shaded in relation to a specific data variable.
- Visualizes values over a geographic region, which can show variation or patterns across the displayed location.
- The data variable uses colour progression to represent itself in each region of the map
- **Challenge: only abstract density of occurrence over a geographic region**

Please read terms of use for authorized access

Original Series



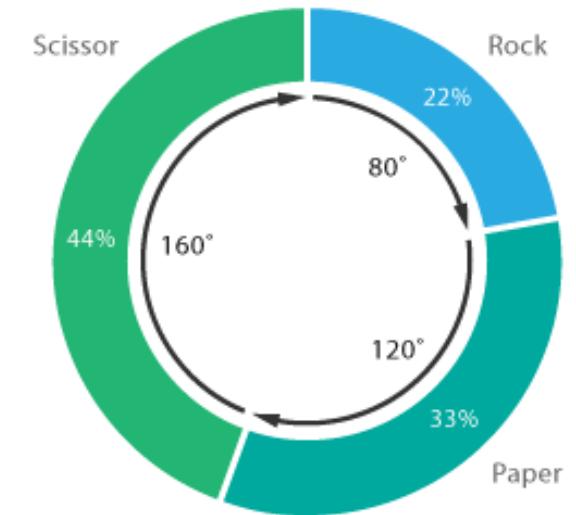
Comparisons

Part-to-whole

Proportions

DONUT CHART

- Used to chart the proportions
- Challenge:**



Data			
Rock	Paper	Scissor	TOTAL
2	3	4	9
To calculate percentages			
$2/9 = 22\%$	$3/9 = 33\%$	$4/9 = 44\%$	100%
Degrees for each "donut slice"			
$(2/9) \times 360 = 80^\circ$	$(3/9) \times 360 = 120^\circ$	$(4/9) \times 360 = 160^\circ$	360°

Comparisons

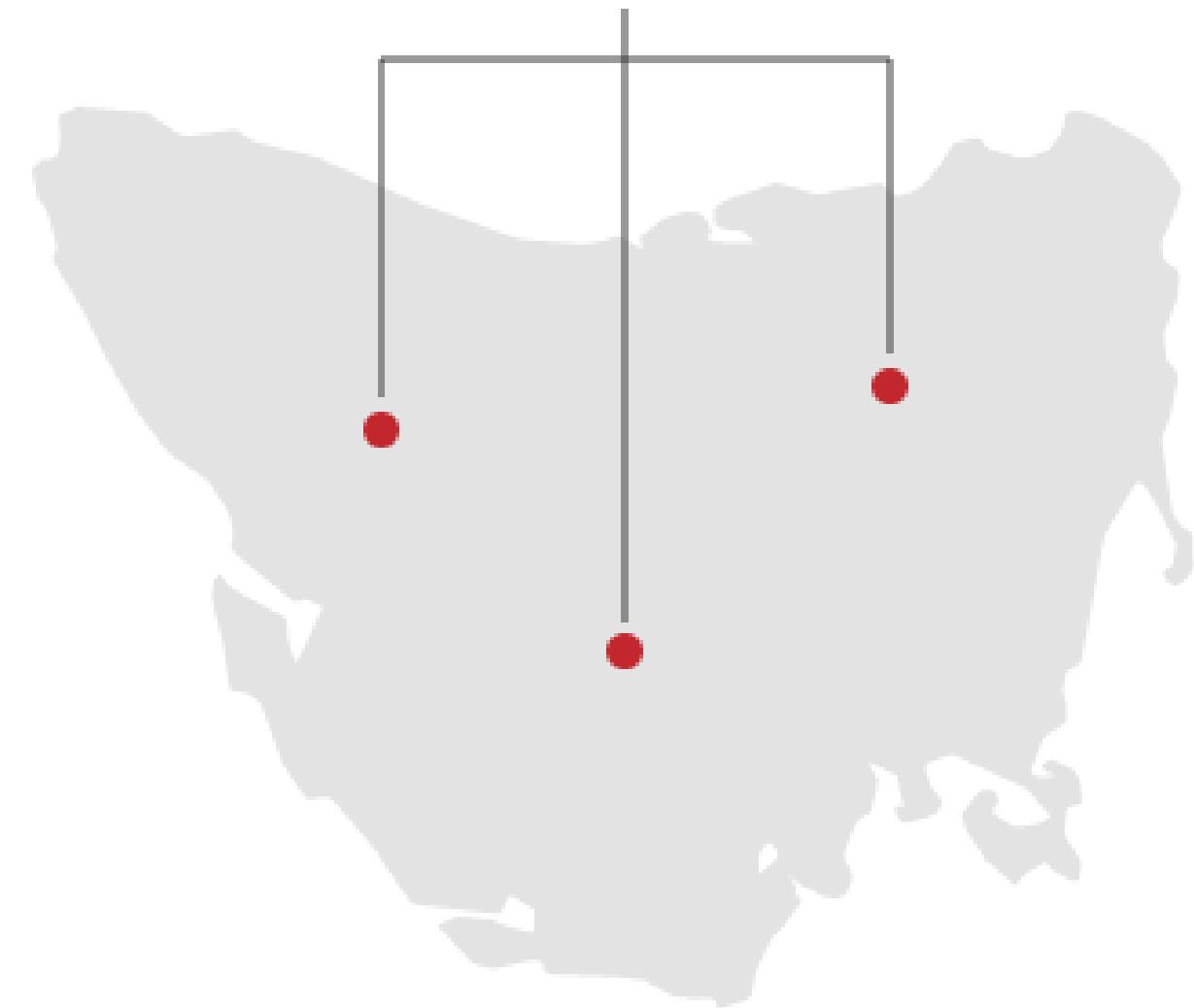
Location

Patterns

DOT DENSITY MAP

- A way of detecting spatial patterns or the distribution of data over a geographical region, by placing equal sized points over a geographical region.
 - Ideal for visualizing data distributed over a geographic region and can reveal patterns when the points cluster on the map.
- Challenge:**

Dots

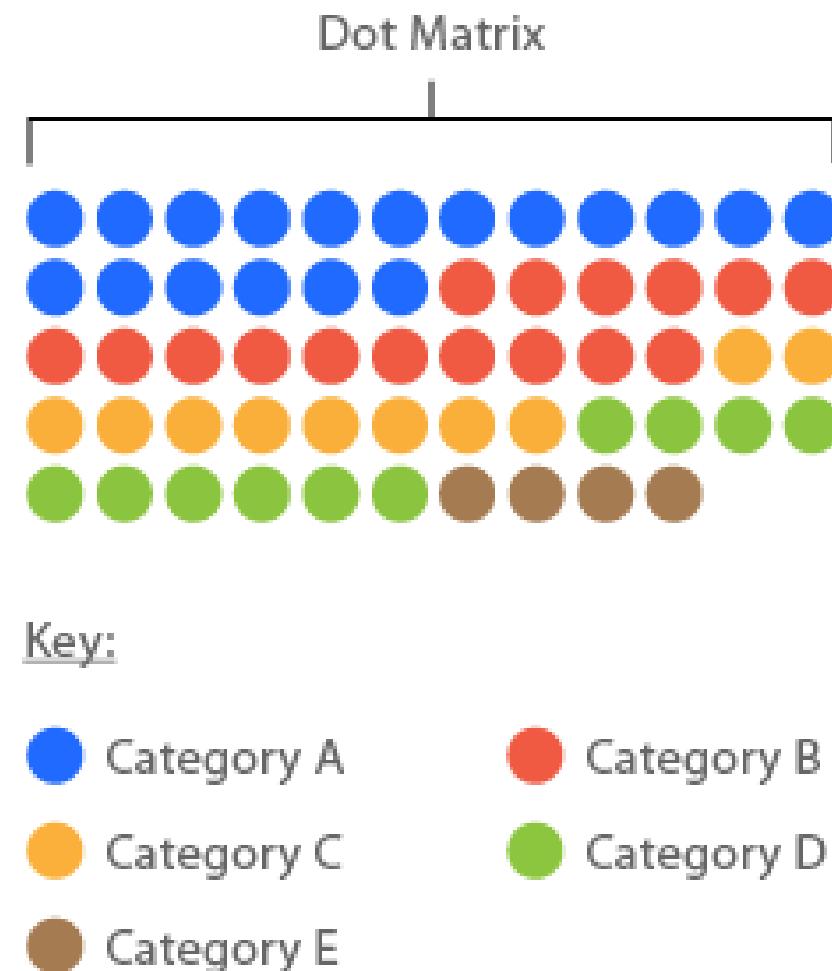


[Comparisons](#)[Patterns](#)[Distribution](#)[Proportions](#)

DOT MATRIX CHART

- Used to display discrete data in units of dots, each colored to represent a particular category and grouped together in a matrix.
 - Provides a quick overview of the distribution and proportions of each category in a dataset and to compare distribution and proportions across other datasets.
- Challenge: to read when only one variable/category is used in the dataset.**

Group Name



Comparisons

Patterns

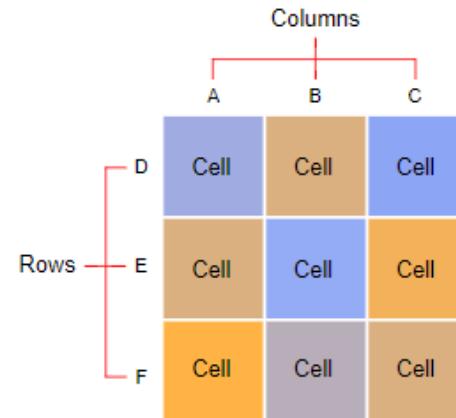
Data over time

Relationships

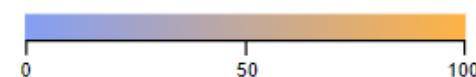
HEAT MAP

- Visualizes data through variations in colouring.
- Useful for cross-examining multivariate data
- Used for showing variance across multiple variables, revealing any patterns, displaying whether any variables are similar to each other.
- Challenge:

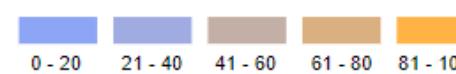
Heatmap using numerical data:



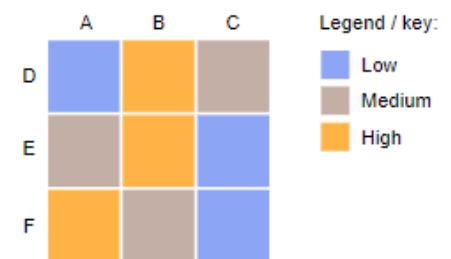
Value scale for determining cell colouring:



Alternative value scale broken into ranges:



Heatmap using categorical data:



Comparisons

Proportions

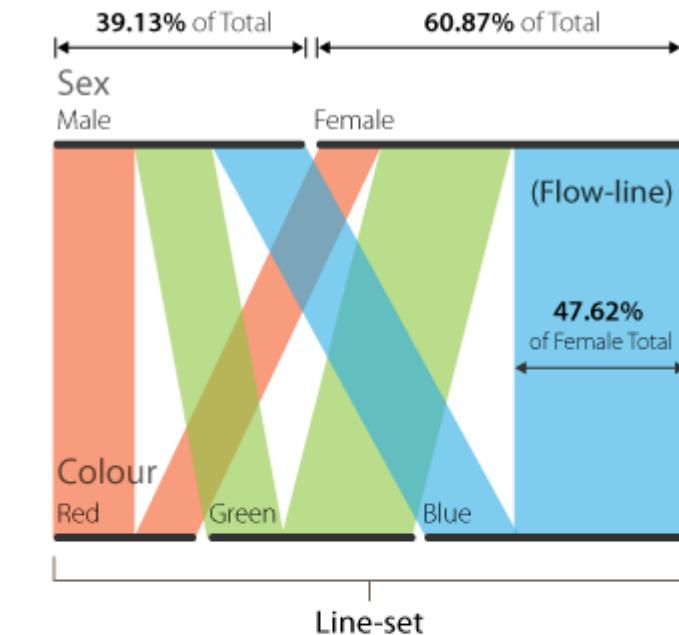
Flow

Distribution

Processes and Methods

PARALLEL SET CHARTS

- Parallel sets don't use arrows and they divide the flow-path at each displayed line-set.
- Each line-set corresponds to a dimension/dataset, which its values/categories are represented in each line divide in that line-set.



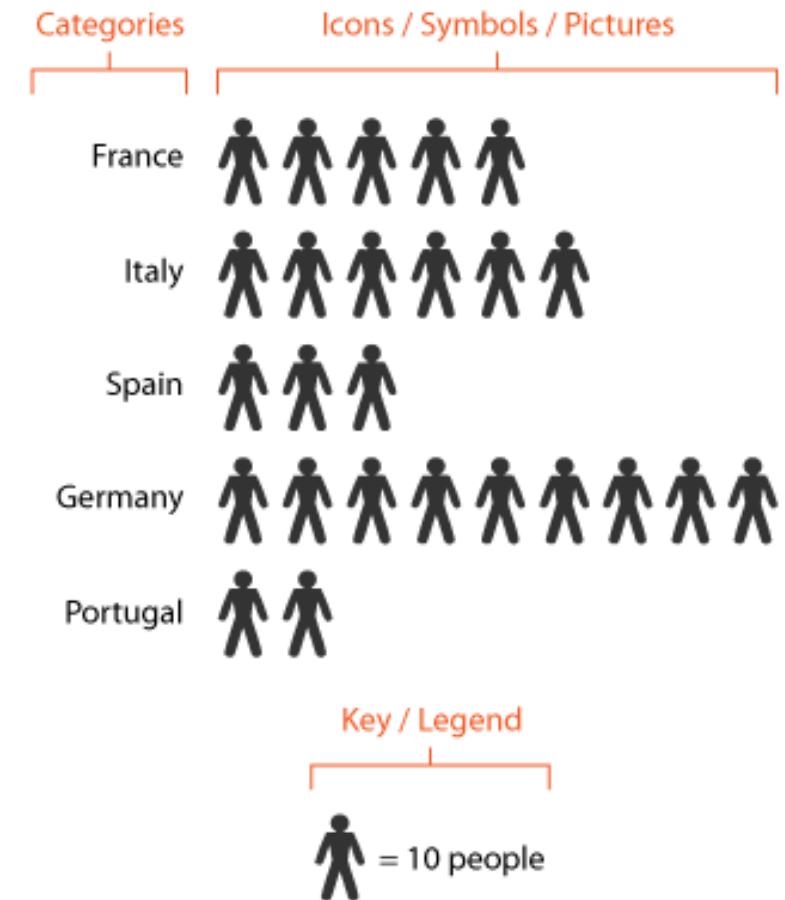
Sex	Colour	Count	% of Sex TOTAL
Male	Red	35	32.41
	Green	33	30.56
	Blue	40	37.04
Female	Red	28	16.67
	Green	60	35.71
	Blue	80	47.62

•Challenge:

[Comparisons](#)[Distribution](#)

PICTOGRAM CHART

- They use icons to give a more engaging overall view of small set of discrete data.
- The icons represent the data's subject or category
- **Challenge: difficult to visualize large data sets.**



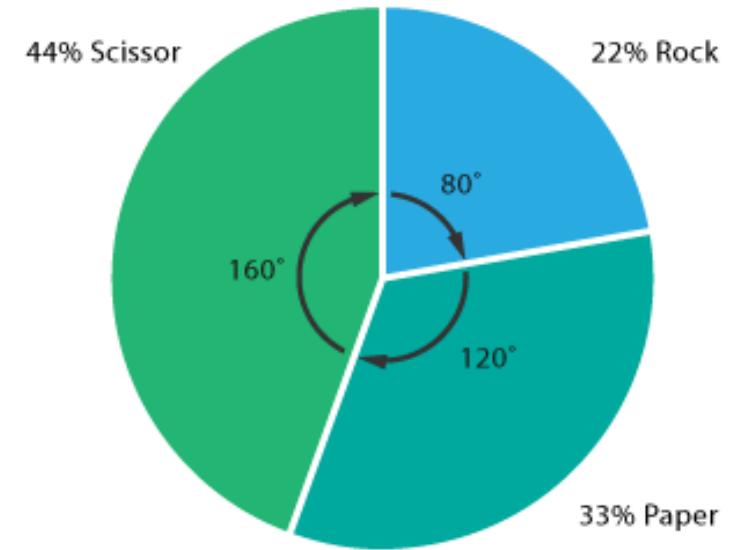
Comparisons

Part-to-a-whole

Proportions

PIE CHART

- Used to represent proportional distribution of data.
- Challenge:**



Data			
Rock	Paper	Scissor	TOTAL
2	3	4	9
To calculate percentages			
$2/9=22\%$	$3/9=33\%$	$4/9=44\%$	100%
Degrees for each "pie slice"			
$(2/9) \times 360 = 80^\circ$	$(3/9) \times 360 = 120^\circ$	$(4/9) \times 360 = 160^\circ$	360°

Comparisons

Proportions

PROPORTIONAL AREA CHART

- Used for comparing values and showing proportions to give a quick, overall view of the relative sizes of the data, without the use of scales.

Challenge:

Data: 500

Area: 500



Length = $\sqrt{\text{Area}}$

Comparisons

Distribution

TALLY CHART

- Used for recording and graphically showing the frequency of the distribution of data by using the tally mark numeral system.

•Challenge:

Title	Tally	Totals
	↑	↓
		38
		20
		37
		35
		33
		15
		30
		20
		34
		25
	↓	

Comparisons

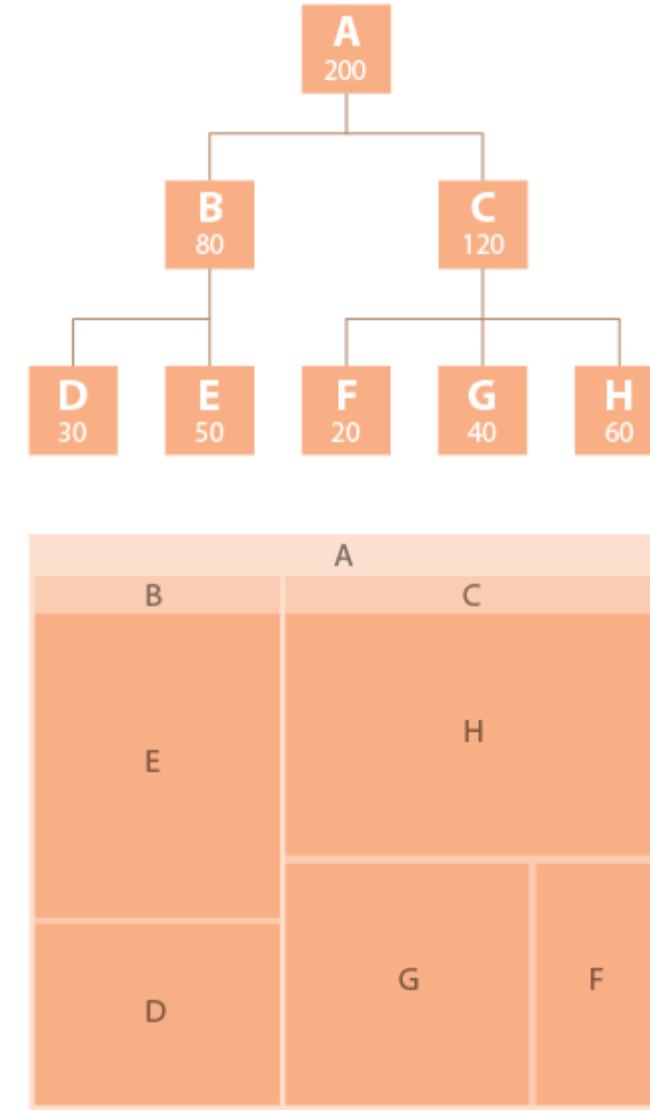
Hierarchy

Part-to-a-whole

Proportions

TREE MAPS

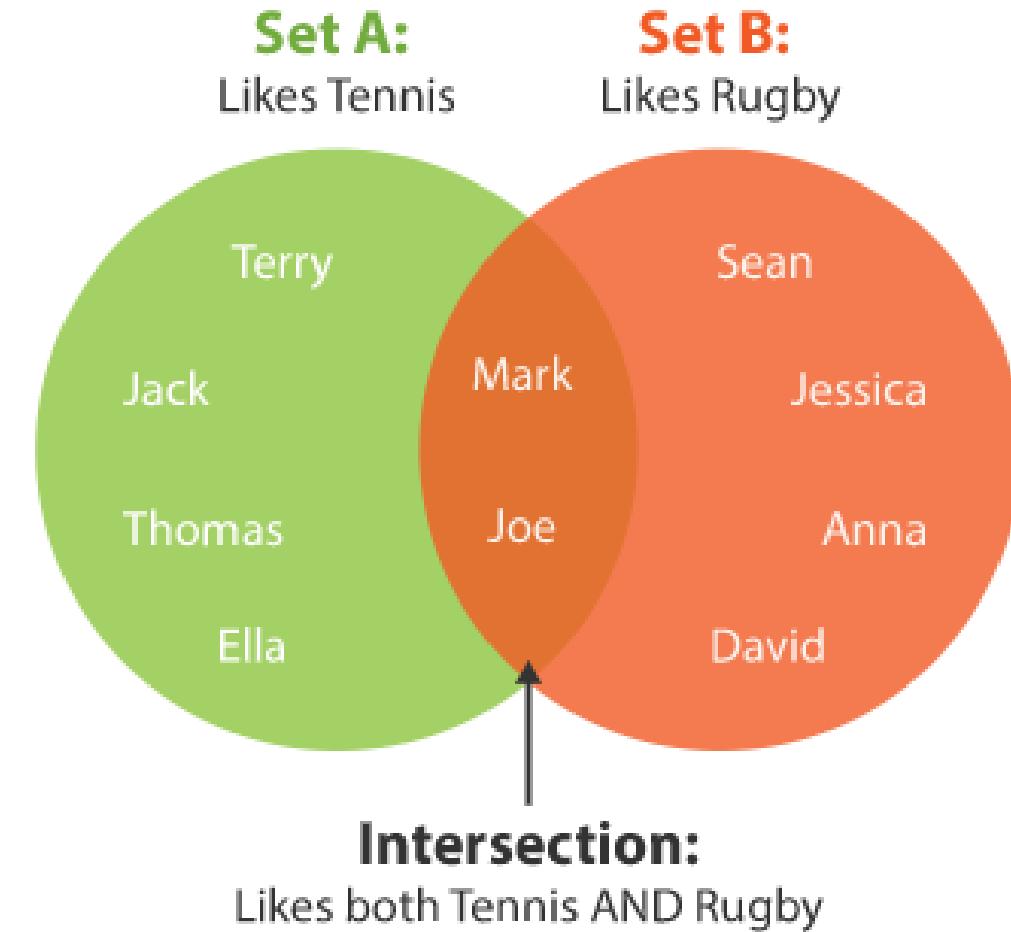
- a way of visualizing the hierarchical structure of a tree diagram, while also displaying quantities for each category via area size.
- Each category is assigned a rectangle area with their subcategory rectangles nested inside of it.
- **Challenge:**



Comparisons concepts Relationships

VENN DIAGRAM

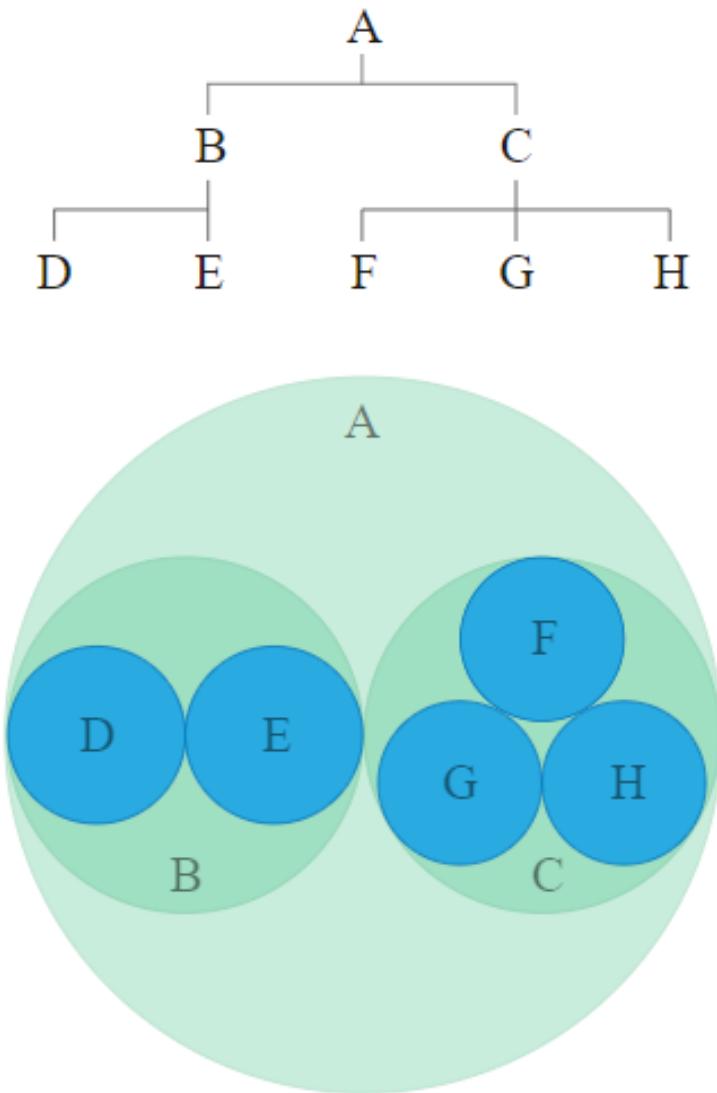
- It visually displays all the possible logical relationships between a collection of sets.
- Each set is typically represented with a circle.
- **Challenge:**



hierarchy**Proportions**

CIRCULAR TREEMAP

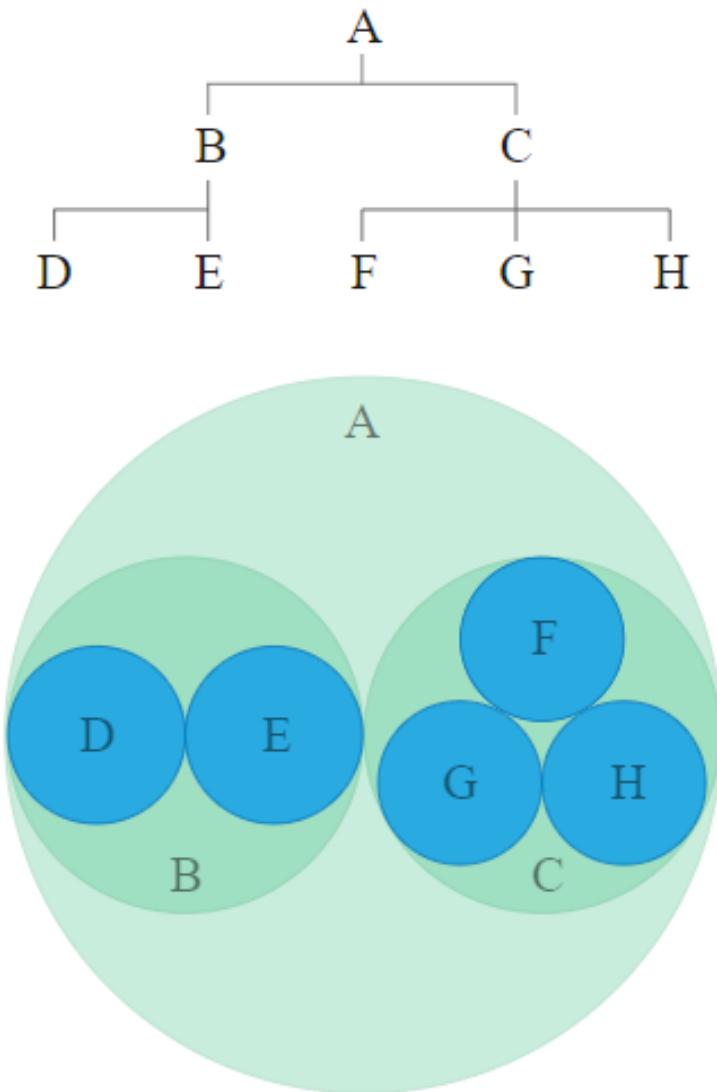
- A variation of treemap that uses circle instead of rectangles.
- **Challenge:**



hierarchy**Proportions**

CIRCULAR TREEMAP

- A variation of treemap that uses circle instead of rectangles.
- **Challenge:**



Distribution

Location

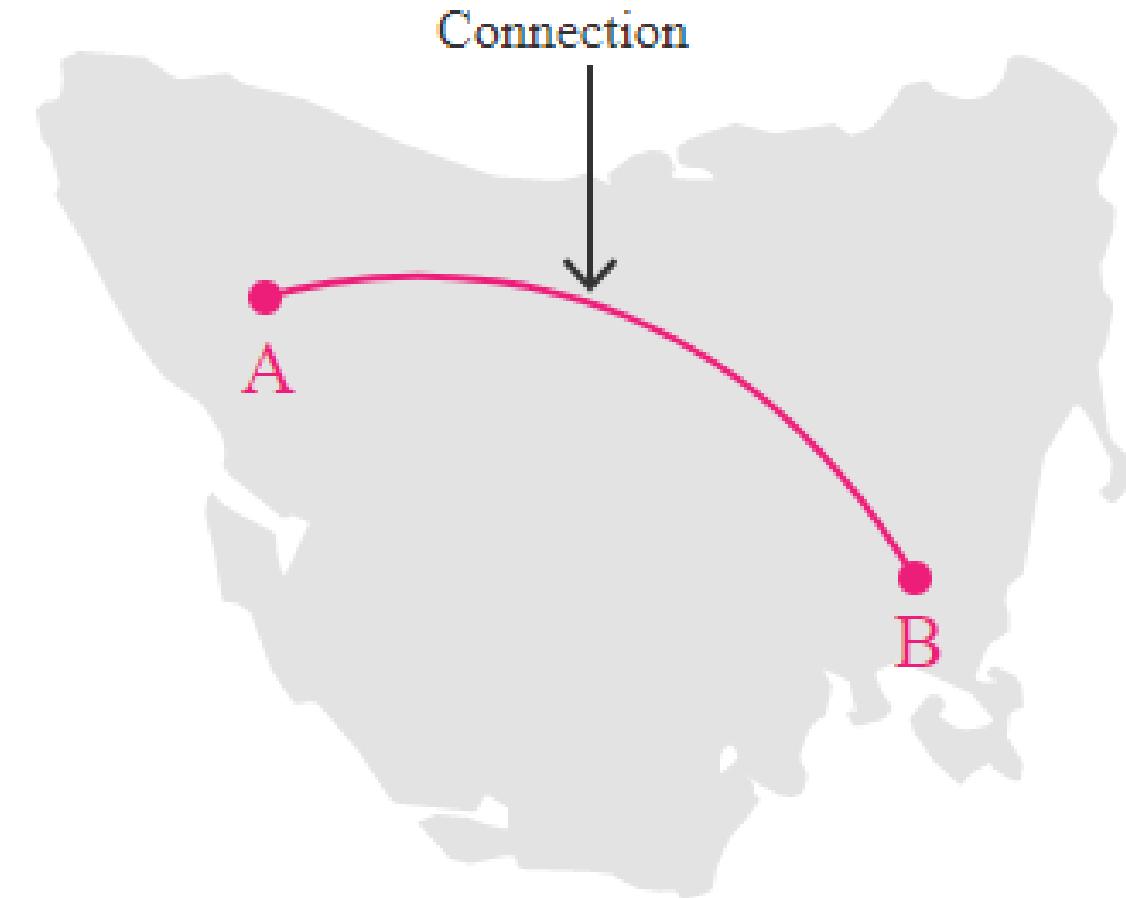
Movement

Patterns

Relationships

CONNECTION MAP

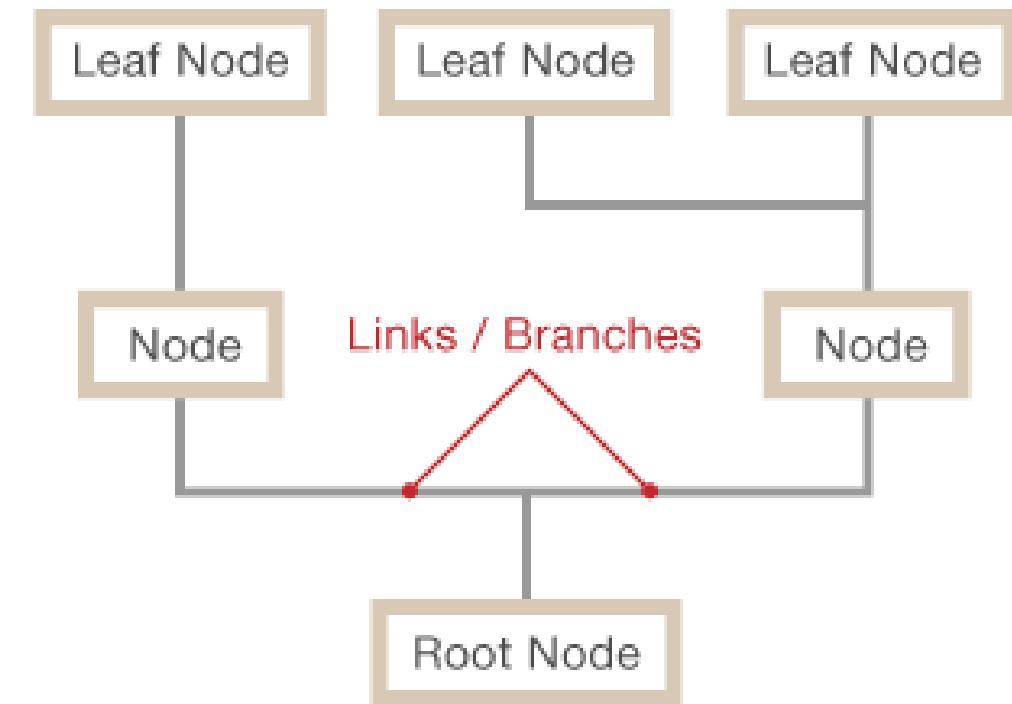
- They are drawn by connecting points placed on a map by straight or curved lines.
- Good for showing connections and relationships geographically.
- Used to display map routes through a single chain of links.
- **Challenge:**



[Hierarchy](#)[Reference Tool](#)[Relationships](#)

TREE DIAGRAM

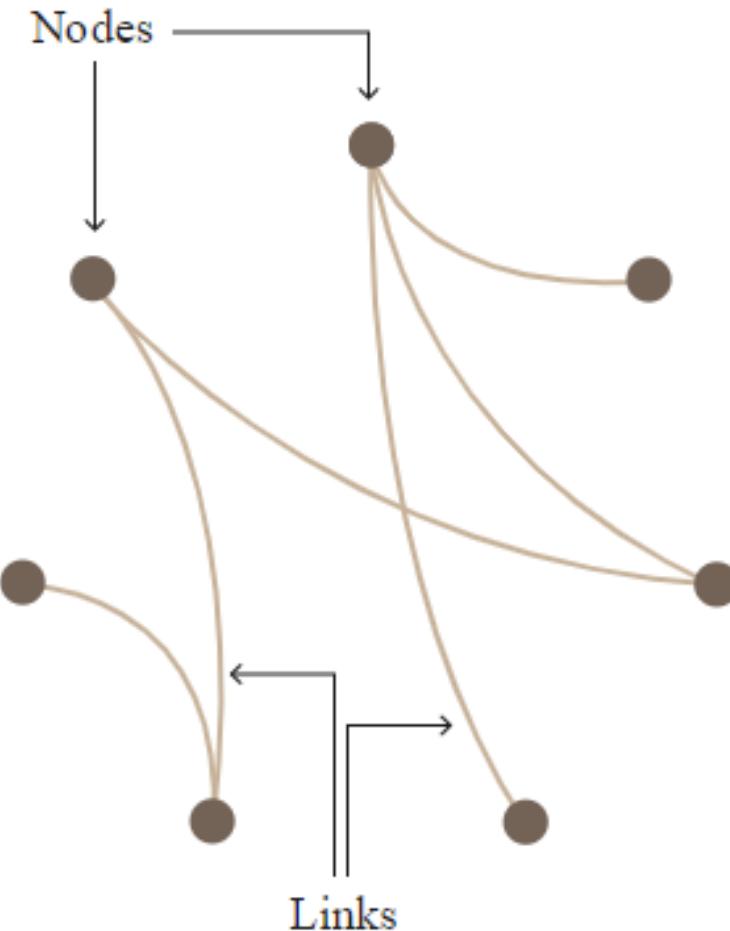
- used to visualize hierarchy in a tree-like structure.
- Used to show family relations and descent
-
- **Challenge:**



Relationships

NON-RIBBON CHORD DIAGRAM

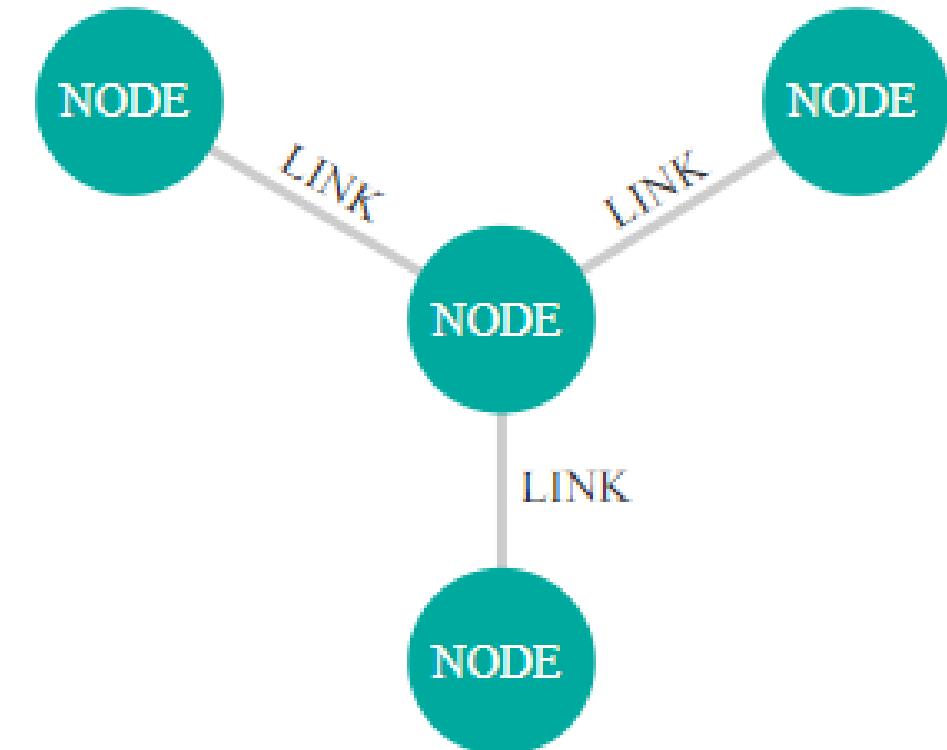
- it is a stripped-down version of chord diagram with only nodes and connection lines showing their relationships.
- Provides more emphasis on the connections within the data
-
- **Challenge:**



Relationships

NETWORK MAP

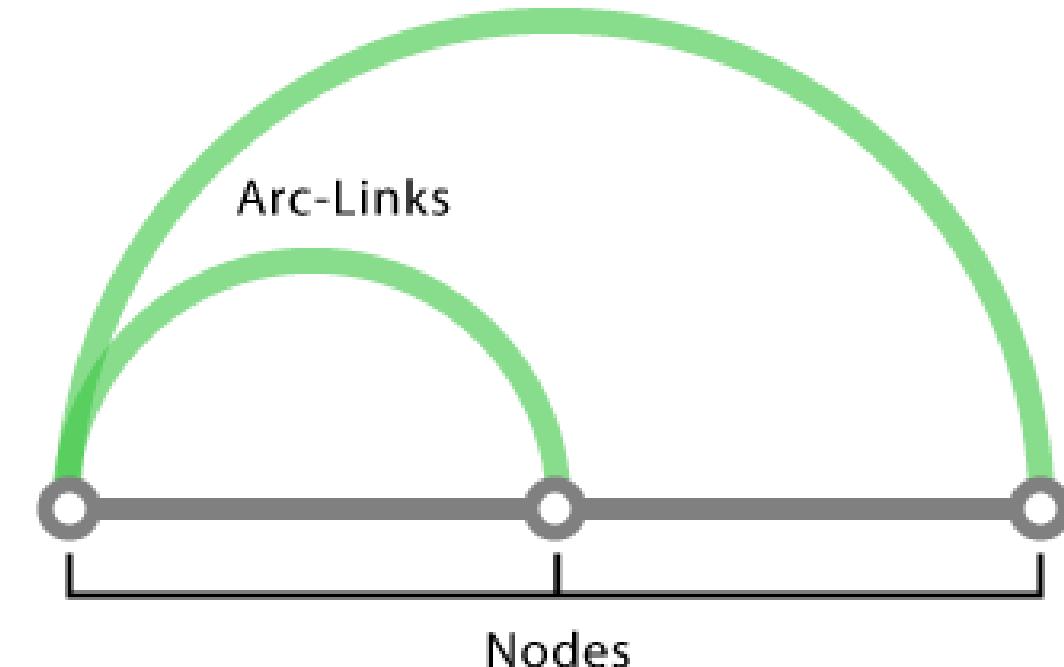
- displays how the variables are interconnected through the use of nodes/vertices and link lines to represent their connections and help illuminate the type of relationships between a group of entities.
 - directed and undirected
- **Challenge:**



[Relationships](#)[Patterns](#)

ARC DIAGRAM

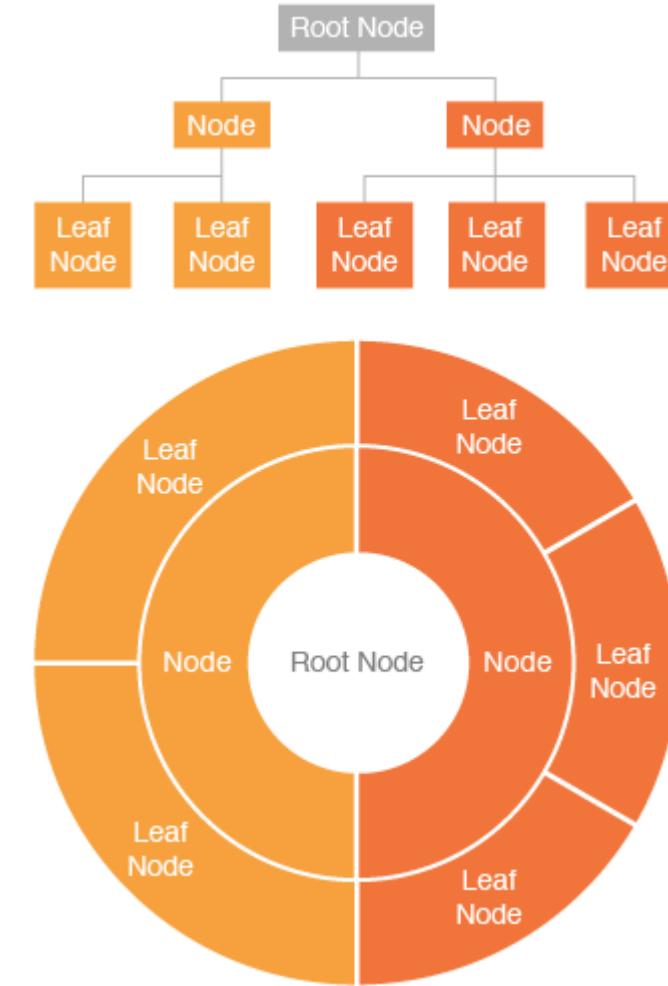
- an alternate way of representing two-dimensional network diagrams.
- Nodes are placed along a single line and arcs are used to show connections between these nodes.
- **Challenge:**



Hierarchy**Part-to-a-whole**

SUNBURST CHART

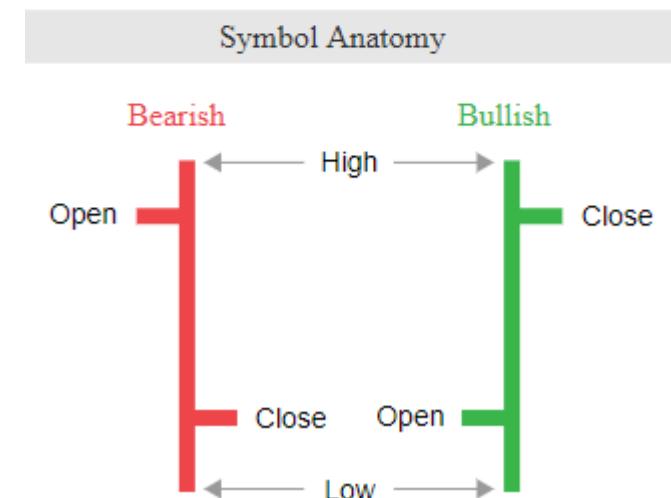
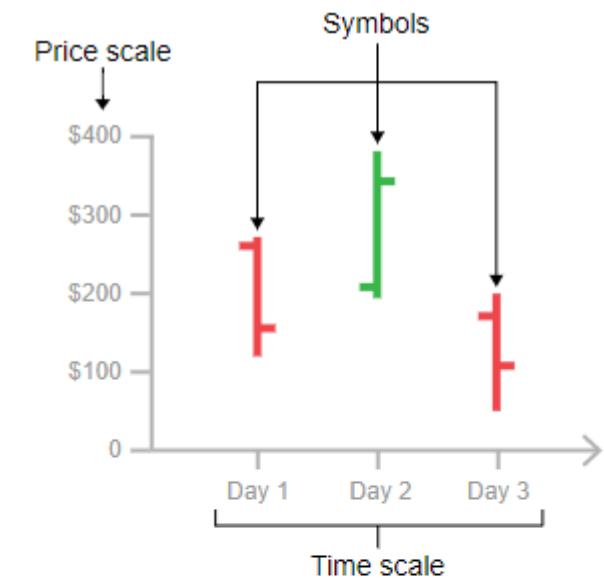
- It shows hierarchy through a series of rings that are sliced for each category node.
- Each ring corresponds to a level in the hierarchy with the central circle representing the root node and the hierarchy moving outwards from it.
- Rings are sliced up and divided based on their hierarchical relationship to the parent slice.
- **Challenge:**



Data over time Patterns Ranges

OPEN-HIGH-LOW-CLOSE CHART

- It is used as a trading tool to visualize and analyze the price changes over time for securities, currencies, stocks, bonds, commodities.
- Useful for interpreting the day-to-day sentiment of the market and forecasting any future price changes through the patterns produced.
- **Challenge:**



Data over time Patterns

TIMELINE

- Used to display a list of events in chronological order.
- Used to communicate time-related information
- Challenge:**

Sequential Timeline:



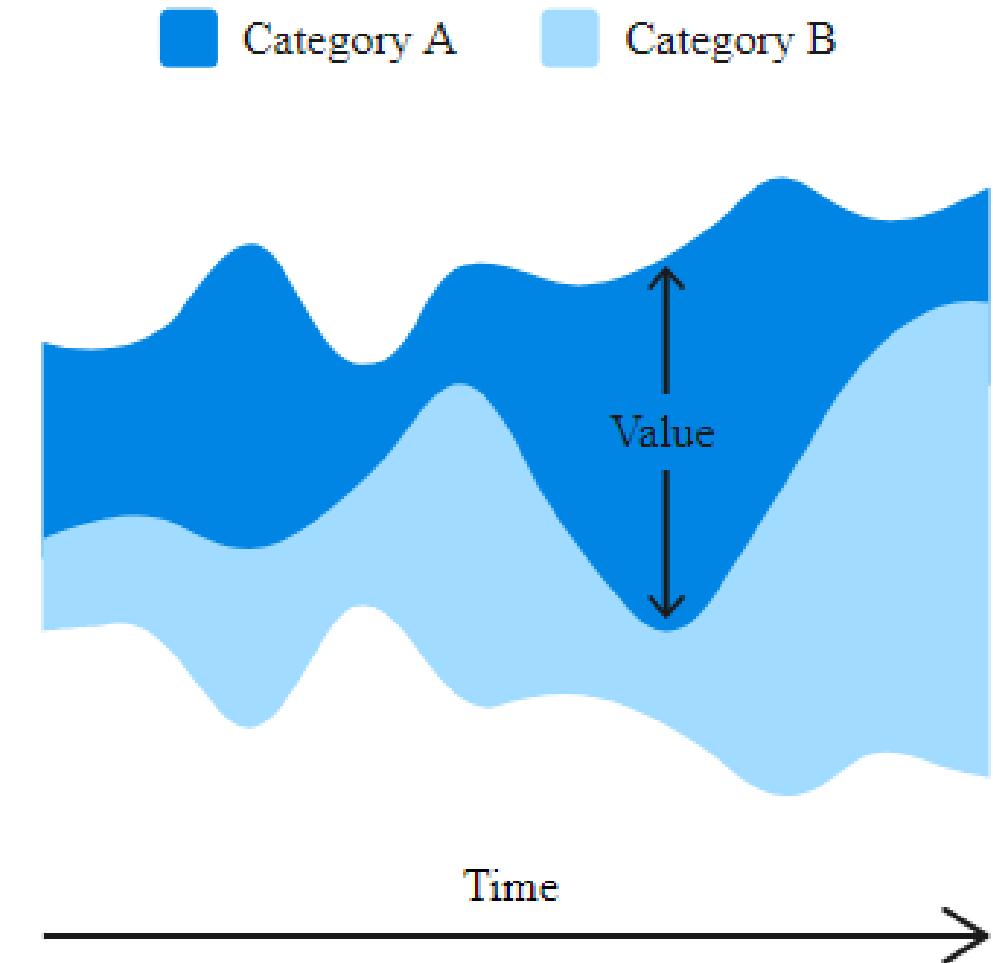
Scaled Timeline:



Data over time Patterns

THEMERIVER

- Values displaced around a varying central baseline.
- It displays the changes in data over time of different categories through the use of flowing, organic shapes that somewhat resemble a river-like stream.
- **Challenge:**



Data over time Patterns

POINT & FIGURE CHART

- Used to depict relationship between supply and demand of a particular asset through a series of columns made up of X's and O's.
- They are time-independent and focus primarily on an asset's filtered price actions.
- Share price fluctuations of a listed company.
- Challenge:**



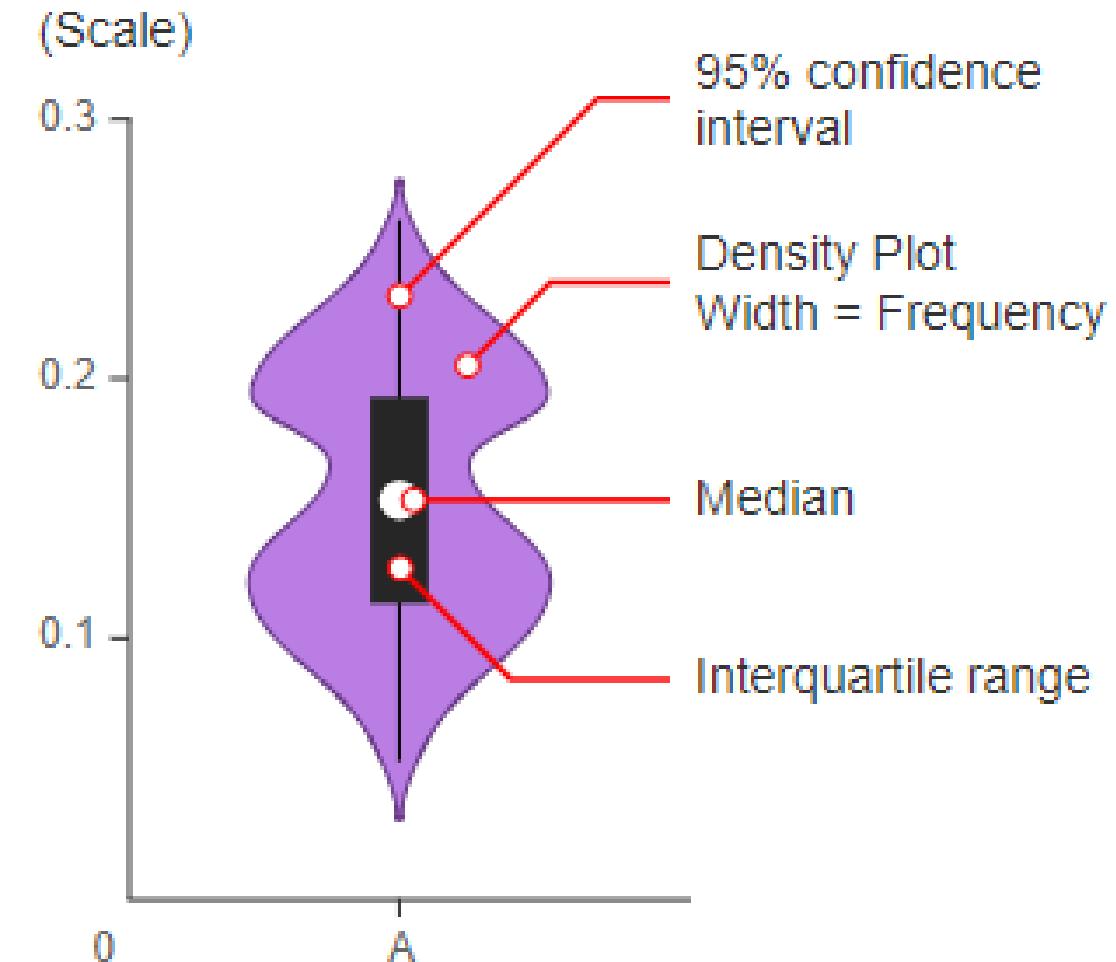
[Distribution](#)[Patterns](#)[Ranges](#)

VIOLIN PLOT

- Used to visualize the distribution of data and its probability density.
- It is combination of box plot and density plot.
- Challenge:**

Please read terms of use for authorized access

Original Series

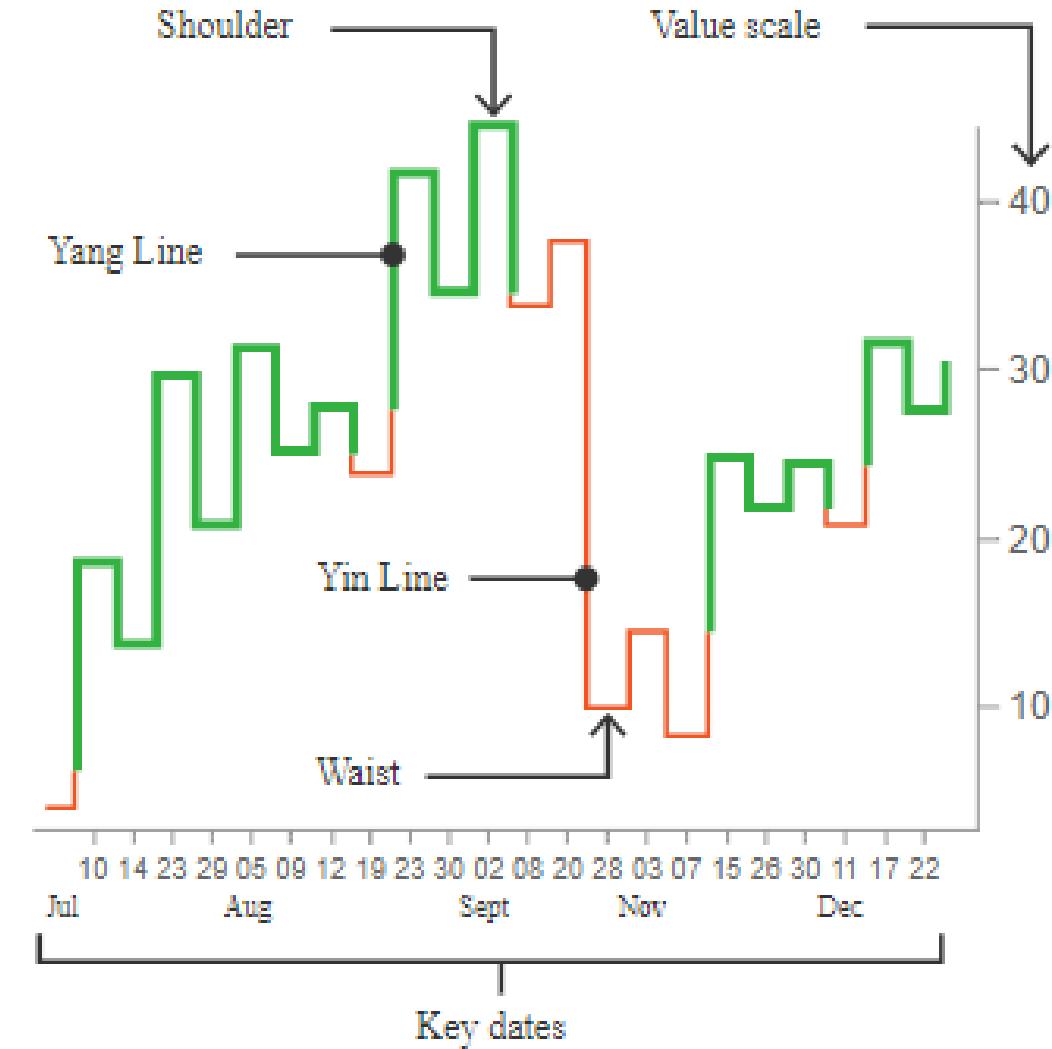


Patterns

Ranges

KAGI CHART

- Used to display the energy levels of supply and demand of a particular asset by visualizing the price actions through a series of line patterns.
- They are time-independent and help filter out the noise that can occur on other financial charts
- Challenge:**

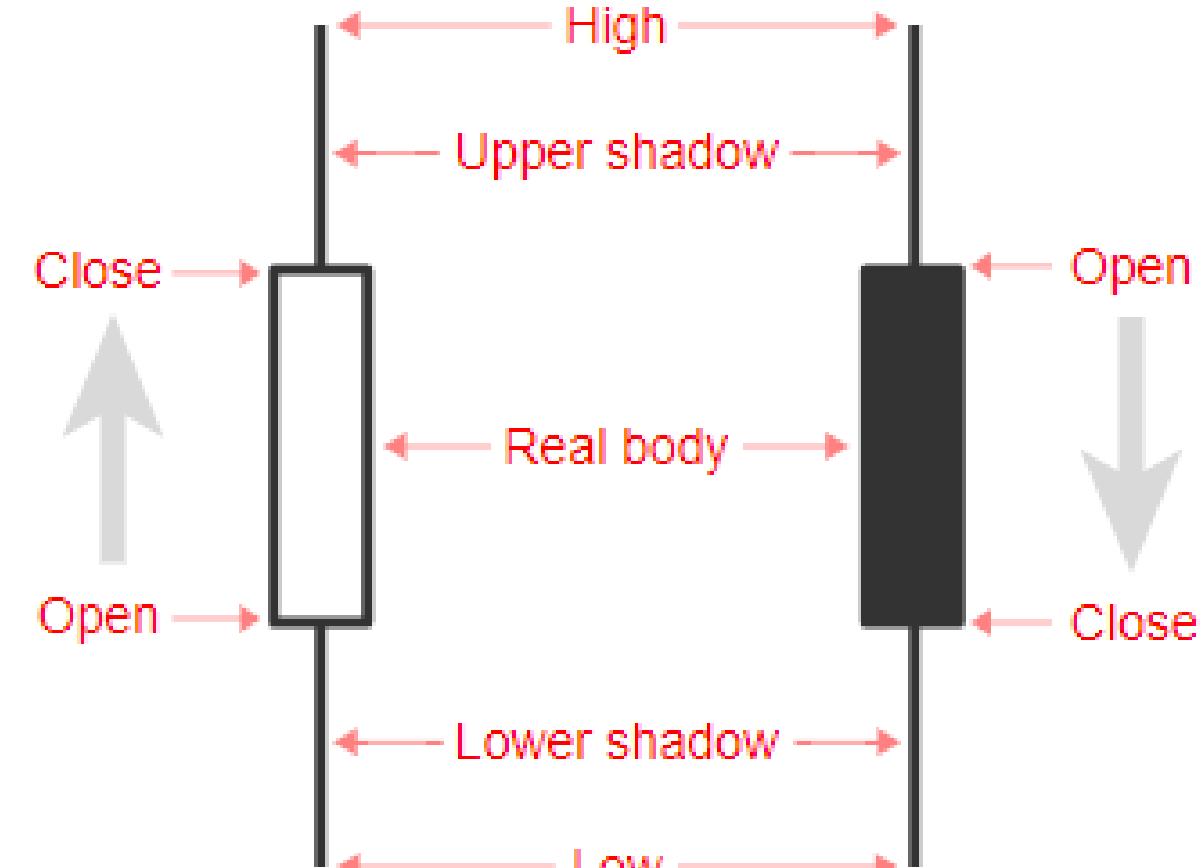


Patterns Ranges Data over time

CANDLESTICK CHART

- Used as a trading tool to visualize and analyze the price movements over time for securities, derivatives, currencies, stocks, bonds, commodities, etc..
- They display multiple bits of price information such as the open price, close price, highest price and lowest price through the use of candlestick-like symbols.
- Challenge:**

Bullish
Candlestick

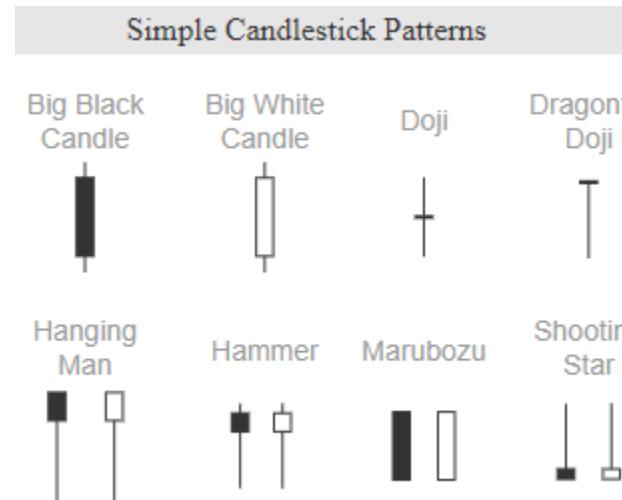


Bearish
Candlestick

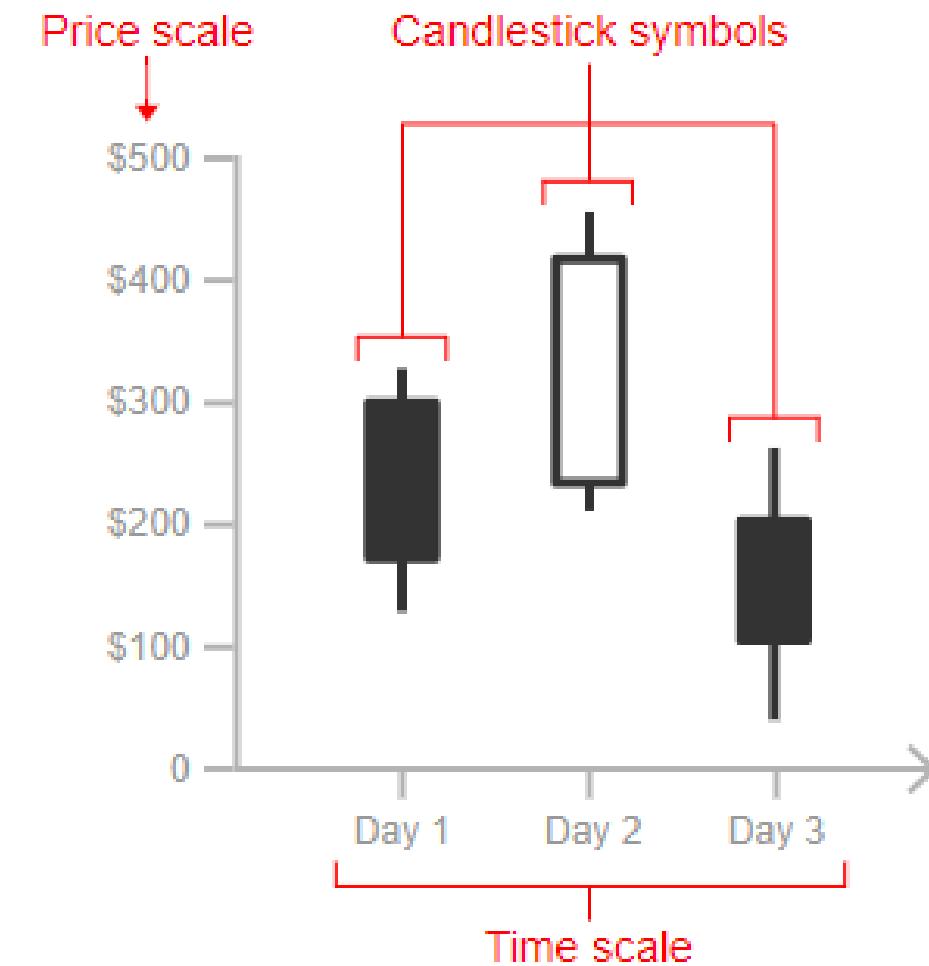


CANDLE STICK CHART

Please read terms of use for authorized access



Original Series



Reference Tool

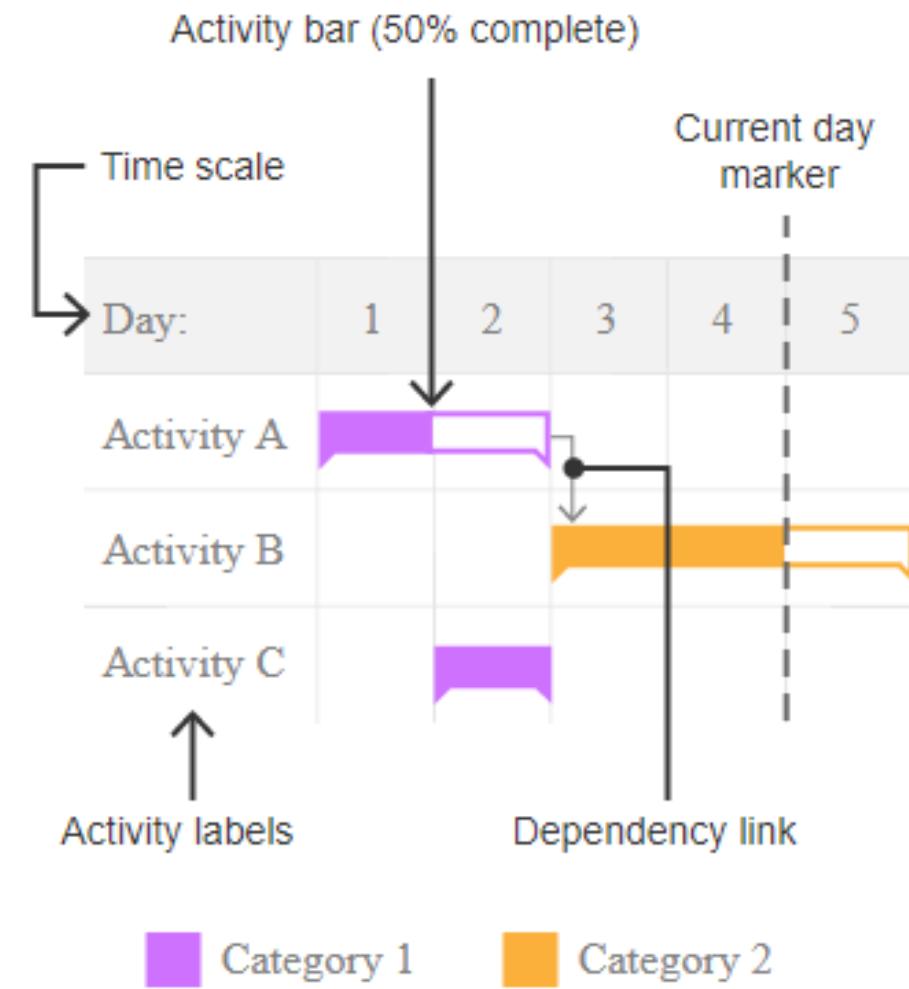
Ranges

Data over time

Processes and Methods

GANTT CHART

- Displays a list of activities/tasks with their duration over time, showing when each activity starts and ends.
- **Challenge:**

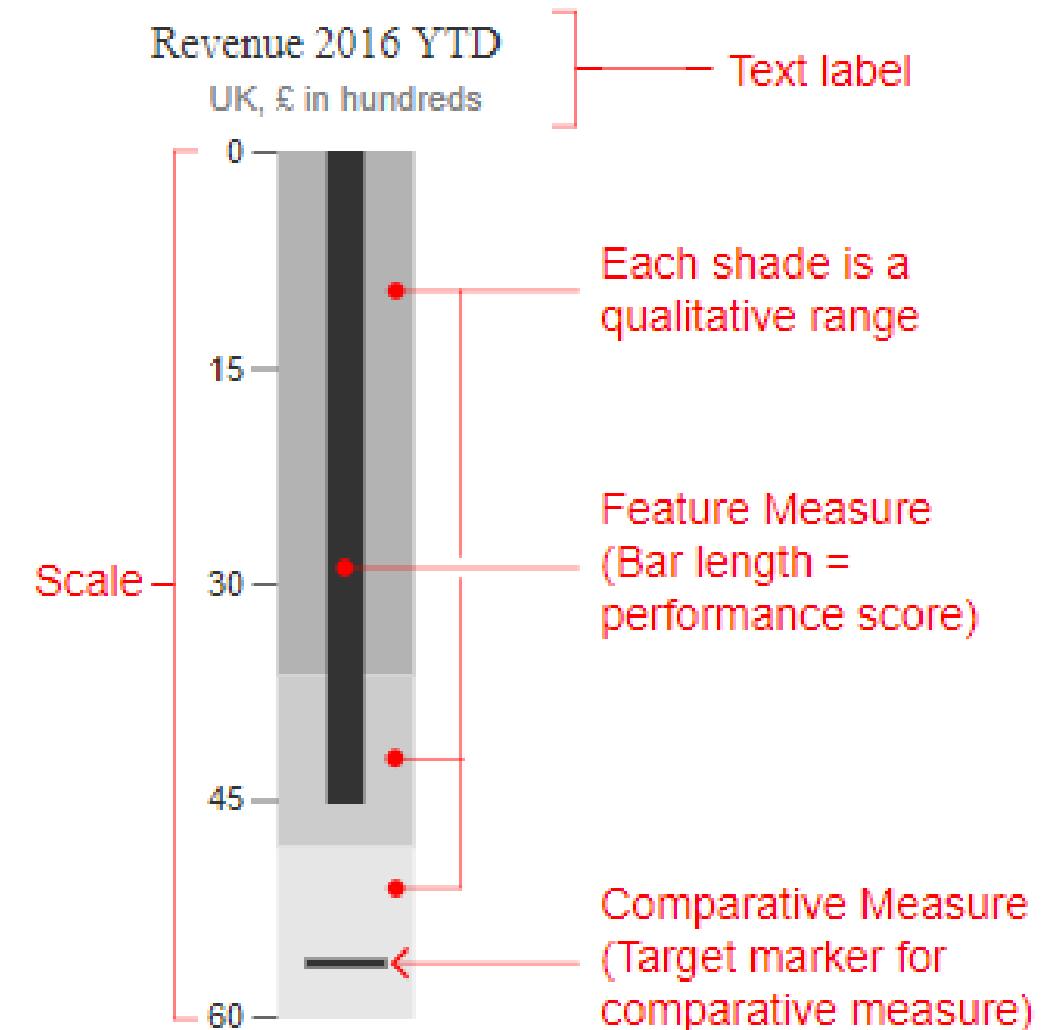


Comparisons

Range

Bullet Graphs

- used to display performance data.
- Feature Measure is encoded by a length of the main bar in the middle of the chart.
- Comparative Measure is perpendicular line marker to the orientation of the graph and is used as a target marker to compare with feature measure.
- **Challenge: sometimes hard to read.**



Bullet chart

- Used to track progress of a variable against predefined goals defined.
- They compare a primary measure to one or more other measures and presents it in the context of defined metrics.
- Evaluating the performance of a metric against a goal.

Gantt chart

- Used to demonstrate schedule of events, projects which vary over time.
- Color can be used to differentiate progress of various variables in time.
- Can be used with other chart types to filter and explore data.

Bubble chart

- A technique to define the frequency or concentration of variables on scatter plots or maps.
- By using bubbles, of varying size and color of data points, a scatter plot can be transformed into a rich visualization.
- When used with maps, it provides a relative concentration of data over a region.

Heat maps

- Used to compare data across two categories using color.
- It is used to demonstrate the intersection of the categories the strongest and weakest.
- Used to show the relationship between two factors.
- By adding a size variation, heat maps let you know the concentration of two intersecting factors

Matching Data Types to Visual Elements

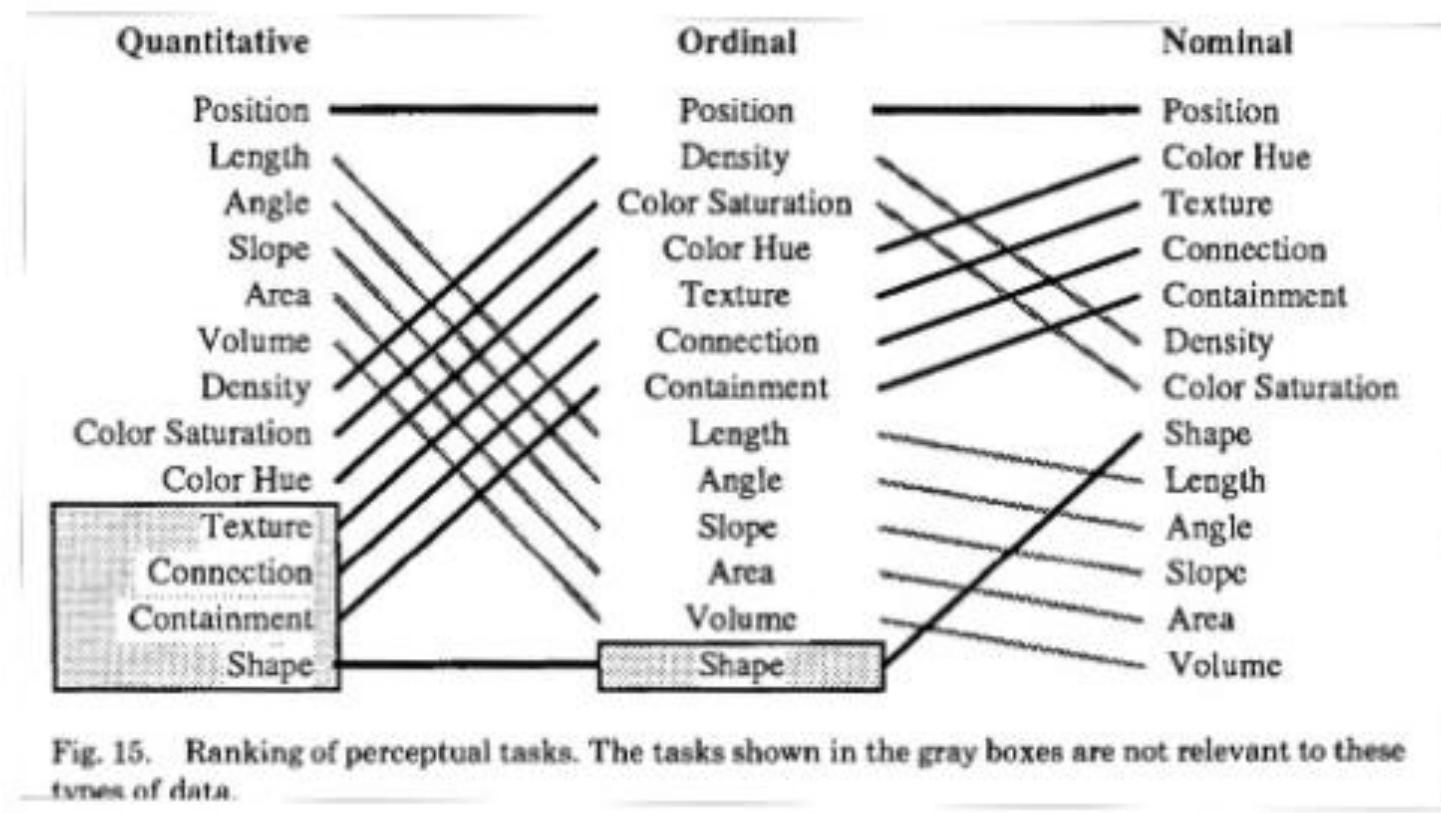
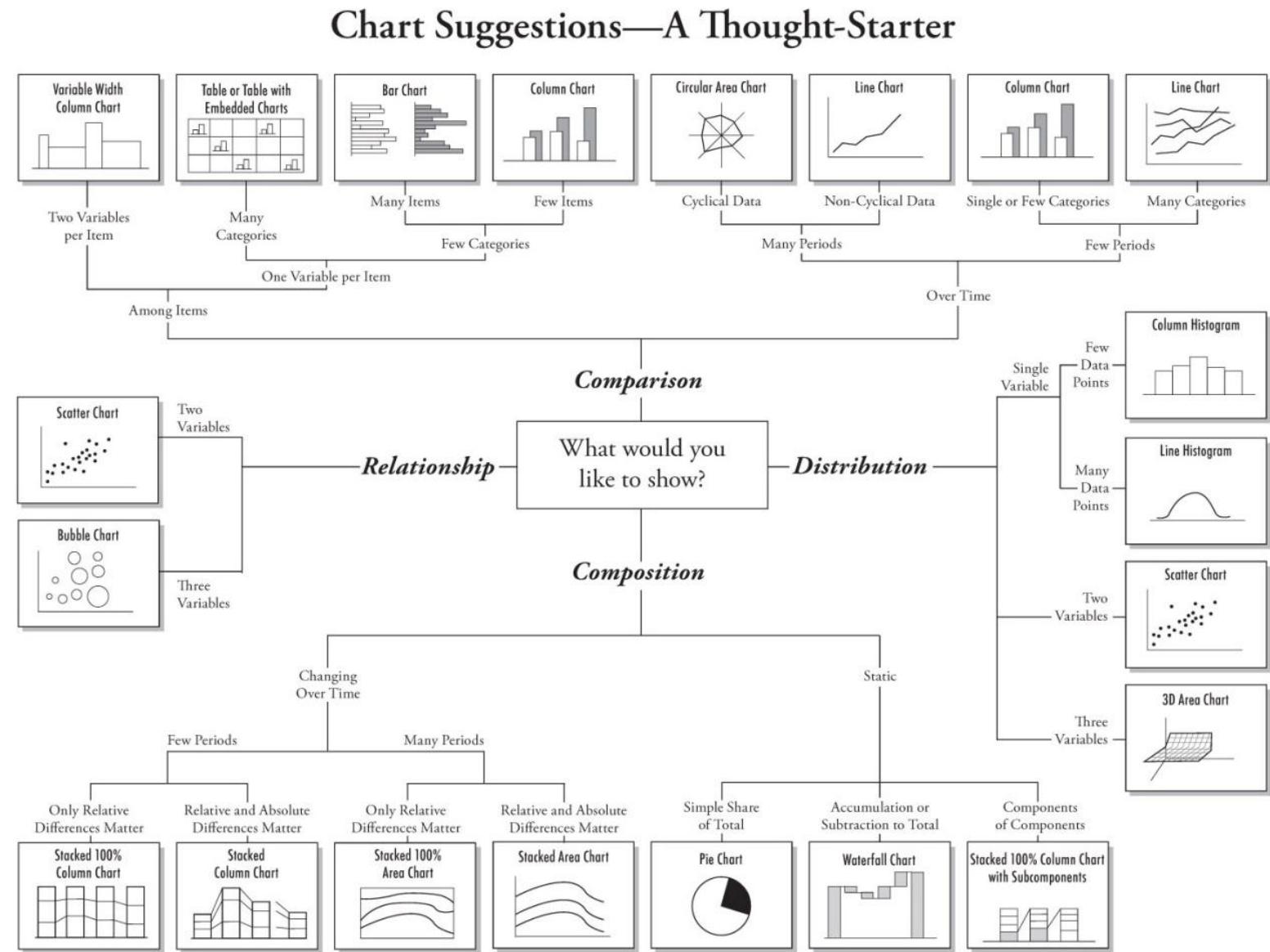


Fig. 15. Ranking of perceptual tasks. The tasks shown in the gray boxes are not relevant to these types of data.

Mackinlay, J. (1986). Automating the design of graphical presentations of relational information. *ACM Transactions on Graphics*, 5(2), 110-141.

<http://dx.doi.org.proxy.lib.duke.edu/10.1145/22949.22950>



Visualization tooling choice

Please read terms of use for authorized access

- We can use various tools for visualization
 - D3JS/NVD3.js
 - Highcharts.js
 - Qlikview
 - Tableau
- D3.js
 - When we need unusual, highly customized chart types (<http://bl.ocks.org/mbostock>)
 - Relatively low number of data points or visible elements (SVG vs HTML5 Canvas)
 - Impressive visualization tooling to be integrated with existing frameworks like Angular, React, KnockoutJS, Aurelia, EmberJS, VueJS
- Tableau
 - Predefined set of visualization, exploratory data analysis and visualization
 - Large amount of data visualization
 - Stand-alone visualization.

Properties and Best Uses of Visual Encodings

Example	Encoding	Ordered	Useful values	Quantitative	Ordinal	Categorical	Relational
	position, placement	yes	infinite	Good	Good	Good	Good
1, 2, 3; A, B, C	text labels	optional (alphabetical or numbered)	infinite	Good	Good	Good	Good
	length	yes	many	Good	Good		
	size, area	yes	many	Good	Good		
	angle	yes	medium/few	Good	Good		
	pattern density	yes	few	Good	Good		
	weight, boldness	yes	few		Good		
	saturation, brightness	yes	few		Good		
	color	no	few (< 20)			Good	
	shape, icon	no	medium			Good	
	pattern texture	no	medium			Good	
	enclosure, connection	no	infinite			Good	Good
	line pattern	no	few				Good
	line endings	no	few				Good
	line weight	yes	few		Good		

Source:<http://complexdiagrams.com/properties>

© COPYRIGHT TPRI- SYED AWASE KHIRNI-2014-17 TABLEAU

Ecosystem

Please read terms of use for authorized access

Original Series



A CLASSIFICATION OF CHART TYPES

Data comparison charts

Data reduction charts

Comparison

Composition

Distribution

Evolution

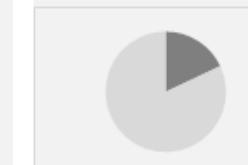
Relationship

Profiling

Bars



Pie



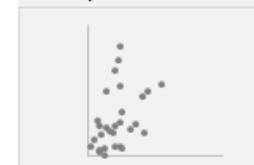
Histogram



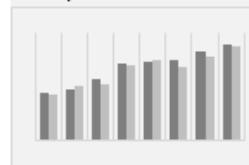
Line



Scatterplot



Grouped bars



Dot plot



Bullet



Pareto



ID Scatterplot



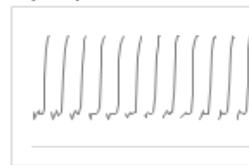
Horizon



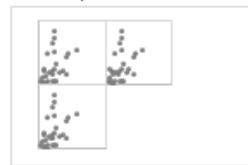
Connected Scatterplot



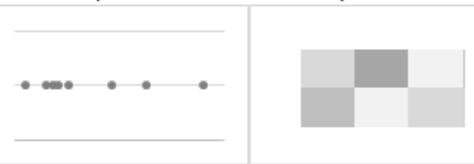
Cycle plot



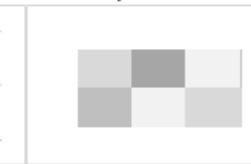
Scatterplot matrix



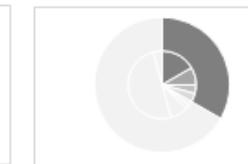
ID Scatterplot



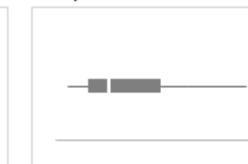
Heat map



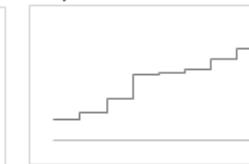
Multidimensional Pie



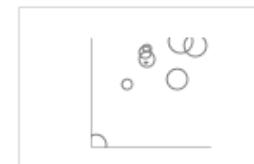
Boxplot



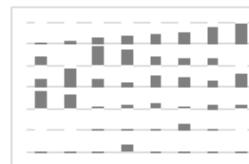
Step



Bubble



Reorderable matrix



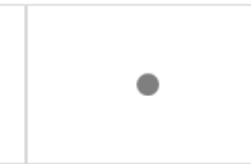
Horizon



Slope



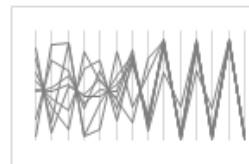
Alert



Connected Scatterplot



Parallel Plot



Trellis



Please read terms of use for authorized access

Original Series

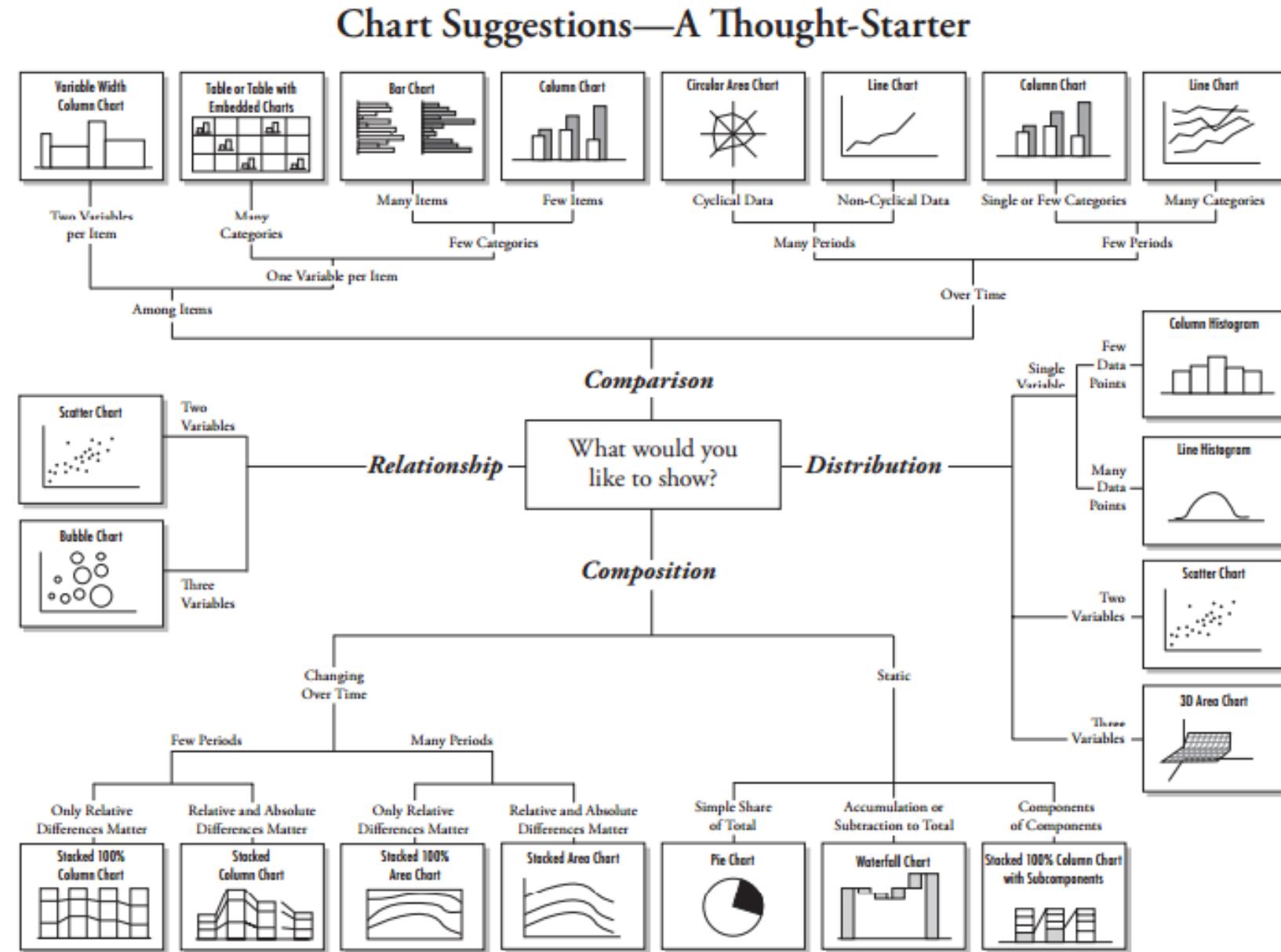
v 0.9

© 2013 Jorge Camoes

excelcharts.com

Tableau's offering?

- Maps(symbol,filled)
- Text tables
- Heat maps
- Highlight tables
- Treemap
- Horizontal bars
- Stacked bars
- Side-by-side bars.
- Line/Area charts
- Lines/Area Charts(discrete)
- Dual lines
- Pie Charts
- Scatter plots
- Circle views
- Side-by-side circles
- Bullet graphs
- Gantt charts
- Histograms
- Dashboards
- Ability to connect to various data source
- Presentation mode



Picture Superiority Effect:

60% increase in memory

When learning through images.

Repeatedly running images on

television registers perceptions broadcasted

“ A Story is 22 times more memorable than facts alone”

• Jennifer Aaker

SYED AWASE KHIRNI

THE DATA STORY

How do we make data tell a story

Does a picture pass the right info?

Moving from raw text/numbers

to narrative

Author driven data story telling

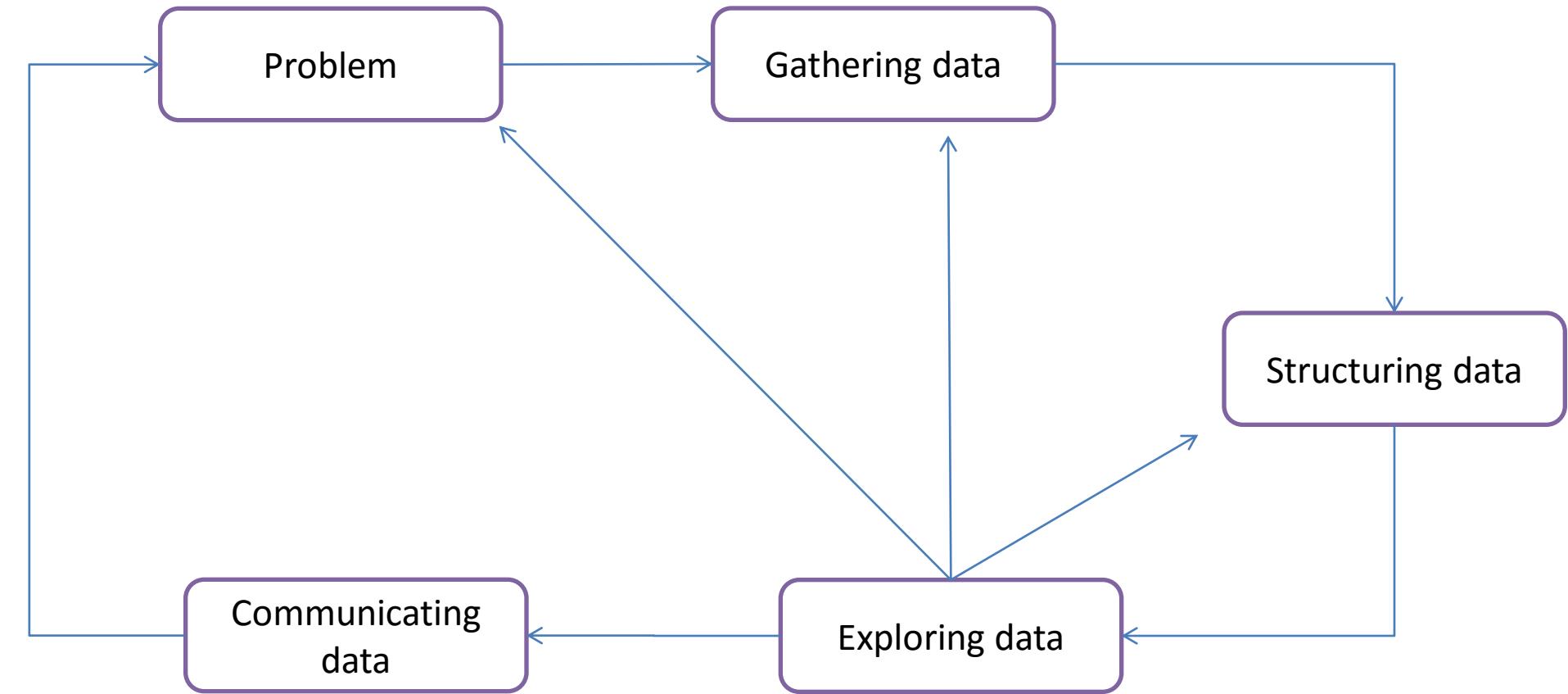
- They have constrained interaction at various checkpoints within a narrative, allowing the user to explore the data without steering way from essence of the story.
- They are not exploration tools.

Reader driven data story telling

- No prescribed ordering of data, supporting images and demands a higher degree of interactivity.
- Not data stories at all
- They are purely exploration and analytical tools
- They are purely dashboards allowing users to sift through explore/sift through data directly.

Data Discovery Process

Original Series
Please read terms of use for authorized access



Six principles of communicating data

Please read terms of use for authorized access

- 1 • Identify the Objective/Goal
- 2 • Select the right data
- 3 • Choosing the right visualization based on data characteristics
- 4 • Design for aesthetics
- 5 • Choose an effective medium and channel to communicate
- 6 • Checking the outcome/result or repeat step 1-6.

Original Series

1. Identify the objective

- Who are the target audience?
- What is the information, intended to communicate.
- Why? What do you want them to do with/about it? (desired effect)

2. Choosing the right data

- Selecting the right data is vital for analysis.
- Perform Design of Experiments
- Design the right survey to collect data.
- Check for data quality and consistency.

3. Right visualization based on data characteristic

Please read terms of use for authorized access

QUANTITATIVE

- Precise numerical values
- Ex: 10.54

ORDINAL

- Elements related by order
- [first, second, third]

NOMINAL

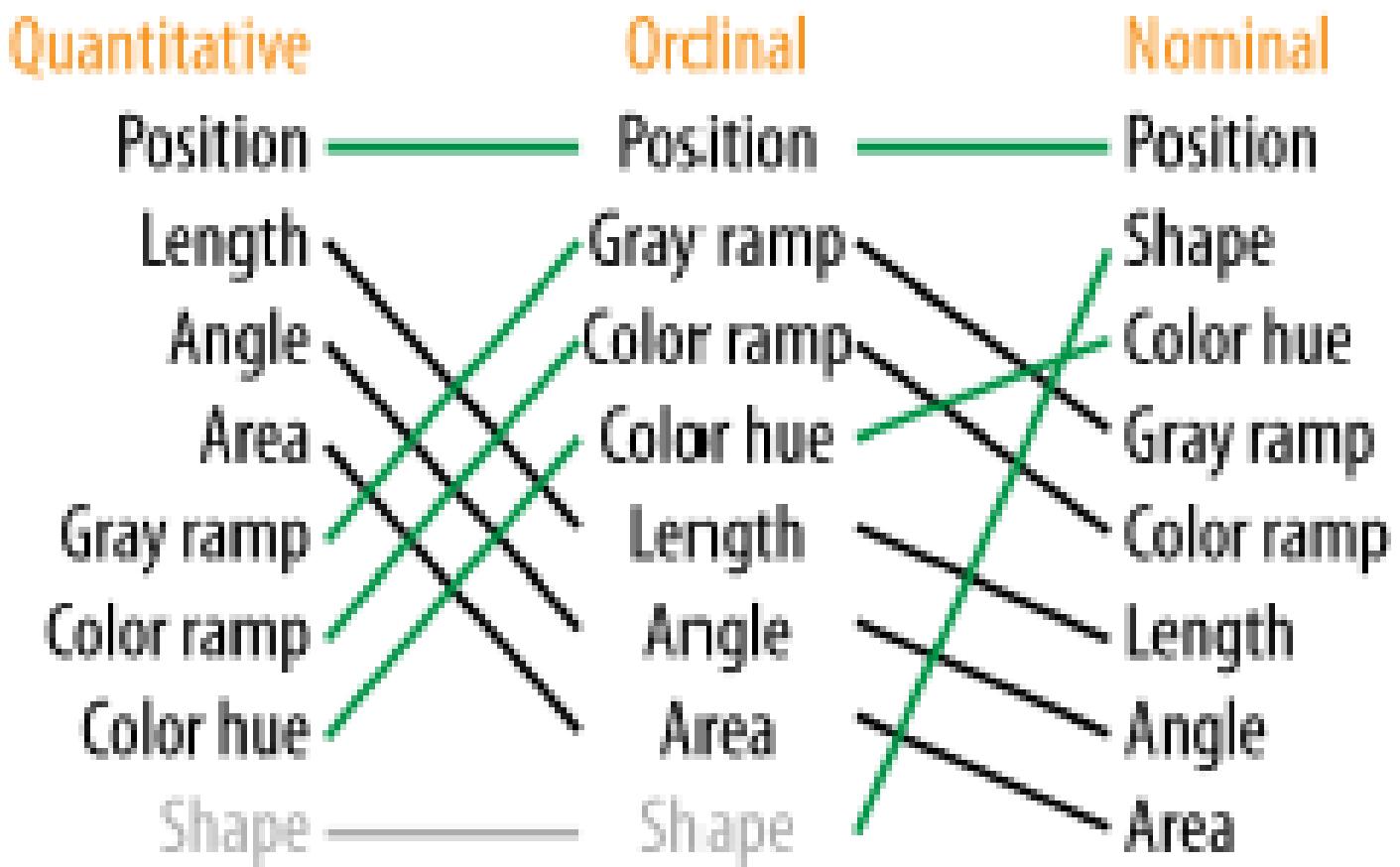
- Members of a group or a class
- [male, female]

Original Series

3. Choose effective visualization type for data type.

Please read terms of use for authorized access

Original Series



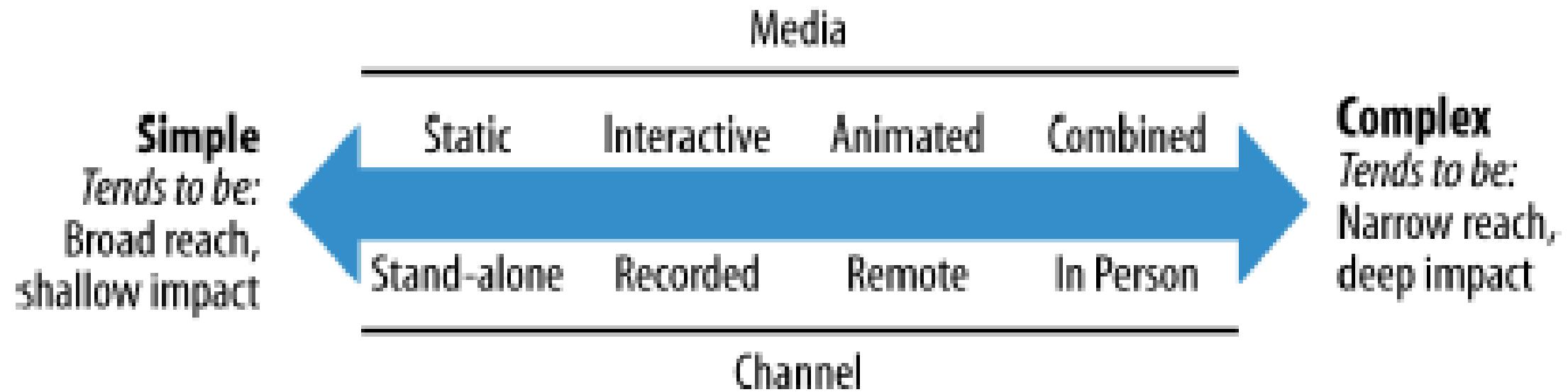
4. Design for aesthetics

- Labeling
- Color coding
- Legend
- Title

5. Choosing an effective communication medium

Please read terms of use for authorized access

Original Series



Source: Fig1-9: A spectrum of data communication types (Ben Jones, 2014, Communicating Data with Tableau, O'Reilly Media Inc., fig1.9 page:13)

SYED AWASE KHIRNI

TABLEAU VS QLIKVIEW

OVERVIEW

Please read terms of use for authorized access

Original Series

TABLEAU

- User driven BI-focused interactive visualization tool that helps businesses analyze large quantities of data intuitively with pre-defined visualization sets to choose from.

qlikview

- A BI-tool that allows users to keep tabs on all business related information in an intuitive and easy access to database.

DATA ACCESS

TABLEAU

- HAS LOCAL FILES
- SUPPORT FOR RDBMS
- SUPPORT FOR OLAP CUBES
- LIMITED FEATURES TO ACCESS ONLINE DATA SOURCES
- ACCESS TO ONLINE RESOURCES

qlikview

- HAS LOCAL FILES
- SUPPORT FOR RDBMS
- NO SUPPORT FOR OLAP CUBES
- SUPPORT FOR ONLINE DATA SOURCES
- ACCESS TO ONLINE RESOURCES

DEVELOPMENT APPROACH

Please read terms of use for authorized access

Original Series

TABLEAU

- MENU BASED
- LIMITED SUPPORT FOR ETL OPERATIONS
- IDE SUPPORT FOR CALCULATIONS
- DATA AGGREGATION MONITORING
- BUSINESS USER DRIVEN
- UI DRIVEN DEVELOPMENT

qlikview

- WIZARD BASED SCRIPTING
- SUPPORT FOR ETL SCRIPTING
- SUPPORT FOR CALCULTION SCRIPTING
- DATA AGGREGATION MONITORING
- PROGRAMMER DRIVEN
- SYNTAX AND SCRIPTING LANGUAGE

USER INTERFACE

TABLEAU

- LIMITED DRAG AND DROP SUPPORT
- LIMITED FEATURES ON DESIGN AND PLACEMENT OF FILTERS
- STANDARD SET OF VISUALIZATION TECHNIQUES
- SUPPORT FOR STATISTICAL ANALYSIS
- SUPPORT OF INSERTING IMAGES AND TEXT
- SUPPORT FOR CARTOGRAPHIC VISUALIZATIONS
- WEB BROWSER SUPPORT

qlikview

- DRAG AND DROP SUPPORT
- SUPPORT FOR DESIGN AND PLACEMENT OF FILTERS
- STANDARD SET OF VISUALIZATION TECHNIQUES
- DIAL, SPARKLINE, RADAR AND MINICHART SUPPORT
- SUPPORT FOR STATISTICAL ANALYSIS
- SUPPORT FOR INSERTING IMAGES AND TEXT.
- LIMITED SUPPORT FOR CARTOGRAPHIC VISUALIZATIONS
- WEB BROWSER SUPPORT

USAGE

Please read terms of use for authorized access

Original Series

TABLEAU

- SUPPORT FOR ADHOC ANALYTICS
- SUPPORT FOR ATYPICAL REPORTING
- SUPPORT FOR DASHBOARDS
- SUPPORT FOR STANDARD REPORTING
- LIMITED SUPPORT FOR COMMUNICATION AND COLLABORATION BETWEEN USERS.

qlikview

- LIMITED SUPPORT FOR ADHOC ANALYTICS
- SUPPORT FOR ATYPICAL REPORTING
- SUPPORT FOR DASHBOARDS
- SUPPORT FOR STANDARD REPORTING
- SUPPORT FOR COMMUNICATION AND COLLABORATION BETWEEN USERS.

HANDLING

TABLEAU

- SUPPORT FOR SERVER AND DESKTOP ENVIRONMENTS
- SUPPORT FOR USER GROUP SECURITY BASED ON ROLES
- SUPPORT FOR AUTOMATED REPORT PUBLISHING
- FREE PREVIEW SUPPORT
- MULTIMODAL PLATFORM SUPPORT

qlikview

- SUPPORT FOR SERVER AND DESKTOP ENVIRONMENTS
- SUPPORT FOR USER GROUP SECURITY BASED ON ROLES
- SUPPORT FOR AUTOMATED REPORT PUBLISHING
- FREE PREVIEW SUPPORT
- MULTIMODAL PLATFORM SUPPORT

LICENSING

Please read terms of use for authorized access

Original Series

TABLEAU

- UNLIMITED
- 20% FROM COST OF LICENSES PER YEAR
- SINGLE USER DESKTOP VERSION
- NAMED USER SERVER LICENSE
- SESSION/DOCUMENT SERVER LICENSE

qlikview

- UNLIMITED
- 20% FROM COST OF LICENSES PER YEAR
- SINGLE USER DESKTOP VERSION
- NAMED USER SERVER LICENSE
- SESSION/DOCUMENT SERVER LICENSE

SYED AWASE KHIRNI

TABLEAU : DATASETS

Datasets

- <http://www.retrosheet.org/game.htm#>
- <http://www.opensourcesports.com/baseball/>
- <http://www.seanlahman.com/baseball-archive/statistics/>
- <https://www.rotowire.com/>
- <https://catalog.data.gov/dataset?tags=car>

Canadian Datasets

- <http://open.canada.ca/en>
- [http://data.vancouver.ca/dataset
atalogue/index.htm](http://data.vancouver.ca/dataset/index.htm)
- <https://data.gov.bc.ca/>
- <http://data.surrey.ca/>
- <http://www.statcan.gc.ca/eng/stat>

USA Datasets

Please read terms of use for authorized access

Original Series

- <https://opendata.cityofnewyork.us/data/>
- <https://www.timeanddate.com/holidays/us/>
- <https://data.sfgov.org/City-Infrastructure/311-Cases/vw6y-z8j6>
- <https://data.cityofchicago.org/Public-Safety/Crimes-2001-to-present/ijzp-q8t2>
- <https://data.seattle.gov/>
- <https://data.nola.gov/browse?limitTo=datasets&utf8=%E2%9C%93>
- <https://socrata.com/>

- <https://data.ny.gov/Transportation/Annual-Average-Daily-Traffic-AADT-Beginning-1977/6amx-2pbv>
- <https://data.cityofchicago.org/Public-Safety/Crimes-2001-to-present/ijzp-q8t2>
- <https://opendata.socrata.com/dataset/The-White-House-Nominations-Appointments/n5m4-mism>
- <https://www.federalreserve.gov/datadownload/>
- <https://catalog.data.gov/dataset>

Sports Data sets

- <https://www.rotowire.com/>
- <http://www.opensourcesports.com/basketball/>
- <http://www.seanlahman.com/baseball-archive/statistics/>
- <http://www.opensourcesports.com/hockey/>
- <http://www.tennis-data.co.uk/alldata.php>
- <http://www.retrosheet.org/gamelogs/index.html#>
- <http://www.exploredatabase.net/Downloads/Baseball-Data-Set>
- <http://content.usatoday.com/sportsdata/football/nfl/salaries/team>
- <http://content.usatoday.com/sportsdata/baseball/mlb/salaries/team>
- <http://www.opensourcesports.com/>

Movie Data sets

- <http://grouplens.org/datasets/movielens/>
- <http://www.boxofficemojo.com/>
- <http://www.imdb.com/interfaces/>

Music Data sets

- <https://musicbrainz.org/doc/MusicBrainz Database>
- <https://opendata.socrata.com/Fun/Top-1-000-Songs-To-Hear-Before-You-Die/ed74-c6ni>
- <https://labrosa.ee.columbia.edu/millionsong/pages/getting-dataset>
- <http://www.dtic.upf.edu/~ocelma/MusicRecommendationDataset/lastfm-1K.html>

Airport/Airline Data sets

- <https://openflights.org/data.html>
- <https://github.com/fivethirtyeight/data/tree/master/airline-safety>

Weather Data sets

- <https://www.ncdc.noaa.gov/ibtracs/index.php?name=wmo-data>
- <http://climate.weather.gc.ca/>
- <https://www.wunderground.com/history/>

Stock Data sets

- <http://eoddata.com/download.aspx>
- <http://www.stockhistoricaldata.com/daily-download>

Ip Address Data sets

- <https://lite.ip2location.com/data/base-ip-country>
- <https://db-ip.com/db/download/country>
- <https://www.maxmind.com/en/free-world-cities-database>
- <https://code.google.com/archive/p/worlddb/>

Social Media Data sets

- <https://gnip.com/>
- <https://developer.twitter.com/en/enterprise>
- <http://datasift.com/>

Please read terms of use for authorized access

Original Series

Other Data sets

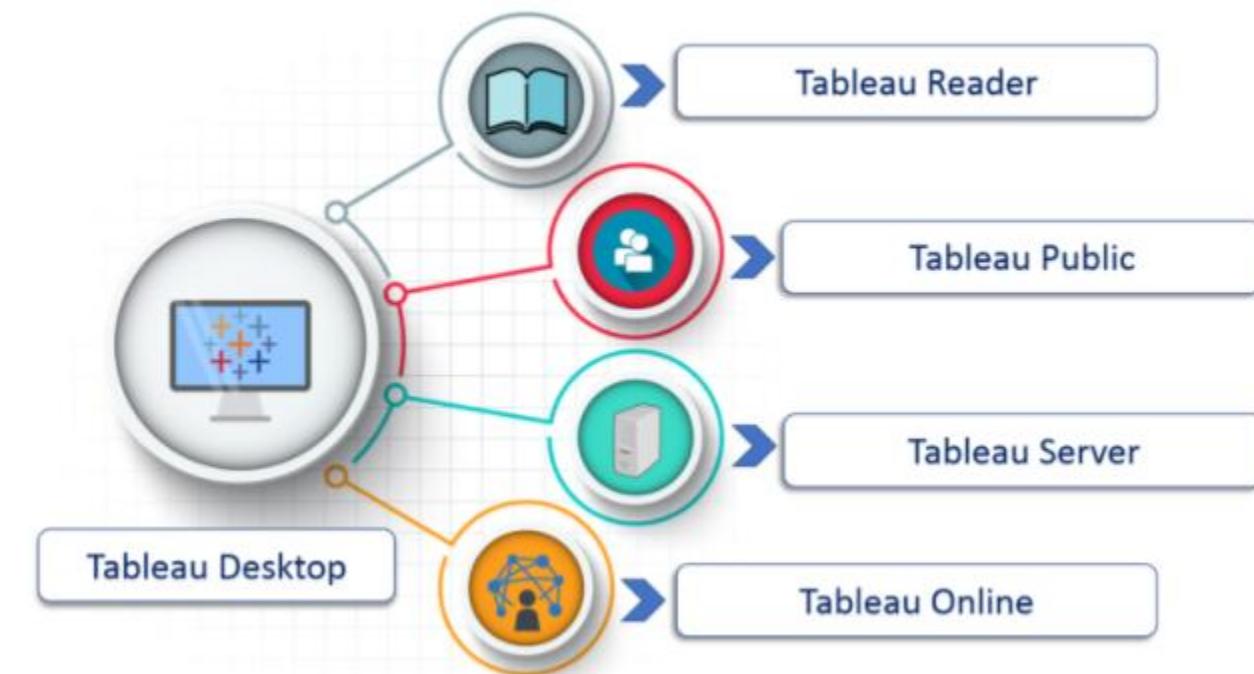
- <http://www.gapminder.org/data/>
- <http://flowingdata.com/>
- <http://www.visualisingdata.com/>
- <https://datamarket.azure.com/browse/data>
- <https://opendata.socrata.com/>
- <https://www.quora.com/Where-can-I-find-large-datasets-open-to-the-public>
- <https://www.kaggle.com/competitions>
- <http://snap.stanford.edu/data/>
- <http://dataportals.org/>
- <https://www.quandl.com/>
- <https://giphy.com/gifs/cat-lol-VXdsfku3cKtcQ>
- <https://www.google.com/publicdata/directory>
- <http://datahub.io/search>
- <https://www.reddit.com/r/dataisbeautiful/>
- <https://datacatalog.worldbank.org/>
- <https://knoema.com/>
- <https://developers.google.com/freebase/>

Other Data sets

- <http://www.generatedata.com/>
- www.mockaroo.com
- <https://opendata.socrata.com/dataset/World-s-Largest-Cathedrals/sfaz-u3mt>
- <https://www.kaggle.com/competitions>
- <http://64px.com/instagram/>
- <https://stackoverflow.blog/tags/c-c-wiki-dump/>
- <http://portals.broadinstitute.org/cgi-bin/cancer/datasets.cgi>
- <http://www.ieor.berkeley.edu/~goldberg/jester-data/>
- <http://www2.informatik.uni-freiburg.de/~cziegler/BX/>
- <https://www.cs.cmu.edu/~enron/L>
- <http://www.publicwhip.org.uk/project/data.php>

Other Data sets

- <https://github.com/fivethirtyeight/data/tree/master/airline-safety>
- <https://github.com/fivethirtyeight/data/tree/master/alcohol-consumption>
- <https://github.com/fivethirtyeight/data/tree/master/comic-characters>
- <https://github.com/fivethirtyeight/data/tree/master/bad-drivers>
- <https://chinookdatabase.codeplex.com/>
- <http://msftdbprodsamples.codeplex.com/releases/view/93587>
- <https://github.com/fivethirtyeight/data/tree/master/most-common-name>
- <https://github.com/fivethirtyeight/data/tree/master/classic-rock>
- <https://github.com/fivethirtyeight/data/tree/master/college-majors>
- <https://github.com/fivethirtyeight/data>
- <http://msftdbprodsamples.codeplex.com/releases/view/93587>
- <http://www.eclipse.org/birt/documentation/sample-database.php>



SYED AWASE KHIRNI

TABLEAU SETUP

Tableau

Please read terms of use for authorized access

Original Series

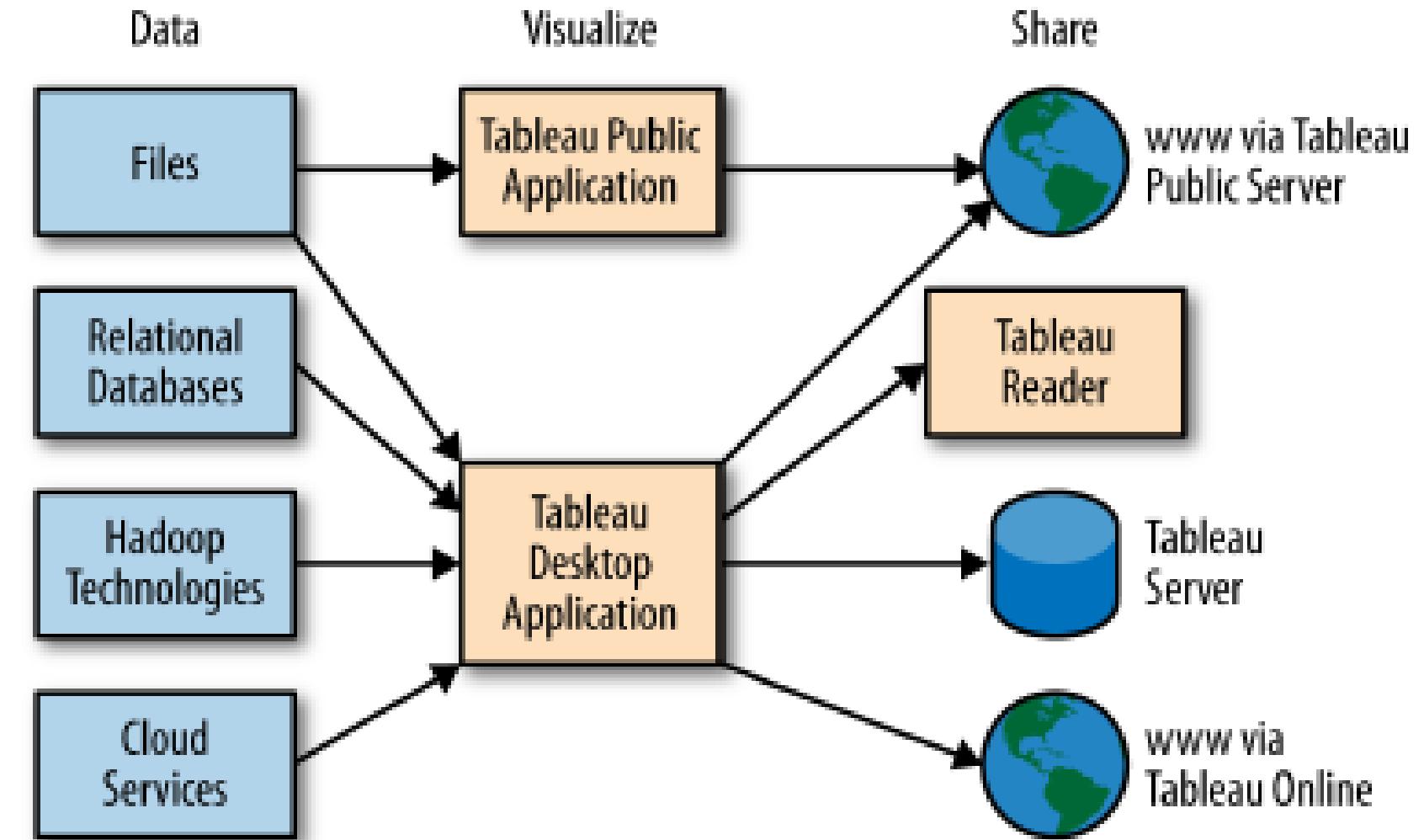


Tableau Product Diagram (Ben Jones, 2014, Communicating Data with Tableau, O'Reilly Media Inc., fig:2.1 page:18)

Tableau Software

Created by Christian Chabot, Chris Stolte ,Pat Hanrahan

Please read terms of use for authorized access



FAST ANALYTICS
FOR EVERYONE

With Tableau Desktop you can explore
and visualize any data in minutes.

[LEARN MORE | FREE TRIAL](#)



COLLABORATION FOR
ANY ORGANIZATION

Tableau Server is an online & mobile
business intelligence solution.

[LEARN MORE | FREE TRIAL](#)



BUSINESS INTELLIGENCE
IN THE CLOUD

Tableau Online is a hosted version of
Tableau Server, no setup required.

[LEARN MORE | FREE TRIAL](#)



FOR PUBLIC DATA

Tableau Public is for journalists or anyone
to publish interactive data online.

[LEARN MORE](#)

Tableau 8.3

- Tableau Dashboard

The screenshot shows the Tableau 8.3 dashboard interface. At the top, there's a navigation bar with 'Tableau - Book1' and icons for File, Data, Server, Help, and a search bar. To the right of the search bar are window control buttons and an 'Open workbook' link.

Data section:

- Connect to data**
- Saved data sources**
 - Sample - Coffee Chain (Access)
 - Sample - Superstore - English (Extract)
 - Sample - Superstore Subset (Excel)
 - Sample - World Bank Indicators (Excel)

Workbooks section:

Getting started

- Watch product tour
- Watch training videos
- Publish dashboards to web

Sample Workbooks

- World Indicators
- Finance
- Sales
- Science
- Variety

More samples

Activate Windows
Go to Settings to activate Windows.

Tableau

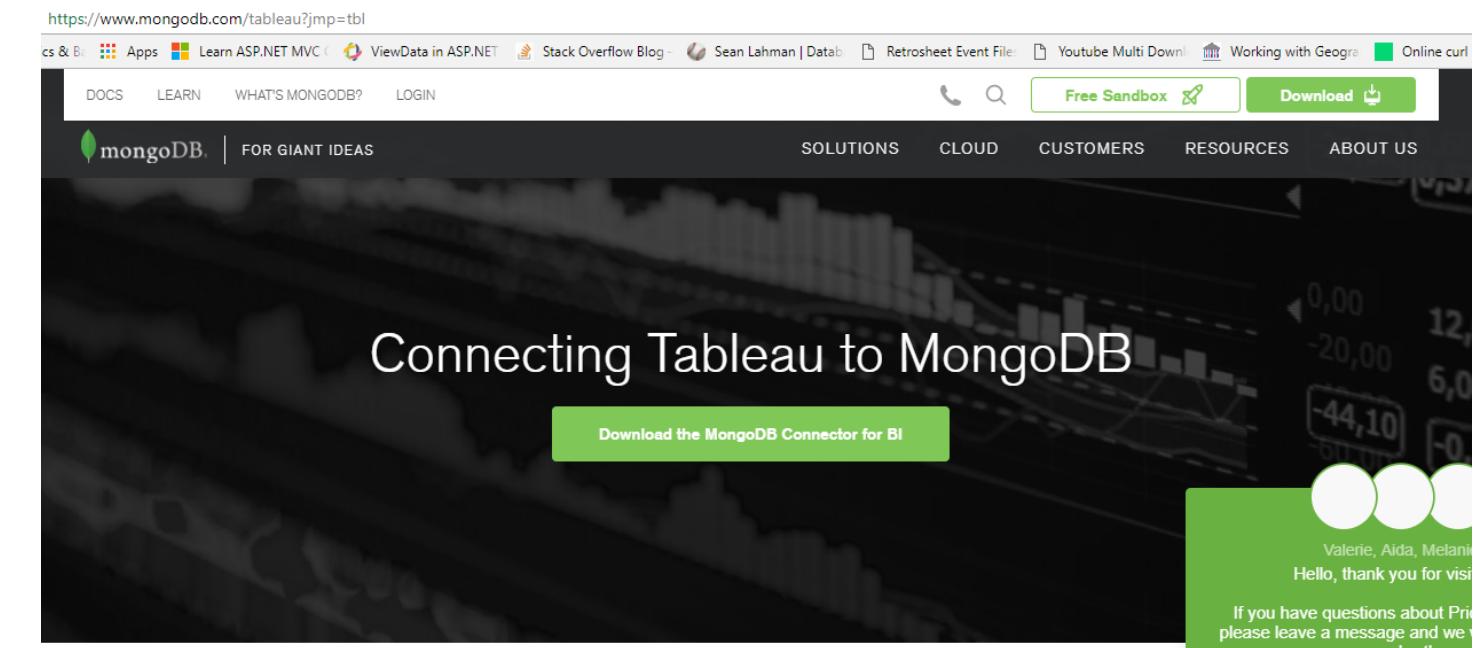
- Drivers to connect to various databases
- <https://www.tableau.com/support/drivers>

The screenshot shows the Tableau support website at <https://www.tableau.com/support>. The page features a search bar at the top. Below it, there's a section titled "Support by Product" with three categories: "Tableau Desktop" (with a monitor icon), "Tableau Server" (with a people icon), and "Tableau Online" (with a hand icon). To the right of these, a "More Products" section lists "Tableau Public", "Tableau Mobile", and "Tableau Reader". Further down, a "Quick Links" section includes links for "Contact Support" (with a "SUBMIT A CASE" button), "Download Drivers" (with a "SEE ALL" link and a red arrow pointing to it), and "Download Desktop & Server" (with a "ALL VERSIONS" link).

Tableau MongoDB Drivers

-

<https://www.mongodb.com/tableau?jmp=tbl>



The MongoDB Connector for Business Intelligence lets you use MongoDB as a data source for SQL-based analytics and data visualization tools like Tableau. Seamlessly create the Tableau visualizations and dashboards that will help you extract the insights

Connecting to Data Sources

- connecting to various data sources

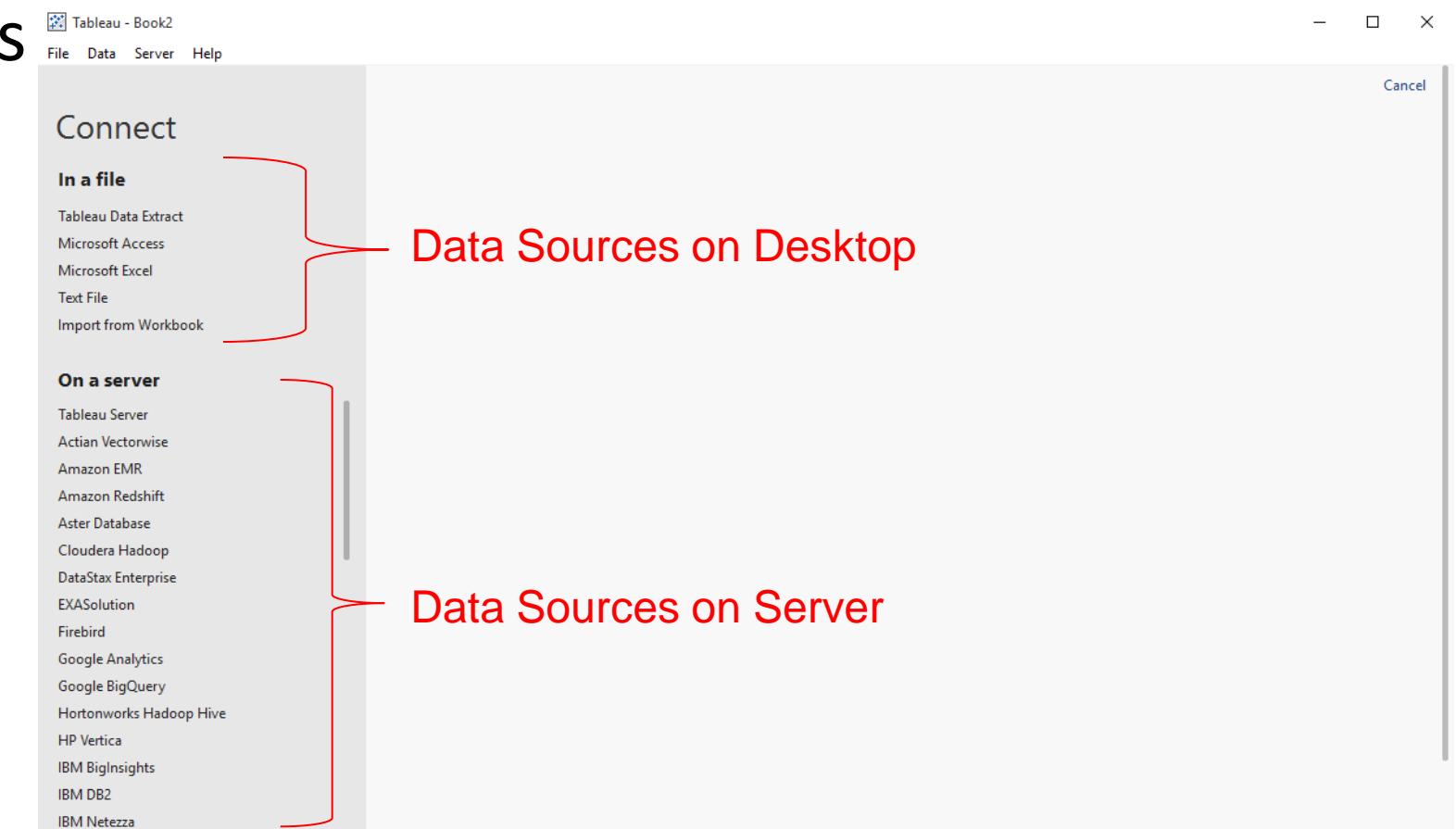


Tableau File Types

- Tableau workbook (.twb)
 - Stores a visualization without source data.
- Tableau bookmark (.tbm)
 - Stores a connection to a worksheet in another Tableau workbook
- Tableau data extract (.tde)
 - Stores tableau data as a filtered and aggregated extract
- Tableau datasource (.tds)
 - Stores the server address, password, and other information required to access a data source.
- Tableau packaged workbook (.twbx)
 - Stores extracted data and visualizations for viewing in Tableau or Tableau Reader

Data Types Supported by Tableau

Please read terms of use for authorized access

Original Series

Boolean

Date

Date & Time

Geographical
Values

Text/String

Number(Decimal)

Number(Whole)

Tableau Help

<https://www.tableau.com/learn/training#getting-started>

The screenshot shows a web browser window with the URL <https://www.tableau.com/learn/training#getting-started> in the address bar. The page title is "Free Training Videos". A search bar is present at the top. The main content area is titled "Tableau Desktop" and contains a brief description: "Do you have data and Tableau Desktop? These videos are for you! Learn how to connect, explore, analyze, present, and share your data." Below this, there is a section for "Getting Started" with three video thumbnails:

Video Title	Duration
Getting Started	25 MIN
The Tableau Interface	4 MIN
Distributing and Publishing	4 MIN

On the right side, there are links for "MORE WAYS TO LEARN" including "eLearning" and "Classroom Training".

<https://www.tableau.com/learn/tutorials/on-demand/getting-started-data?edition=unlicensed&version=9.3.0&full-version=9300.16.0315.0125&platform=windows&status=buy®-delay=true>

Problem Description:

Data set used:	
----------------	--

SYED AWASE KHIRNI

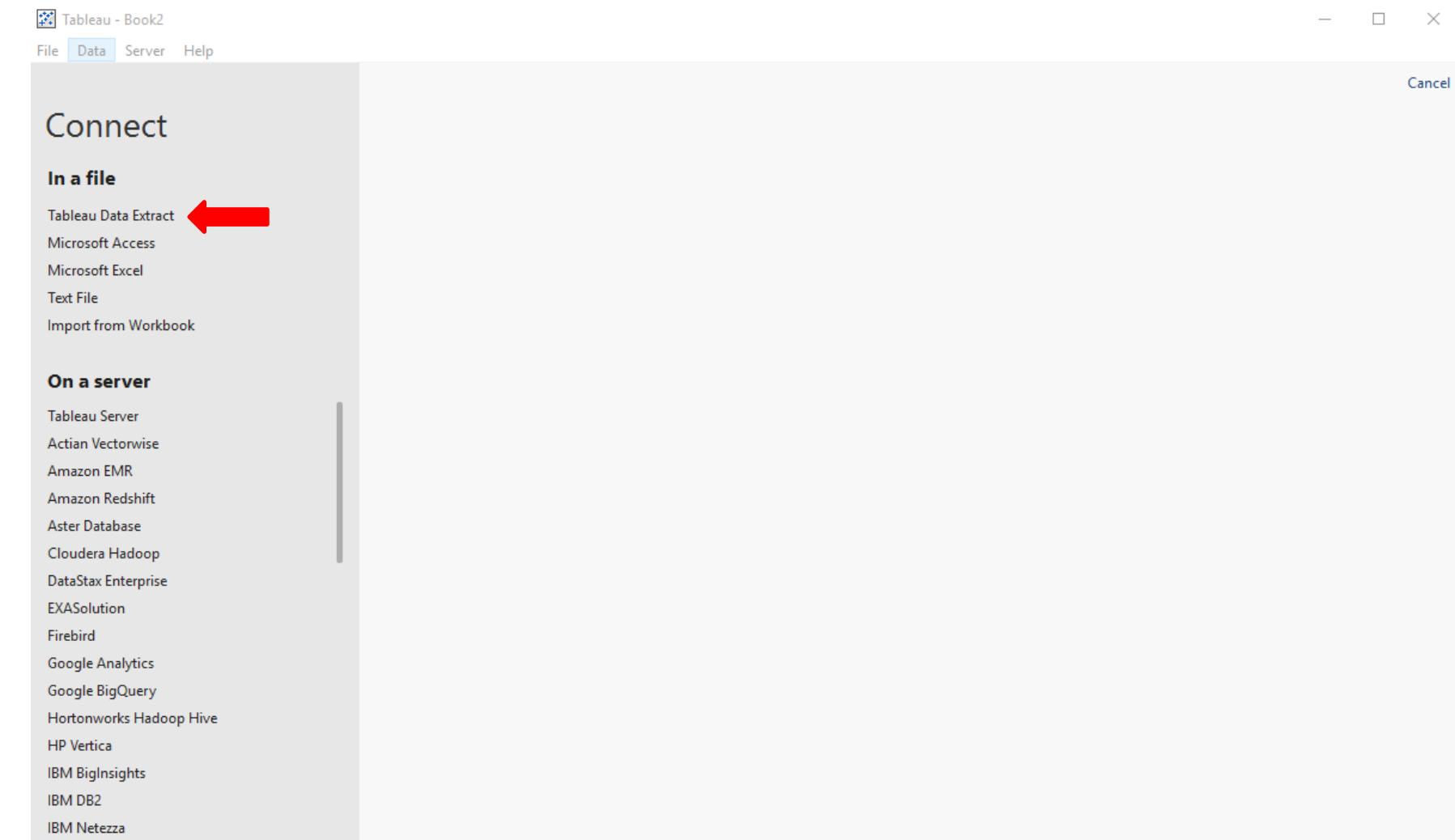
TABLEAU : CONNECTION TYPES

TABLEAU

PLAY BOOK : SETTING UP WORKSHEET BY CONNECTING TO TABLEAU DATA EXTRACT

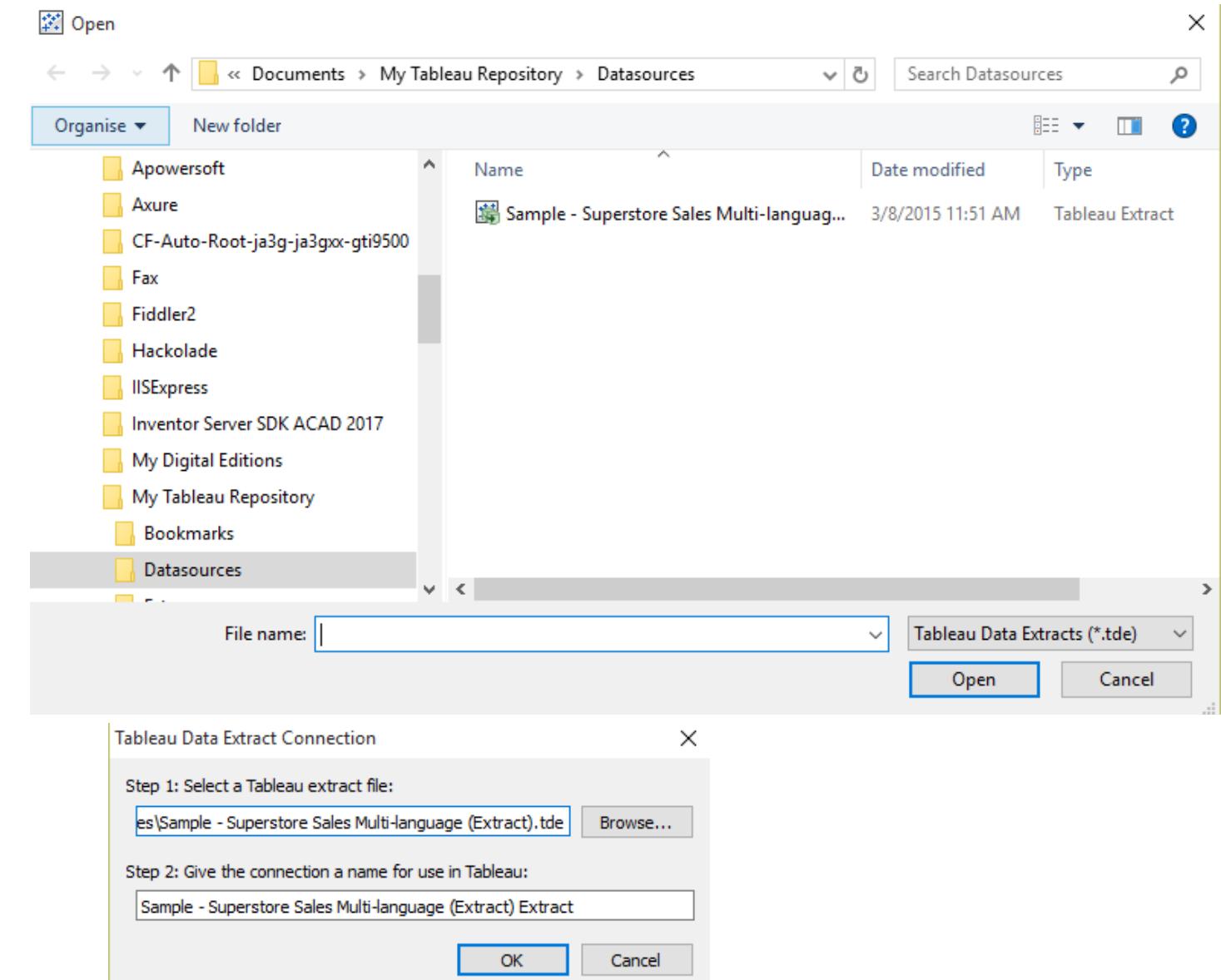
Step 1:

- Connecting to TABLEAU DATA EXTRACT



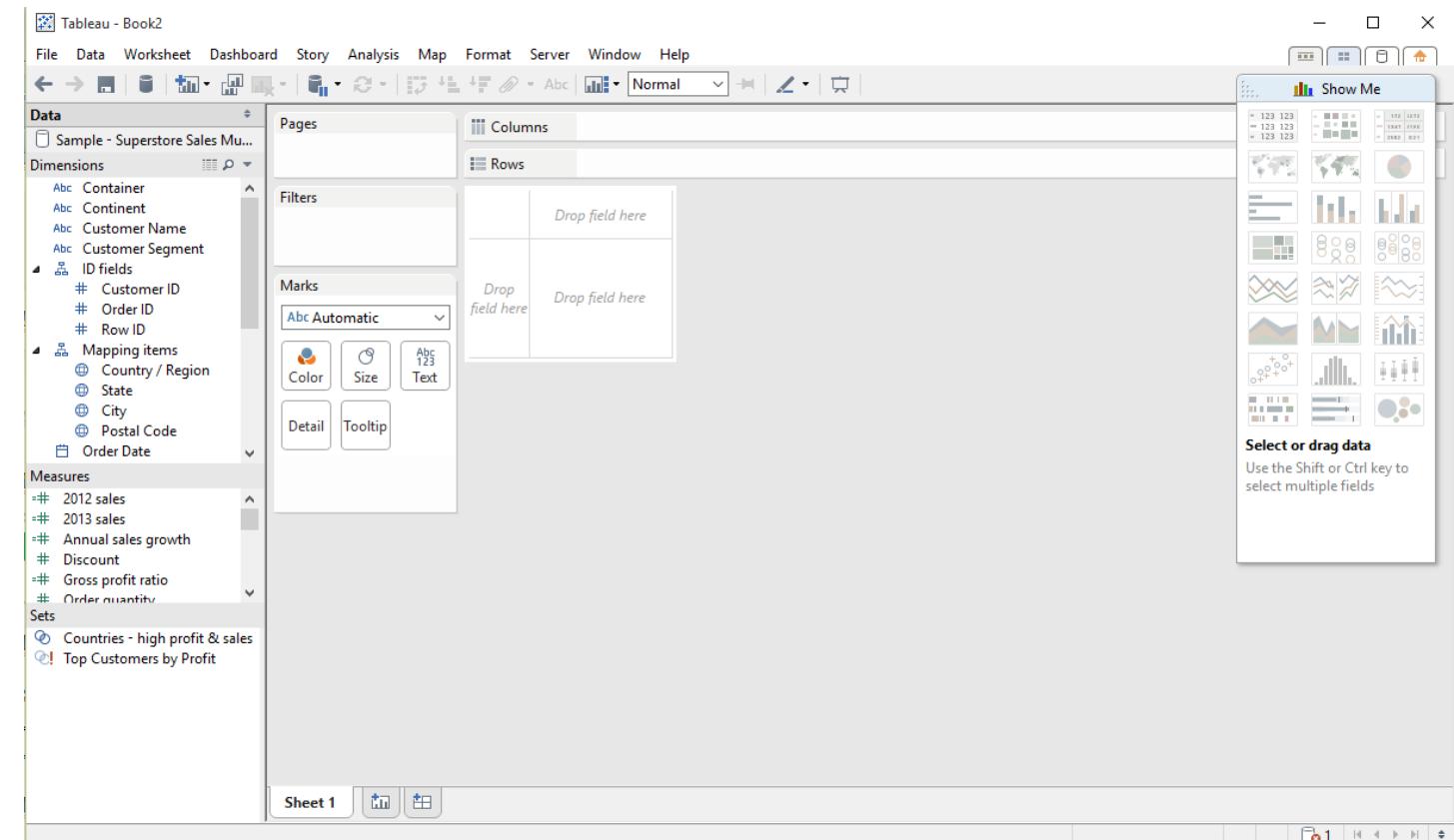
Step 2:

- select tableau data extract file



Step 3:

- creates a worksheet panel. With Dimensions, Measures, Sets and Data on the side bar.
- Tableau provides a set of predefined visualization toolbox on the right side bar.

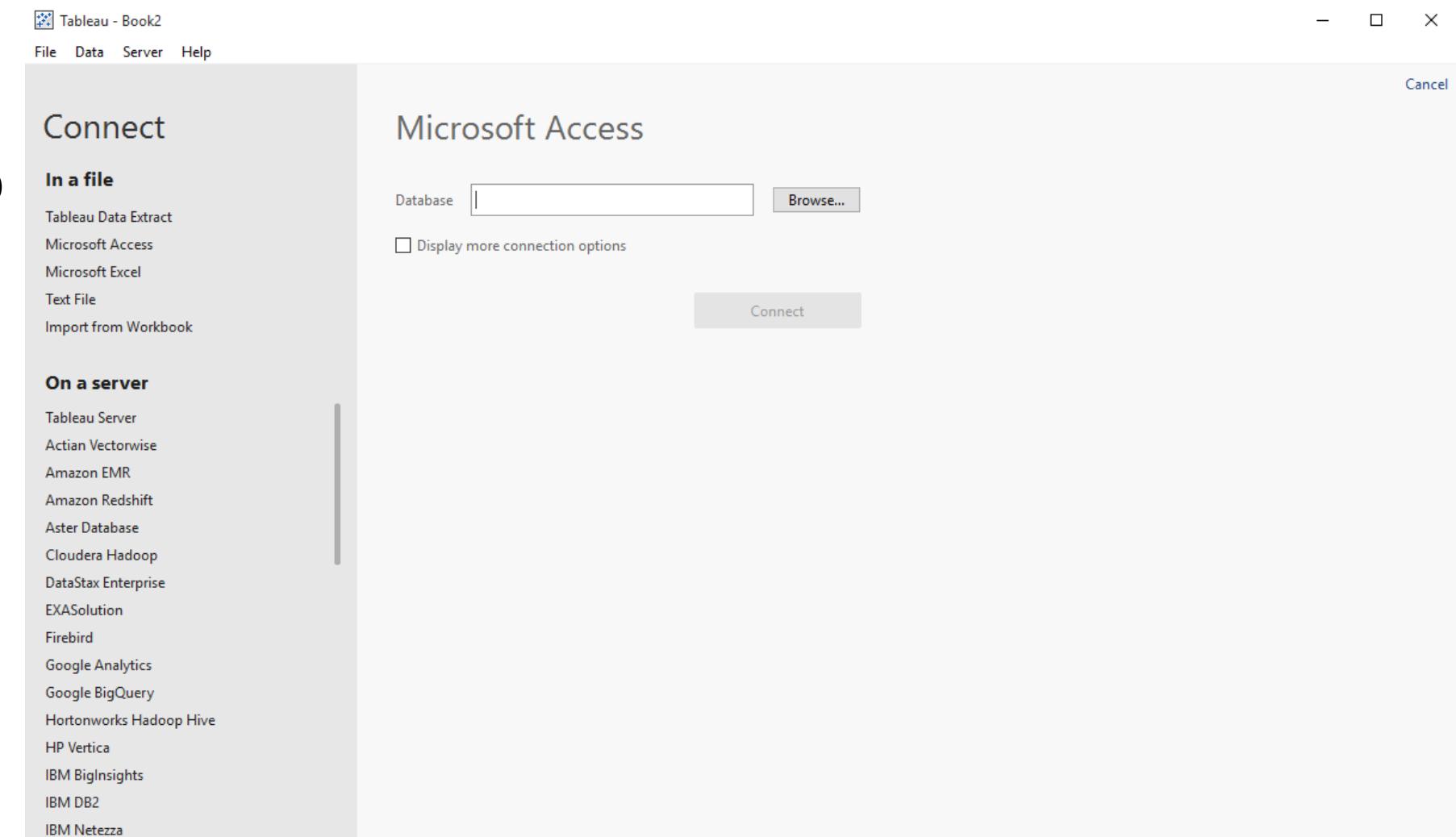


TABLEAU

PLAY BOOK : SETTING UP WORKSHEET BY CONNECTING TO MICROSOFT ACCESS

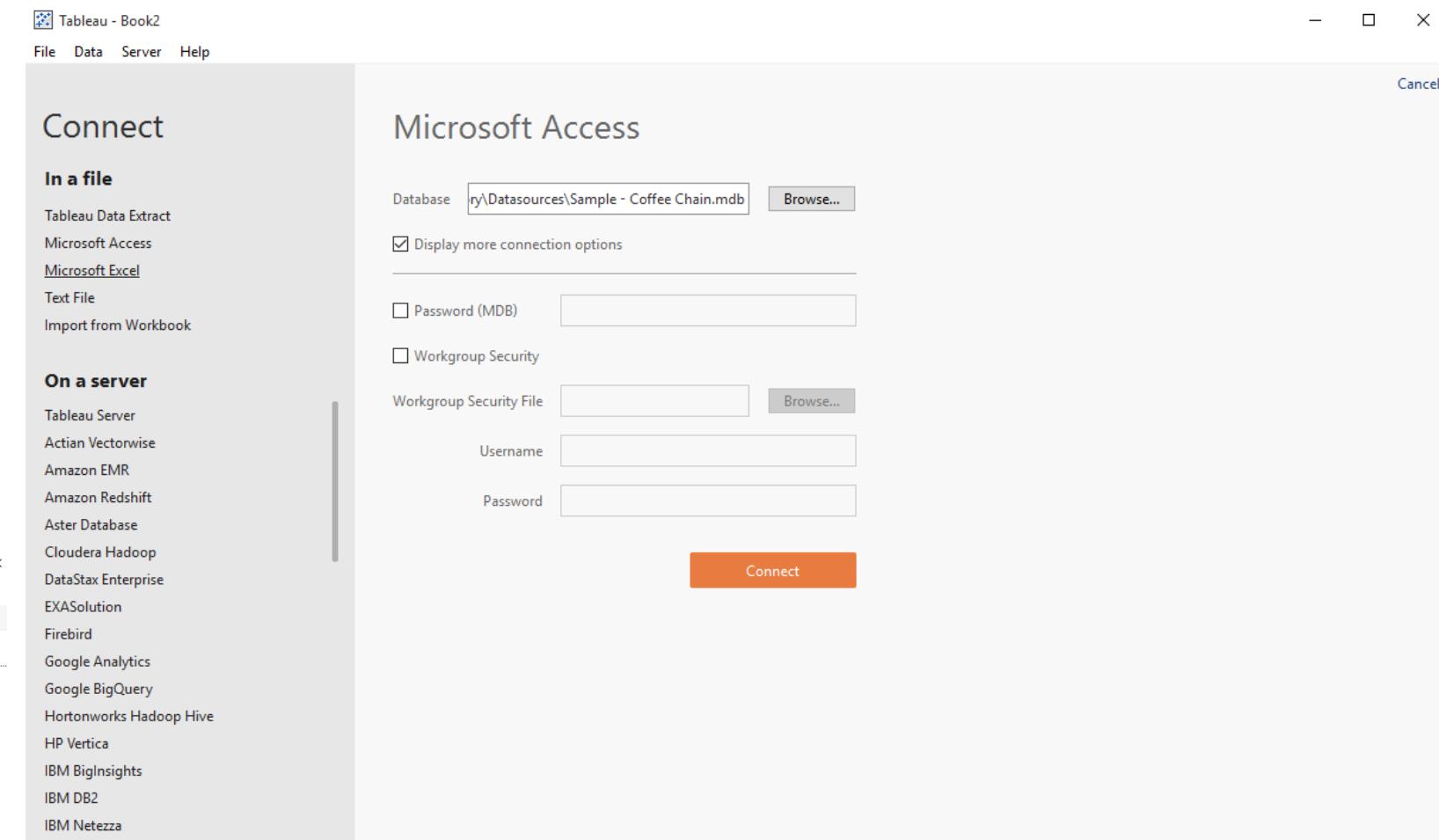
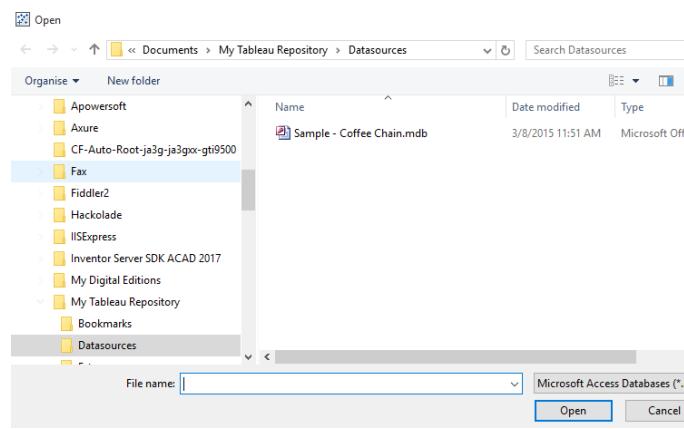
Step 1:

- Connecting to TABLEAU DATA EXTRACT



Step 2:

- connecting to Microsoft Access Database.



Step 3:

- Select tables to work with in worksheet

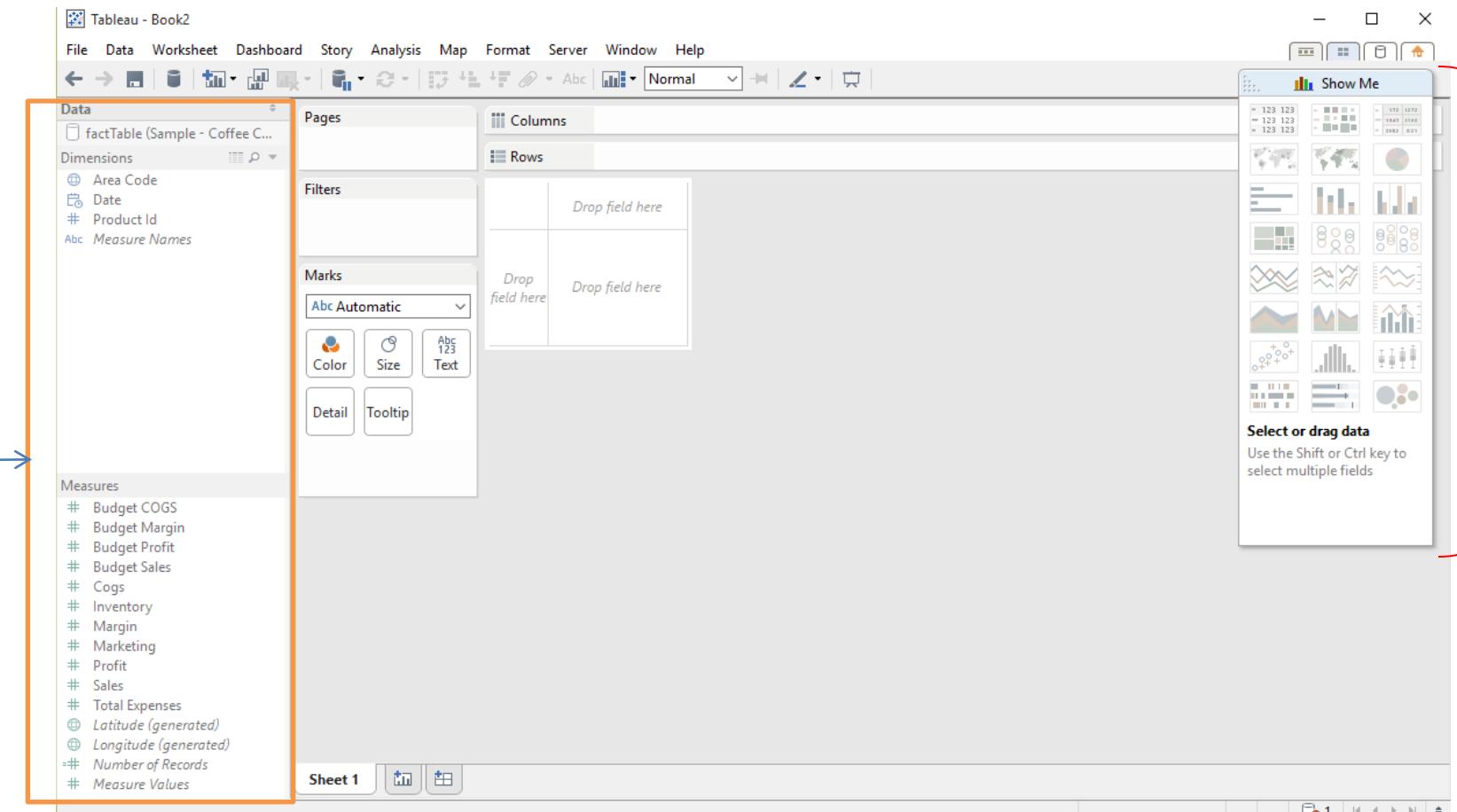
The screenshot shows the Tableau Data Source interface. The title bar says "Tableau - Book2". The menu bar includes File, Data, Server, Help. The connection status is "Connected to Microsoft Access" with "Sample - Coffee Chain.mdb". The "factTable (Sample - Coffee Chain)" is selected. On the left, there's a sidebar with "Database File" set to "Sample - Coffee Chain.mdb" and a "Table" section containing "Enter table name" and a list of tables: "CoffeeChain Query", "factTable", "Location", "Product", and "New Custom SQL". On the right, the data preview for "factTable" is shown in a grid format with columns: Profit, Margin, Sales, Cogs, Total Expenses, Marketing, Inventory, Budget Profit, and Budget COGS. The first few rows of data are visible. A red arrow points to the "Go to Worksheet" button at the bottom right of the preview area.

Profit	Margin	Sales	Cogs	Total Expenses	Marketing	Inventory	Budget Profit	Budget COGS
#	#	#	#	#	#	#	#	#
94.00	130.000	219.000	89.000	36.000	24.000	777	100.000	
68.00	107.000	190.000	83.000	39.000	27.000	623	80.000	
101.00	139.000	234.000	95.000	38.000	26.000	821	110.000	1
30.00	56.000	100.000	44.000	26.000	14.000	623	30.000	
54.00	80.000	134.000	54.000	26.000	15.000	456	70.000	
53.00	108.000	180.000	72.000	55.000	23.000	558	80.000	
99.00	171.000	341.000	170.000	72.000	47.000	1,091	110.000	1
0.00	87.000	150.000	63.000	87.000	57.000	435	20.000	
33.00	80.000	140.000	60.000	47.000	19.000	336	40.000	

Step 4:

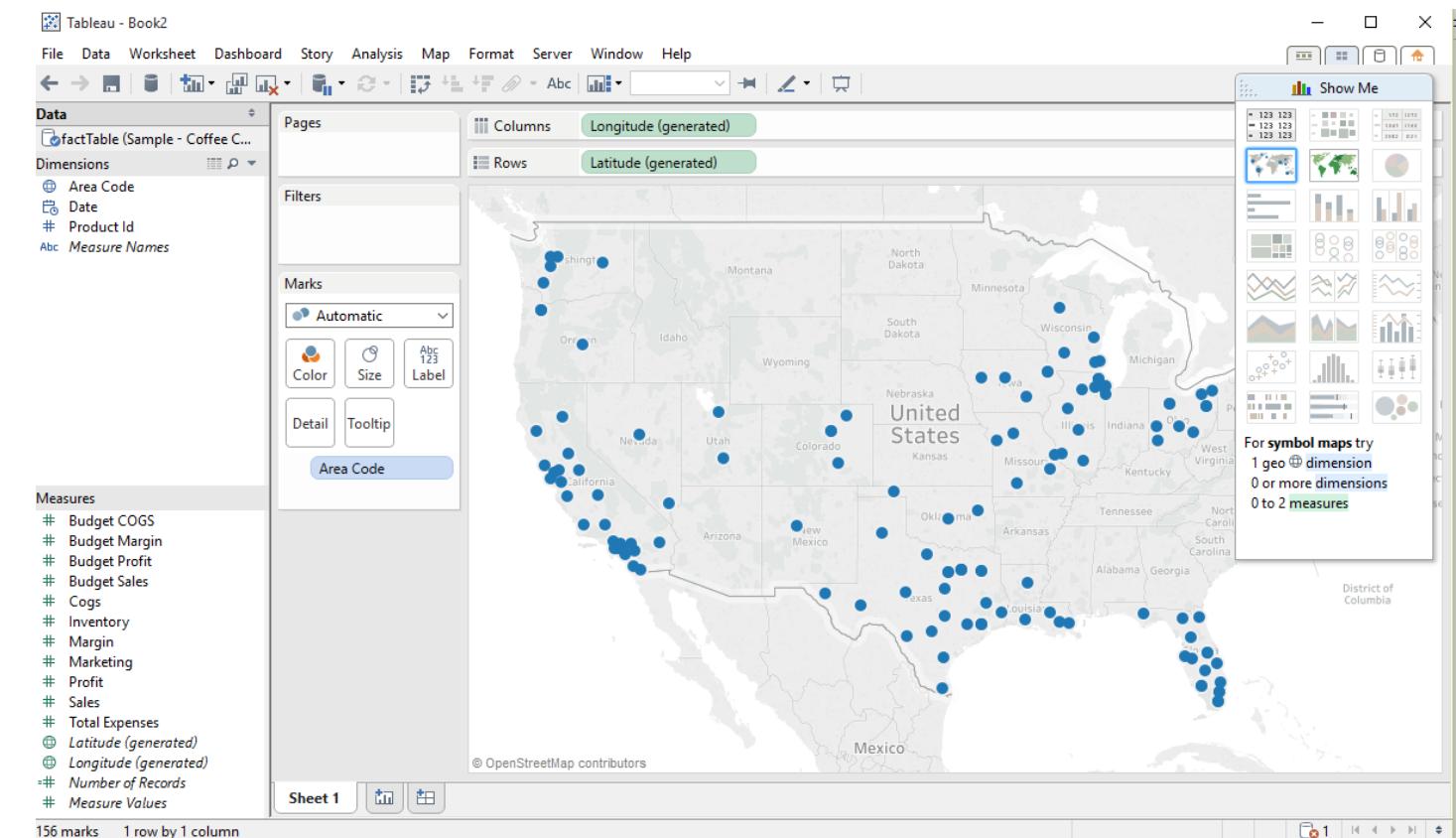
- prompts you for worksheet.

DATA PANEL



Step 5:

- Select an appropriate dimension to visualize your data based on the pre-defined sets of visualizations.

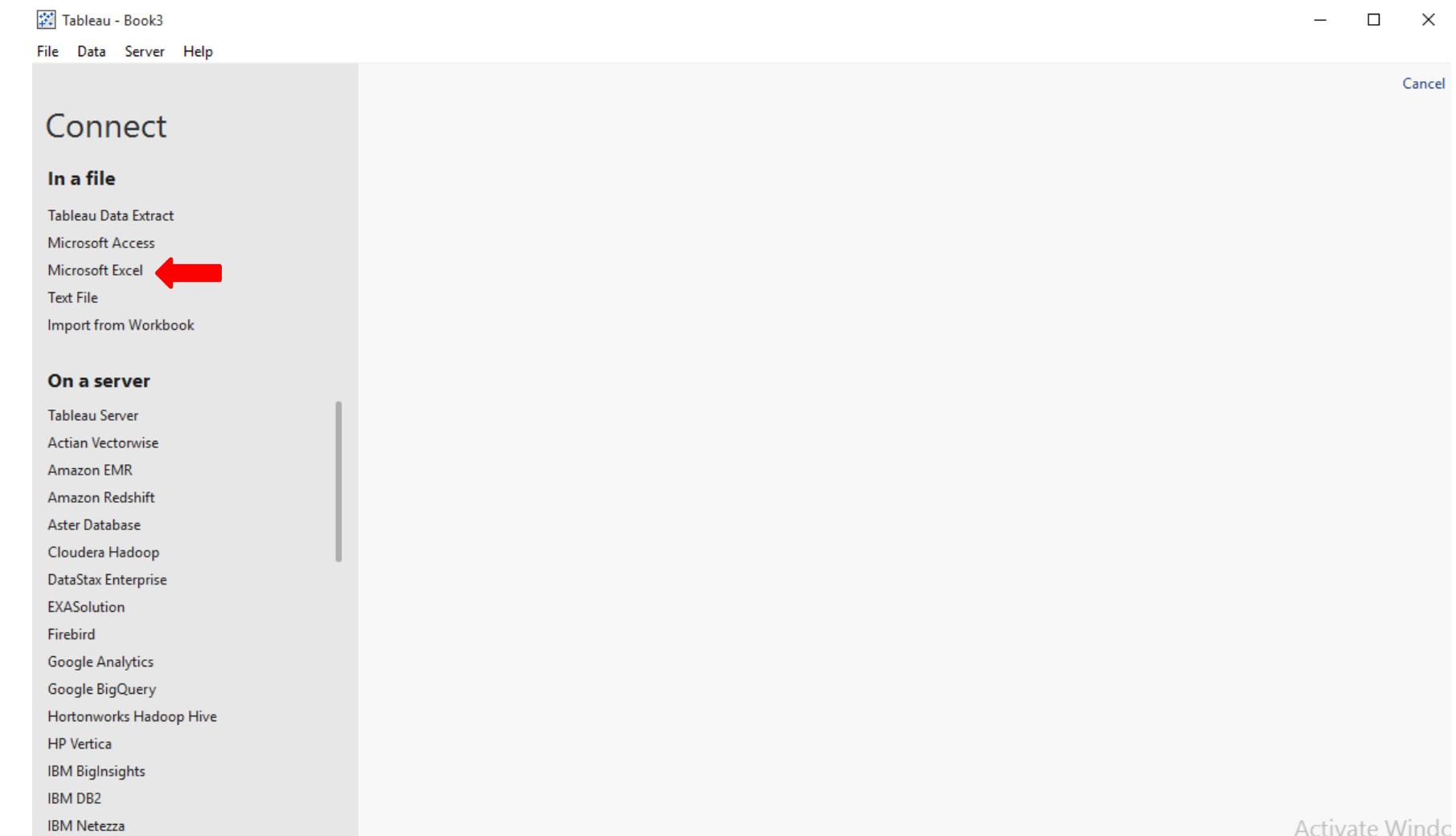


TABLEAU

PLAY BOOK : SETTING UP WORKSHEET BY CONNECTING TO MICROSOFT EXCEL

Step 1:

- Connecting to Microsoft Excel

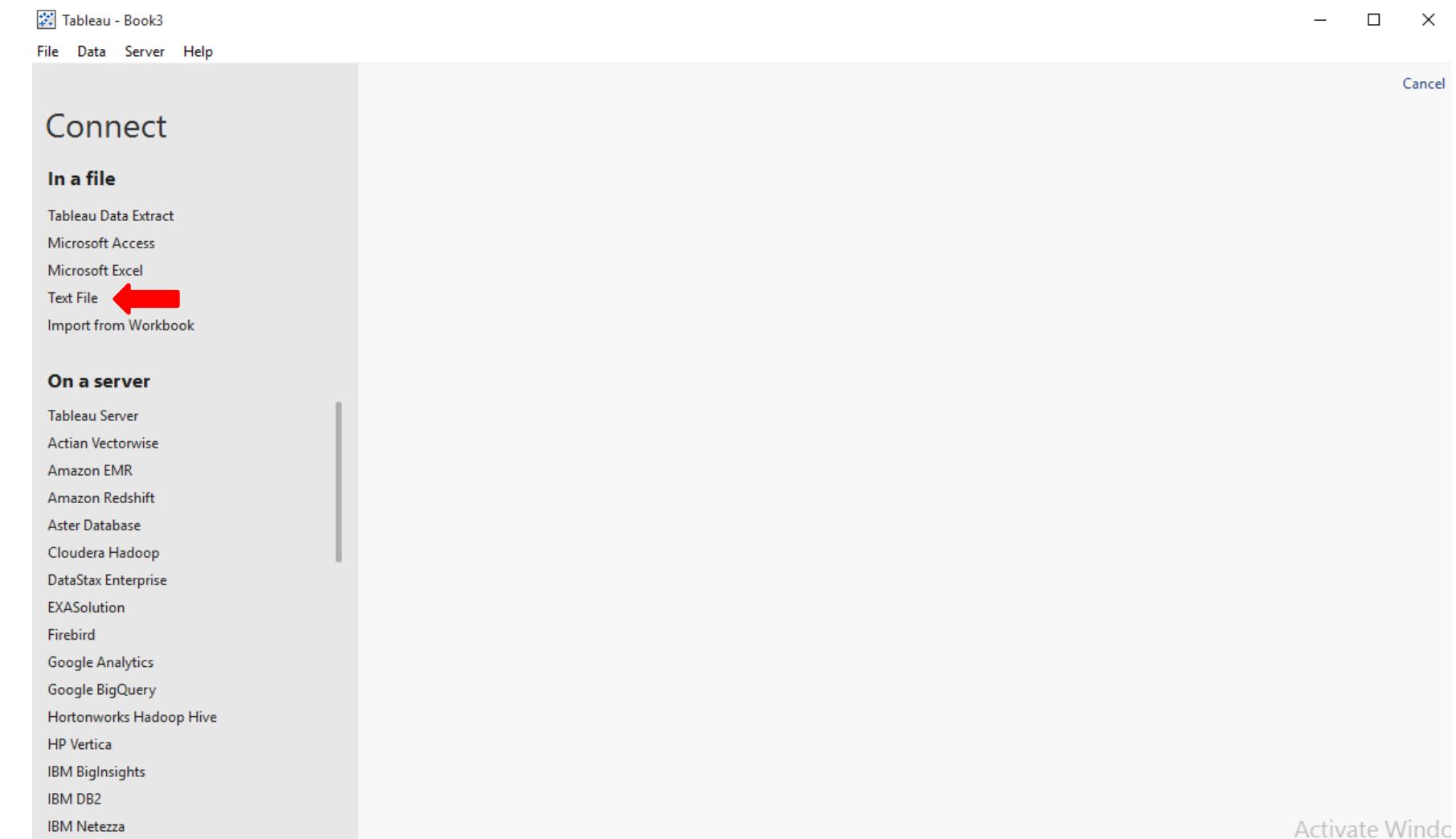


TABLEAU

PLAY BOOK : SETTING UP WORKSHEET BY CONNECTING TO TEXT FILE

Step 1:

- Connecting to Text File



SYED AWASE KHIRNI

TABLEAU : ORGANIZING YOUR DATA

SYED AWASE KHIRNI

TABLEAU : BASIC VISUALIZATIONS

Problem Description:

Data set used:

TABLEAU

PLAY BOOK : GENERATING VISUALIZATION USING MICROSOFT EXCEL DATA SOURCE

Step 1:

- Connecting to Super Store Subset Excel Sheet.
- Drag the sheets into the selection panel to visualize the relationship between the variables

Data: C:\Users\SyedAwase\Documents\My Tableau Repository\Datasources

The screenshot shows the Tableau Data Source interface. At the top, it displays the connection name "Orders+ (Sample - Superstore Subset (Excel))". Below this, the "Connection" section has "Live" selected. The "Filters" section shows 0 filters with an "Add..." button. On the left, the "Workbook" section shows "Sample - Superstore Subset (Excel).xlsx" and the "Sheets" section lists "Orders", "Returns", and "Users". A central workspace shows a diagram with three nodes: "Orders", "Returns", and "Users", connected by lines. Below the workspace is a preview pane containing a data grid with 98 rows of data. The columns include Row ID, Order Priority, Discount, Unit Price, Shipping Cost, Customer ID, Customer Name, and Ship Mode. The data shows various order details and customer information.

Row ID	Order Priority	Discount	Unit Price	Shipping Cost	Customer ID	Customer Name	Ship Mode
1359	Low	0.050000	5.850	2.2700	21	Tony Wilkins Winters	Regular Air
1950	Medium	0.010000	4.910	0.5000	117	Linda Weiss	Regular Air
1951	Medium	0.090000	4.000	1.3000	117	Linda Weiss	Express Air
5055	High	0.020000	3.280	5.0000	117	Linda Weiss	Regular Air
5573	Low	0.020000	11.970	5.8100	272	Eleanor Swain	Regular Air
5574	Low	0.030000	159.310	60.0000	272	Eleanor Swain	Delivery Truck
5302	High	0.010000	8.330	1.9900	308	Glen Caldwell	Regular Air
5303	High	0.040000	85.990	0.9900	308	Glen Caldwell	Regular Air
5257	Low	0.090000	550.980	64.5900	349	Kim Weiss	Delivery Truck

Measures

- **Measures** are the numeric metrics or measurable quantities of the data, which can be analyzed by dimension table. Measures are stored in a table that contain foreign keys referring uniquely to the associated dimension tables.
- The table supports data storage at atomic level and thus, allows more number of records to be inserted at one time. For instance, a Sales table can have product key, customer key, promotion key, items sold, referring to a specific event.

Dimensions

- **Dimensions** are the descriptive attribute values for multiple dimensions of each attribute, defining multiple characteristics.
- A dimension table ,having reference of a product key form the table, can consist of product name, product type, size, color, description, etc.

Tableau Data

Please read terms of use for authorized access

Original Series

Data: Dimensions

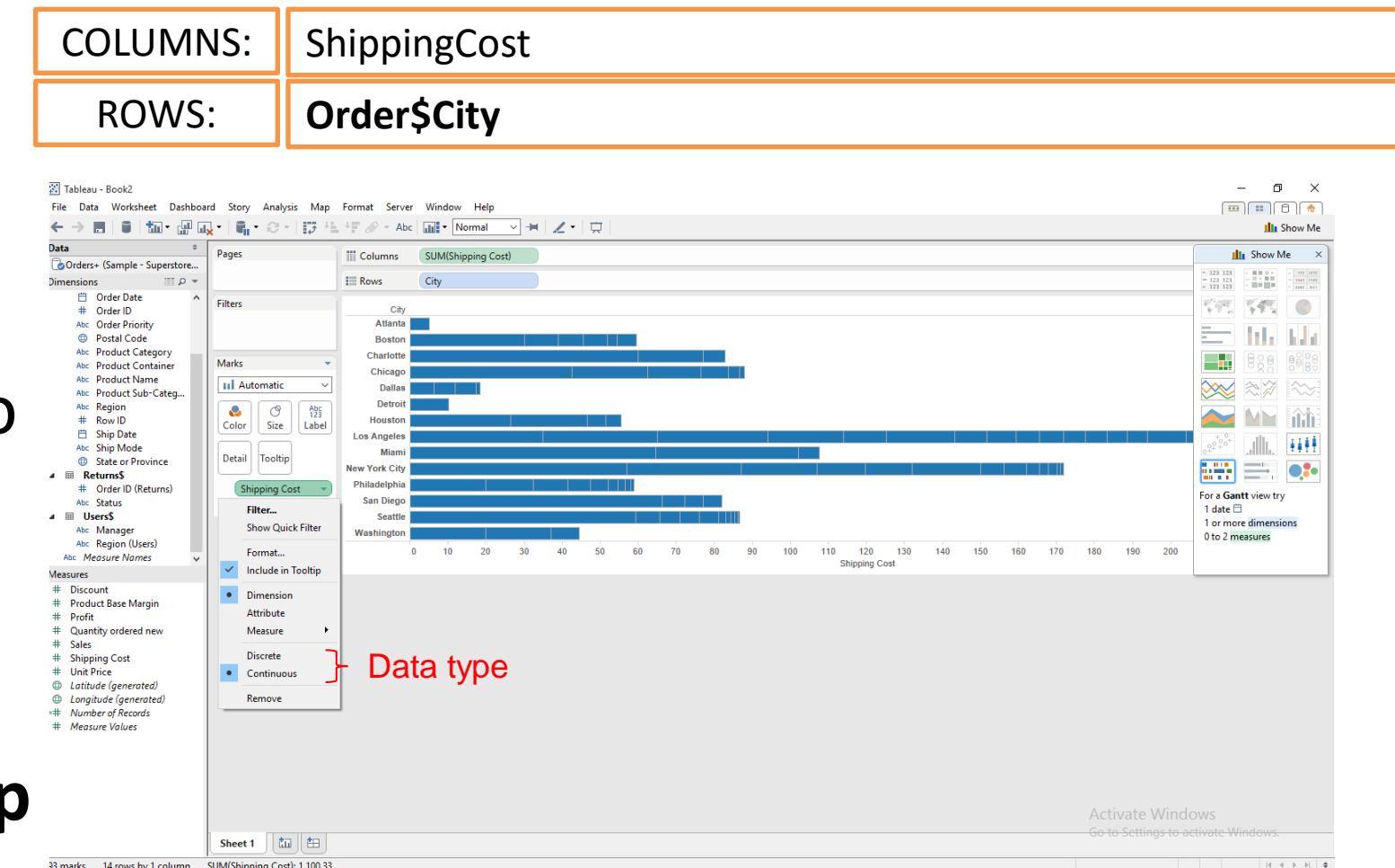
- Dimensions are variables that are categorical data types/Qualitative data type.
- Dimensions are independent variables
- Tableau recognizes dimensions and color codes them in blue.
- Dimensions specify the level of granularity in tableau.

Data: Measures

- Measure are numerical data or quantitative data type.
- Measure are dependent variables.
- Tableau recognizes measures and color codes them in green.
- Measures are used for aggregation in tableau

Step 2:

- select from Data Panel /Dimensions Orders\$City drag it to the visualization canvas on to Rows.
- We would like to draw the relationship between city and shipping costs.



Comparisons

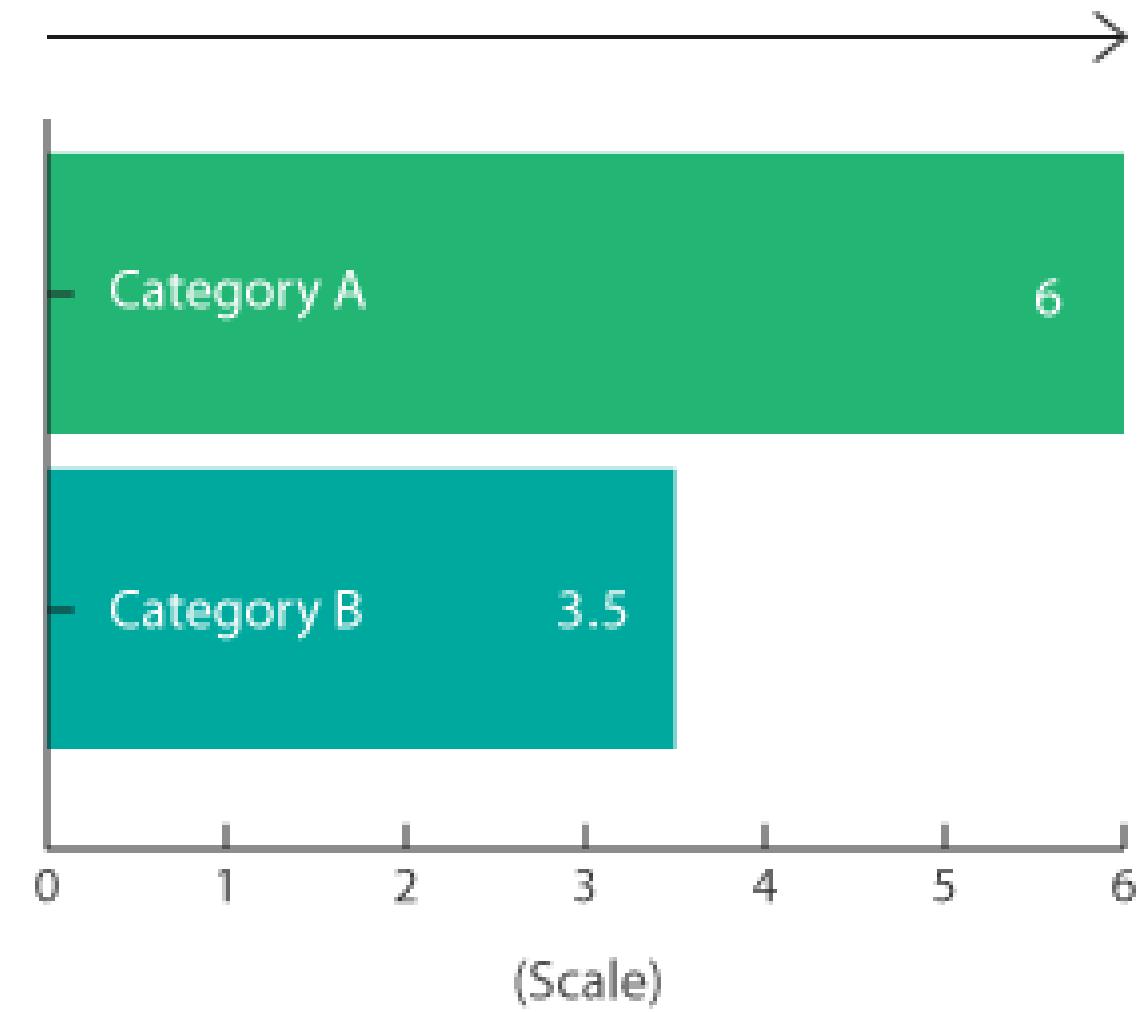
Pattern

Bar Chart

- can be either horizontal or vertical bars
- To show discrete, numerical comparisons across categories being compared
- They do not display continuous developments over an interval.
- **Challenge: labeling for huge data**

Original Series

Bar length = value amount



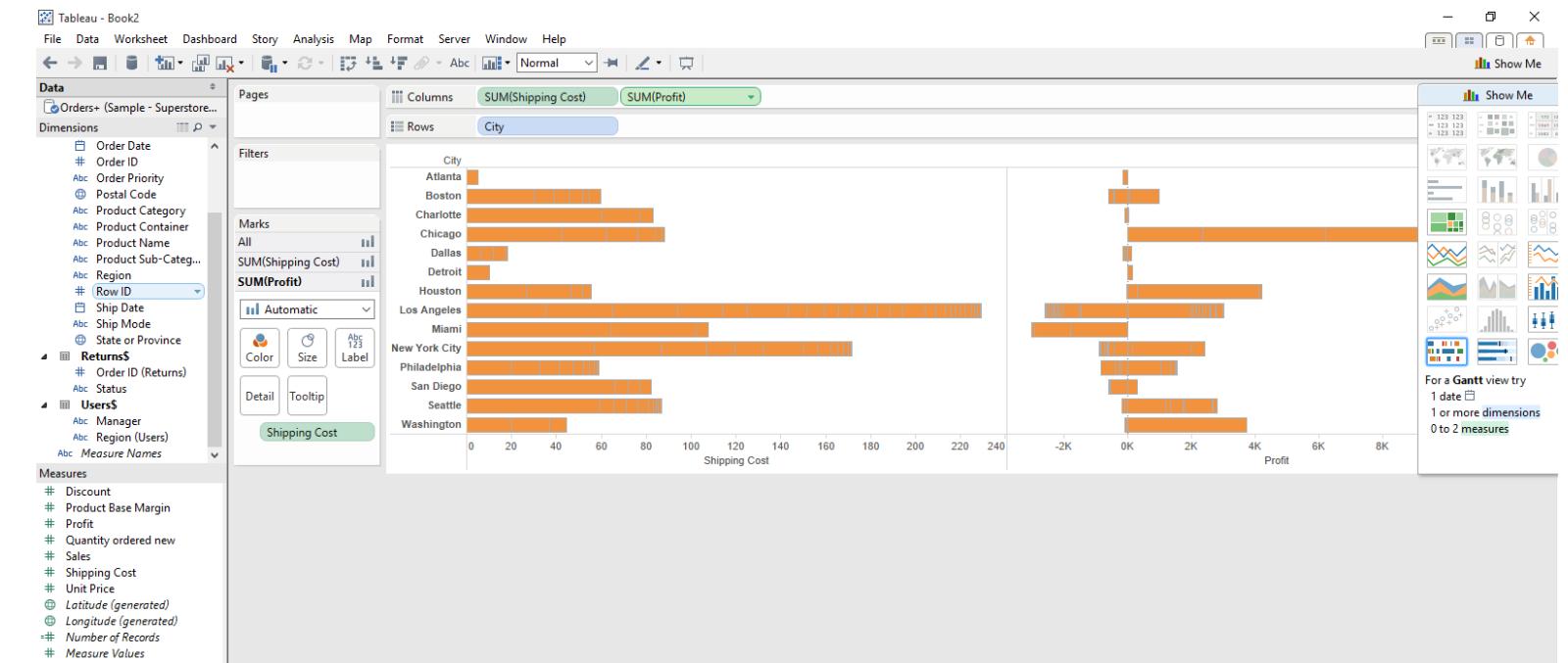
Bar Chart

- Bar charts reveal highs and lows at a glance.
- Effective for numerical data that splits nicely into different categories.
- Used for comparing data across categories.
- Add colors to bars for more impact.
- Displaying related data on top or next to each other gives depth to analysis and address multiple questions.
- Can be used to plot positive and negative data points along a continuous axis.
- Can be combined with bar charts with maps.

Step 3:

- select from **Data Panel /Dimensions** Orders\$City drag it to the visualization canvas on to Rows.
- We would like to draw the relationship between city and shipping costs.
- Adding additional variables to compare and visualize

COLUMNS:	ShippingCost, Profit
ROWS:	Order\$City



Problem Description:

Data set used:

TABLEAU

PLAY BOOK : GENERATING VISUALIZATION FOR PRODUCT CATEGORY, SUB-CATEGORY

Step 1:

- select **Product Category** dimension and drag it to visualize on the canvas (ROWS)

COLUMNS:

ROWS: ProductCategory

Tableau - Book3

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Data

Sheet1 (Sales File with India Data)

Dimensions

- Customer Name
- Customer Segment
- Customer State
- Order Date
- Order ID
- Order Priority
- Product Category
- Product Container
- Product Name
- Product Sub-Category
- Region
- Ship Date
- Ship Mode
- Measure Names

Marks

Abc Automatic

Color Size Abc 123 Text

Detail Tooltip

Filters

Product Category

Product Category	Abc
Furniture	Abc
Office Supplies	Abc
Technology	Abc

Pages

Columns

Rows ProductCategory

Show Me

For text tables try
1 or more dimensions
1 or more measures

Data Source: India Sales Data

Step 2:

- select **Product Sub-Category** dimension and drag it to visualize on the canvas (ROWS)

COLUMNS: []

ROWS: [] **ProductCategory,Product Sub-Category**

Product Category	Product Sub-Category	Customer Name
Furniture	Bookcases	Abc
	Chairs & Chaimats	Abc
	Office Furnishings	Abc
	Tables	Abc
Office Supplies	Appliances	Abc
	Binders and Binder Accessori..	Abc
	Envelopes	Abc
	Labels	Abc
	Paper	Abc
	Pens & Art Supplies	Abc
	Rubber Bands	Abc
	Scissors, Rulers and Trimmers	Abc
	Storage & Organization	Abc
Technology	Computer Peripherals	Abc
	Copiers and Fax	Abc
	Office Machines	Abc
	Telephones and Communicati..	Abc

Data Source: India Sales Data

Step 3:

- Now, we shall add additional dimension

CustomerSegment

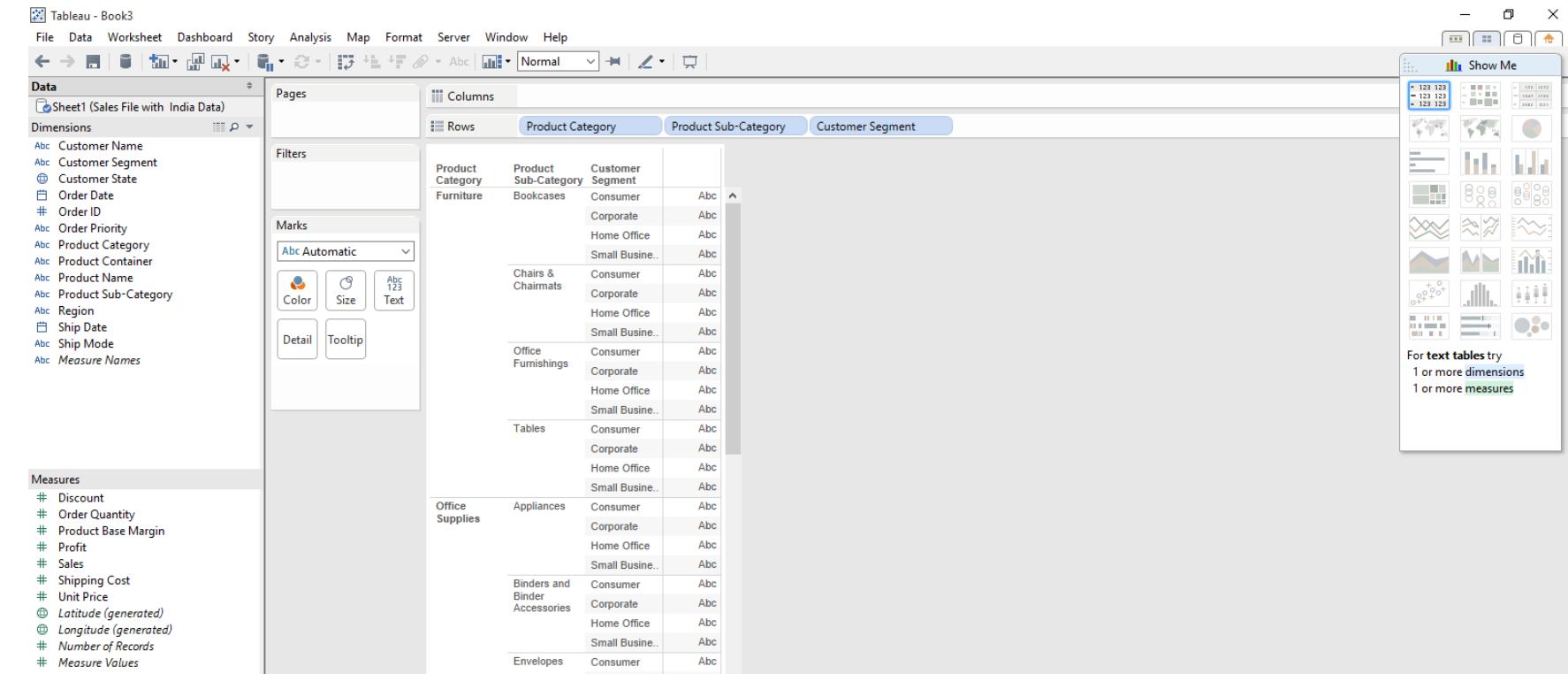
COLUMNS

ROWS

ProductCategory,Product Sub-Category

Please read terms of use for authorized access

Original Series

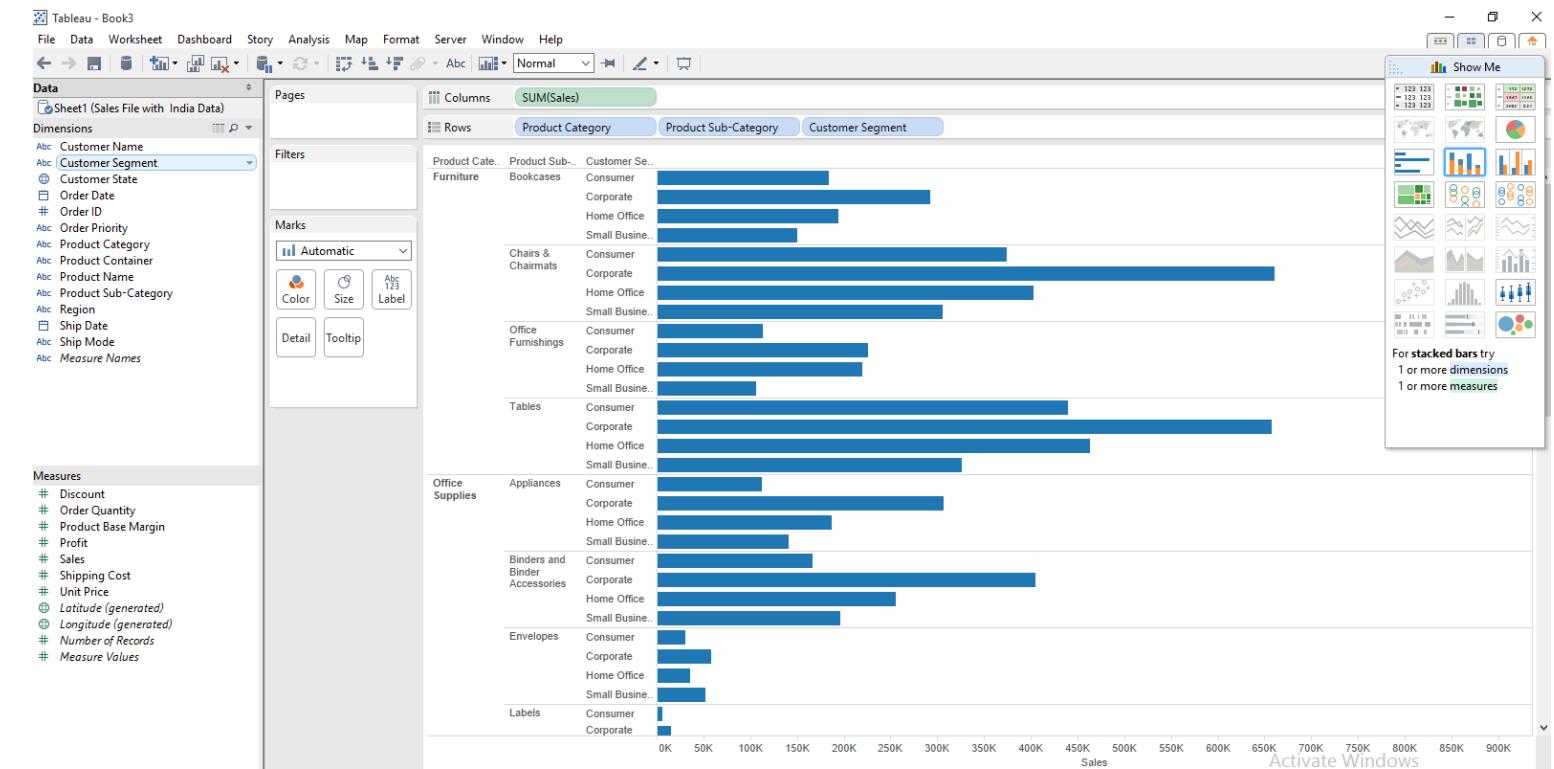


Data Source: India Sales Data

Step 3:

- Now, we shall add sales measure
- Note that TABLEAU automatically highlights possible visualizations, outlined in the visualization toolbox panel.**

COLUMNS:	sales
ROWS:	ProductCategory,Product Sub-Category



Data Source: India Sales Data

Step 4:

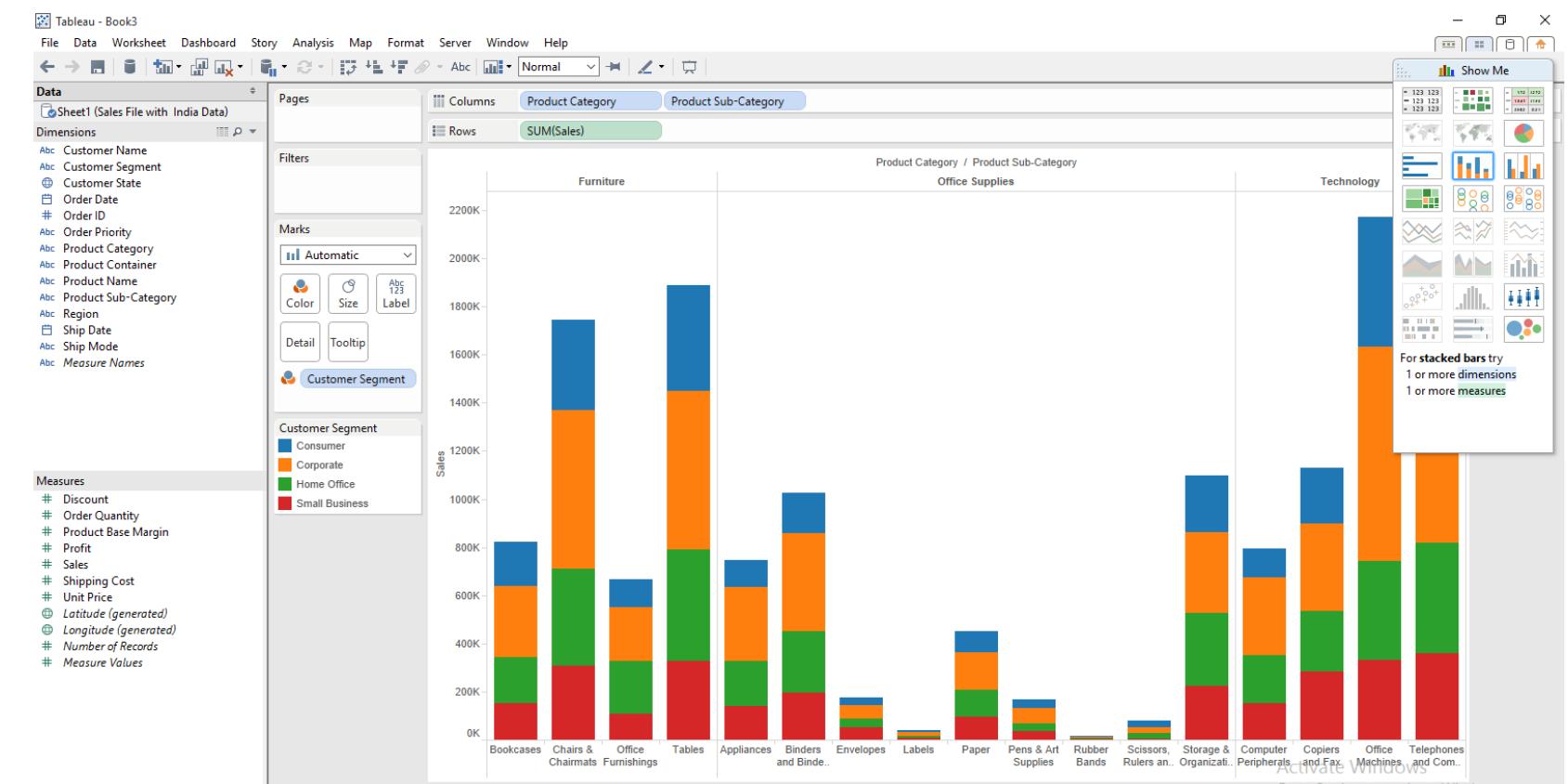
- upon selection of one of the highlighted visualization, you can transform to the new visualization.

COLUMNS

ROWS

sales

ProductCategory,Product Sub-Category



Data Source: India Sales Data

Problem Description:

Data set used:	
----------------	--

TABLEAU

PLAY BOOK : TABLEAU 9.X DATA INTERPRETER DEMO

Step 1:

- Some times data is irregularly structured during the capture phase making it difficult to prune or import.
- Tableau provides **Data Interpreter functionality** to structure this kind of dataset and import it.



Year 2015							
	id	first_name	last_name	email	gender	ip_address	
null	1	Audie	Elgee	aelgee0@jugem.jp	Female	202.60.234.36	
null	2	Charmain	Fantone	cfantone1@ocn.ne.jp	Female	62.72.74.99	
null	3	Doug	Reed	dreed2@google.it	Male	8.240.219.4	
null	4	Avie	Colerick	acolerick3@house.gov	Female	45.239.155.30	
null	5	Kathryne	Berrane	kberrane4@qq.com	Female	131.120.216.180	
null	6	Gilberta	Aulsford	gaulsford5@is.gd	Female	41.181.192.106	
null	7	Bernice	Duckerin	bduckerin6@microsoft.com	Female	73.129.27.239	
null	8	Ardyce	Sapey	asapey7@nifty.com	Female	0.70.242.40	
null	9	Norrie	Panniers	npanniers8@newsvine.com	Male	96.19.220.79	
null	10	Toiboid	Goodson	tgoodson9@tumblr.com	Male	41.70.165.218	
null	11	Alfreda	Josowitz	ajosowitzza@amazon.de	Female	174.54.54.143	
null	12	Corny	Chechetelli	cchechetellib@ted.com	Female	104.131.147.31	
null	13	Angel	Ebbing	aebbingc@google.nl	Male	46.80.133.51	
null	14	Ado	Hillyatt	ahillyatt@indiegogo.com	Male	118.210.76.148	
null	15	Bradly	Downton	bdowntone@simplemachines.org	Male	225.219.71.1	
null	16	Binni	Garnar	bgarnarf@shop-pro.jp	Female	192.90.127.152	
null	17	Odille	Massot	omassotg@hhs.gov	Female	207.12.159.29	
null	18	Cristine	Sliman	cslimanh@mlb.com	Female	140.34.69.29	
null	19	Rikki	Matyatin	rmatyatin@tumblr.com	Male	243.155.156.163	
null	20	Gill	Grayshon	ggrayshonj@goo.gl	Male	7.202.58.42	
null	21	Jillarye	Petracek	jpetracekk@nba.com	Female	90.73.13.243	
null	22	Susan	Grimme	sgrimmel@sfgate.com	Female	63.104.193.34	
null	23	Paul	Beamish	pbeamishm@baidu.com	Male	93.67.140.168	
null	24	Kessiah	Jost	kjostn@bbc.co.uk	Female	65.113.143.33	
null	25	Doy	St. Leger	dstlegero.imgur.com	Male	215.240.42.93	
null	26	Brunhilda	Topes	btopesp@ucla.edu	Female	59.3.123.172	
null	27	Eula	Kilalea	ekilaleaq@stumbleupon.com	Female	250.103.237.235	
null	28	Earl	Mottinelli	emottinellir@wikimedia.org	Male	227.123.161.125	
null	29	Klaus	Goff	kgoffs@tuttocitta.it	Male	240.18.45.61	
null	30	Agosto	MacKowle	amackowlet@weather.com	Male	59.15.253.32	
null	31	Dona	Giacomi	dgiacomiu@acquirethisname.cc	Female	219.40.113.247	



Data Source: userinfo.xlsx

Snapshot of
irregularly
structured data

Step 2

- Using data interpreter to clean the irregularly structured data.

The screenshot shows the Tableau Data Interpreter interface. On the left, the 'Connections' pane shows a connection to 'userInfo' from 'Excel'. A red bracket highlights the 'Use Data Interpreter' checkbox and its explanatory text: 'Data Interpreter might be able to clean your Excel workbook.' Below this is the 'Sheets' section, which lists 'data' and 'New Union'. The main workspace displays a preview of the 'data' sheet. The preview shows a header row with columns labeled 'Abc', '#', 'Abc', 'Abc', 'Abc', 'Abc', 'Abc', 'Abc', 'F1', 'F2', 'F3', 'F4', 'F5', 'F6', 'F7'. The data body contains 10 rows of data with columns for 'Year', 'first_name', 'last_name', 'email', 'gender', and 'ip_address'. The first few rows are:

Year	first_name	last_name	email	gender	ip_address
2015	Audie	Eigee	aelgee0@jugem.jp	Female	202.60.234.36
	Charmain	Fantone	cfantone1@ocn.ne.jp	Female	62.72.74.99
	Doug	Reed	dreed2@google.it	Male	8.240.219.4
	Avie	Colerick	acolerick3@house.gov	Female	45.239.155.30
	Kathryne	Berrane	kberrane4@qq.com	Female	131.120.216.180
	Gilberta	Aulsford	gaulsford5@is.gd	Female	41.181.192.106
	Bernice	Duckerlin	bduckerlin6@microso...	Female	73.129.27.239
	Ardyce	Sapey	asapey7@nifty.com	Female	0.70.242.40
	Norrie	Panniers	npanniers8@newsvin...	Male	96.19.220.79

Step 3:

- cleaned with Data Interpreter, we eliminate a column with null data.

The screenshot shows the Tableau Data Source interface for the 'userinfo.xlsx' file. The 'Connections' section lists 'userinfo' as an Excel connection. The 'Sheets' section shows 'data' selected, with a note that it has been cleaned by the Data Interpreter. The data preview shows 11 rows of user information with columns: Id, First Name, Last Name, Email, Gender, and Ip Address. The first row is highlighted.

#	First Name	Last Name	Email	Gender	Ip Address
1	Audie	Elgee	aelgee0@jugem.jp	Female	202.60.234.36
2	Charmain	Fantone	cfantone1@ocn.ne.jp	Female	62.72.74.99
3	Doug	Reed	dreed2@google.it	Male	8.240.219.4
4	Avie	Colerick	aocolerick3@house.gov	Female	45.239.155.30
5	Kathryne	Berrane	kberrane4@qq.com	Female	131.120.216.180
6	Gilberta	Aulsford	gaulsford5@is.gd	Female	41.181.192.106
7	Bernice	Duckerin	bduckerin6@microsoft.com	Female	73.129.27.239
8	Ardyce	Sapey	asapey7@nifty.com	Female	0.70.242.40
9	Norrie	Panniers	npanniers8@newsvin...	Male	96.19.220.79
10	Toiboid	Goodson	tgoodson9@tumblr.com	Male	41.70.165.218
11	Alfreda	Josowitz	ajosowitzza@amazon....	Female	174.54.54.143

Data Source: demo1/userinfo.xlsx

Problem Description:

Data set used:

SYED AWASE KHIRNI

TABLEAU : MEASURE NAME AND MEASURE VALUES

Measure Name

- Measure names field always appears at the bottom of the dimensions area in the data pane and contains the names of all measures in your data, collected into a single field with discrete values.
- Can be used as a filter
- Can assign aliases to the values for measure names.

Measure Values

- Measure values field always appears at the bottom of the measures areas in the data pane and contains all the measures in your data, collected into a single field with continuous values.

Step 1

- load GlobalSuperStore 2016.xlsx file and add the orders worksheet

COLUMNS:	SUM(UnitPrice)
ROWS:	SUM(Profit)

The screenshot shows the Tableau Data Source interface. On the left, the 'Connections' pane lists 'Global Superstore Orders 2016 (Excel)'. Below it, the 'Sheets' pane shows 'Orders', 'People', and 'New Union'. The main area displays the 'Orders' worksheet with the following columns: #, Row ID, Order ID, Order Date, Ship Date, Ship Mode, Customer ID, Customer Name, Segment, Postal Code, City, and State. The data consists of 10 rows of order information. At the bottom, there are tabs for 'Data Source' (selected), 'Sheet1', and other sheet icons.

Data Source: demo1/ GlobalSuperStore2016.xlsx

Step 2

- Measure Names and Measure Values are **tableau** generated fields containing the names of each measure to use with Measure Values to enable certain types of analysis.

The screenshot shows the Tableau desktop application interface. On the left, the 'Data' pane is open, displaying various dimensions and measures. Two specific items, 'Measure Names' and 'Measure Values', are highlighted with red arrows pointing to them from the text above. The main workspace is labeled 'Sheet 1' and contains two blank 'Drop field here' areas. The top navigation bar includes 'File', 'Data', 'Worksheet', 'Dashboard', 'Story', 'Analysis', 'Map', 'Format', 'Window', and 'Help'. The bottom navigation bar includes 'Data Source', 'Sheet 1', and other sheet icons. A legend on the right side of the interface shows various chart types.

Data Source: demo1/ GlobalSuperStore2016.xlsx

Step 3

- Measure Names and Measure Values are **tableau** generated fields containing the names of each measure to use with Measure Values to enable certain types of analysis.

COLUMNS: Order Priority

ROWS: Category

Sheet 1

Order Priority

Category	Critical	High	Low	Medium
Furniture	75,949	161,981	22,838	179,619
Office Supplies	71,924	153,012	19,868	165,498
Technology	87,054	195,516	23,079	201,548

Measures

- Discount
- Profit
- Quantity
- Sales
- Shipping Cost
- Latitude (generated)
- Longitude (generated)
- Number of Records
- Measure Names

Dimensions

- Category
- City
- Country
- Customer ID
- Customer Name
- Market
- Order Date
- Order ID
- Order Priority
- Postal Code
- Product ID
- Product Name
- Region
- Row ID
- Segment
- Ship Date
- Ship Mode
- State
- Sub-Category
- Measure Values

Filters

Marks

Color
Size
Text
Detail
Tooltip
SUM(Shipping...)

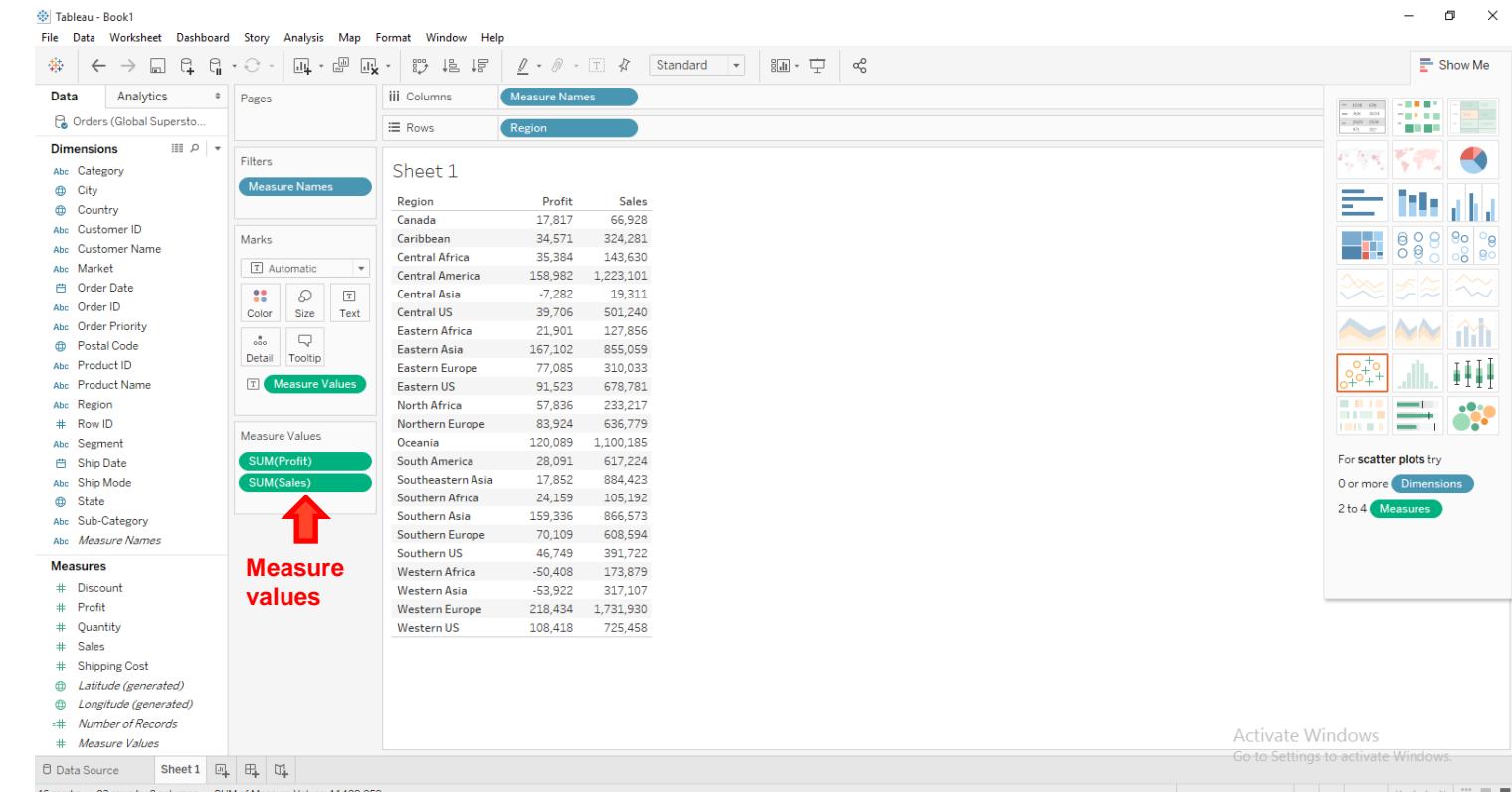
Activate Windows
Go to Settings to activate Windows.

Data Source: demo1/ GlobalSuperStore2016.xlsx

Step 4

- Functionality of Measure Names and Measure Values allows for greater flexibility when dealing with different data structures.

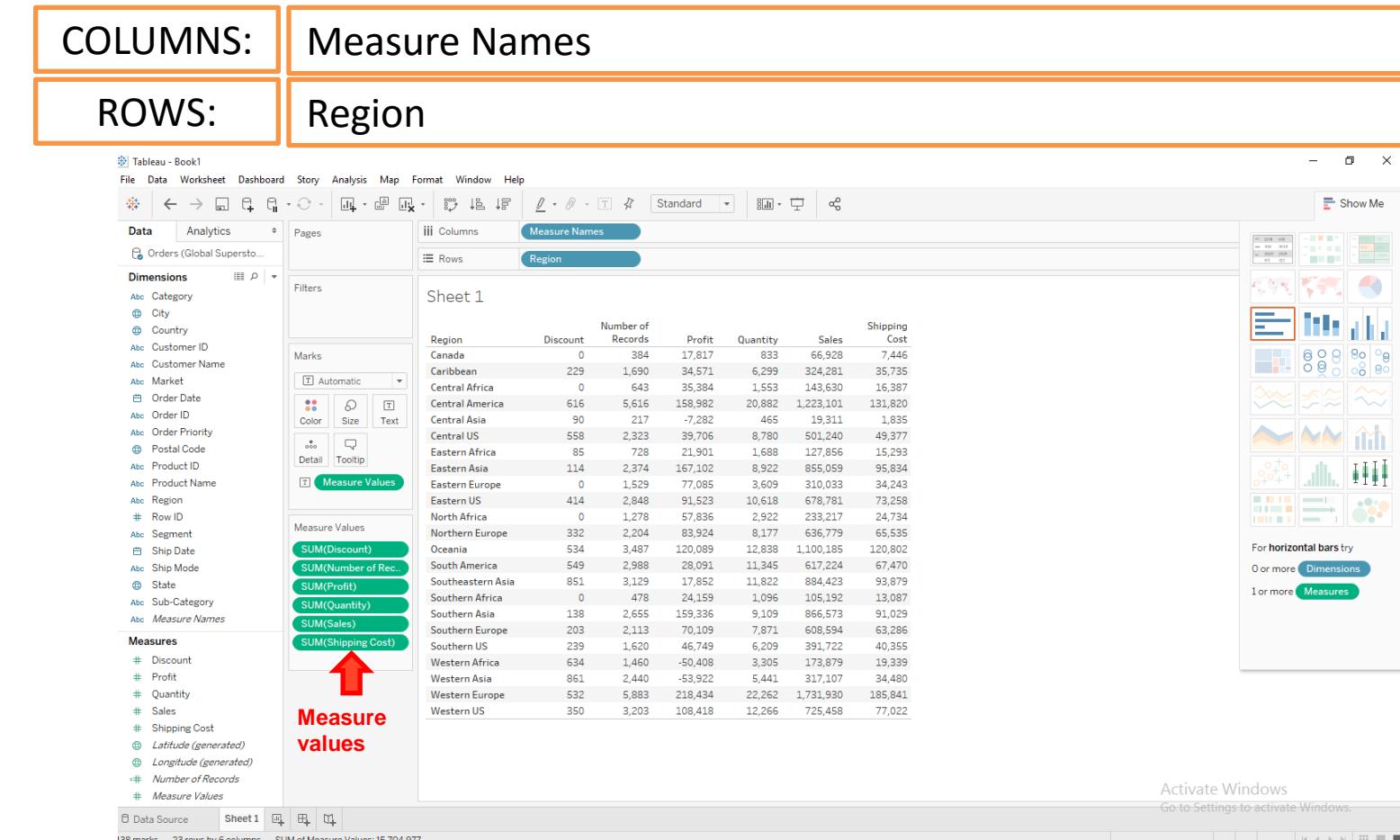
COLUMNS:	Order Priority
ROWS:	Category



Data Source: demo1/ GlobalSuperStore2016.xlsx

Step 5

- Let us try to plot Measure Names and Measure Values(Marks=>text) will generate table illustrating all the measures for names.
- Measure names are also used for field labels in your visualization.



Data Source: demo1/ GlobalSuperStore2016.xlsx

Problem Description:

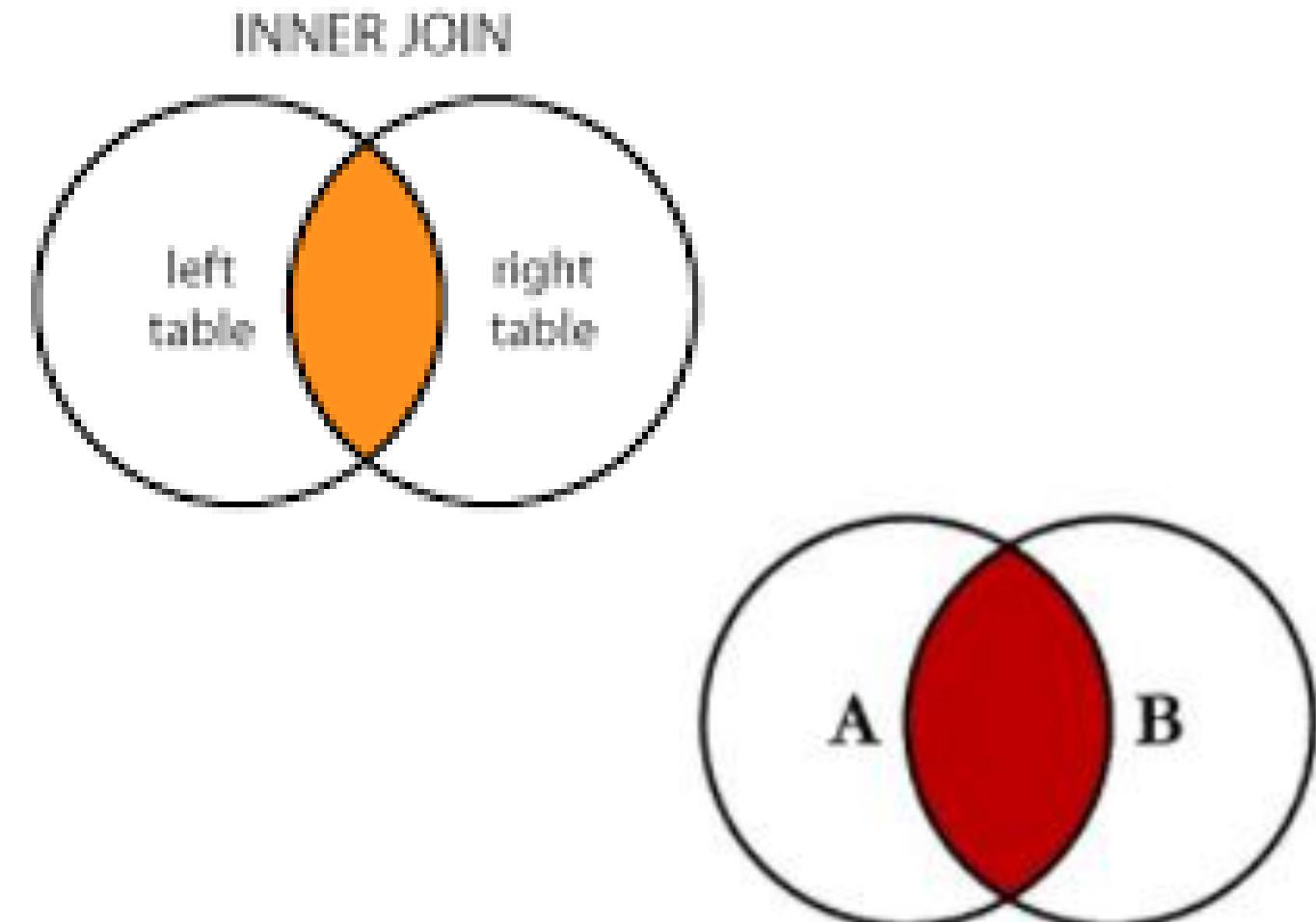
Data set used:	
----------------	--

TABLEAU

PLAY BOOK : JOINING TWO TABLES AND VISUALIZING DATA

Joins: INNER JOIN

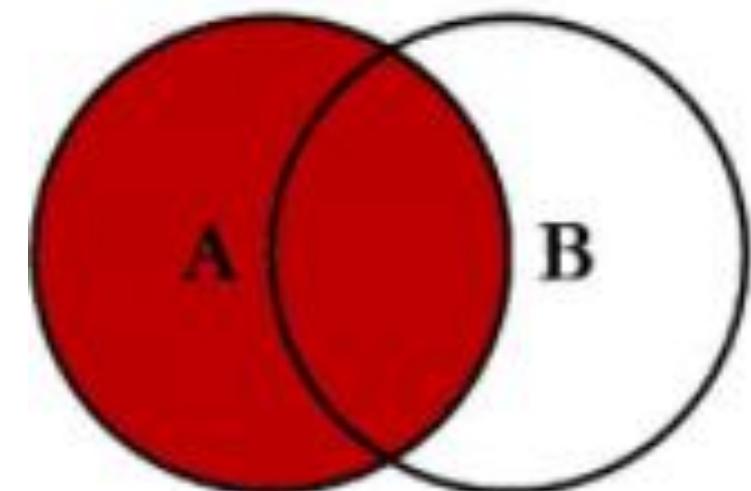
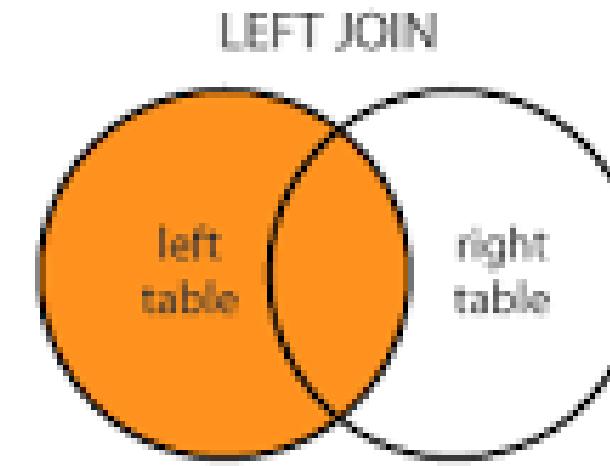
- Inner join:
Intersection of records from two tables.



```
SELECT <select_list>
FROM TableA A
INNER JOIN TableB B
ON A.Key = B.Key
```

Joins: LEFT OUTER JOIN

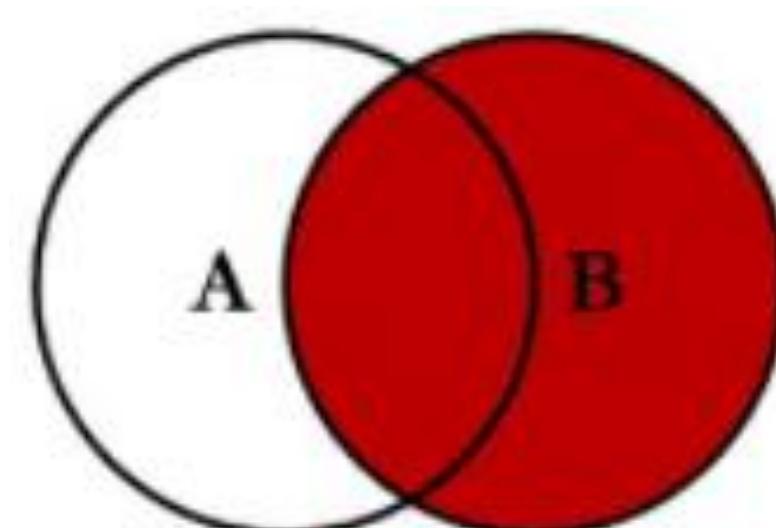
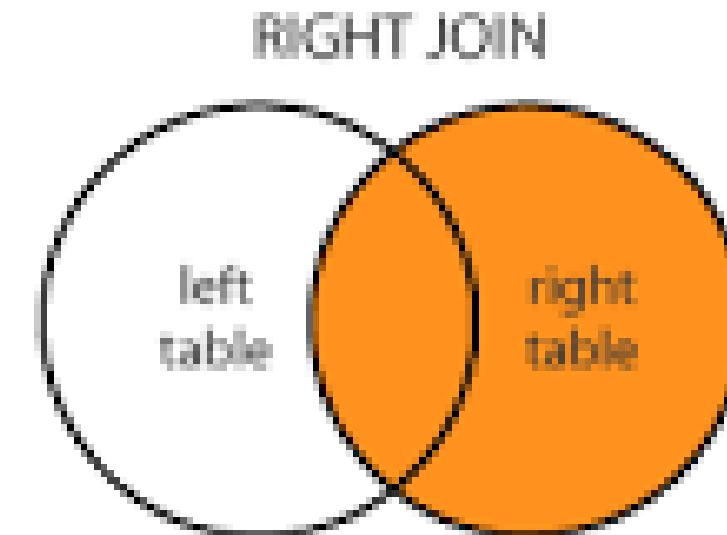
- Table on the left of the join is called the **primary table** and matched for the records from the **right table**.



```
SELECT <select_list>
FROM TableA A
LEFT JOIN TableB B
ON A.Key = B.Key
```

Joins: RIGHT OUTER JOIN

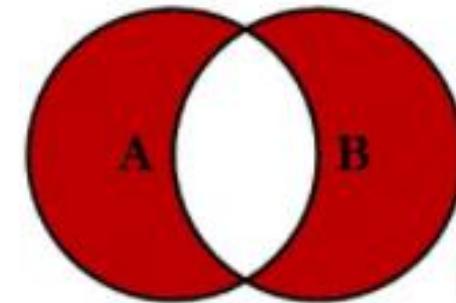
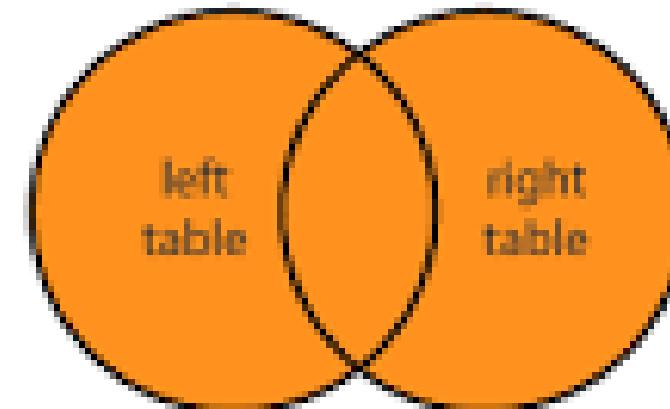
- Table on the right of the join is called the **primary table** and matched for the records from the left table.



```
SELECT <select_list>
FROM TableA A
RIGHT JOIN TableB B
ON A.Key = B.Key
```

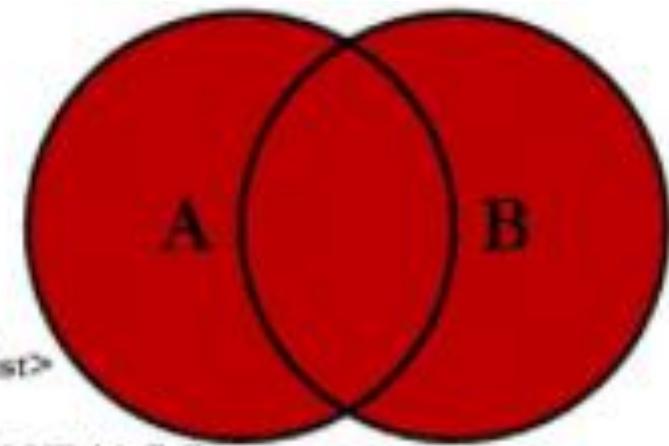
Joins: FULL JOIN

FULL JOIN

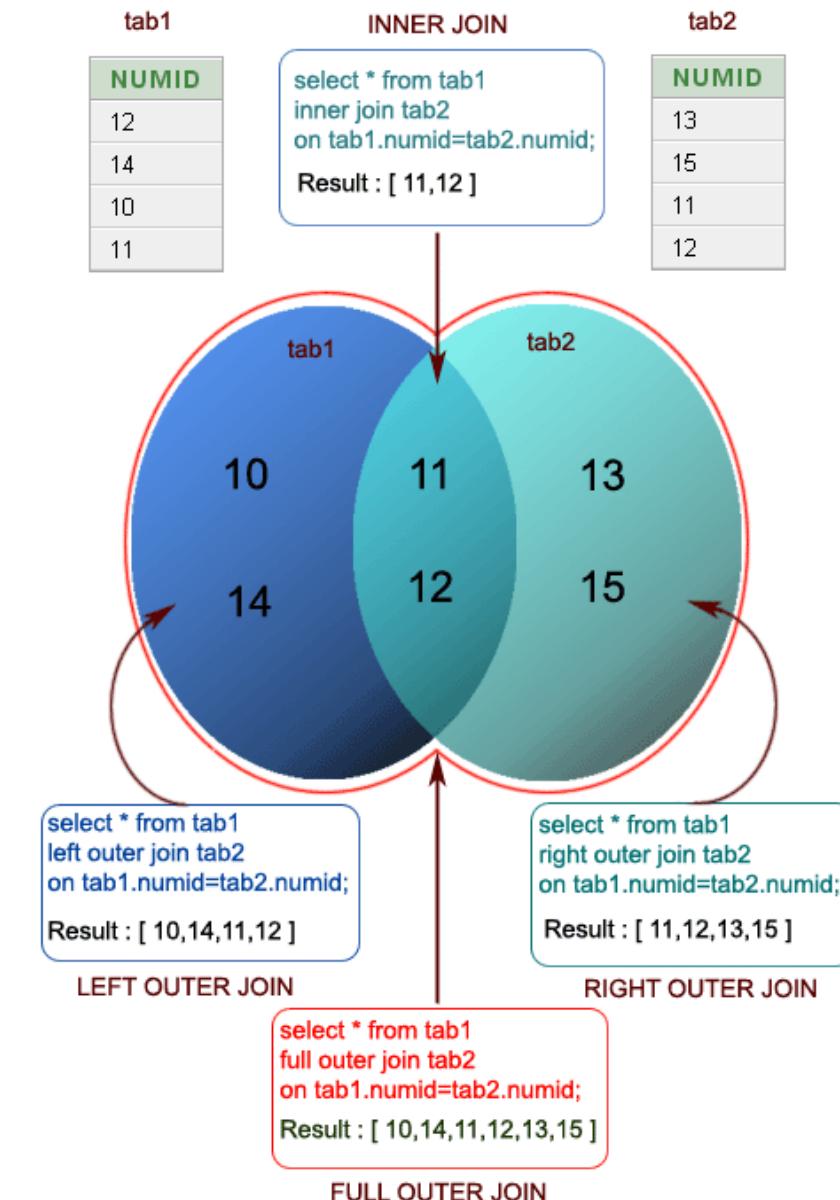


```
SELECT <select_list>
FROM TableA A
FULL OUTER JOIN TableB B
ON A.Key = B.Key
WHERE A.Key IS NULL
OR B.Key IS NULL.
```

```
SELECT <select_list>
FROM TableA A
FULL OUTER JOIN TableB B
ON A.Key = B.Key
```



JOINS:DEMO



src: <https://www.w3resource.com/sql/joins/sql-joins.php>

Step 1:

- select
CustomerOrders.xlsx load the data connections.
- customer Info + **InnerJoin**
+ OrderDetails
- CustomerNumber = OrderID

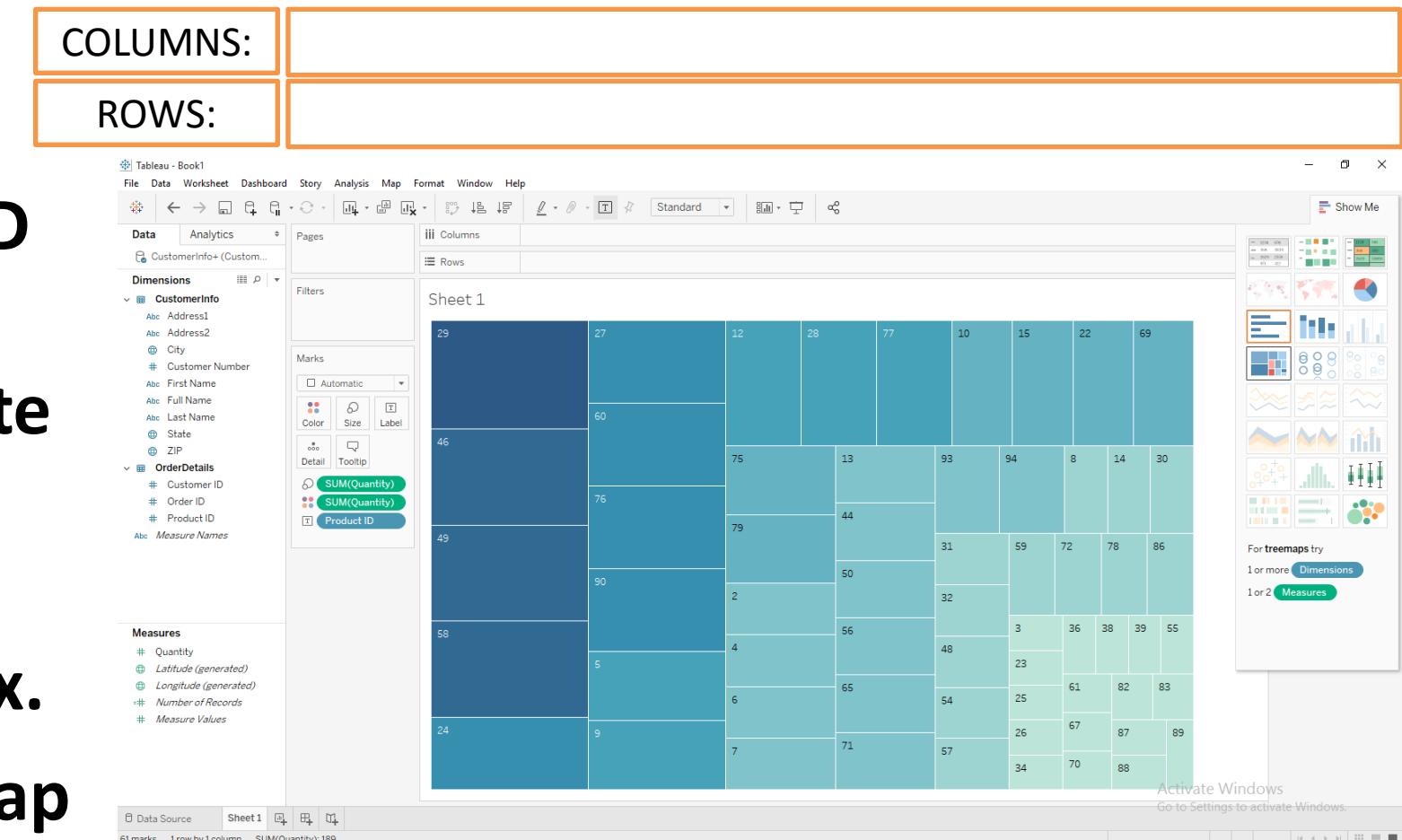
COLUMNS:	
ROWS:	ProductCategory

The screenshot shows the Tableau Data Source interface. On the left, the 'Connections' pane shows 'CustomerOrders' (Excel). On the right, the 'CustomerInfo+ (CustomerOrders)' pane displays a join configuration between 'CustomerInfo' and 'OrderDetails'. The join type is set to 'Inner'. The 'Customer Number' field from 'CustomerInfo' is joined with the 'Order ID' field from 'OrderDetails'. Below the join configuration, a preview of the data is shown in a grid format. The columns include Customer Number, First Name, Last Name, Address1, Address2, City, State, ZIP, Order ID, and Customer ID. The preview contains 59 rows of data. At the bottom of the preview, there are buttons for 'Data Source' and 'Sheet1'.

Data Source: demo1/CustomerOrders.xlsx

Step 2

- ctrl select productID and Quantity, and select the appropriate visualization in showme data visualization tool box.
- To render to tree map as shown below.



Data Source: demo1/CustomerOrders.xlsx

Problem Description:

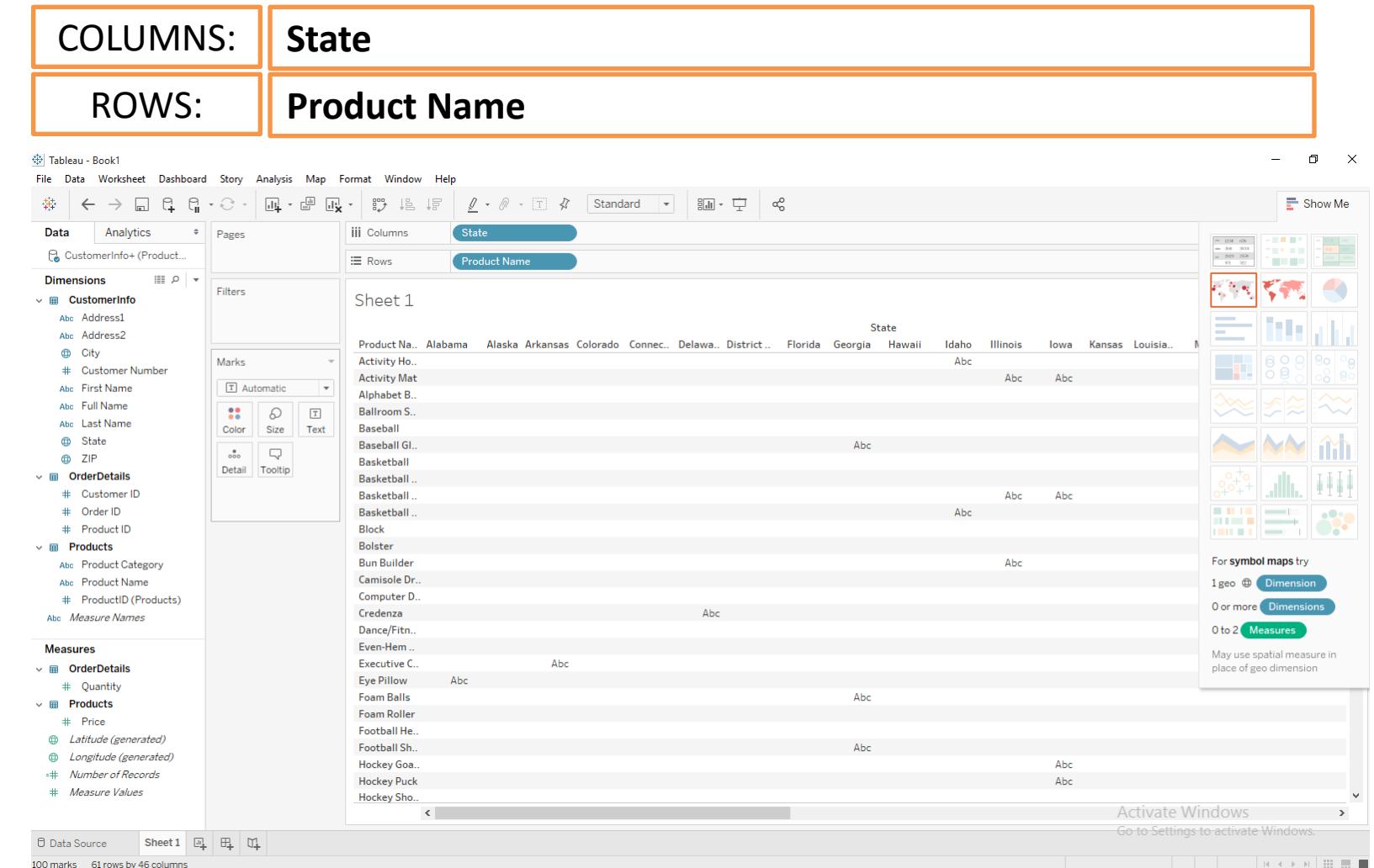
Data set used:

TABLEAU

PLAY BOOK : CORRELATING DATA VARIABLES IN TABLEAU AND CALCULATED FIELDS

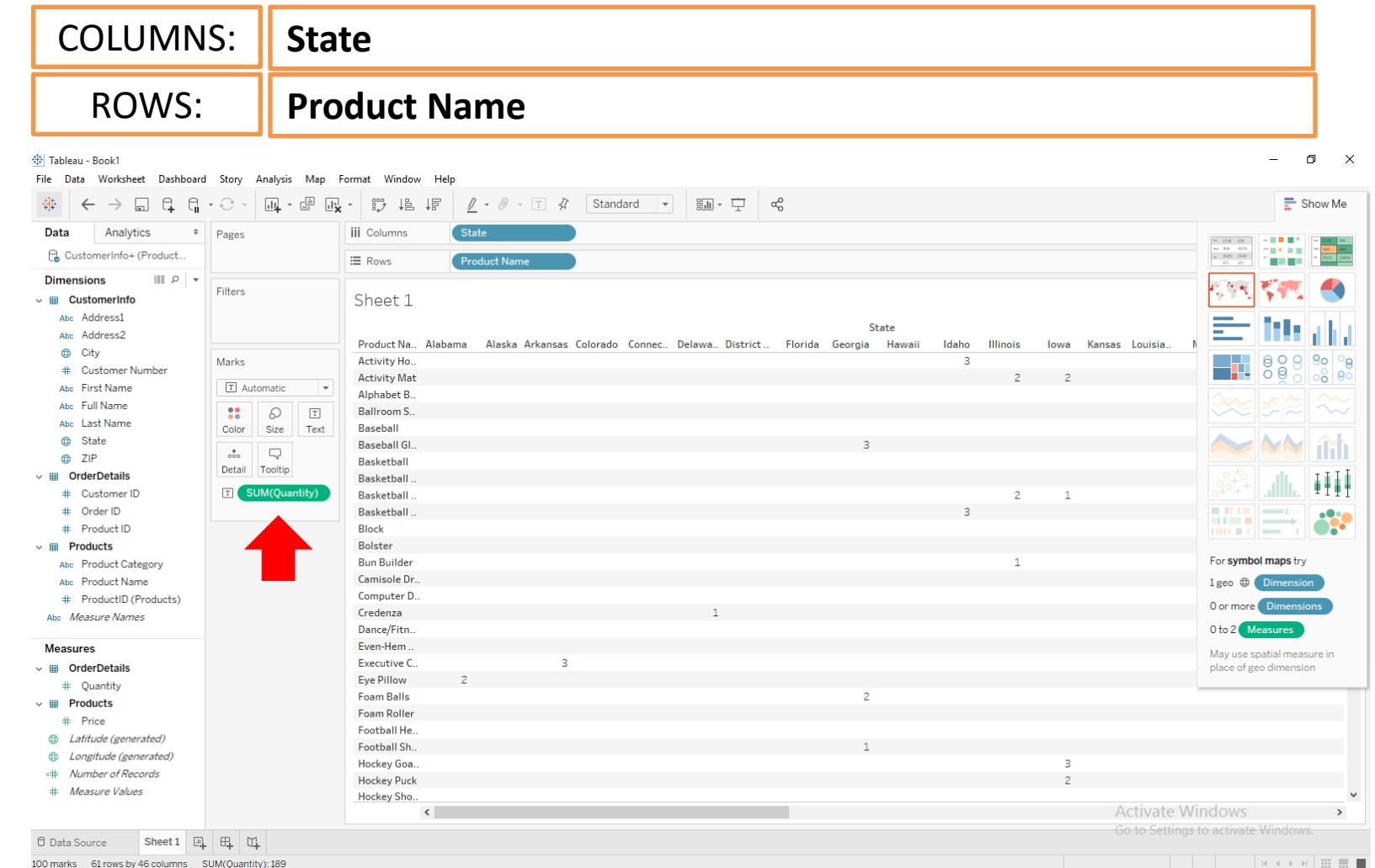
Step 1:

- select
ProductCustomersOrders.xlsx load the data connections.



Step 2:

- select
ProductCustomersOrders.xlsx load the data connections.



Data Source: demo2/ProductsCustomersOrders.xlsx

Step 3:

- select
ProductCustomersOrders.xlsx load the data connections.

COLUMNS:	
ROWS:	State,Product Name

The screenshot shows the Tableau desktop interface with a data source named "demo2/ProductsCustomersOrders.xlsx". The visualization is a simple table with "State" in the columns and "Product Name" in the rows. The data shows various products available in different states. The Tableau interface includes a sidebar with dimensions like CustomerInfo, OrderDetails, and Products, and a toolbar with various analysis and visualization tools.

State	Product Name
Alabama	Eye Pillow
Alaska	Mat Bag
Arkansas	Executive Chair
Colorado	Hockey Stick
	Zabuton
Connecticut	Pointe Shoes
Delaware	Credenza
	Puff Sleeve Dress
	Wedge
	Zabuton
District of Columbia	Shoes -- Basketball
Florida	Medium File Cabinet
	Side Table
	Swivel Chair
Georgia	Baseball Glove
	Foam Balls
	Football Shoulder Pads
Hawaii	Playground Ball
Idaho	Activity Hoop
	Basketball Net
	Medium File Cabinet
Illinois	Activity Mat
	Basketball Jersey
	Bun Builder
	Pointe Shoes
Iowa	Activity Mat
	Basketball Jersey
	Hockey Goalie Pads
	Hockey Puck

Data Source: demo2/ProductsCustomersOrders.xlsx

Step 4:

- create calculated field : Computed Total
 $= [\text{Quantity}] * [\text{Price}]$

COLUMNS: []

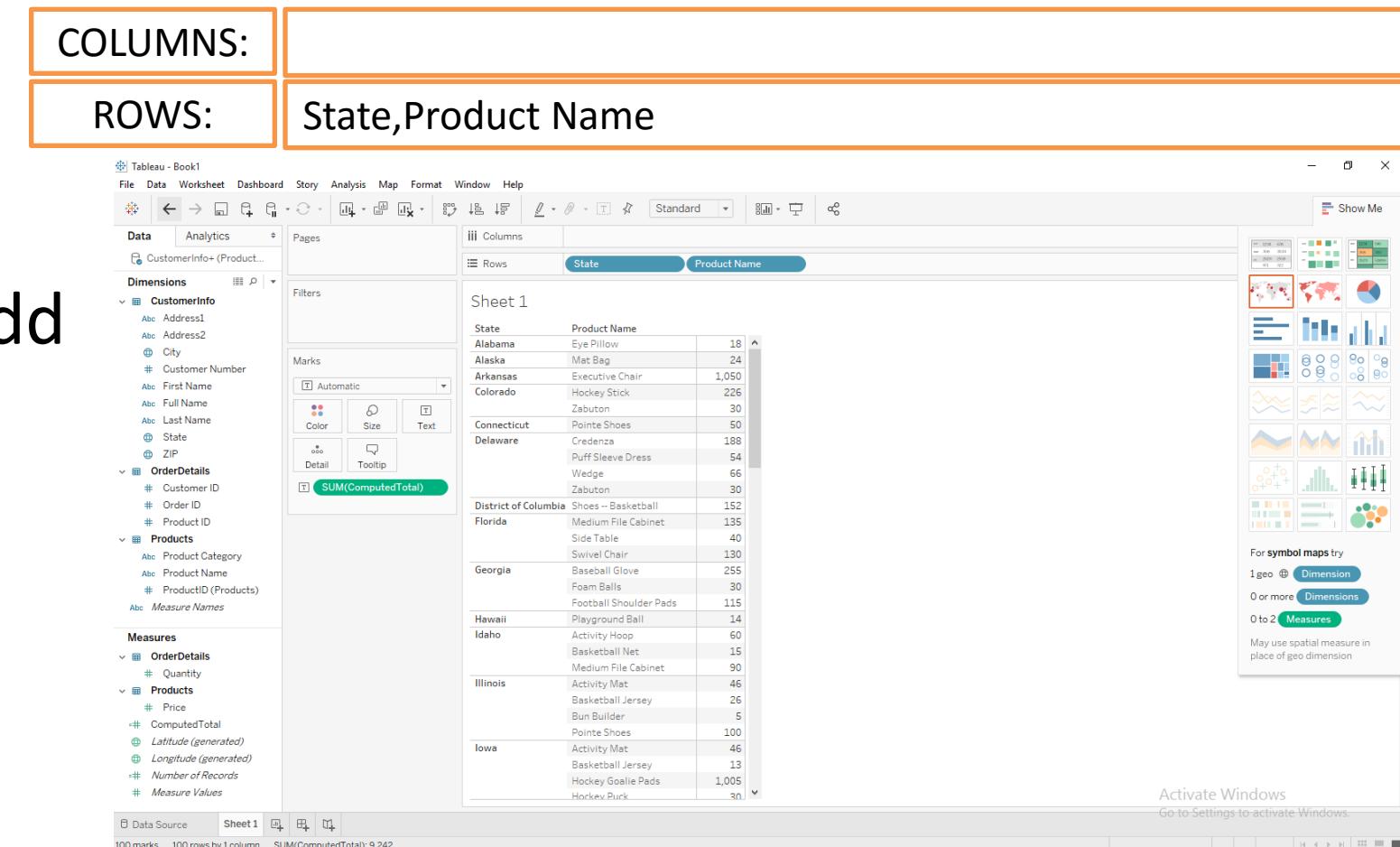
ROWS: State,Product Name []

The screenshot shows the Tableau Data Editor interface. In the top navigation bar, 'Data' is selected. On the left, the 'Dimensions' shelf has 'CustomerInfo' (Product...) and 'OrderDetails' selected. The 'Measures' shelf has 'Quantity' and 'Price' selected. A context menu is open over the 'Price' field, with 'Create Calculated Field...' highlighted. A modal dialog box is open, titled 'Sheet 1', containing the calculated field definition: 'ComputedTotal' with the formula '[Quantity] * [Price]'. Below the formula, a message says 'The calculation is valid.' with 'OK' and 'Apply' buttons. The main workspace shows a table with columns 'State' and 'Product Name', listing various states and their corresponding products like Eye Pillow, Mat Bag, etc. The bottom status bar indicates '100 marks 100 rows by 1 column SUM(Quantity): 189'.

Data Source: demo2/ProductsCustomersOrders.xlsx

Step 5

- remove the sum(Quantity) and add Computed Total



Data Source: demo2/ProductsCustomersOrders.xlsx

Step 6

- creating custom measured values => creating a quick calculation field off the shelf to enhance the data.

COLUMNS:

ROWS: State,Product Name

The screenshot shows the Tableau Data Source view. In the 'Measures' section, there is a calculated field named 'ComputedTotal' which is defined as `SUM(Quantity)*(Price)`. This field is highlighted with a green background. Below it, other measures like 'Quantity' and 'Price' are listed. The main pane displays a table with columns 'State', 'Product Name', and 'ComputedTotal'. The data includes various products from different states like Alabama, Alaska, Arkansas, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Hawaii, Idaho, Illinois, and Iowa, along with their respective quantities and prices.

State	Product Name	ComputedTotal
Alabama	Eye Pillow	18 18
Alaska	Mat Bag	24 24
Arkansas	Executive Chair	1,050 1,050
Colorado	Hockey Stick	226 226
	Zabuton	30 30
Connecticut	Pointe Shoes	50 50
Delaware	Credenza	188 188
	Puff Sleeve Dress	54 54
	Wedge	66 66
	Zabuton	30 30
District of Columbia	Shoes - Basketball	152 152
Florida	Medium File Cabinet	135 135
	Side Table	40 40
	Swivel Chair	130 130
Georgia	Baseball Glove	255 255
	Foam Balls	30 30
	Football Shoulder Pads	115 115
Hawaii	Playground Ball	14 14
Idaho	Activity Hoop	60 60
	Basketball Net	15 15
	Medium File Cabinet	90 90
Illinois	Activity Mat	46 46
	Basketball Jersey	26 26
	Bun Builder	5 5
	Pointe Shoes	100 100
Iowa	Activity Mat	46 46
	Basketball Jersey	13 13
	Hockey Goalie Pads	1,005 1,005
	Hockey Puck	30 30

Data Source: demo2/ProductsCustomersOrders.xlsx

Step 7

- select Product Category(Columns) and State(Rows)
- Choose Analysis menu option => totals to display “Show Row Grand Totals” and “Show Column Grand Totals”

COLUMNS: Product Category

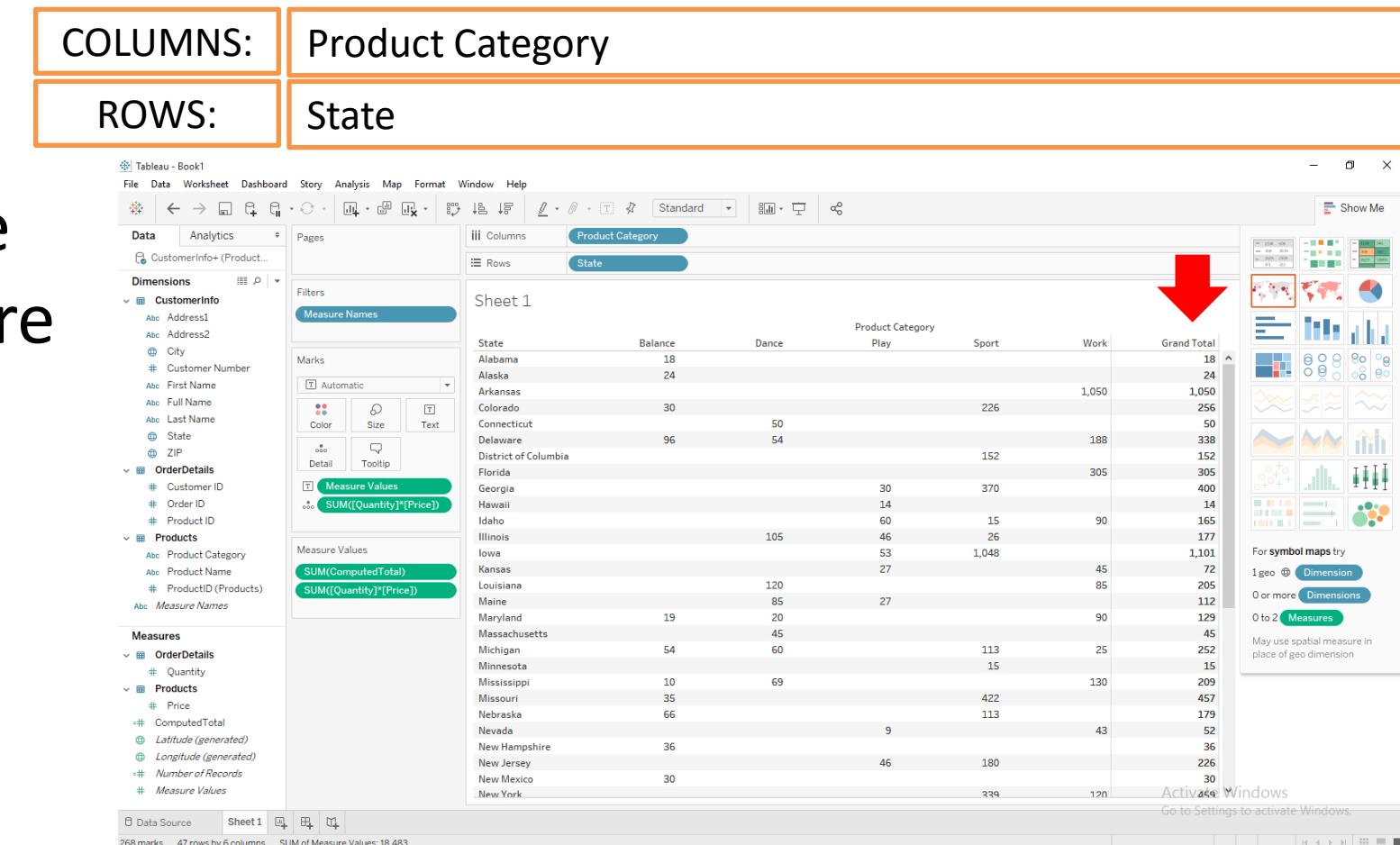
ROWS: State

	Dance	Play	Sport	Work	Grand Total
Louisiana	226			1,050	1,286
Maine		50		256	306
Maryland			54	50	109
Massachusetts				188	338
Michigan				152	152
Minnesota				305	305
Mississippi				338	338
Missouri				177	177
Nebraska				305	305
Nevada				400	400
New Hampshire				165	165
New Jersey				14	14
New Mexico				129	129
New York				457	457
	1,048			1,101	1,101
		370		72	72
		14		205	205
		60		112	112
		46		45	45
		27		129	129
		113		45	45
			90	15	15
				130	130
				179	179
				52	52
				36	36
				226	226
				30	30
				120	120

Data Source: demo2/ProductsCustomersOrders.xlsx

Step 8

- Grand Totals for the Rows and Columns are displayed.



Data Source: demo2/ProductsCustomersOrders.xlsx

Step 9

- adding filters to the current worksheet.

COLUMNS: Product Category

ROWS: State

The screenshot shows the Tableau desktop interface with a filter dialog open over a worksheet. The worksheet has 'Product Category' in the columns shelf and 'State' in the rows shelf. The filter dialog for 'State' is open, showing a list of US states with checkboxes. Most states are checked, and the checkbox for 'None' is selected. The 'OK' button is highlighted. The bottom right corner of the dialog says 'Active Windows'. The top right corner of the main window says 'Show Me'.

Sport	Work	Grand Total
18	28	46
228	1,858	2,086
28	50	78
188	230	418
158	158	316
198	205	393
200	208	408
18	18	36
15	98	113
28	168	196
1,868	1,309	3,177
45	52	97
85	208	293
98	189	287
113	25	138
15	15	30
130	268	408
228	298	526
113	130	243
43	52	95
38	38	76
28	180	208
38	180	218
329	128	457
350	350	700

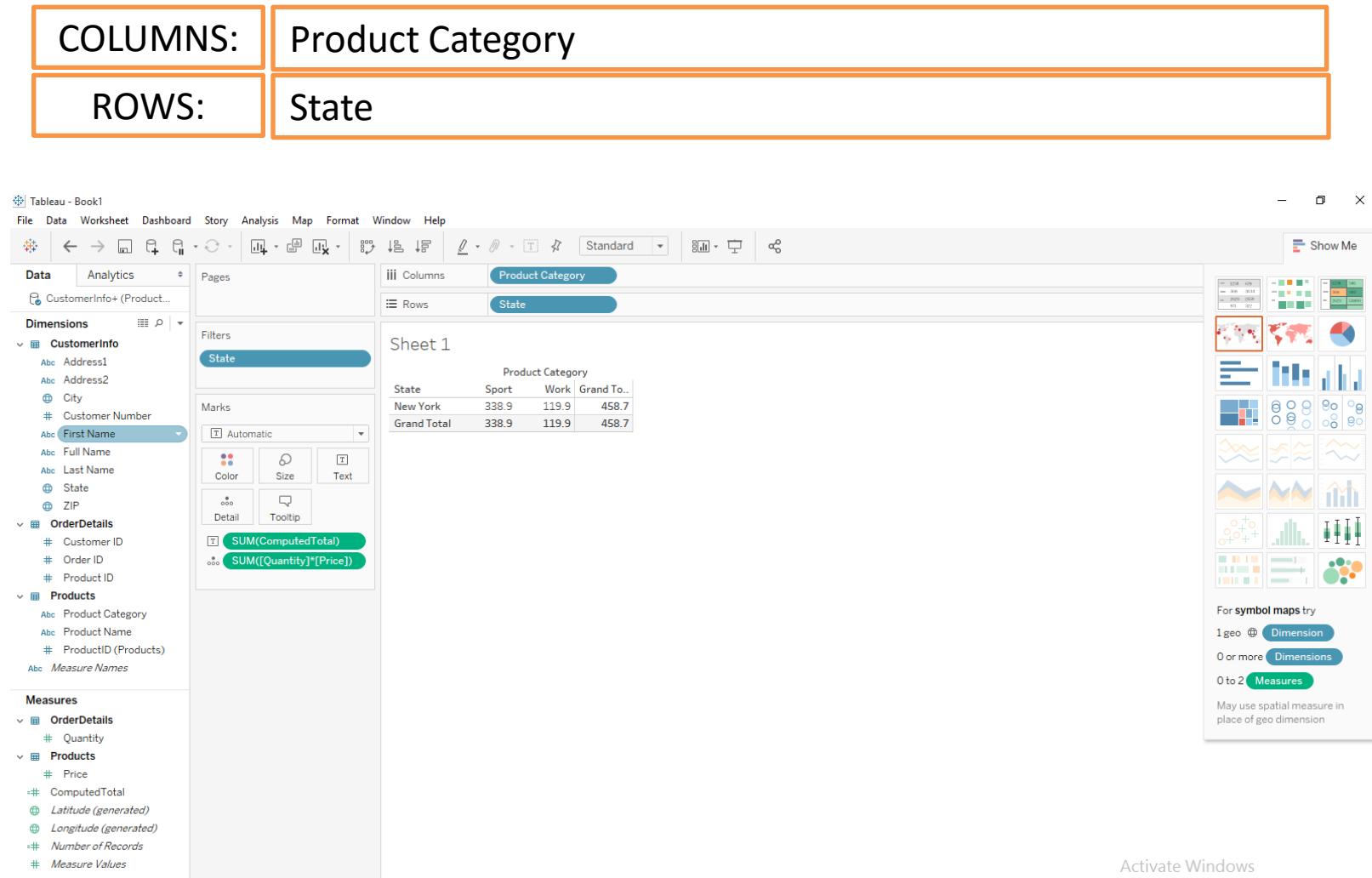
For horizontal bars try
0 or more Dimensions
1 or more Measures

Active Windows
Go to Settings to activate Windows.

Data Source: demo2/ProductsCustomersOrders.xlsx

Step 10

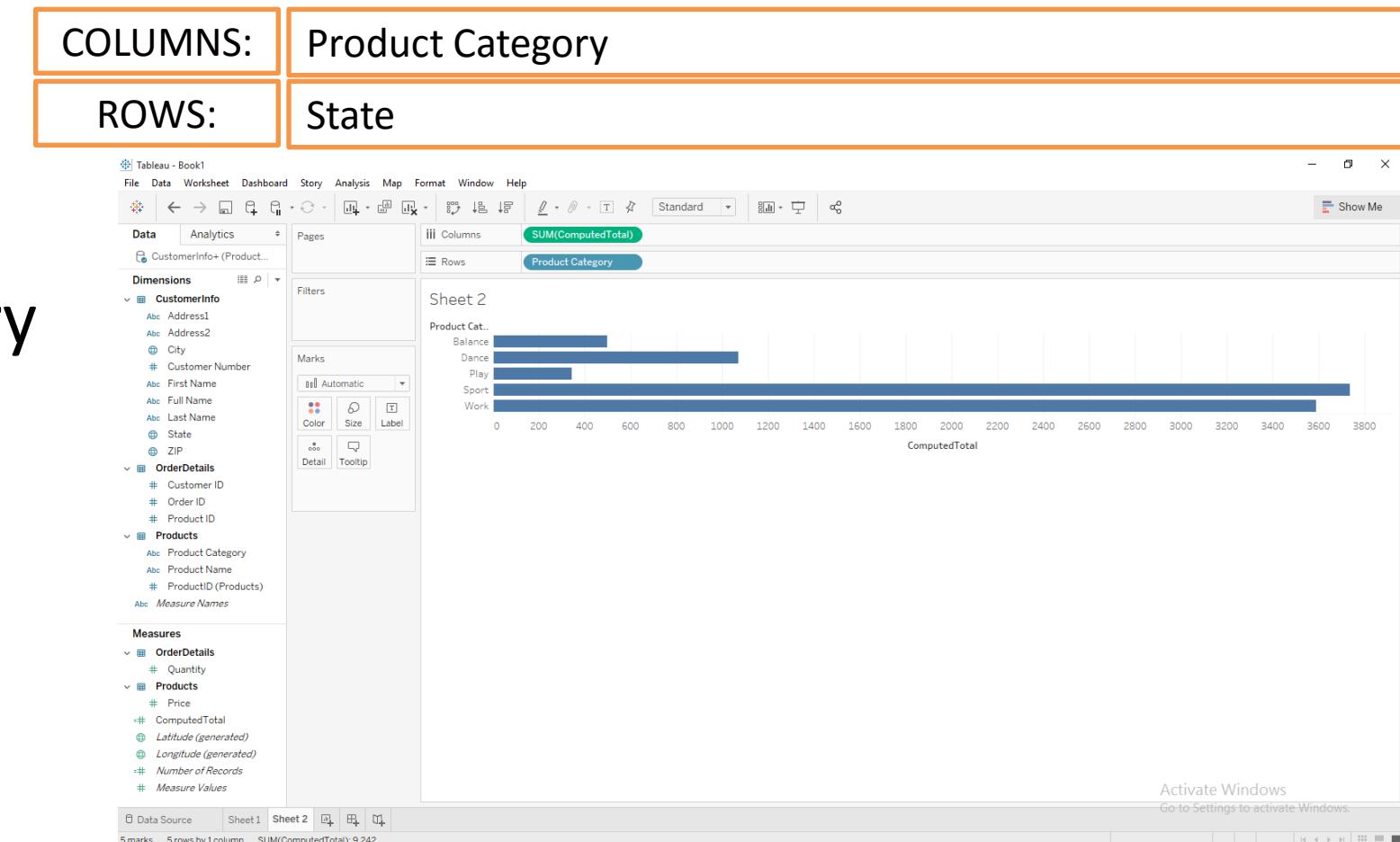
- Post Application of filter.



Data Source: demo2/ProductsCustomersOrders.xlsx

Step 11

- creating bar chart with product category and pricing



Data Source: demo2/ProductsCustomersOrders.xlsx

Problem Description:

Data set used:

TABLEAU

PLAY BOOK : WORKING WITH TIMESERIES DATA::PLOTTING LINE GRAPH AND AREA CHART

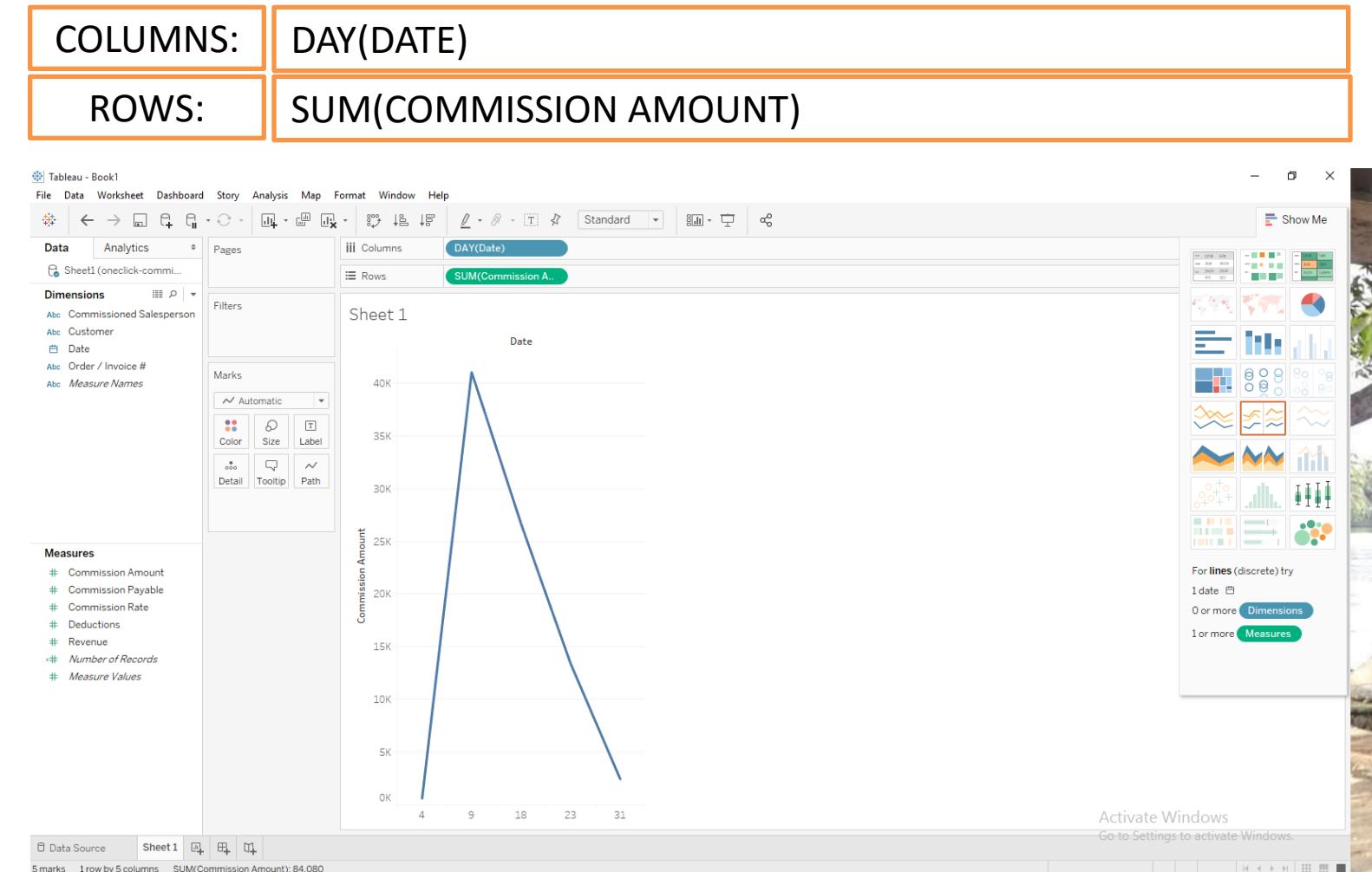
The screenshot shows a Microsoft Excel spreadsheet titled "Sales-Commission-By-Revenue_OneClick-Template.xls". The spreadsheet includes a header section with company information and a "Revenue based rate table". Below this is a detailed table of sales data.

Date	Customer	Order / Invoice #	Revenue	Commissioned Salesperson	Commission Rate	Commission		Commission Payable
						Amount	Deductions	
10/31/2017	Acme Widgets	#8999	\$ 2,000.00	Edward Lee	5%	\$ 100.00	\$ -	\$ 100.00
11/4/2017	Acme Widgets	#9000	\$ 450.00	Erin Miller	4%	\$ 18.00	\$ -	\$ 18.00
11/9/2017	Acme Widgets	#9001	\$ 12,500.00	James Smith	6%	\$ 750.00	\$ -	\$ 750.00
11/18/2017	Acme Widgets	#9002	\$ 125,000.00	Linda Brady	10%	\$ 12,500.00	\$ -	\$ 12,500.00
11/23/2017	Acme Widgets	#9003	\$ 45,250.00	Edward Lee	6%	\$ 2,715.00	\$ -	\$ 2,715.00
10/31/2017	Bravo Gizmos	#9004	\$ 22,500.00	Erin Miller	6%	\$ 1,350.00	\$ -	\$ 1,350.00
11/4/2017	Bravo Gizmos	#9005	\$ 9,000.00	James Smith	5%	\$ 450.00	\$ -	\$ 450.00
11/9/2017	Bravo Gizmos	#9006	\$ 65,250.00	Linda Brady	7%	\$ 4,567.50	\$ -	\$ 4,567.50
11/18/2017	Bravo Gizmos	#9007	\$ 5,500.00	James Smith	5%	\$ 275.00	\$ -	\$ 275.00
11/23/2017	Bravo Gizmos	#9008	\$ 4,795.00	Linda Brady	5%	\$ 239.75	\$ -	\$ 239.75
11/23/2017	Bravo Gizmos	#9009	\$ 52,500.00	Edward Lee	7%	\$ 3,675.00	\$ -	\$ 3,675.00
10/31/2017	Casey Bats	#9010	\$ 4,900.00	Erin Miller	5%	\$ 245.00	\$ -	\$ 245.00
11/4/2017	Casey Bats	#9011	\$ 250.00	James Smith	4%	\$ 10.00	\$ -	\$ 10.00
11/9/2017	Casey Bats	#9012	\$ 357,000.00	Linda Brady	10%	\$ 35,700.00	\$ -	\$ 35,700.00
11/18/2017	Casey Bats	#9013	\$ 125,000.00	Edward Lee	10%	\$ 12,500.00	\$ -	\$ 12,500.00
11/23/2017	Casey Bats	#9014	\$ 68,500.00	Erin Miller	7%	\$ 4,795.00	\$ -	\$ 4,795.00
10/31/2017	Delta Doors	#9015	\$ 12,500.00	James Smith	6%	\$ 750.00	\$ -	\$ 750.00
11/4/2017	Delta Doors	#9016	\$ 2,500.00	Linda Brady	5%	\$ 125.00	\$ -	\$ 125.00
11/9/2017	Delta Doors	#9017	\$ 375.00	James Smith	4%	\$ 15.00	\$ -	\$ 15.00
11/18/2017	Delta Doors	#9018	\$ 22,500.00	James Smith	6%	\$ 1,350.00	\$ -	\$ 1,350.00
11/23/2017	Delta Doors	#9019	\$ 32,500.00	Edward Lee	6%	\$ 1,950.00	\$ -	\$ 1,950.00
			Total	\$ 970,770.00		\$ 84,080.25	\$ -	\$ 84,080.25

Data Source: demo2/Sales-Commission-By-Revenue_OneClick-Template.xlsx

Step 2

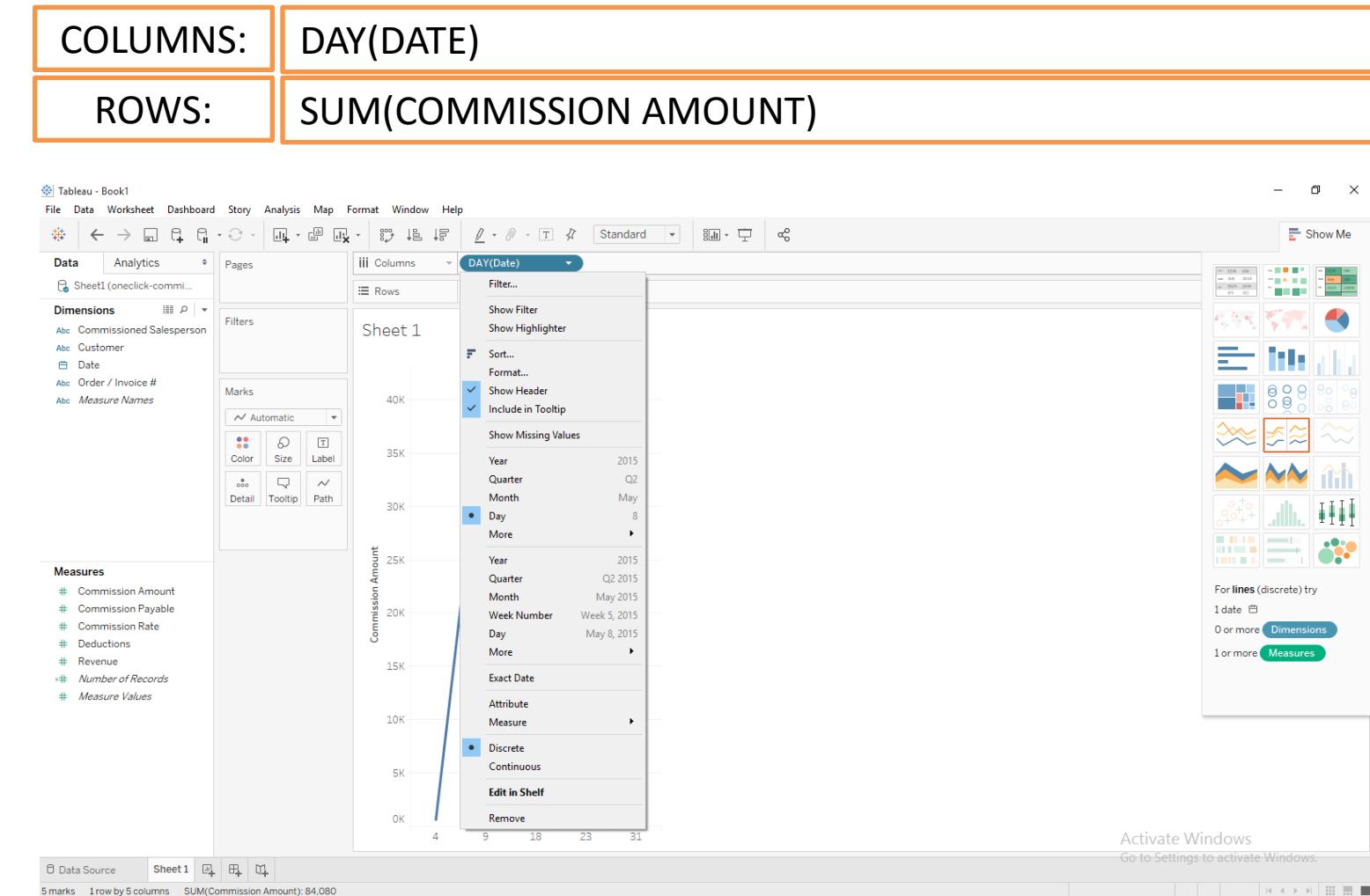
- Refactor the data to create a new file **oneclick-commission-sales.xlsx**



Data Source: demo2/ oneclick-commission-sales.xlsx

Step 3

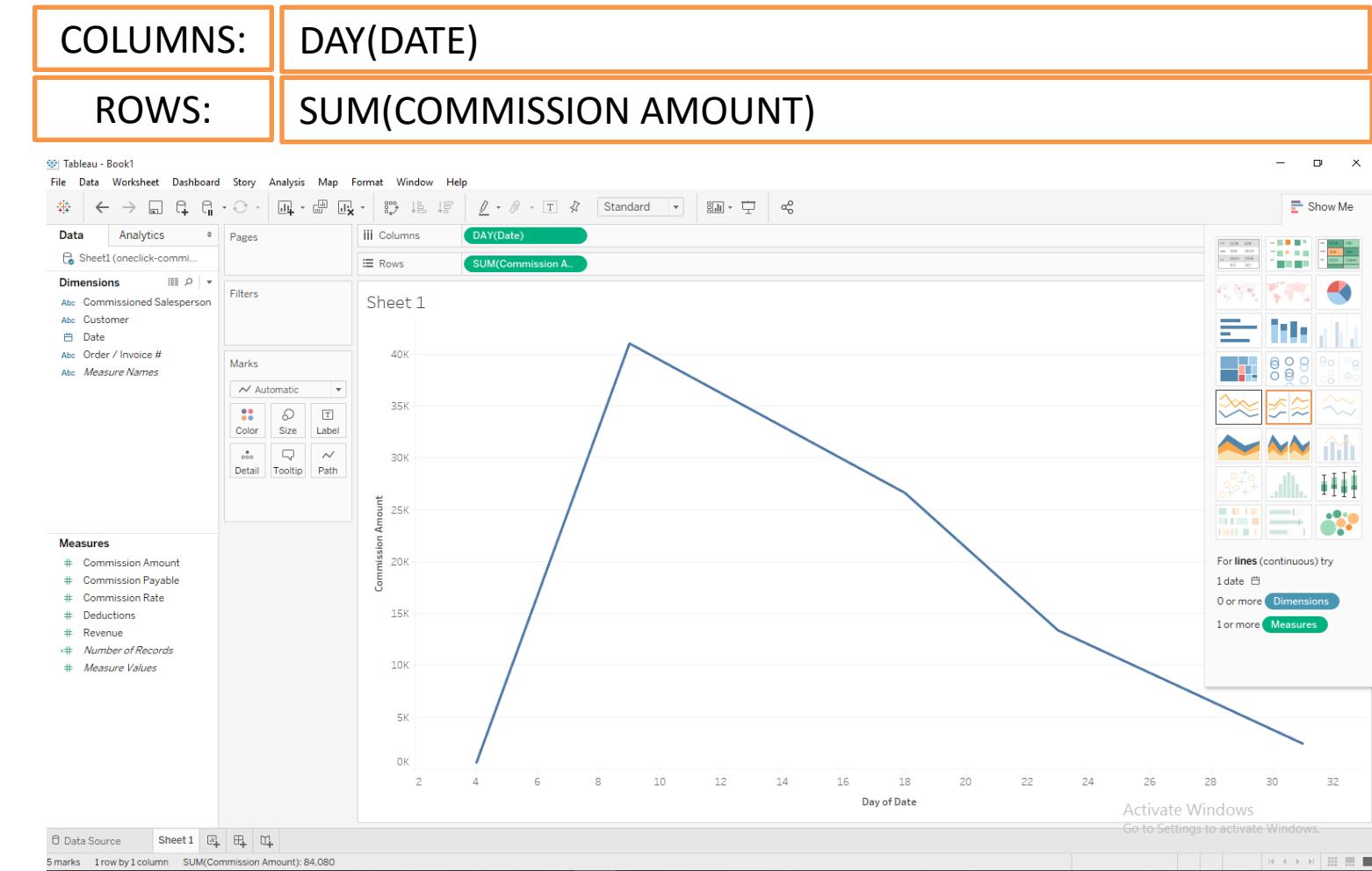
- Refactor the data to create a new file oneclick-commission-sales.xlsx
 - Tableau provides you to select appropriate options on time series(year, quarter, month, day)



Data Source: demo2/ oneclick-commission-sales.xlsx

Step 4

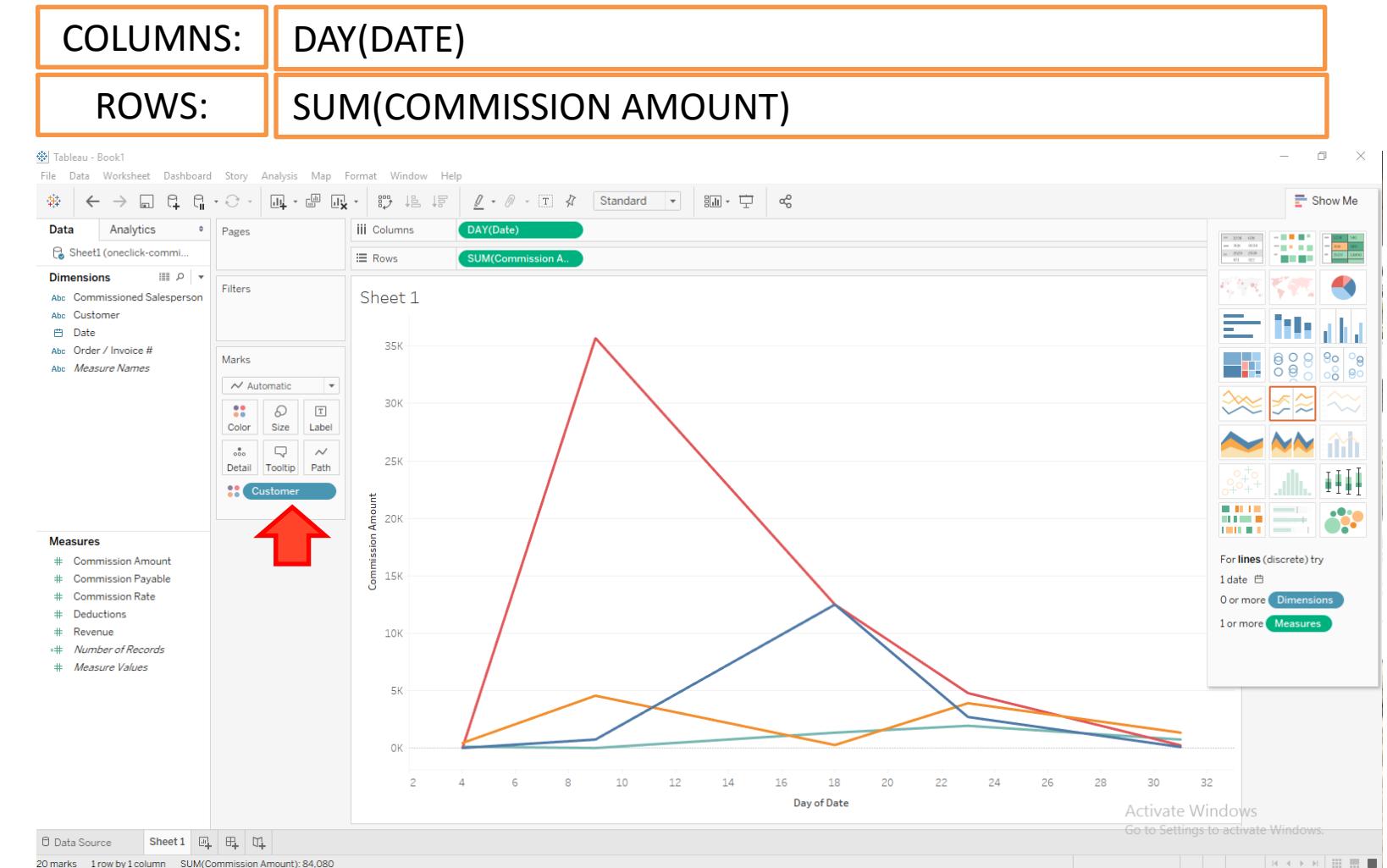
- On selecting an alternative line graph plot.



Data Source: demo2/ oneclick-commission-sales.xlsx

Step 5

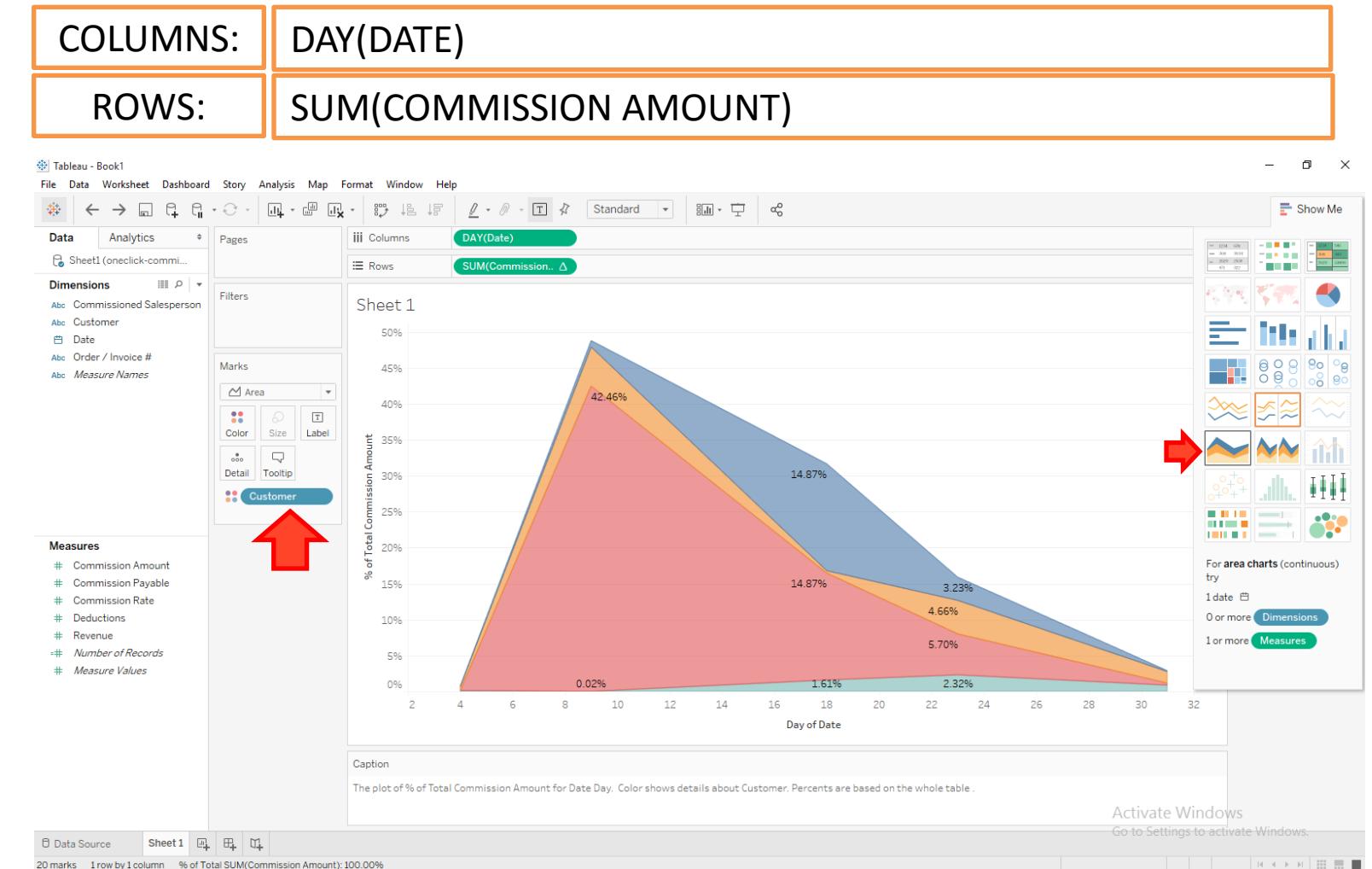
- Add the customer dimension to the marks pane to visualize comparison of date/Commission Amount based on customer



Data Source: demo2/ oneclick-commission-sales.xlsx

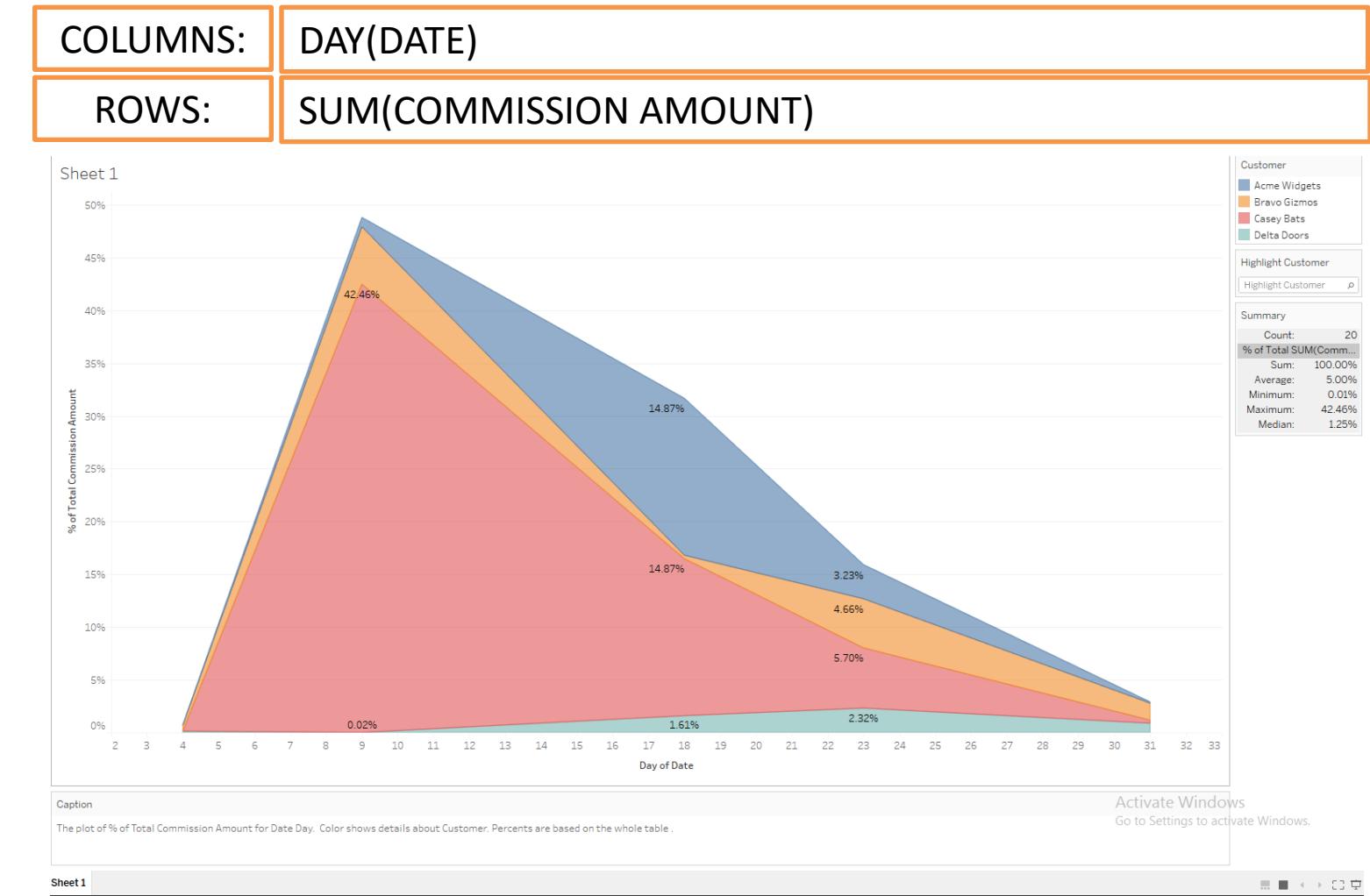
Step 6

- Select the area chart by selecting the visualization type to area chart to visualize how much each of the customer contributed to the commission amount.



Step 7

- On selecting the presentation mode, we can visualize an area chart with legends.



Data Source: demo2/ oneclick-commission-sales.xlsx

Problem Description:

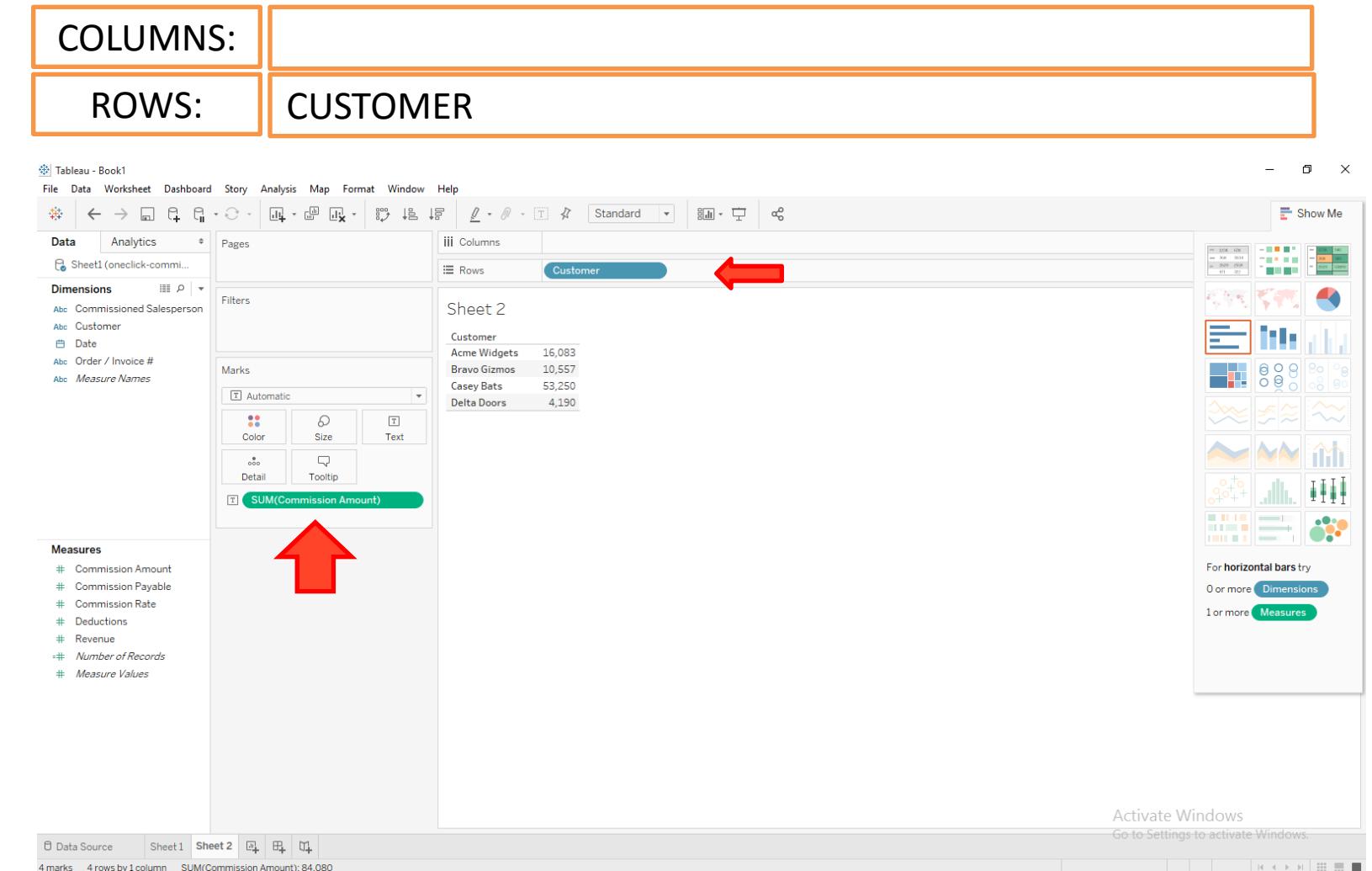
Data set used:	
----------------	--

TABLEAU

PLAY BOOK : CREATING PIE CHART

Step 1

- Using the oneclick-commission-sales.xlsx data
- Lets visualize the contribution amount per customer.
- This view provides me table summary of customer vs commission amount



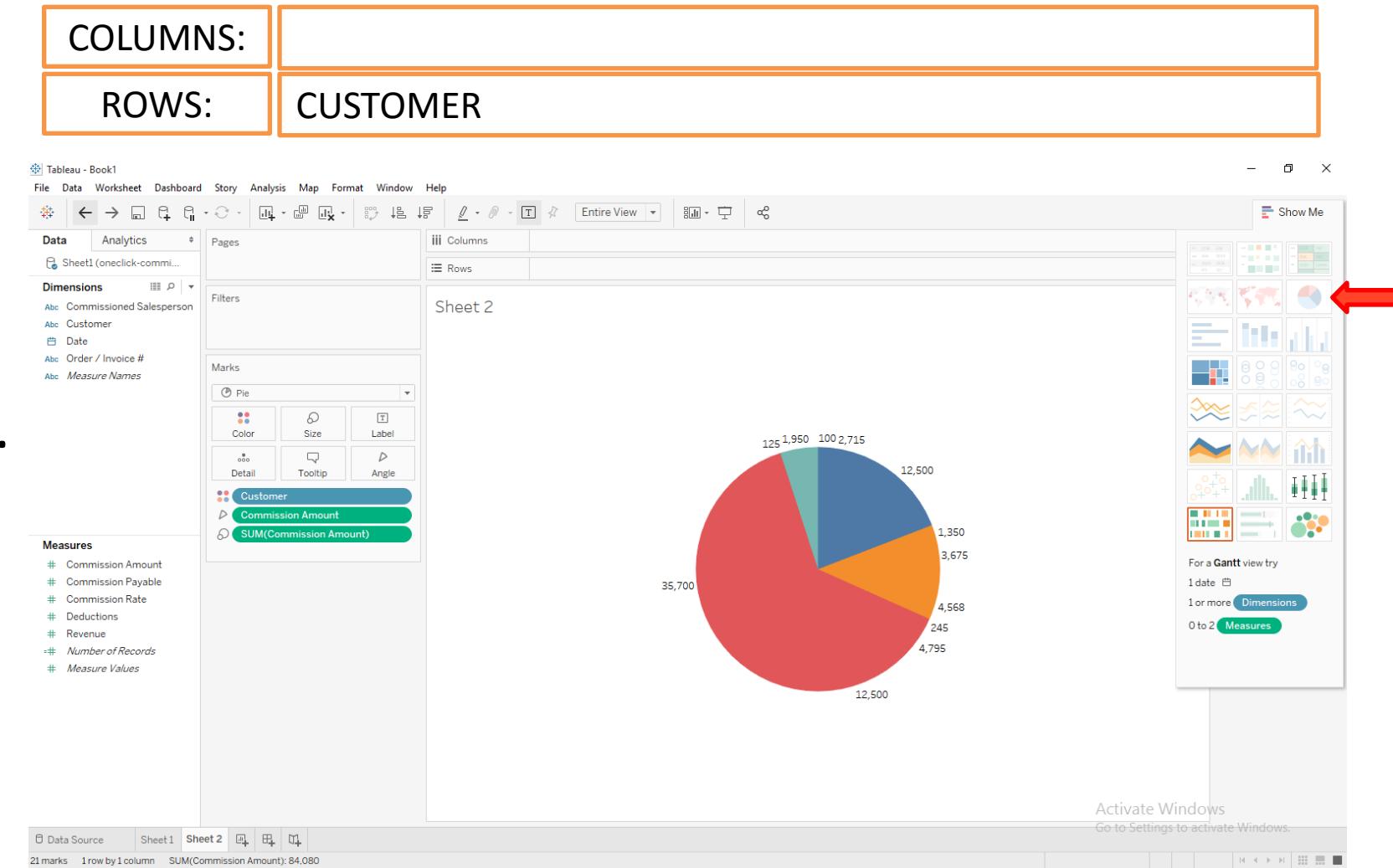
Data Source: demo2/ oneclick-commission-sales.xlsx

Pie chart

- Used to show relative proportions or percentages of information.
- Can be used to highlight geographical trends in the data using pies.

Step 2

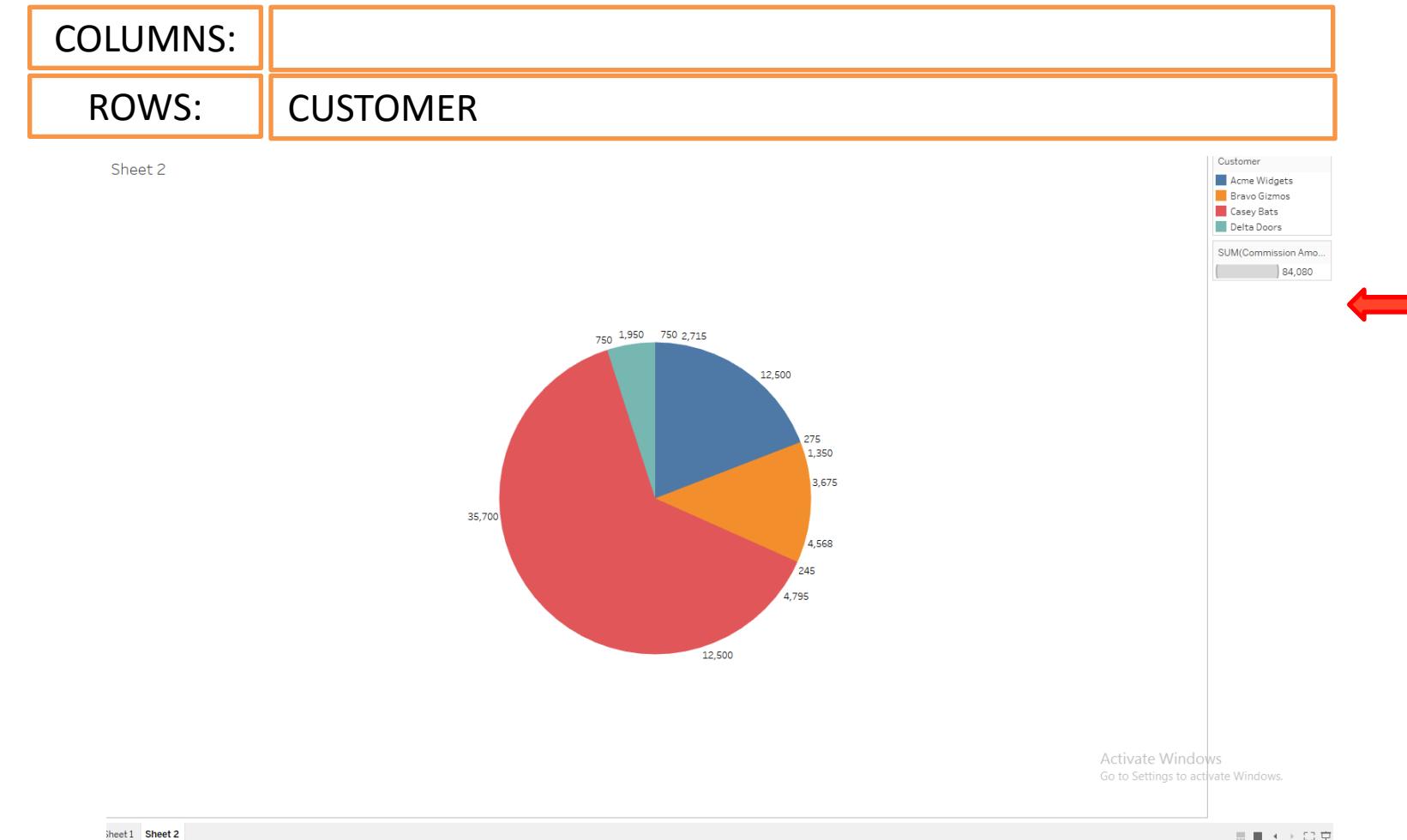
- Upon selection of appropriate pie chart icon from the “show me” visualization panel.
- We can visualize the percentage of contribution by each customer.



Data Source: demo2/ oneclick-commission-sales.xlsx

Step 3

- on enabling the presentation mode, we can visualize the customer legend as shown in the figure.



Data Source: demo2/ oneclick-commission-sales.xlsx

Problem Description:

Data set used:	
----------------	--

TABLEAU

PLAY BOOK : SCATTER PLOT

Step 1

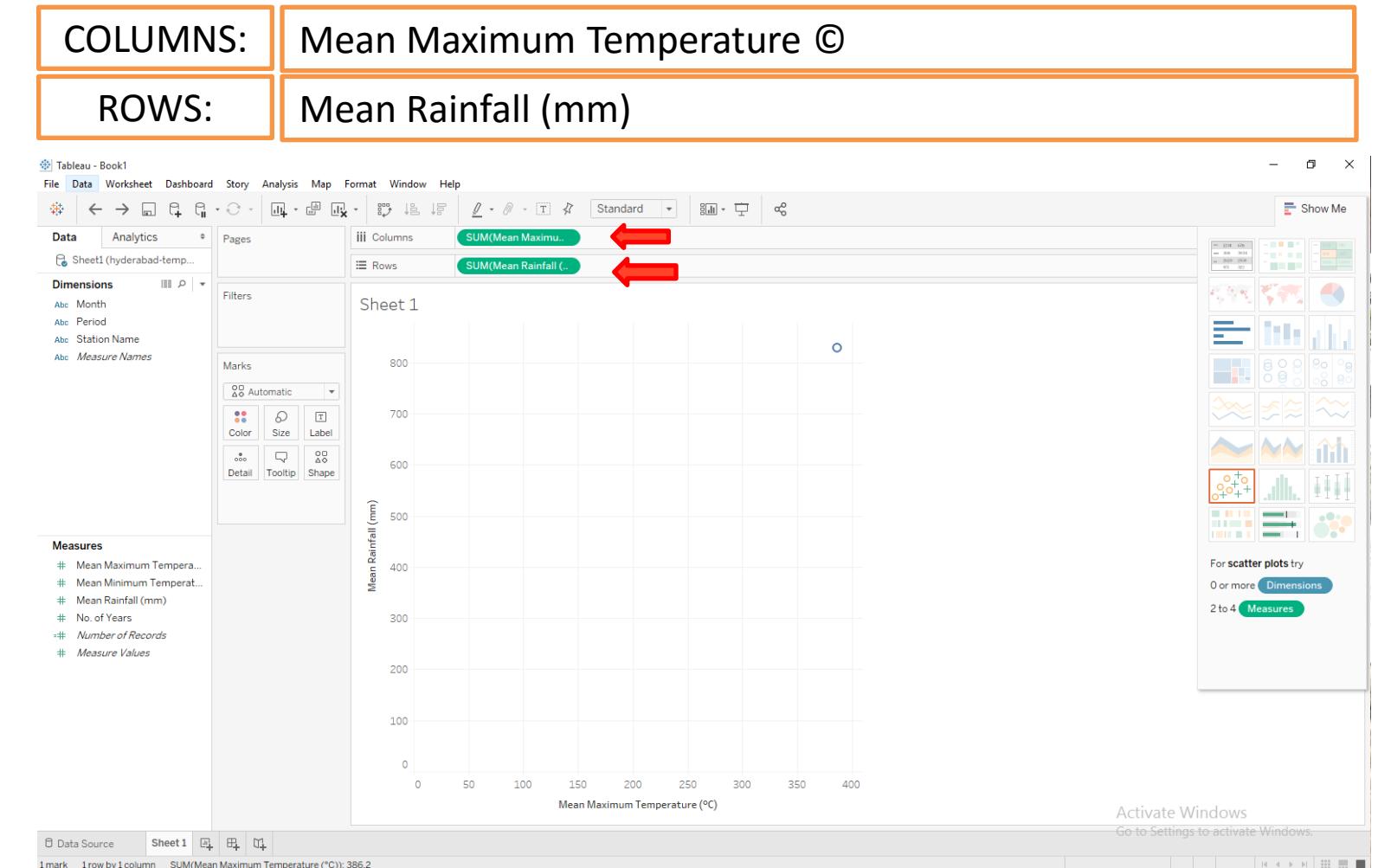
- Scatter plots are used to plot measures on the number of occurrence to identify a pattern.
- Plotting temperature and rainfall measures would help us look at a pattern.

COLUMNS:						
ROWS:						
A	B	C	D	E	F	G
Station Name	Month	Mean Maximum Temperature (°C)	Mean Minimum Temperature (°C)	Mean Rainfall (mm)	Period	No. of Years
Hyderabad (A)	January	28.8	15.2	13.2	1951-2000	50
	February	31.9	17.6	7.9	1951-2000	50
	March	35.4	20.8	15.3	1951-2000	50
	April	37.9	24.3	20.2	1951-2000	50
	May	39.0	26.2	35.7	1951-2000	50
	June	34.5	24.0	103.8	1951-2000	50
	July	30.8	22.6	169.9	1951-2000	50
	August	29.8	22.1	178.7	1951-2000	50
	September	30.5	22.0	158.3	1951-2000	50
	October	30.6	20.3	97.2	1951-2000	50
	November	29.0	16.9	22.4	1951-2000	50
	December	28.0	14.5	5.9	1951-2000	50

Data Source: demo2/ india-climate-data.xlsx

Step 1

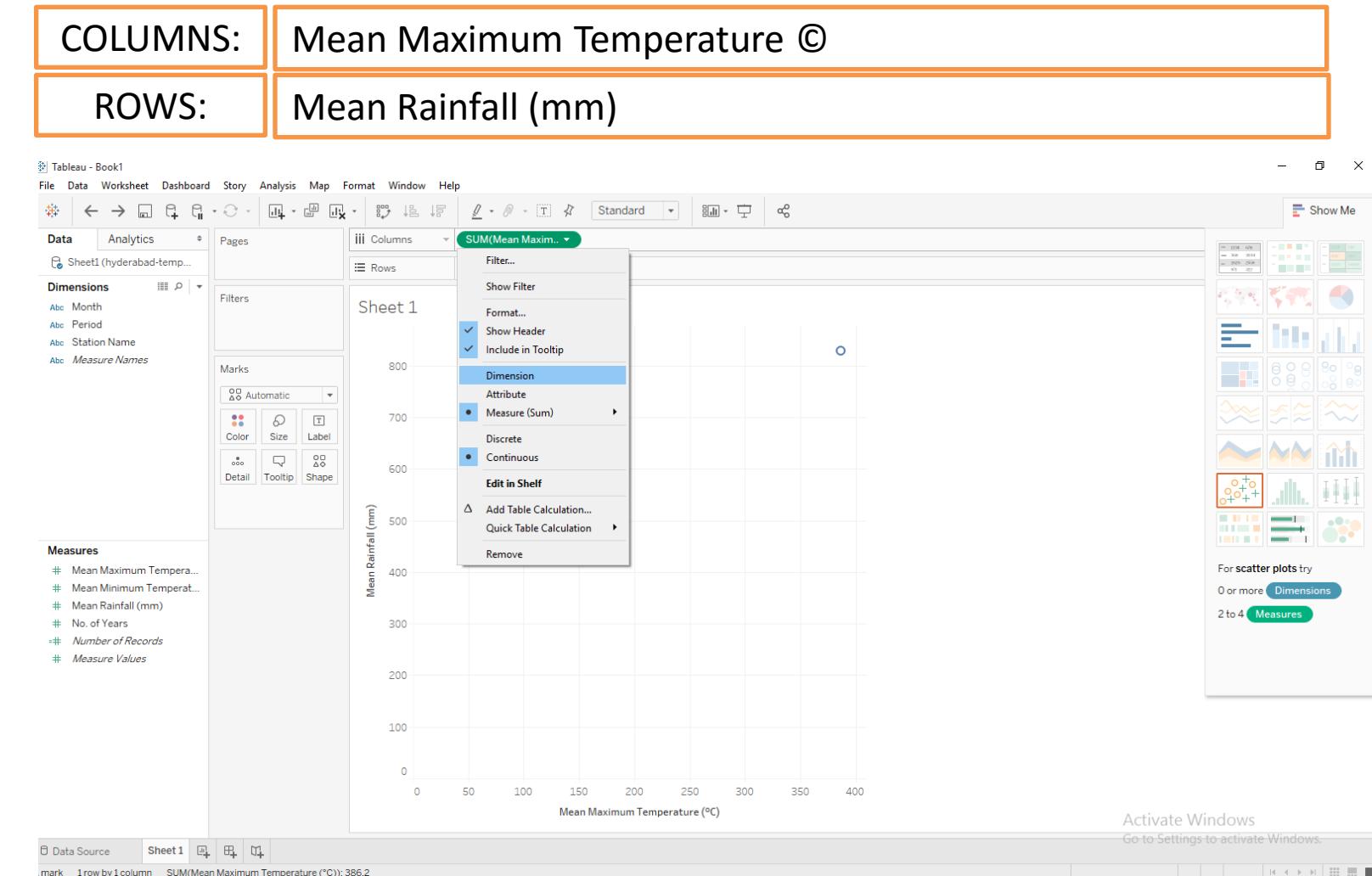
- Extracted sub-set of the data for the region of Hyderabad.
- Drawing relationships between temperature and rainfall using scatter plot.



Data Source: demo2/ hyderabad-temp-rainfall.xlsx

Step 2

- select Mean Maximum Temperature and change the measure to dimension.
- Repeat this step for the row dimension as well.



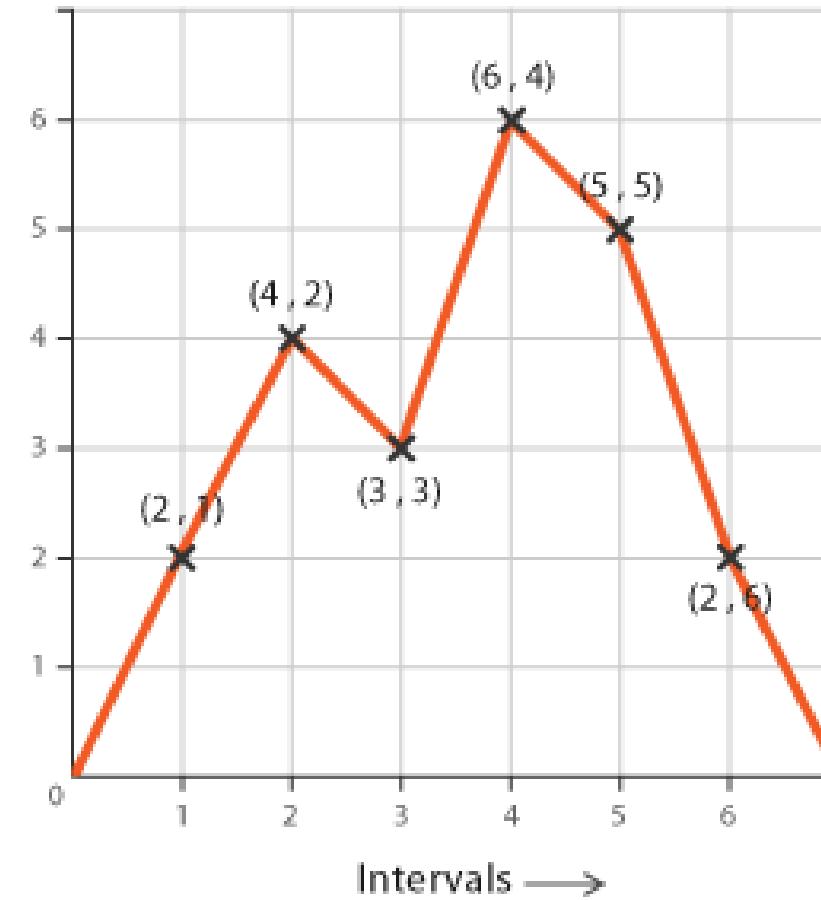
Data Source: demo2/ hyderabad-temp-rainfall.xlsx

[Distribution](#)[Range](#)[Data Over time](#)[Proportions](#)[Relationships](#)

Line Graph

- used to display quantitative values over a continuous interval or time period.
- show trends and analyse how the data has changed over time.
- Uses Cartesian coordinate grid.
- **Challenge:**

Value Scale

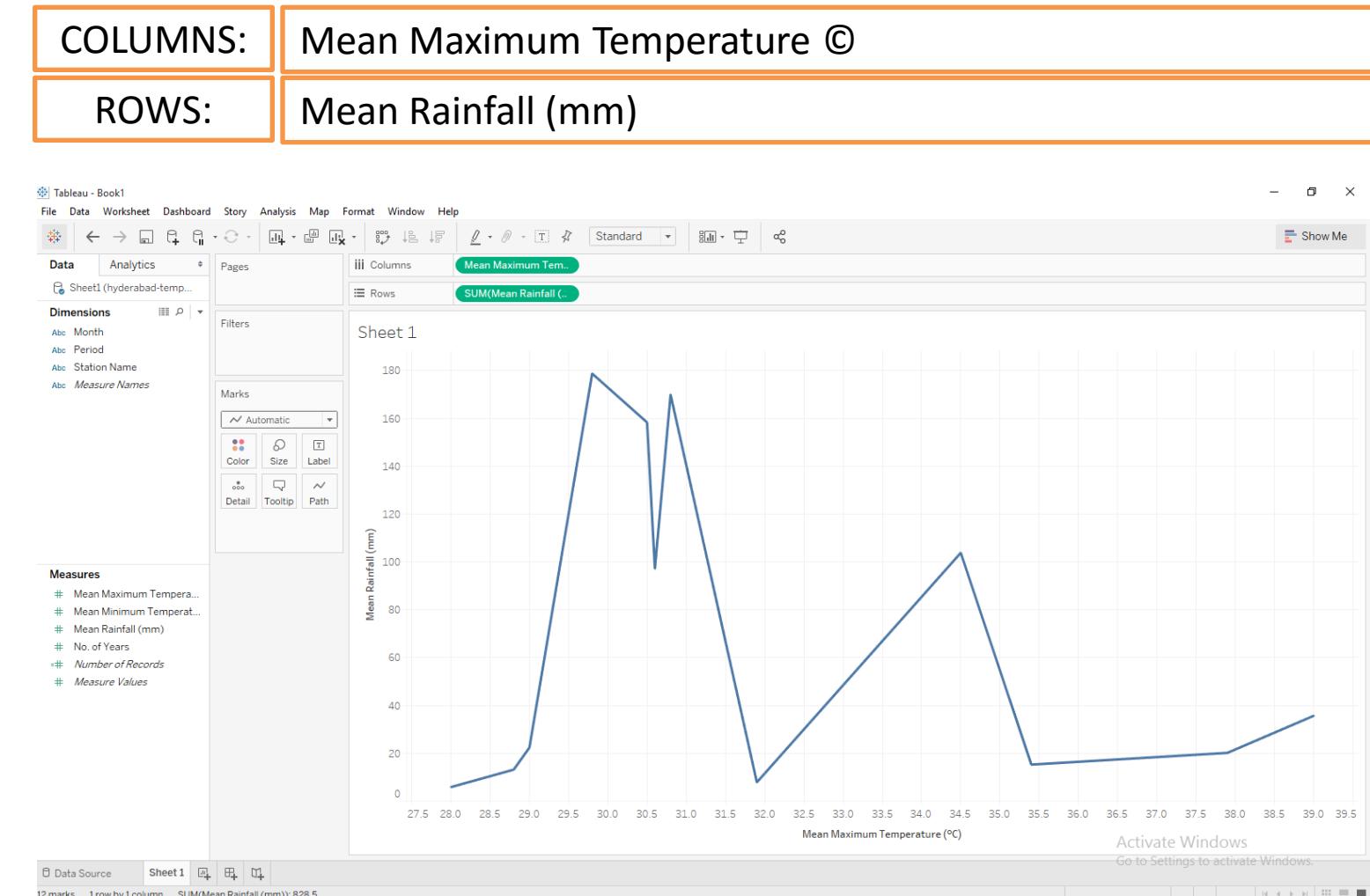


Line chart

- They are used to connect individual numerical data points.
- Used to display trends over a period of time.
- Can be combined with bar charts.
- When two or more line charts are present, filling the space under respective lines to create an area chart. It provides relative contribution that line contributes to the whole.

Step 3

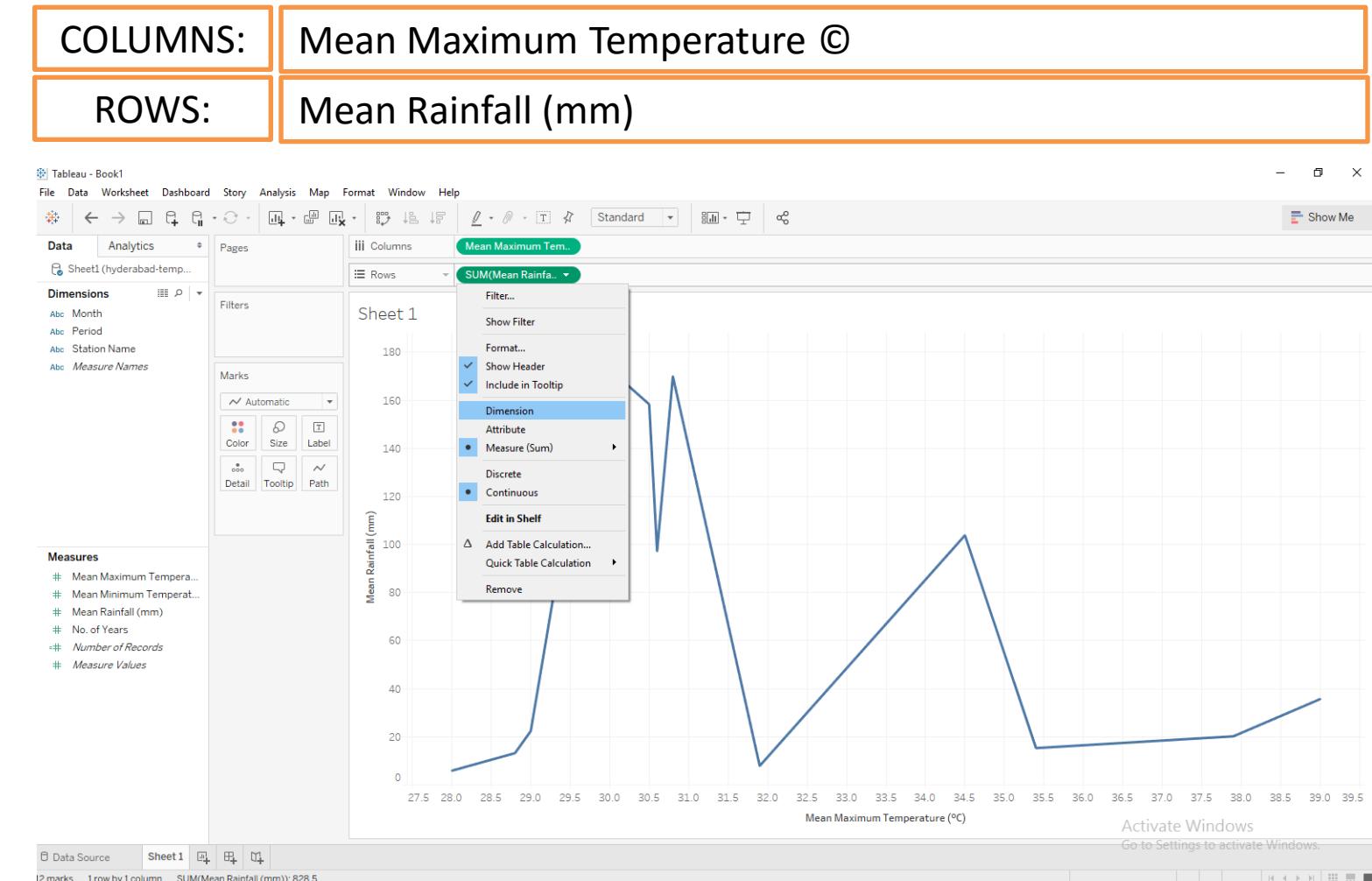
- select Mean Maximum Temperature and change the measure to dimension.
- Repeat this step for the row dimension as well.



Data Source: demo2/ hyderabad-temp-rainfall.xlsx

Step 3

- select Mean Maximum Temperature and change the measure to dimension.
- Repeat this step for the row dimension as well.



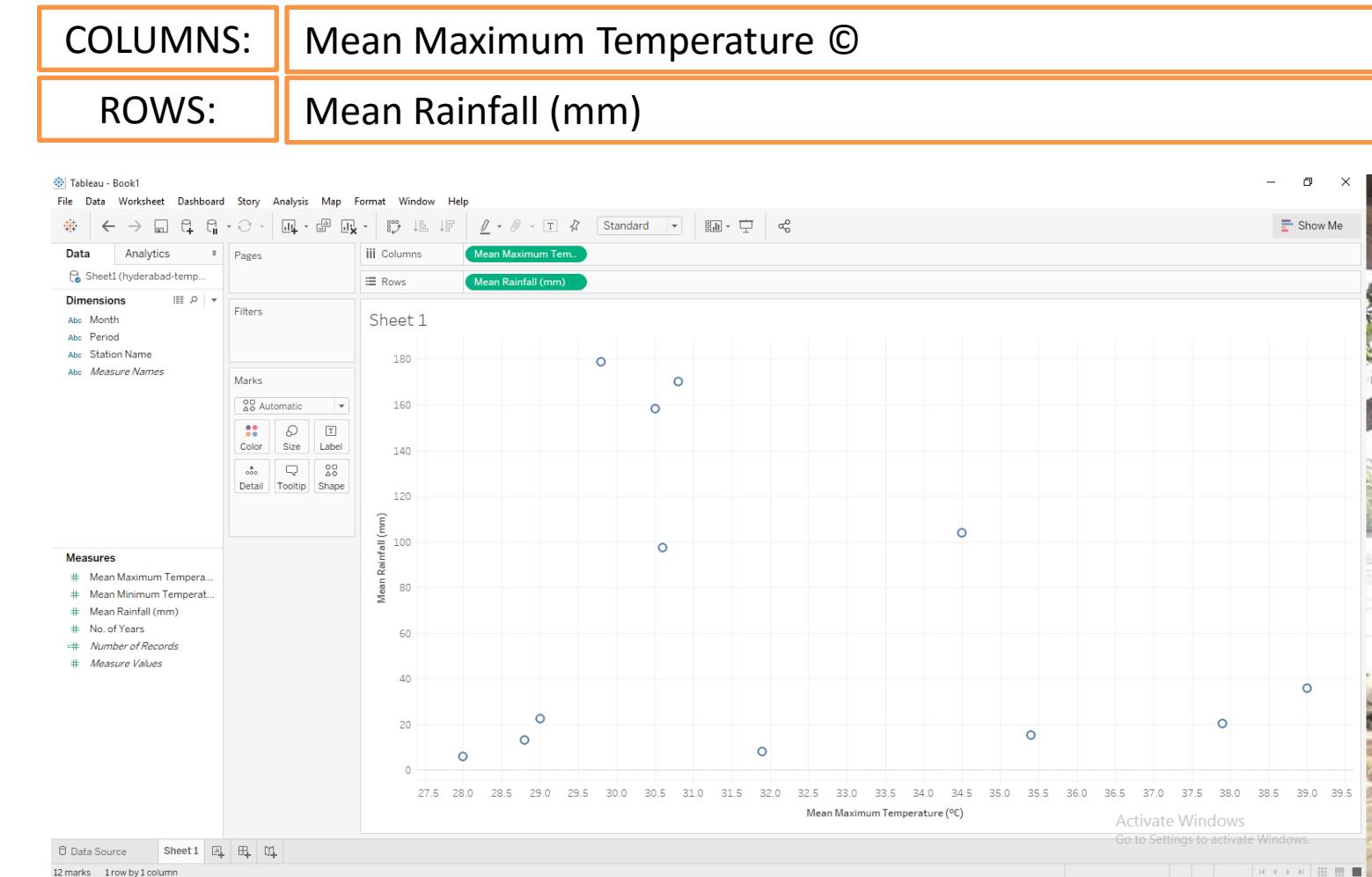
Data Source: demo2/ hyderabad-temp-rainfall.xlsx

Scatter plot

- Used to demonstrate trends, concentrations and outliers that will direct users for further investigation/analysis.
- Used to investigate relationship between different variables.
- By adding a trend line the correlation among the data is clear.
- By incorporating filters, users can drill down into different perspectives and details to quickly identify patterns in the data.

Step 4

- upon transformation from **measure** to dimension for both rows and columns, we have a scatter plot depicting the pattern/relationship between the temperature and rainfall



Data Source: demo2/ hyderabad-temp-rainfall.xlsx

Problem Description:

Data set used:	
----------------	--

TABLEAU

PLAY BOOK : CREATING A HISTOGRAM

Step 1

- Histograms are a great way to look at the distribution of the data.
- Let's look at number of visitors to New Zealand by category.

COLUMNS:

ROWS:

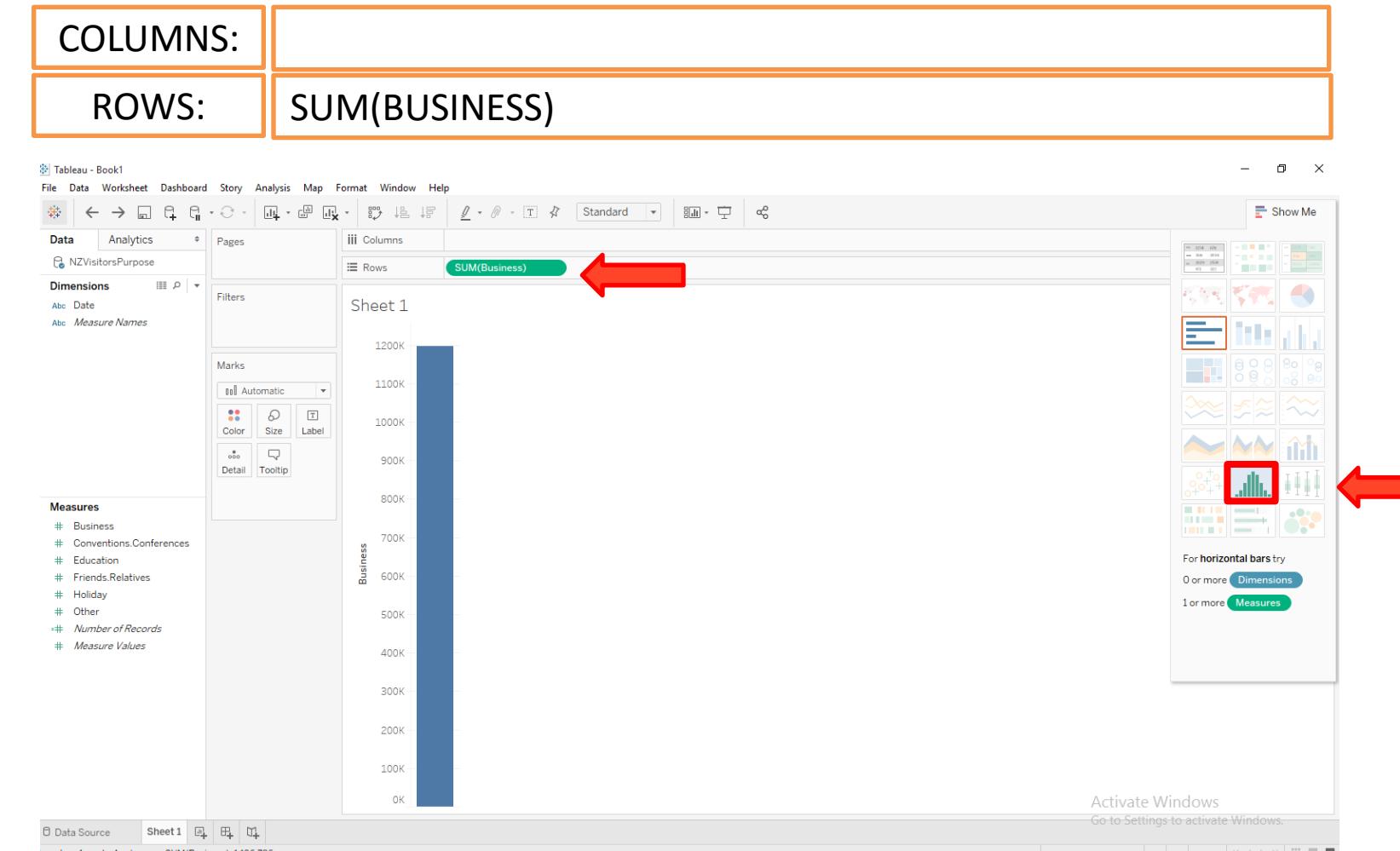
The screenshot shows the Tableau Data Source interface. On the left, there's a sidebar with 'Connections' and 'Files'. Under 'Files', 'NZVisitorsPurpose.csv' is selected. The main area displays the data from this CSV file. The columns are: Date, Business, Conventions.Conf..., Education, Holiday, Other, and Friends.Relatives. The data consists of 12 rows of visitor counts for different months and categories. A tooltip 'Go to Worksheet' points to the 'Sheet1' tab at the bottom. The top right shows connection status ('Live') and filter settings ('0 | Add').

Date	Business	Conventions.Conf...	Education	Holiday	Other	Friends.Relatives
2000M01	6,214	602	3,433	60,352	10,950	54,617
2000M02	8,169	1,284	5,375	67,851	10,495	46,058
2000M03	7,253	791	6,008	55,838	9,455	37,248
2000M04	5,591	797	6,174	41,449	8,311	32,964
2000M05	5,734	714	6,171	26,373	7,608	21,301
2000M06	5,527	616	6,363	20,887	6,990	18,535
2000M07	6,122	990	7,862	28,937	8,195	22,796
2000M08	6,116	910	8,036	30,832	7,749	21,621
2000M09	5,614	680	7,981	27,848	7,473	20,343
2000M10	6,322	1,036	8,541	34,019	8,045	21,888
2000M11	6,877	979	8,364	54,182	8,708	27,743

Data Source: demo2/ TimeSeriesDatasets_130207/NZVisitorsPurpose.csv

Step 2

- We would like to see the distribution of Visitors to New Zealand in the Business Category.



Data Source: demo2/ TimeSeriesDatasets_130207/NZVisitorsPurpose.csv

Distribution

Range

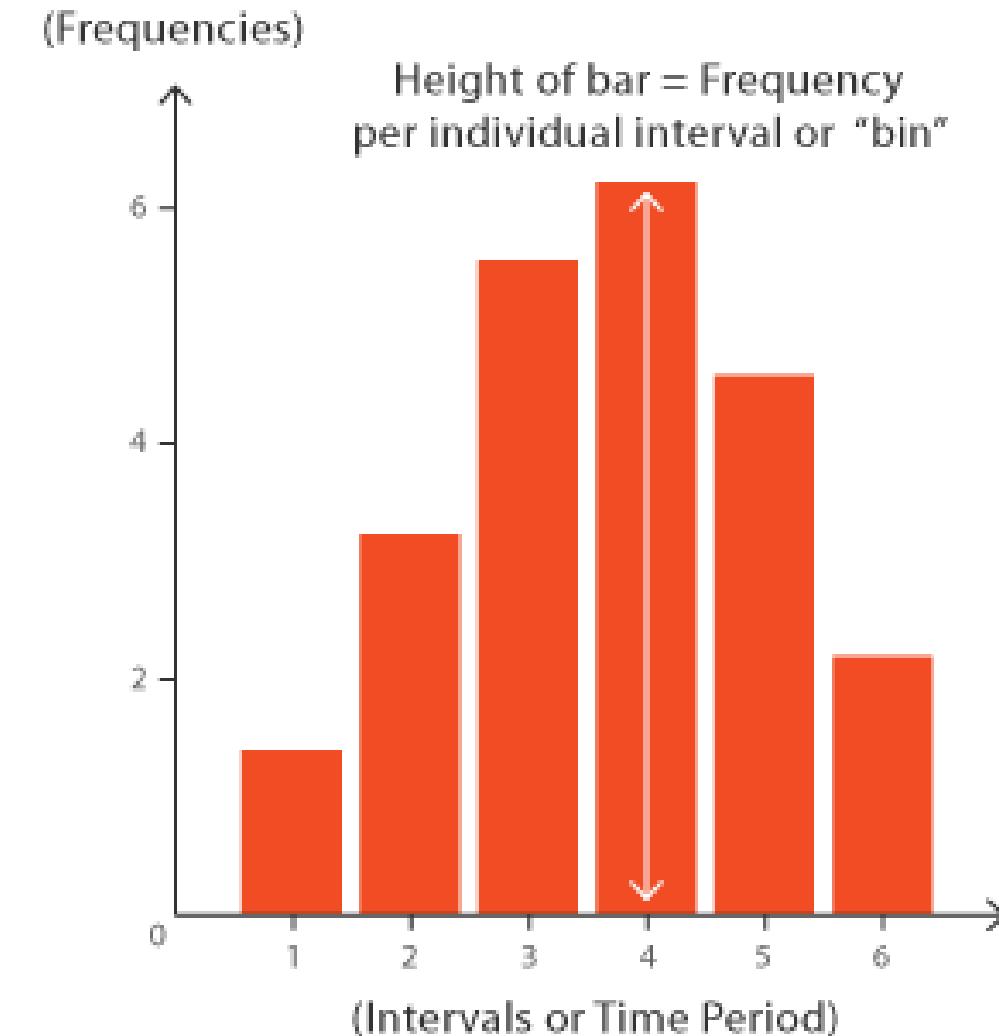
Data Over time

Proportions

Comparisons

Histograms

- used to visualize the distribution of data over a continuous interval or certain time period.
- Tabulated frequency at each interval/bin.
- Give an estimate as to where values are concentrated, what the extremes are and where there are any gaps or unusual values.
- **Challenge: sometimes hard to read.**

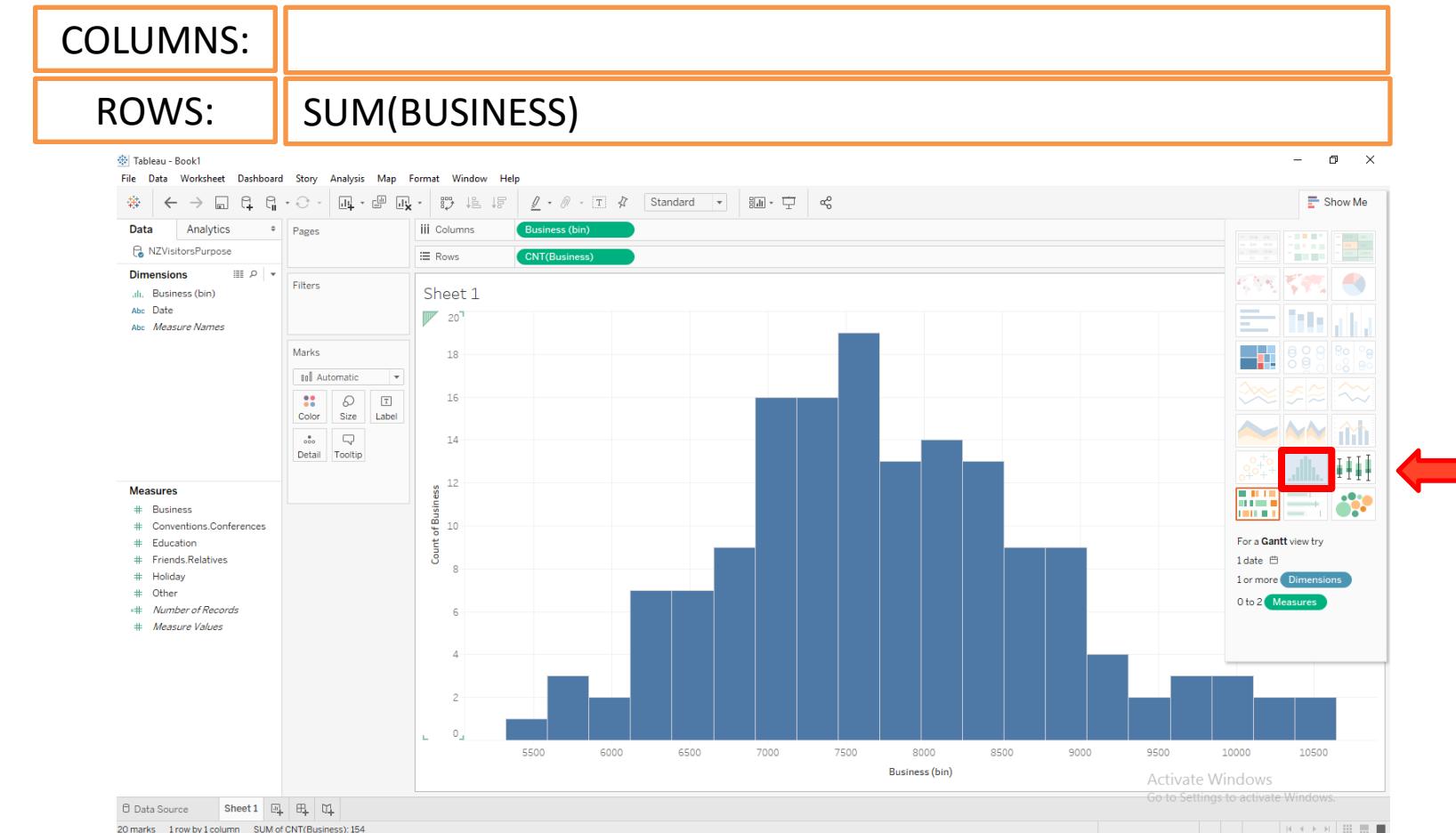


Histogram

- To display data distributed across group.
- Used to explore data for groupings, or “bins” that make sense.

Step 3

- We would like to see the distribution of Visitors to New Zealand in the **Business Category.**
- Upon selection of Histogram chart, it displays distribution of data



Data Source: demo2/ TimeSeriesDatasets_130207/NZVisitorsPurpose.csv

Problem Description:

Data set used:	
----------------	--

TABLEAU

PLAY BOOK : CREATING TREE MAP

Step 1

- Tree maps , much like a pie chart , tree maps show relative contribution of parts to a whole.
- But unlike a pie chart, which uses color to distinguish the parts, a treemap uses both **shape and size and color shade to represent the part's contribution**

COLUMNS:

ROWS:

# Orders	Abc Orders	# Orders	# Orders	# Orders	# Orders	# Orders	Abc Orders	Abc Orders	Abc Orders	Abc Orders
Row ID	Order Priority	Discount	Unit Price	Shipping Cost	Customer ID	Customer Name	Ship Mode	Customer Segment	Product Category	Product Sub-Category
20847	High	0.010000	2.84	0.930	3	Bonnie Potter	Express Air	Corporate	Office Supplies	Pens & Stationery
20228	Not Specified	0.020000	500.98	26.000	5	Ronnie Proctor	Delivery Truck	Home Office	Furniture	Chairs & Seats
21776	Critical	0.060000	9.48	7.290	11	Marcus Dunlap	Regular Air	Home Office	Furniture	Office Furniture
24844	Medium	0.090000	78.69	19.990	14	Gwendolyn F Tyson	Regular Air	Small Business	Furniture	Office Furniture
24846	Medium	0.080000	3.28	2.310	14	Gwendolyn F Tyson	Regular Air	Small Business	Office Supplies	Pens & Stationery
24847	Medium	0.050000	3.28	4.200	14	Gwendolyn F Tyson	Regular Air	Small Business	Office Supplies	Pens & Stationery
24848	Medium	0.050000	3.58	1.630	14	Gwendolyn F Tyson	Regular Air	Small Business	Office Supplies	Rubber
18181	Critical	0.000000	4.42	4.990	15	Timothy Reese	Regular Air	Small Business	Office Supplies	Envelopes
20925	Medium	0.010000	35.94	6.660	15	Timothy Reese	Regular Air	Small Business	Office Supplies	Envelopes
26267	High	0.040000	2.98	1.580	16	Sarah Ramsey	Regular Air	Small Business	Office Supplies	Rubber
26268	High	0.050000	115.99	2.500	16	Sarah Ramsey	Regular Air	Small Business	Technology	Telephones

Data Source: demo2/ SuperStoreUS_2015.xlsx

Step 2

- Add **region** to the columns and **SUM(sales)** to the marks.

COLUMNS: Region

ROWS:

Tableau - Book1

File Data Worksheet Dashboard Story Analysis Map Format Window Help

Standard

Regions

Central East South West

448,285 592,171 357,105 526,777

Activate Windows
Go to Settings to activate Windows.

Data Analytics

Dimensions

- City
- Country
- Customer ID
- Customer Name
- Customer Segment
- Order Date
- Order ID
- Order Priority
- Postal Code
- Product Category
- Product Container
- Product Name
- Product Sub-Category
- Region
- Row ID
- Ship Date
- Ship Mode
- State or Province

Marks

- Automatic
- Color
- Size
- Text
- Detail
- Tooltip
- SUM(Sales)**

Measures

- Discount
- Product Base Margin
- Profit
- Quantity ordered new
- Sales
- Shipping Cost
- Unit Price
- Latitude (generated)
- Longitude (generated)
- Number of Records
- Measure Values

Sheet 1

4 marks 1 row by 4 columns SUM(Sales): 1924,338

Show Me

For horizontal bars try
0 or more Dimensions
1 or more Measures

Data Source: demo2/ SuperStoreUS_2015.xlsx

Step 3

- Now select the “Show me” visualization pane to select “Tree Map” visualization.

COLUMNS: Region

ROWS:

Tableau - Book1

File Data Worksheet Dashboard Story Analysis Map Format Window Help

Standard

Regions

Dimensions

- City
- Country
- Customer ID
- Customer Name
- Customer Segment
- Order Date
- Order ID
- Order Priority
- Postal Code
- Product Category
- Product Container
- Product Name
- Product Sub-Category
- Region
- Row ID
- Ship Date
- Ship Mode
- State or Province

Marks

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

Measures

- Discount
- Product Base Margin
- Profit
- Quantity ordered new
- Sales
- Shipping Cost
- Unit Price
- Latitude (generated)
- Longitude (generated)
- Number of Records
- Measure Values

Region

	Central	East	South	West
448,285	592,171	357,105	526,777	

Sheet 1

Activate Windows
Go to Settings to activate Windows.

For horizontal bars try
0 or more Dimensions
1 or more Measures

Data Source: demo2/ SuperStoreUS_2015.xlsx

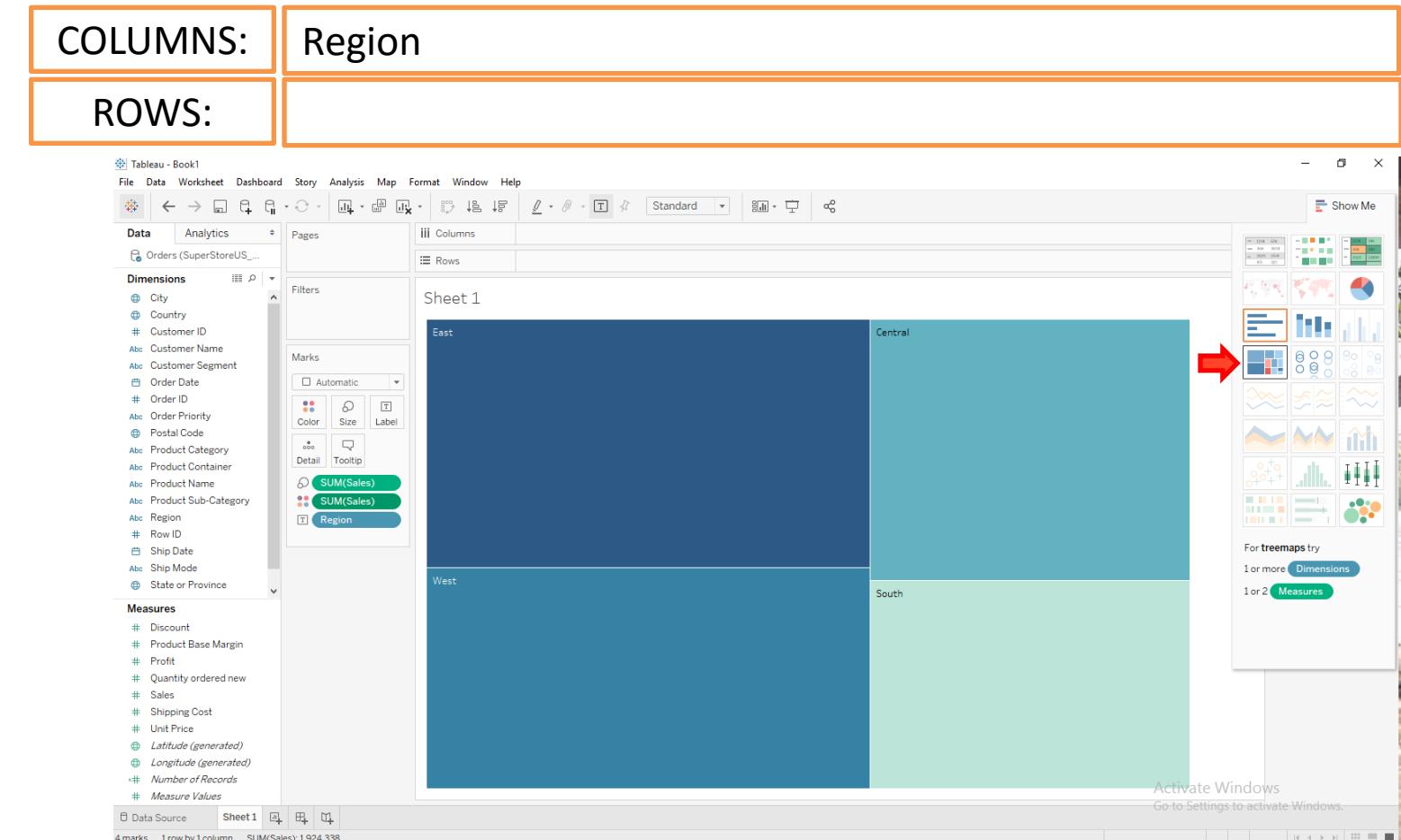
Data Source: demo2/ SuperStoreUS_2015.xlsx

Treemap

- Used to display hierarchical data as a proportion of a whole.
- By coloring the rectangles by a category different from how they are hierarchically structured.

Step 4

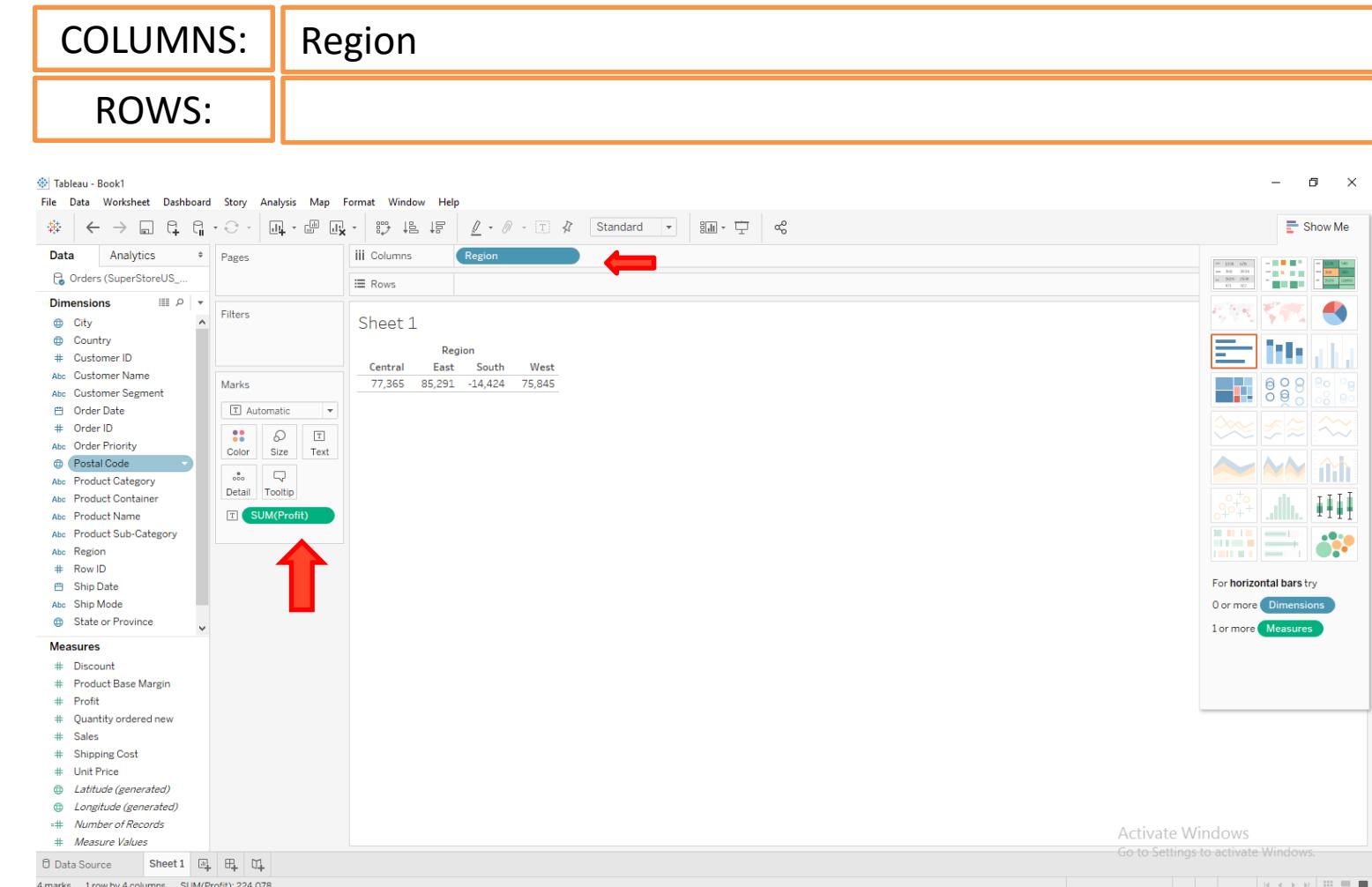
- Tree map uses the intensity of the color, shape and size to determine the relative contribution of parts to the whole.



Data Source: demo2/ SuperStoreUS_2015.xlsx

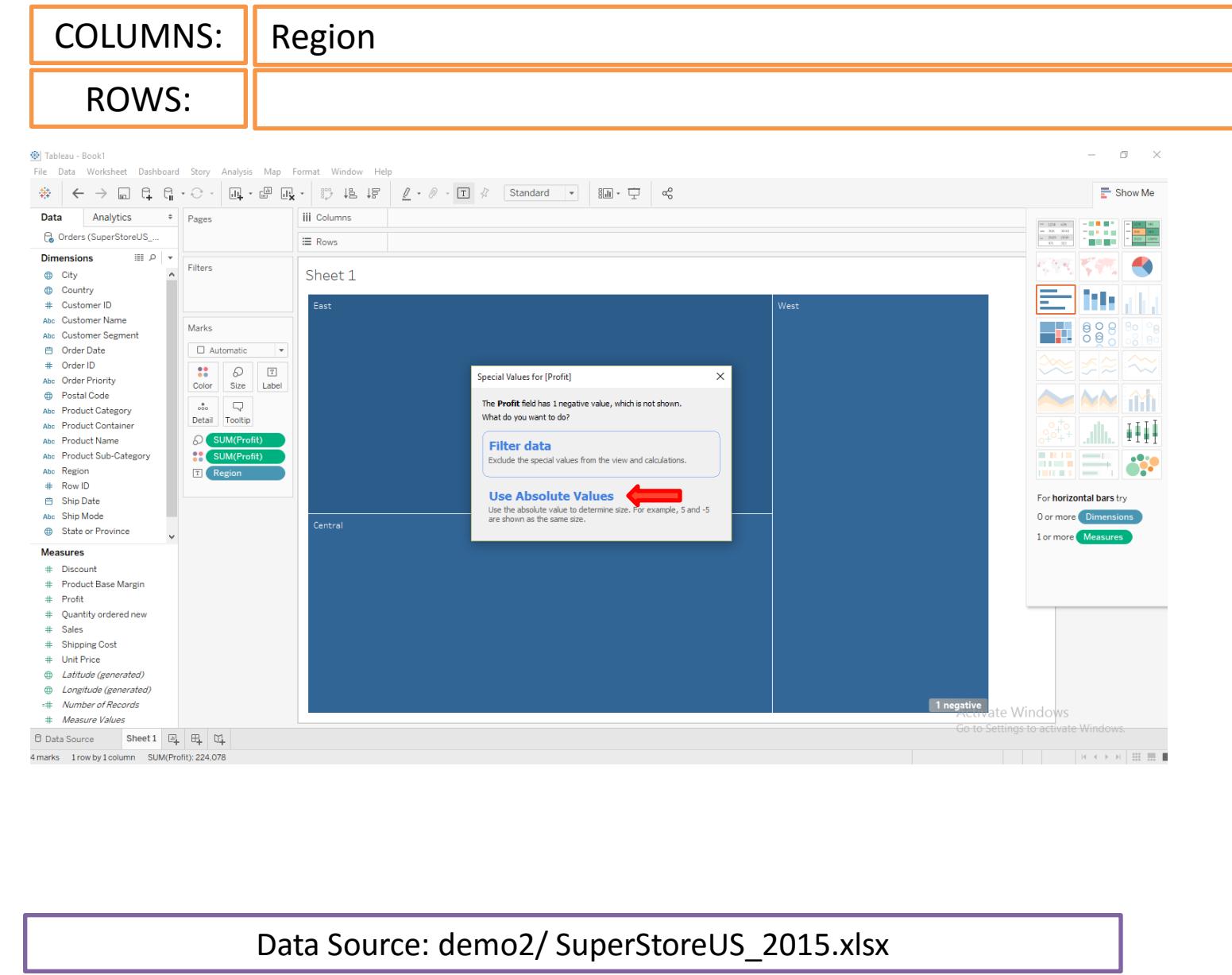
Step 5

- Now let us look at relative contribution of profits to the regions in USA.
- We notice some negative values.



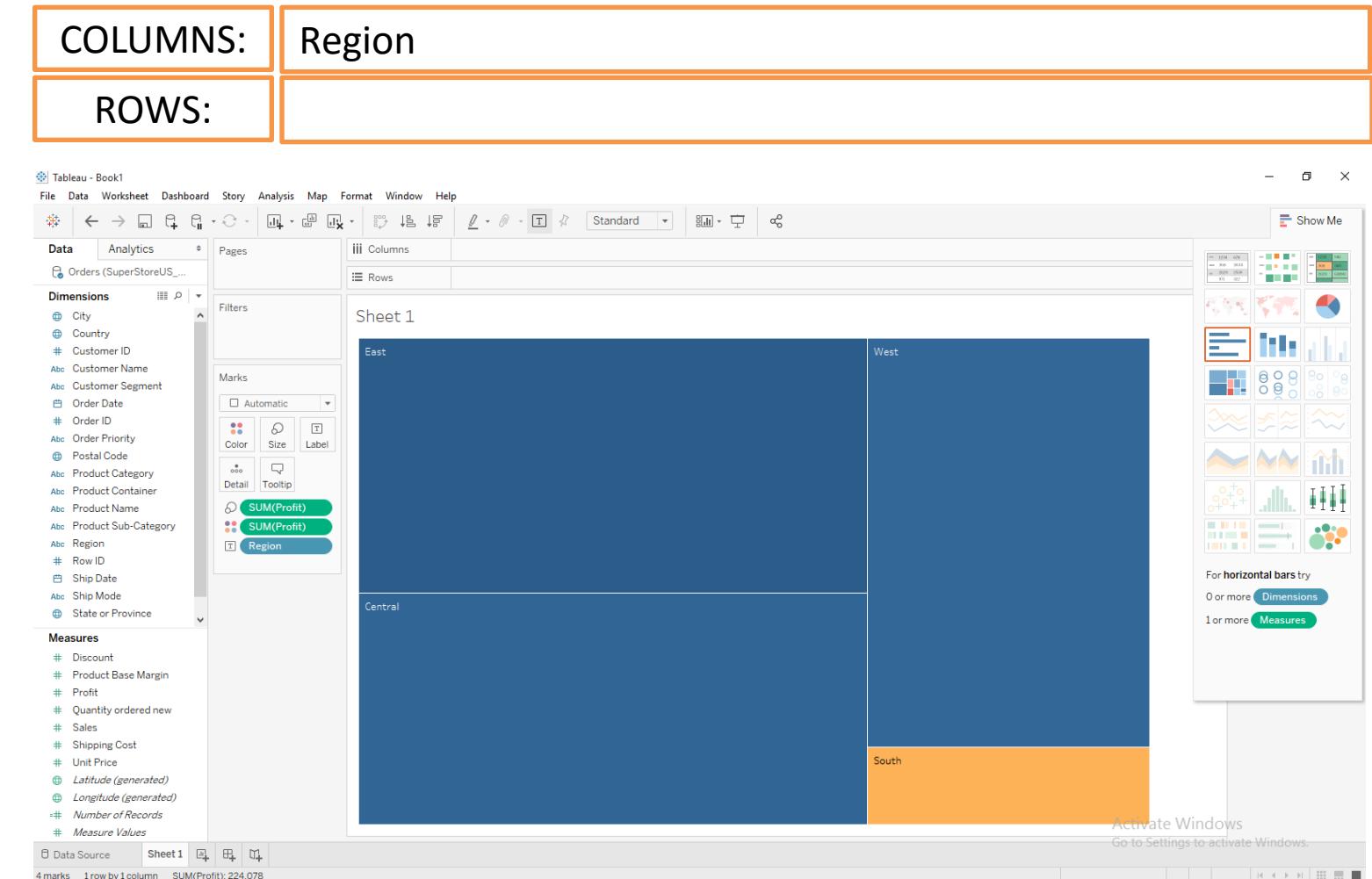
Step 5

- Now let us look at relative contribution of profits to the regions in USA.
- We notice some negative values.
- Upon selecting Treemap visualization, you can see 1 negative value in tree map.
- Selecting it, prompts you for
 - Filter data
 - Use Absolute Values



Step 5

- Upon selection of Absolute values, we see the negative tree map values with a different color code.



Data Source: demo2/ SuperStoreUS_2015.xlsx

Problem Description:

Data set used:

demo2/ SuperStoreUS_2015.xlsx

TABLEAU

PLAY BOOK : CREATING BOX PLOT

Step 1

- select the SuperStoreUS_2015.xlsx data set and load the orders worksheet.

COLUMNS:

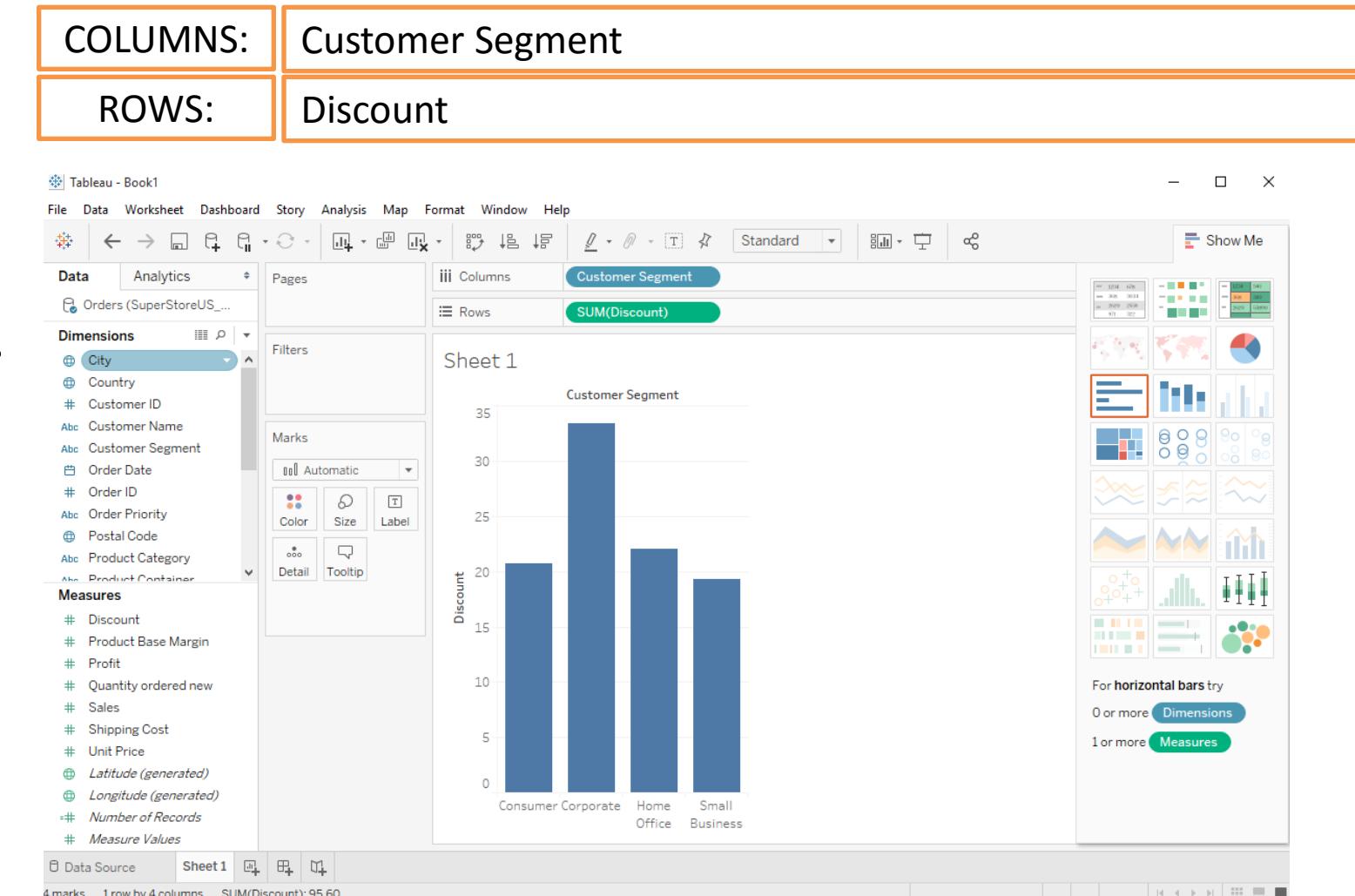
ROWS:

The screenshot shows the Tableau Data Source interface. On the left, the 'Connections' pane shows 'SuperStoreUS_2015' (Excel). The 'Sheets' pane lists 'Orders', 'Returns', 'Users', and 'New Union'. The main area displays the 'Orders' worksheet from the 'Orders (SuperStoreUS_2015)' connection. The data table has 14 columns: Order ID, Order Date, Ship Date, Profit, Quantity ordered, Sales, Order ID, Order Date, Ship Date, Profit, Quantity ordered, Sales, Order ID, and Order Date. A tooltip 'Go to Worksheet' points to the worksheet tab at the bottom. At the bottom of the interface, there are tabs for 'Data Source' (selected), 'Sheet1' (highlighted in orange), and other sheet icons.

Data Source: demo2/ SuperStoreUS_2015.xlsx

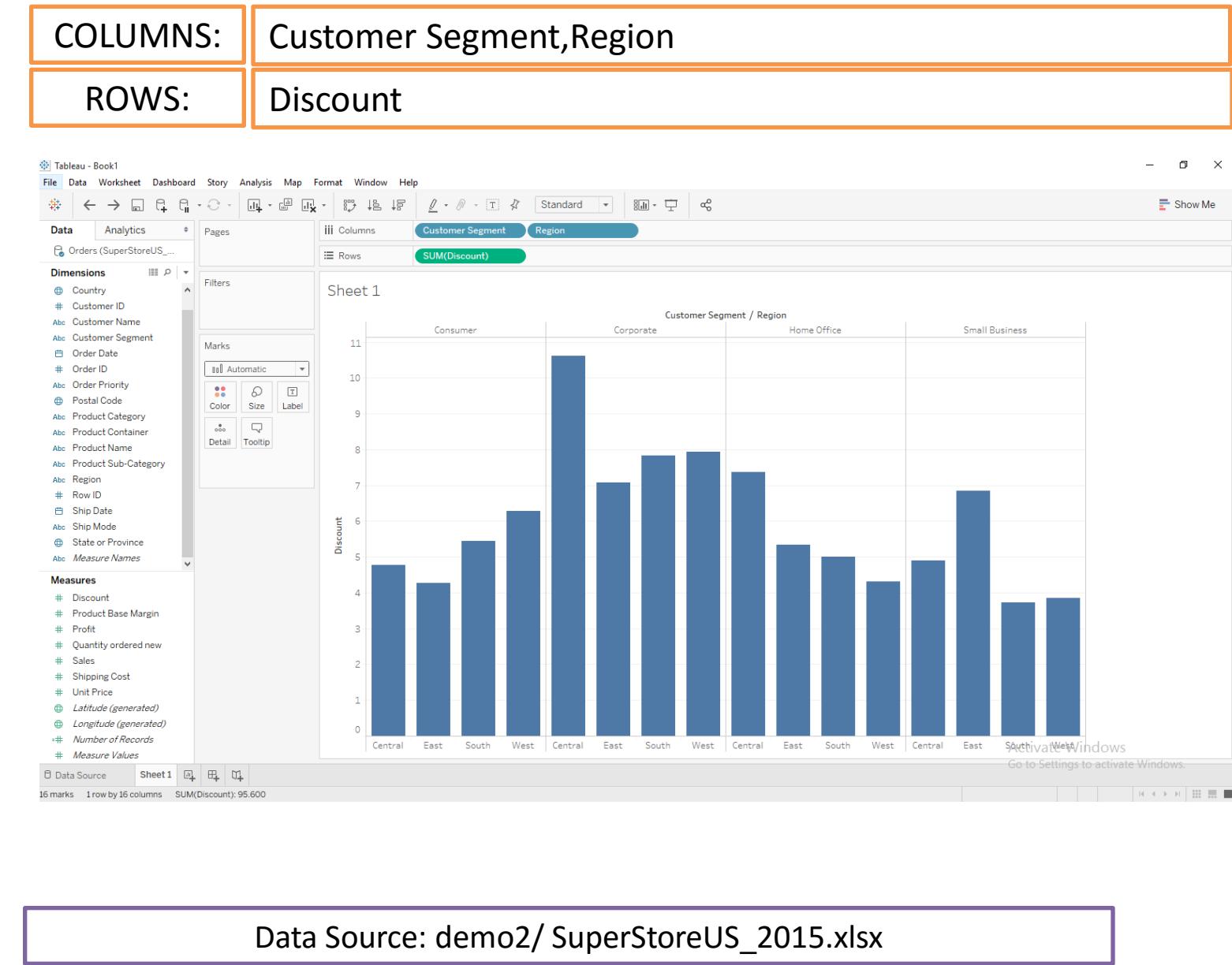
Step 2

- We would like to plot, the customer segment and discounts offered by region.
- Lets choose “customer segment” for dimensions and “discount” for measure.



Step 4

- Now let us add, “region” to the customer segment dimension to visualize and organize the results based on region as shown in the figure.
- The default bar chart provides a perspective classifying the data by region, we could choose to change the perspective from the “show me” visualization pane.

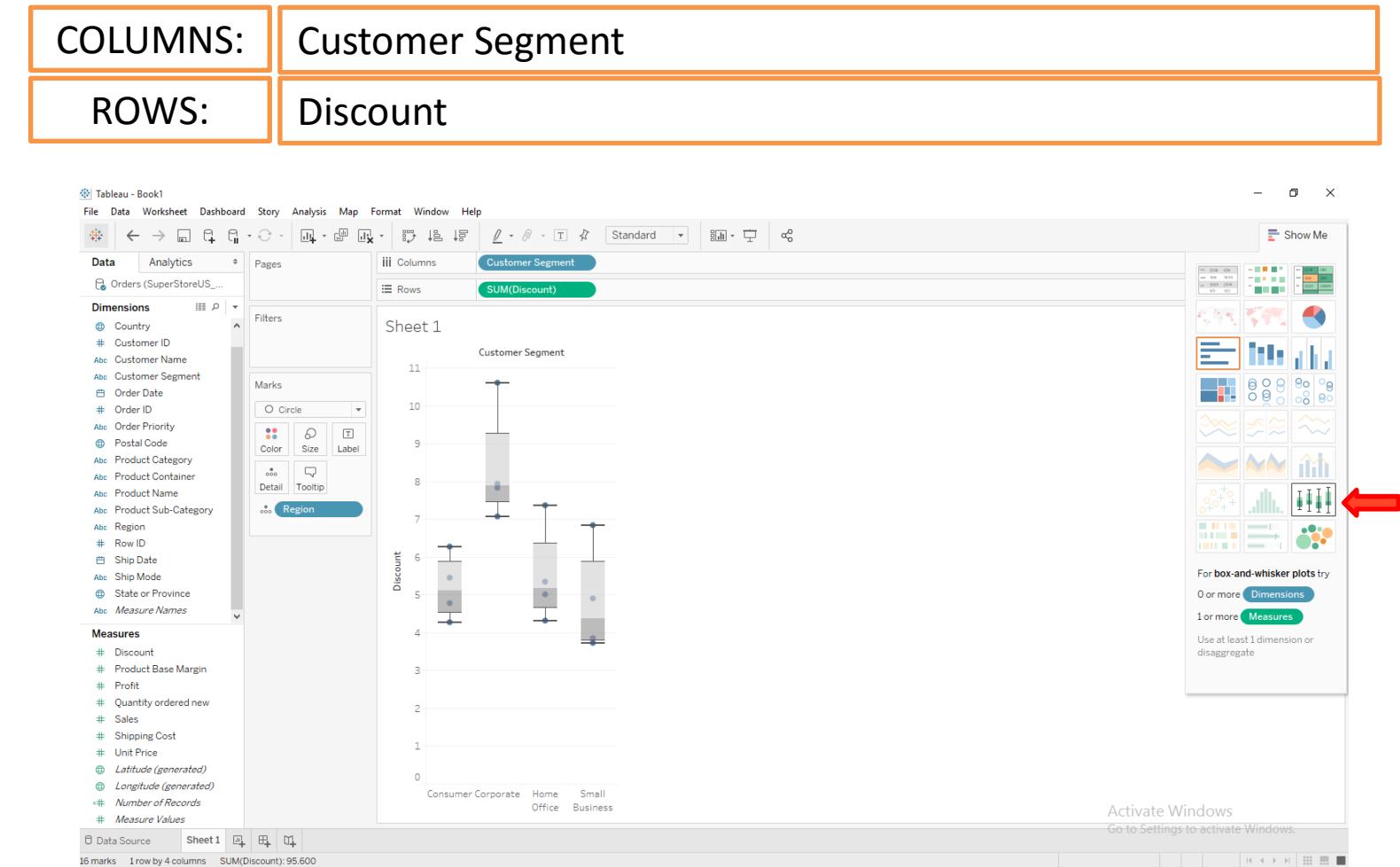


Box-and-whisker plot

- Used to show distribution of data. The box contains the median of the data along the 1st and 3rd quartiles, and the whiskers, typically represent data within 1.5 times the inter-quartile range(the difference between the 1st and 3rd quartiles)
- Can be used to show the maximum and minimum points within the data.
- Used to compare boxplots across categorical dimensions or to compare distributions between data sets.

Step 5

- Upon selection of the box plot visualization from the “show me” visualization pane.
- Tableau provides us with a box plot perspective as shown in the figure.**



Problem Description:

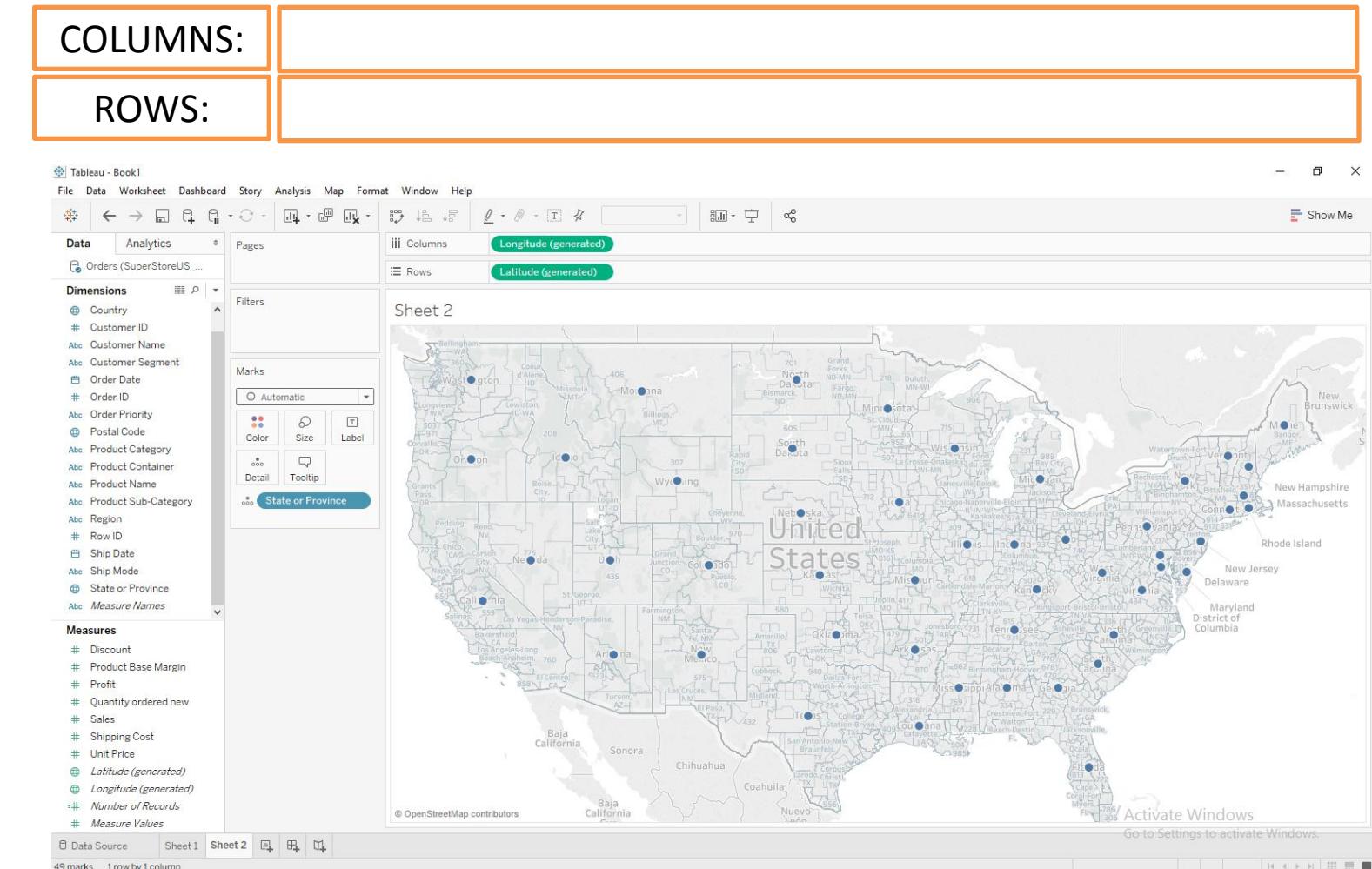
Data set used:	
----------------	--

SYED AWASE KHIRNI

TABLEAU : MAPPING GEOGRAPHIC DATA

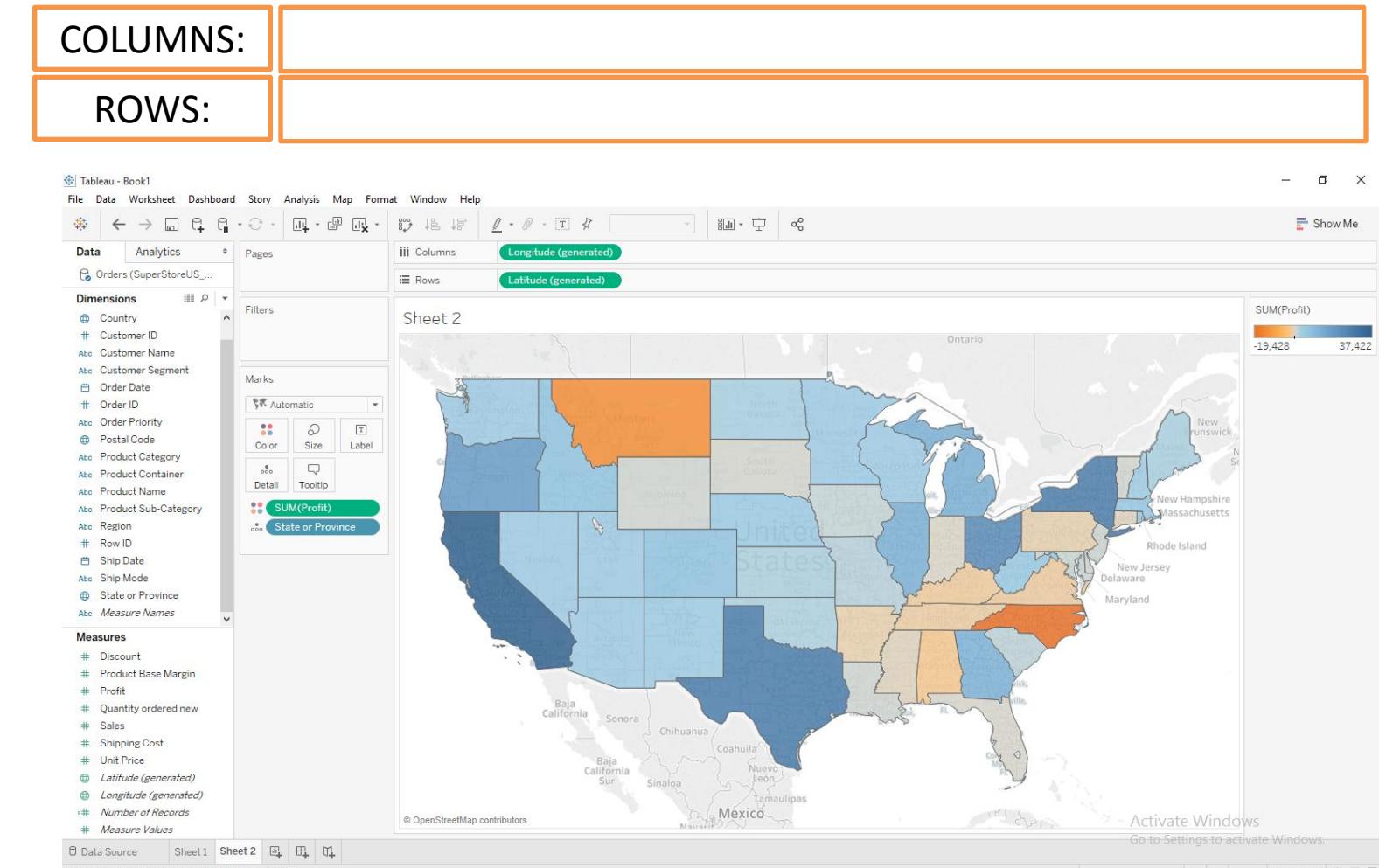
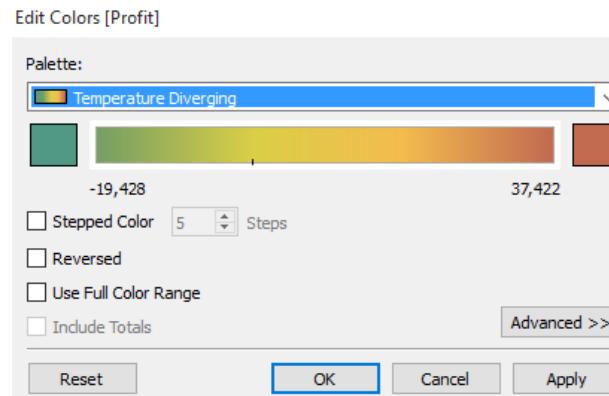
Step 1

- Select “State or Province” Measure name to plot a map with open source map data inside tableau.



Step 2

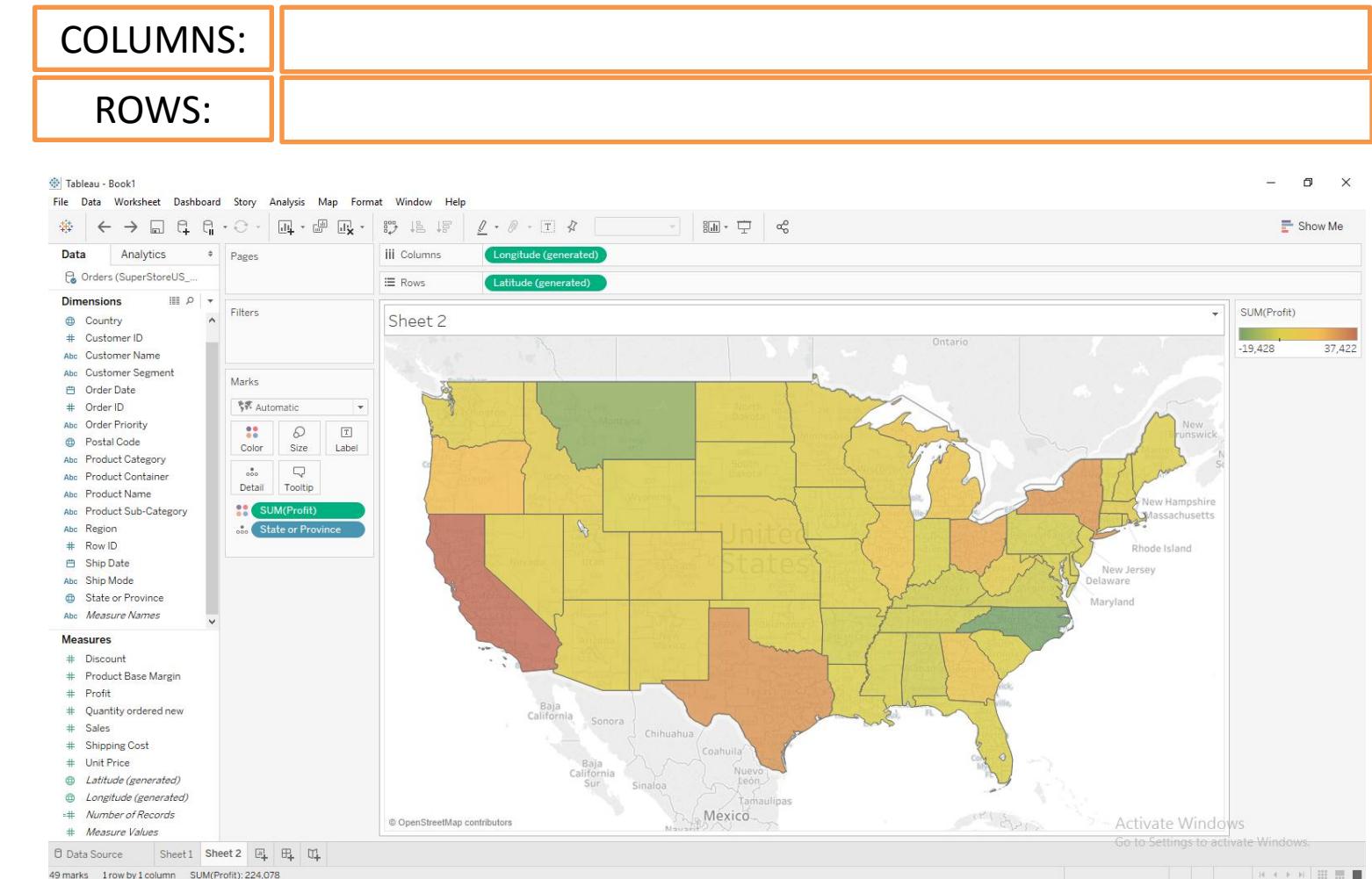
- select “profit” measure value to mark on to the colors by the state.



Data Source: demo2/ SuperStore2015.xlsx

Step 3

- Upon apply the color theme, we see profit by state.



Data Source: demo2/ SuperStore2015.xlsx

Problem Description:

Data set used:

SYED AWASE KHIRNI

TABLEAU : DUAL AXIS GRAPHS/COMBINATION CHARTS

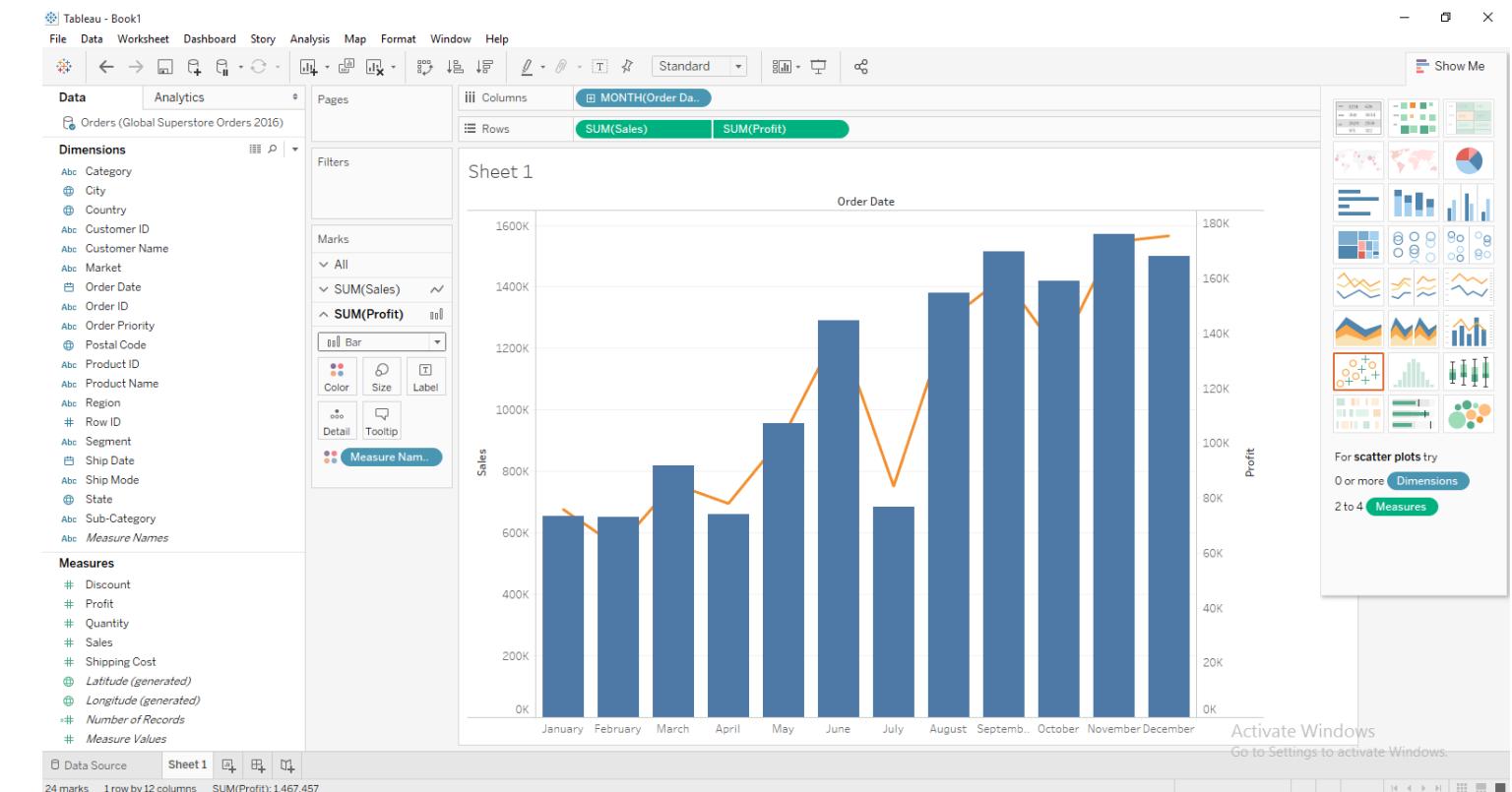
Combination Charts/Dual Axis Chart

- A chart that combines two or more chart types into a single chart.
- They are similar to multi-series charts, they allow us to plot multiple datasets on the same chart.
- They can be rendered in either 2D or 3D can have single or dual y-axes and can be stacked or multi-series in nature.
- Dual Axis charts are used for comparing a variable across different timelines such as year 2013 and year 2014 for sales(Year over Year Sales).

Step 1

- We select OrderDate by Month and sales, subsequently let us drag profit to the right hand side axis to create a dual axis .
- We can select the profits in the marks pane and select visualization type to bar chart.

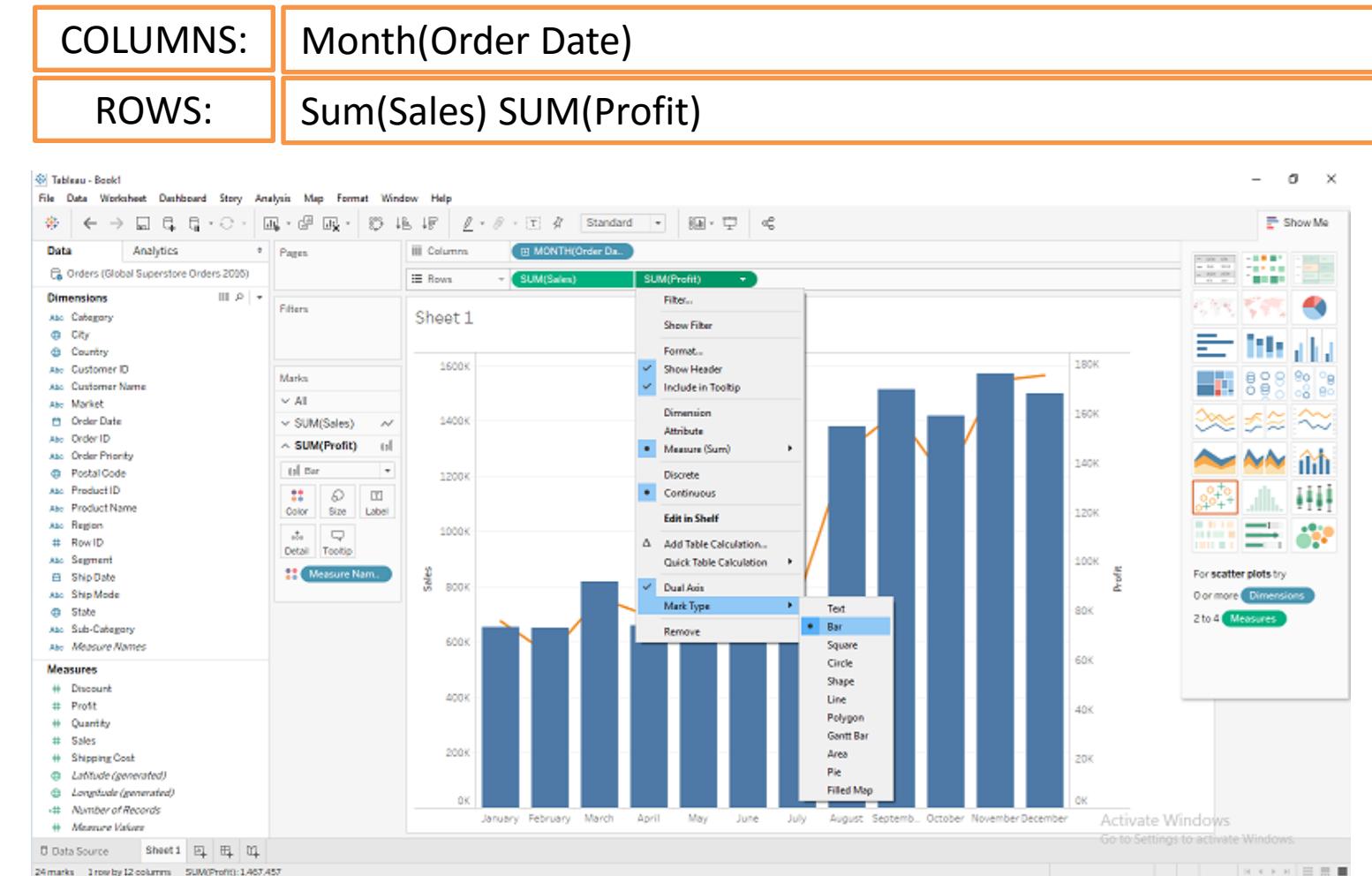
COLUMNS:	Month(Order Date)
ROWS:	Sum(Sales) SUM(Profit)



Data Source: demo1/ GlobalSuperStore2016.xlsx

Step 2

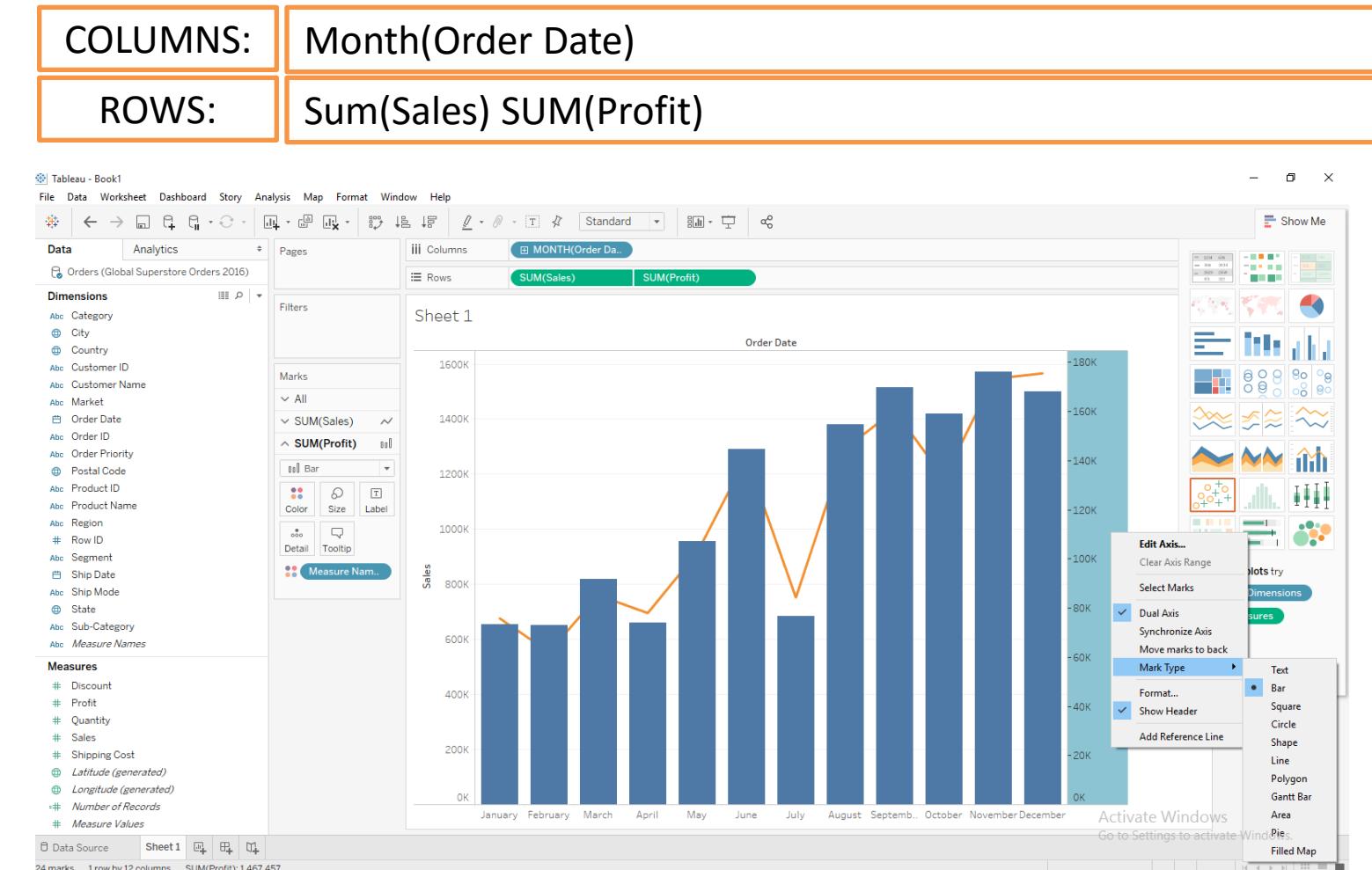
- Alternatively, you can switch the Sum(Profit) visualization type by selecting the rows pane and choosing appropriate mark type as shown in the figure.



Data Source: demo1/ GlobalSuperStore2016.xlsx

Step 3

- Alternatively, you can click on the secondary axis to select appropriate mark type



Data Source: demo1/ GlobalSuperStore2016.xlsx

Example 2:

Step 1

- Load the superstore2015.xlsx files into tableau.

COLUMNS:
ROWS:

The screenshot shows the Tableau interface with the following details:

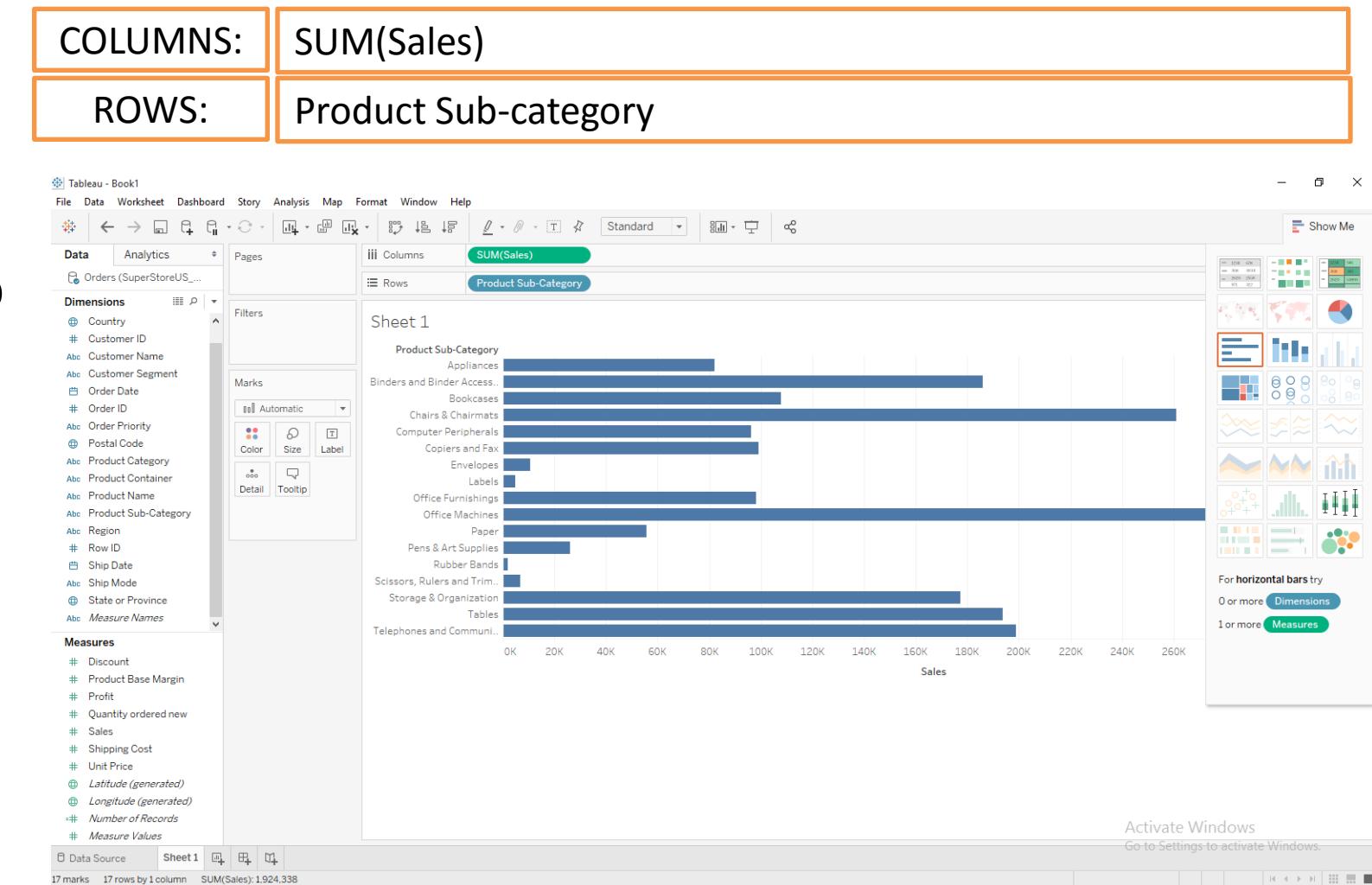
- File Menu:** File, Data, Window, Help.
- Connections:** SuperStoreUS_2015 (Excel).
- Sheets:** Orders, Returns, Users, New Union.
- Data Interpreter:** Use Data Interpreter is checked.
- Orders Sheet View:**
 - Header: #, Order ID, Order Priority, #, Discount, #, Unit Price, #, Shipping Cost, #, Customer ID, Abc, Customer Name, Abc, Ship Mode, Abc, Customer Segment, Abc, Product Category, Abc, Product S.
 - Rows: A sample of 16 rows is shown, each containing data for an order, including customer information like Bonnie Potter, delivery mode like Express Air, and product categories like Office Supplies.
 - Buttons: Go to Worksheet, Data Source, Sheet1, and other sheet navigation icons.
- Bottom Right:** Connection (Live or Extract) and Filters (0 Add).

Data Source: demo2/ SuperStore2015.xlsx

Example 2:

Step 2

- Select sales and product sub-category to visualize a bar chart.



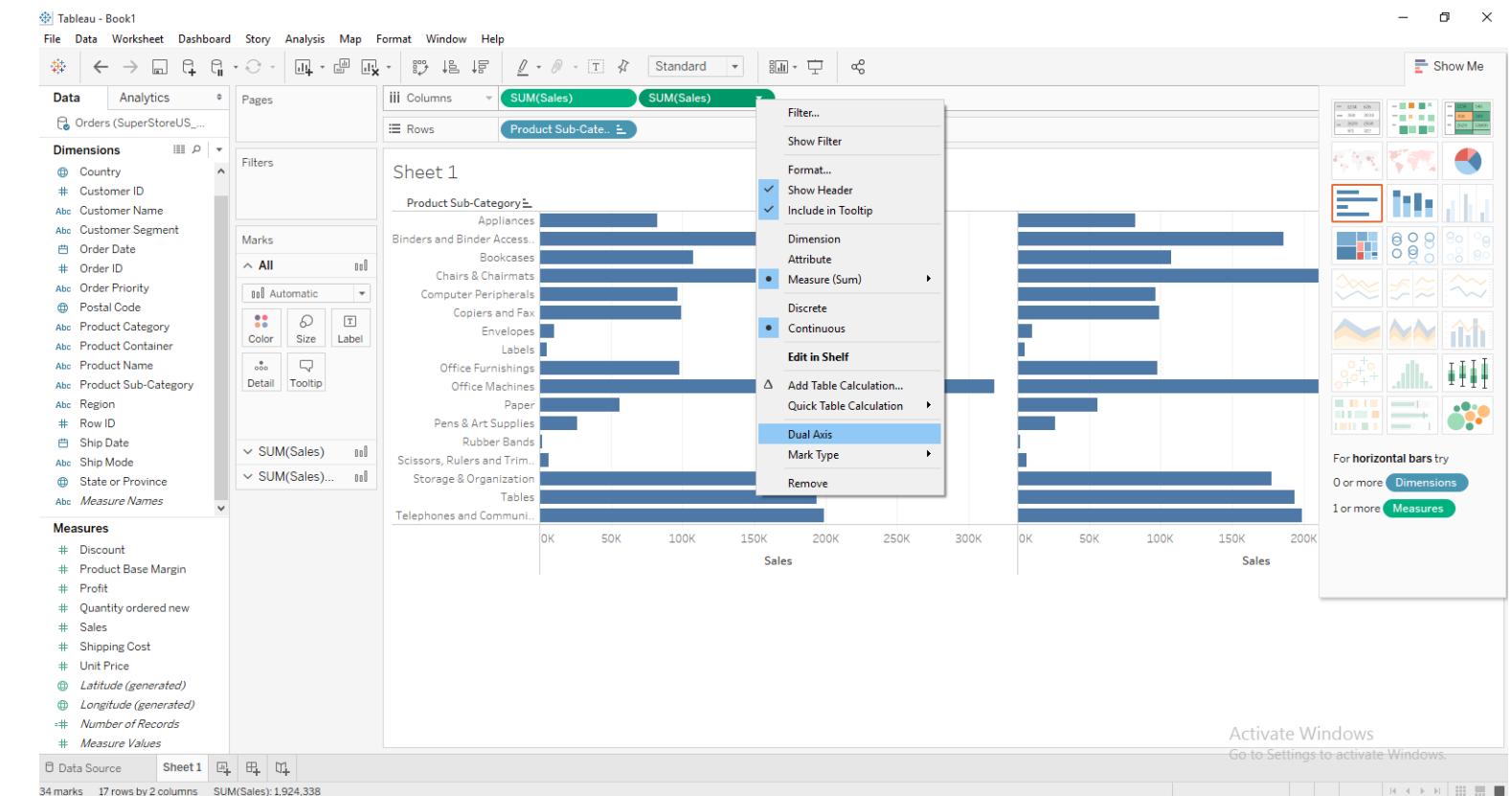
Data Source: demo2/ SuperStore2015.xlsx

Example 2:

Step 3

- To create a dual axis chart, let's now add another SUM(sales) measure to the columns and in the options select dual axis chart.

COLUMNS:	SUM(Sales),SUM(Sales)
ROWS:	Product Sub-category



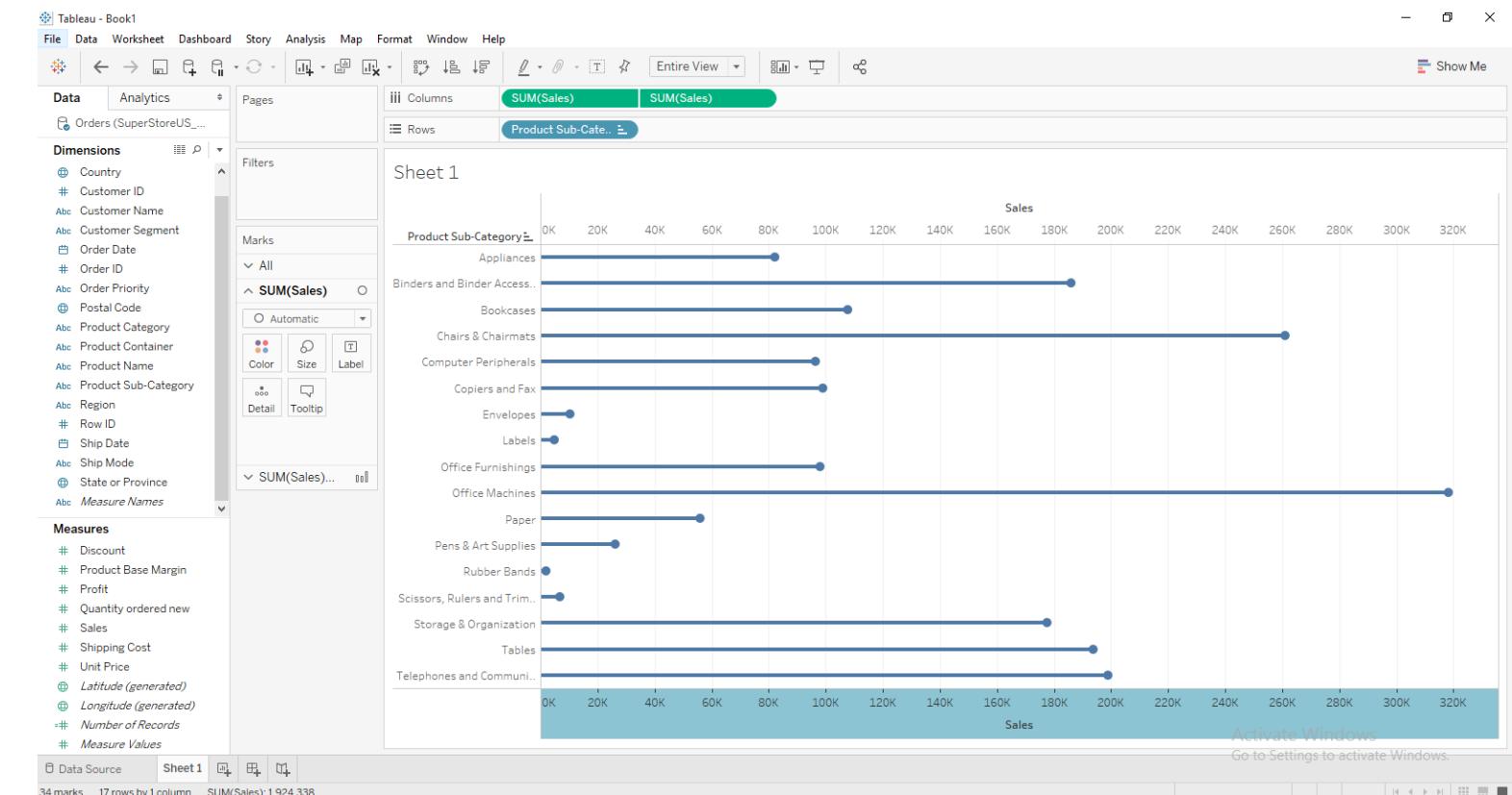
Data Source: demo2/ SuperStore2015.xlsx

Example 2:

Step 4

- Resize the marks for dual marks to make a lolipop chart and synchronize both the axis.

COLUMNS:	SUM(Sales)
ROWS:	Product Sub-category

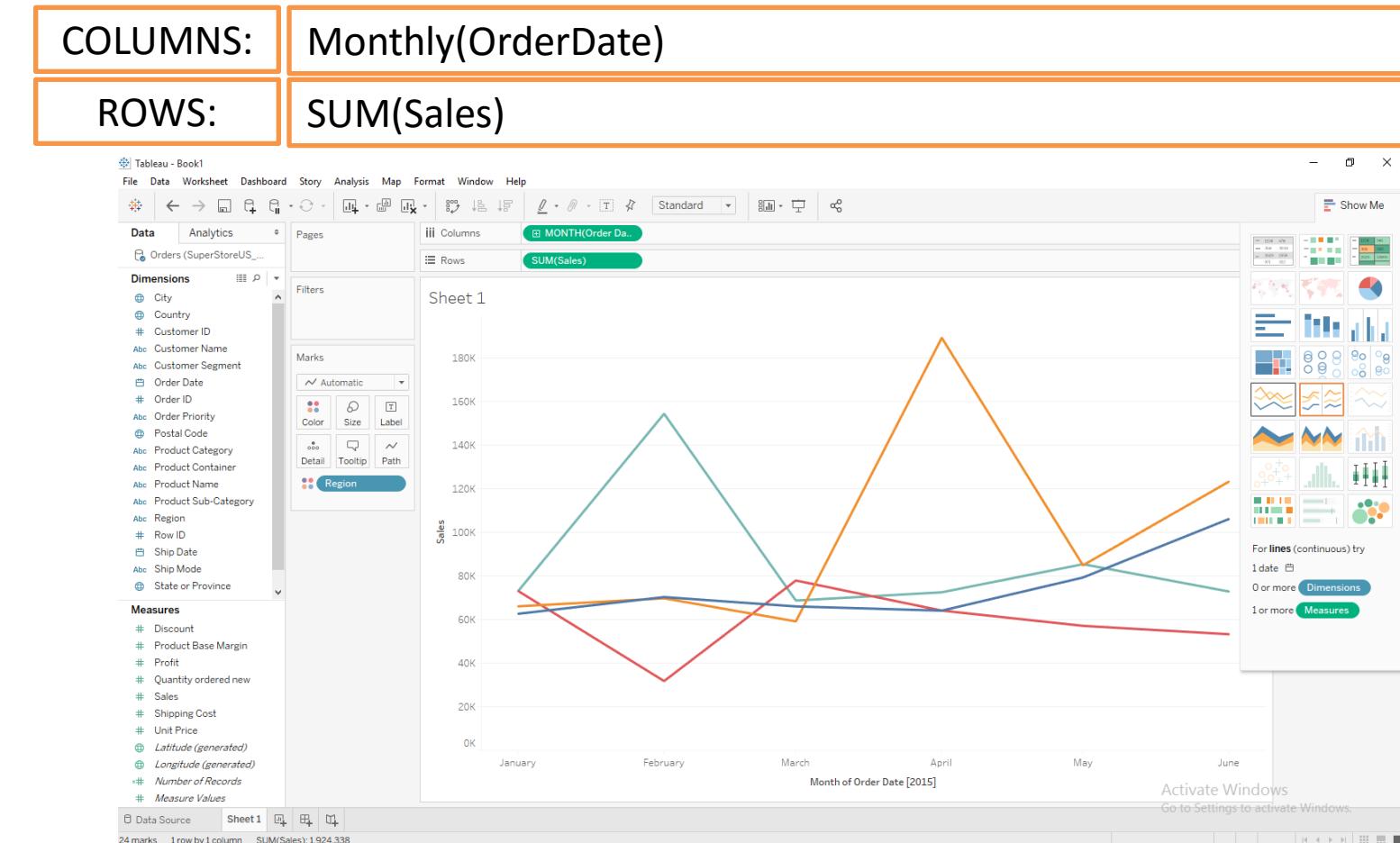


Data Source: demo2/ SuperStore2015.xlsx

Example 3:

Step 1

- plot Monthly(orderDate) to Sum(Sales), drag the region to color marks to visualize based on regions.

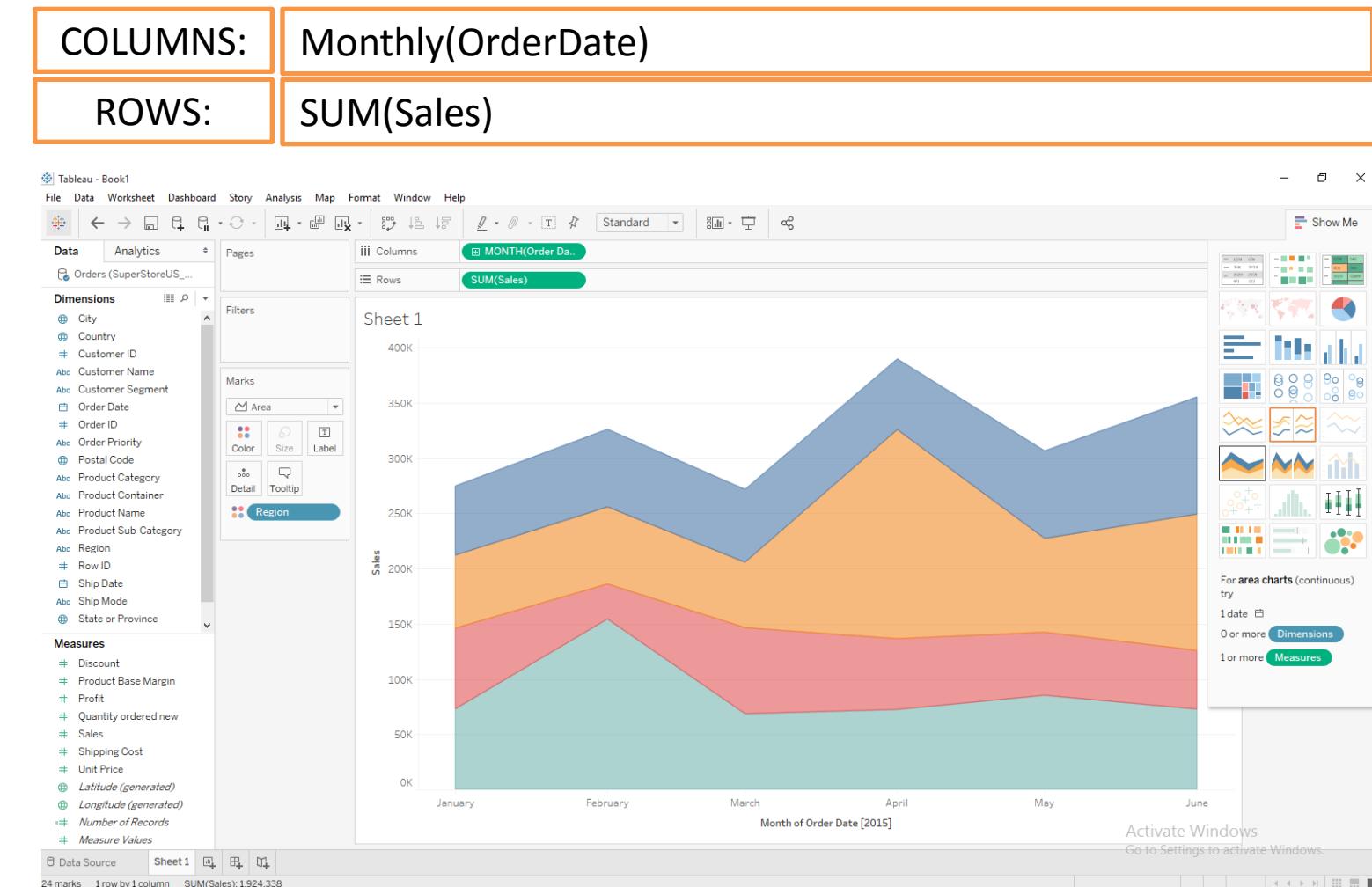


Data Source: demo2/ SuperStore2015.xlsx

Example 3:

Step 2

- now select “area chart” from showme visualization chart.

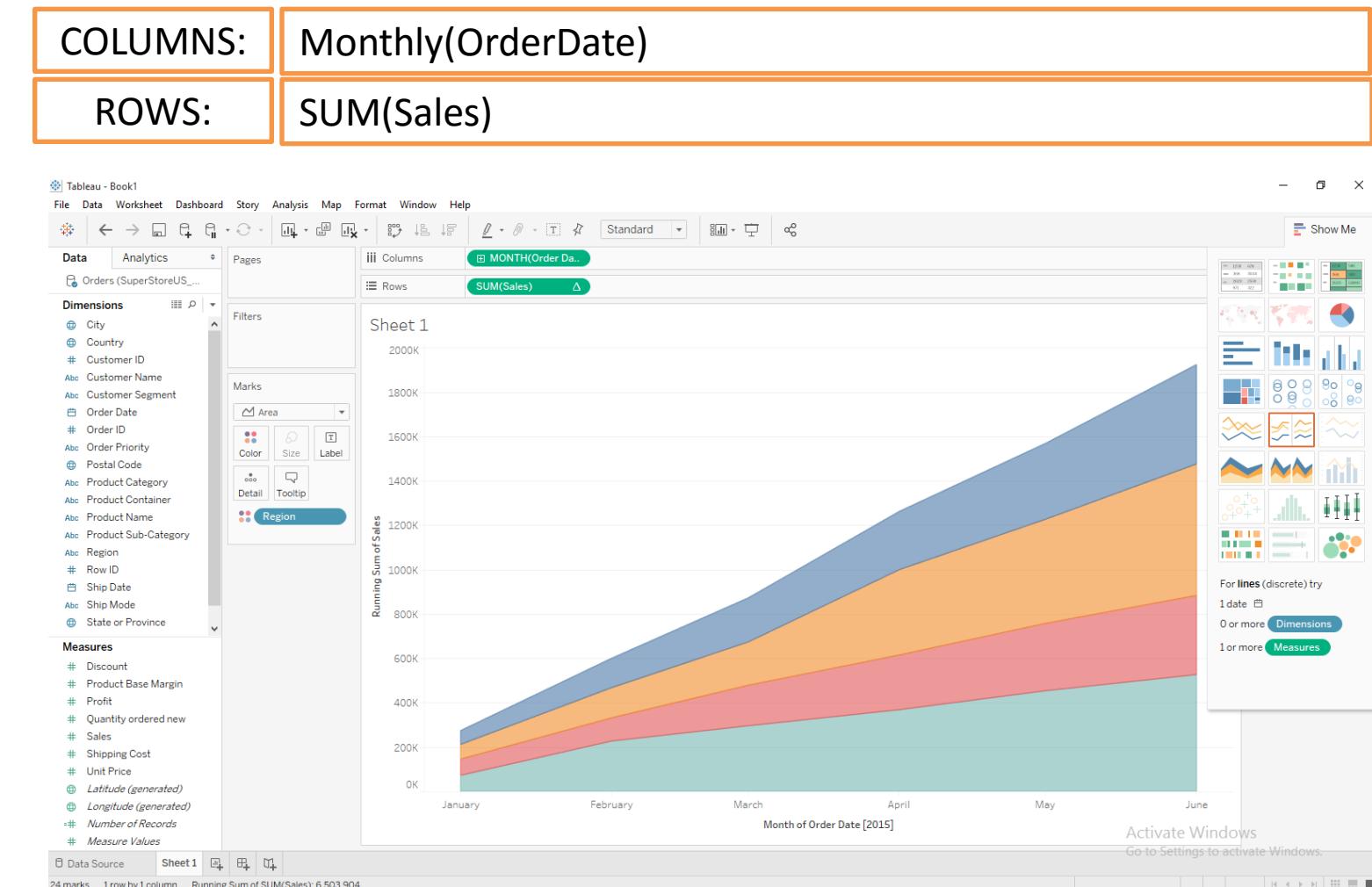


Data Source: demo2/ SuperStore2015.xlsx

Example 3:

Step 3

- select from options of SUM(sales) running total to visualize a running total area chart visualization.

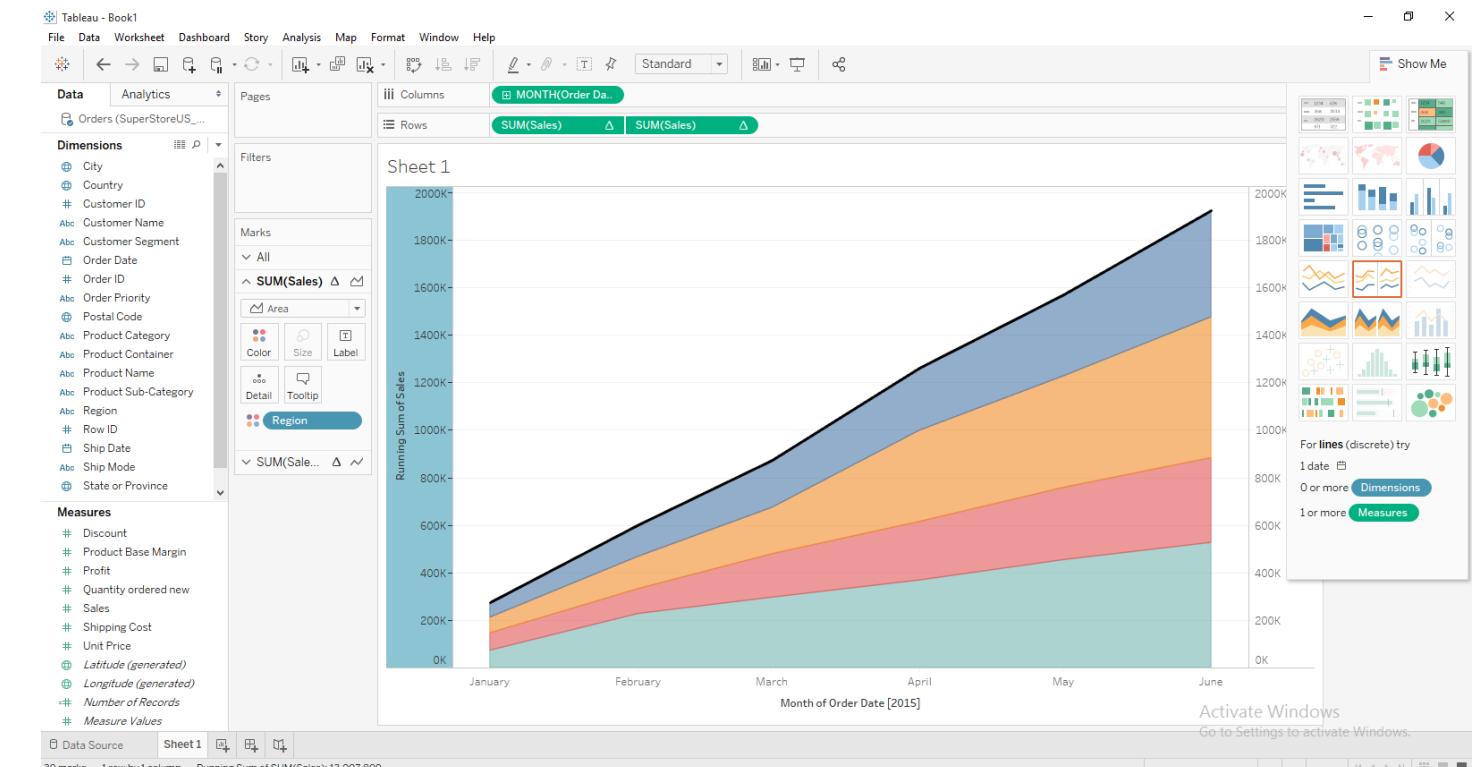


Example 3:

Step 4

- use ctrl+to drag to create SUM(sales) and select quick table calculation => running total.
- Select the SUM(sales) on the right as “dual axis” and overlay

COLUMNS:	Monthly(OrderDate)
ROWS:	SUM(Sales), SUM(Sales)



Data Source: demo2/ SuperStore2015.xlsx

Problem Description:

Data set used:	
----------------	--

SYED AWASE KHIRNI

TABLEAU : DATA SLICING BY TIME

Problem Description:

Data set used:

SYED AWASE KHIRNI

TABLEAU : USING PARAMETERS FOR DYNAMIC VALUES

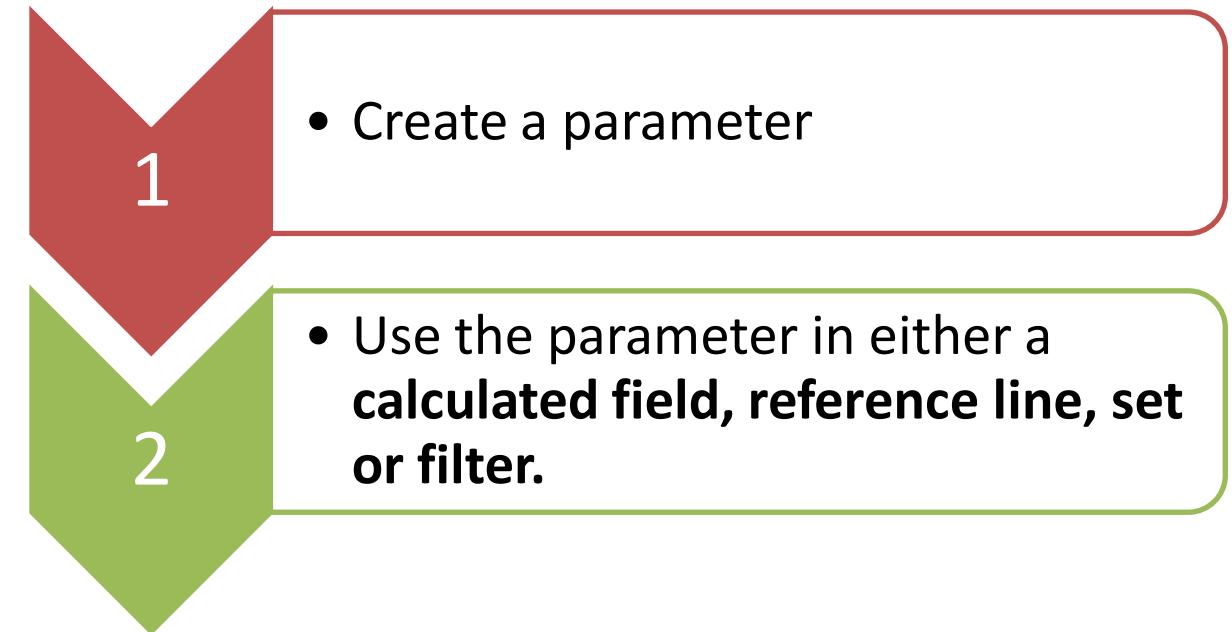
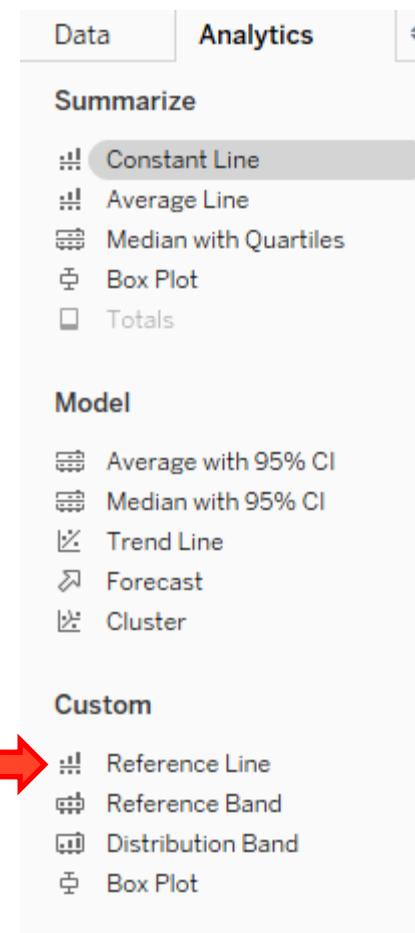
Parameters?

- A parameter is a value that can be changed by the user interacting with a view, rather than a visualization using a constant value.
- Parameters allow us to give users control over the visualization.
- Usage of parameters
 - User-controlled thresholds
 - What-if analysis
 - Dynamic field, axis, titles, etc.
 - Filtering across disparate data sources
 - Top N analysis

How to use a parameter?

Please read terms of use for authorized access

Original Series



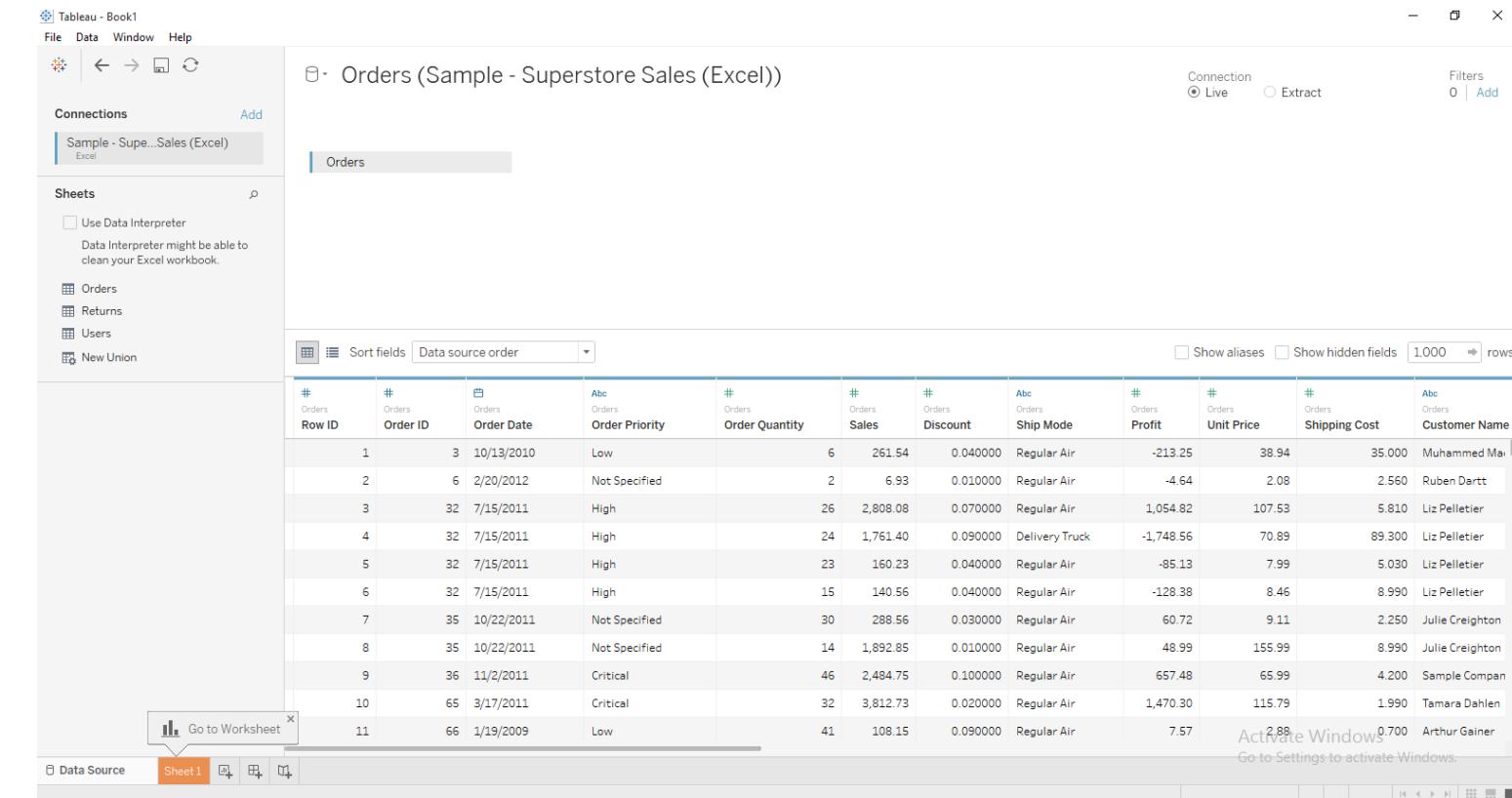
- Parameters can be used across all sheets/data sources in a workbook.
- Parameter controls can be used on Dashboards or Worksheets.

Use Case :Reference Line

Step 1

- load Sample-SuperStore Sales(Excel)-xlsx file into tableau

COLUMNS:	
ROWS:	



The screenshot shows the Tableau interface with the 'Orders' sheet selected. The data is displayed in a table with the following columns and their descriptions:

# Orders Row ID	# Orders Order ID	# Orders Order Date	Avg Orders Order Priority	# Orders Order Quantity	# Orders Sales	# Orders Discount	Avg Orders Ship Mode	# Orders Profit	# Orders Unit Price	# Orders Shipping Cost	Avg Orders Customer Name
1	3	10/13/2010	Low	6	261.54	0.040000	Regular Air	-213.25	38.94	35.000	Muhammed Ma...
2	6	2/20/2012	Not Specified	2	6.93	0.010000	Regular Air	-4.64	2.08	2.560	Ruben Dartt
3	32	7/15/2011	High	26	2,808.08	0.070000	Regular Air	1,054.82	107.53	5.810	Liz Pelletier
4	32	7/15/2011	High	24	1,761.40	0.090000	Delivery Truck	-1,748.56	70.89	89.300	Liz Pelletier
5	32	7/15/2011	High	23	160.23	0.040000	Regular Air	-85.13	7.99	5.030	Liz Pelletier
6	32	7/15/2011	High	15	140.56	0.040000	Regular Air	-128.38	8.46	8.990	Liz Pelletier
7	35	10/22/2011	Not Specified	30	288.56	0.030000	Regular Air	60.72	9.11	2.250	Julie Creighton
8	35	10/22/2011	Not Specified	14	1,892.85	0.010000	Regular Air	48.99	155.99	8.990	Julie Creighton
9	36	11/2/2011	Critical	46	2,484.75	0.100000	Regular Air	657.48	65.99	4.200	Sample Compan...
10	65	3/17/2011	Critical	32	3,812.73	0.020000	Regular Air	1,470.30	115.79	1.990	Tamara Dahlen
11	66	1/19/2009	Low	41	108.15	0.090000	Regular Air	7.57	2.88	0.700	Arthur Gainer

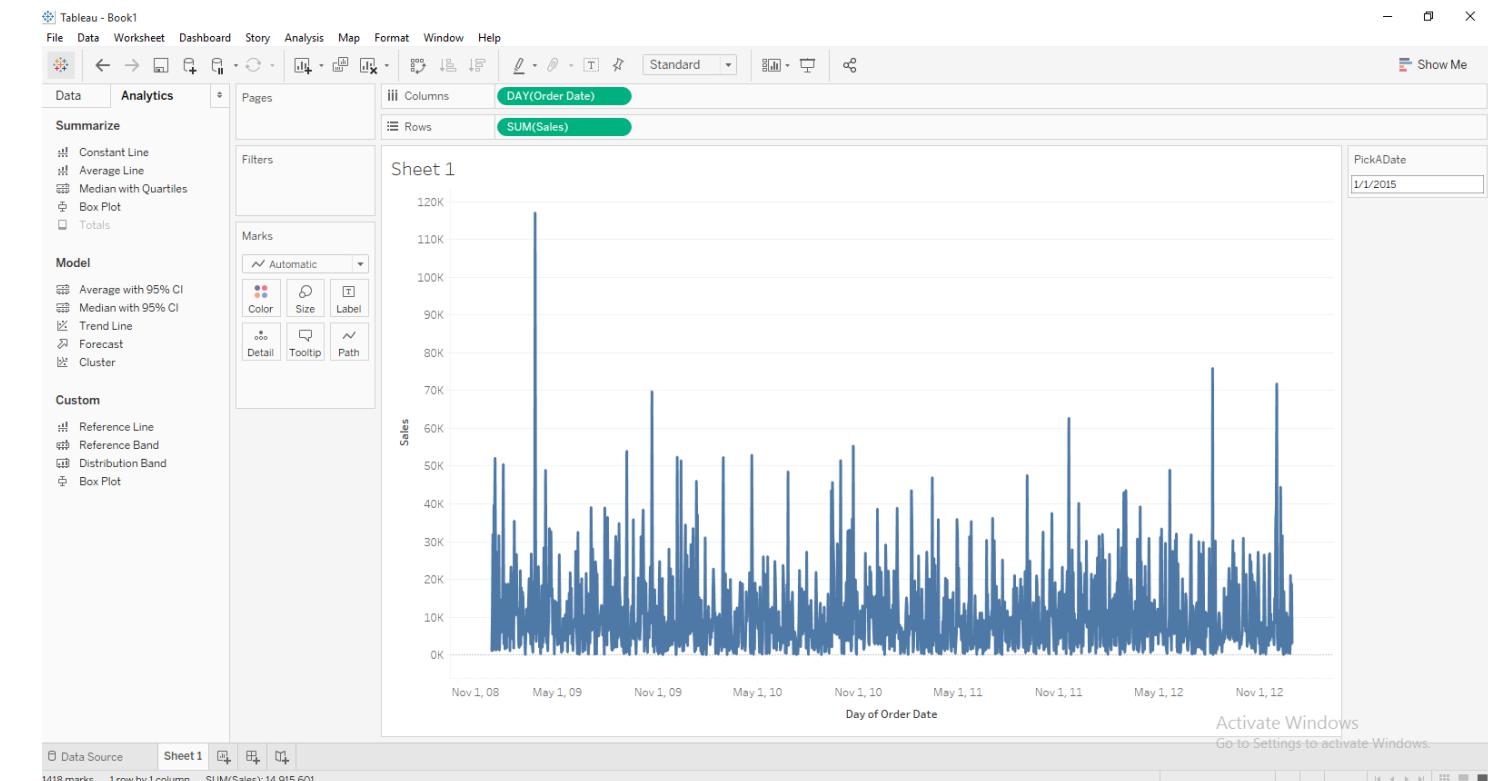
Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Reference Line

Step 2

- select orderDate and Sales to visualize a line chart as shown in the figure.
- We would like to create a parameter, where in user's can select/pick a date and draw insights about the sales on that specific date.

COLUMNS:	Day(OrderDate)
ROWS:	Sales

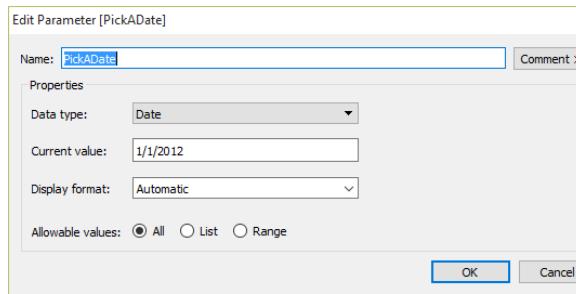


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

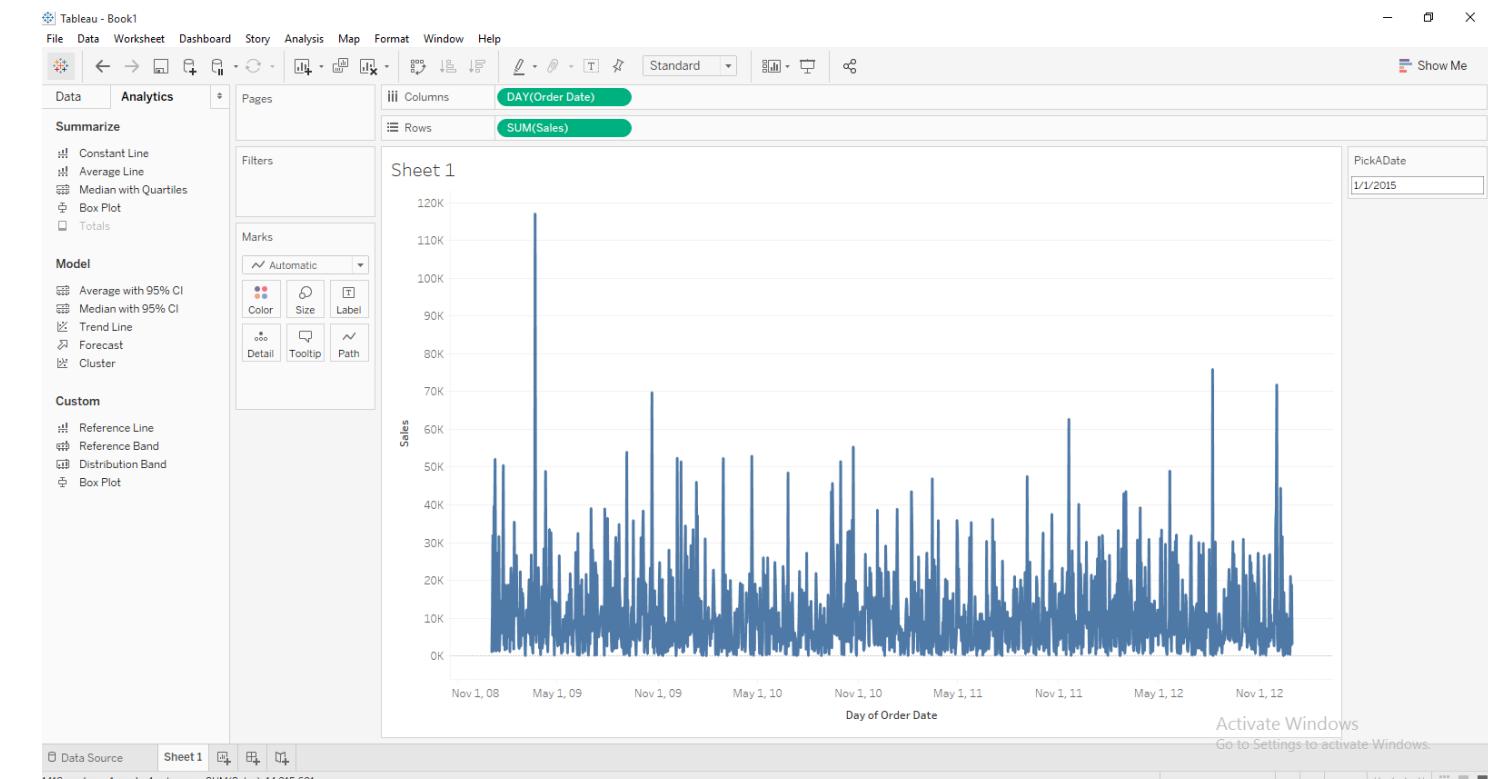
Use Case :Reference Line

Step 3

- create a parameter “PickADate” with data type “Date”



COLUMNS:	Day(OrderDate)
ROWS:	Sales

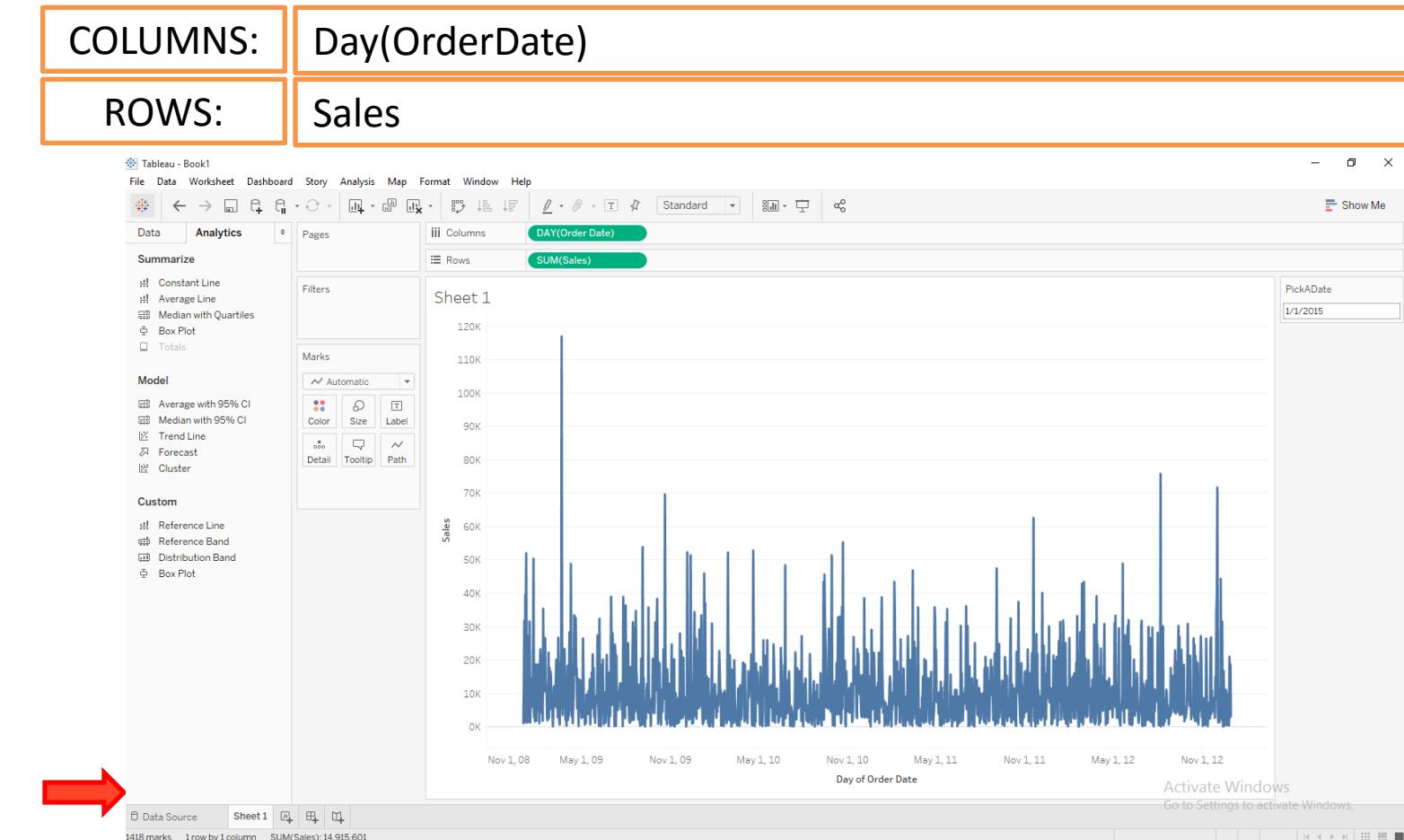


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Reference Line

Step 4

- A parameter “PickADate” of data type “date” is created.
- We can enable to show the parameter control on the right hand side pane.

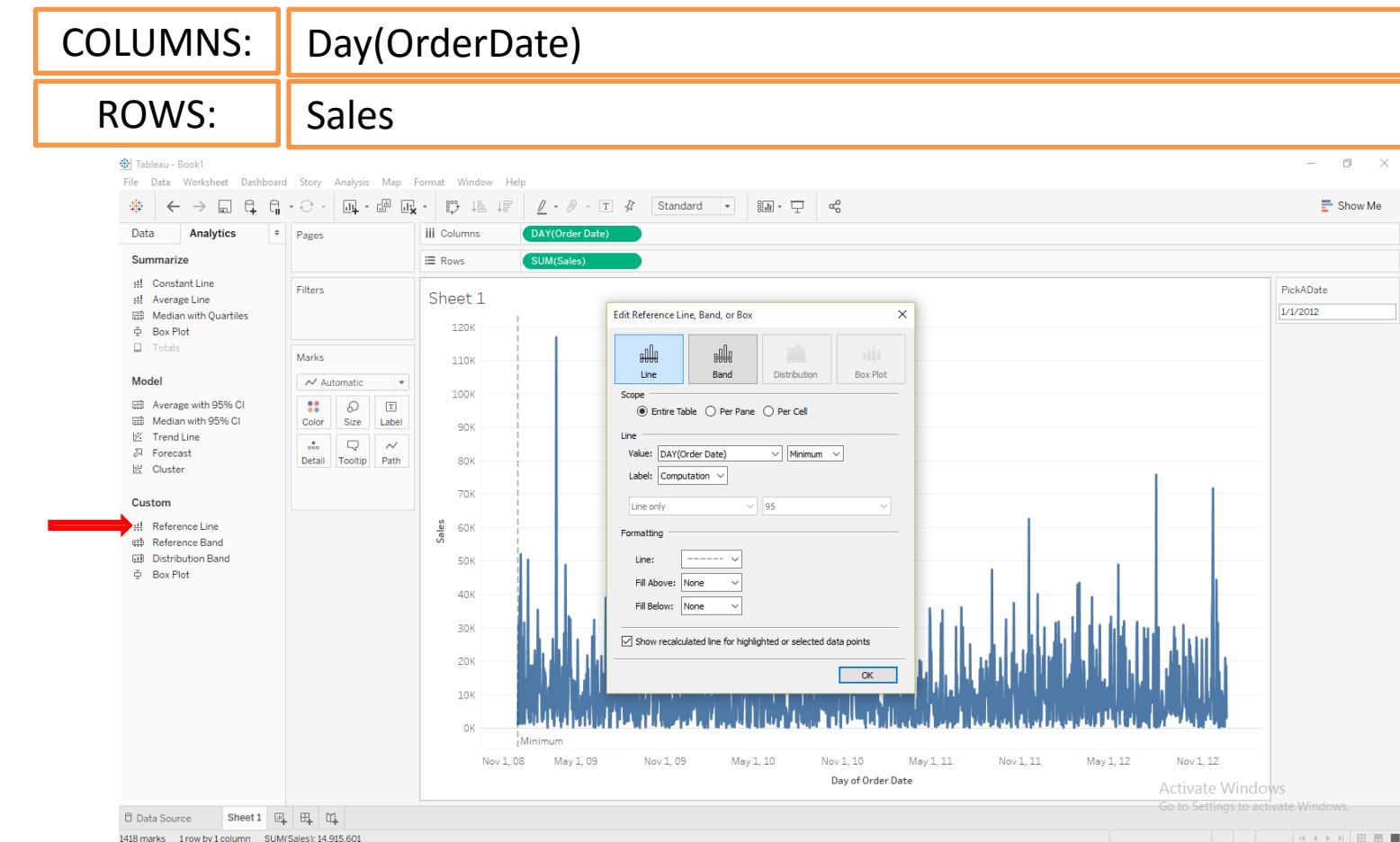


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Reference Line

Step 5

- Select Analytics pane and drag reference line on to the canvas panel, prompting you to select the parameter name “PickADate”



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Reference Line

Step 6

- Select Analytics pane and drag reference line on to the canvas panel, prompting you to select the parameter name “PickADate”

COLUMNS:	Day(OrderDate)
ROWS:	Sales

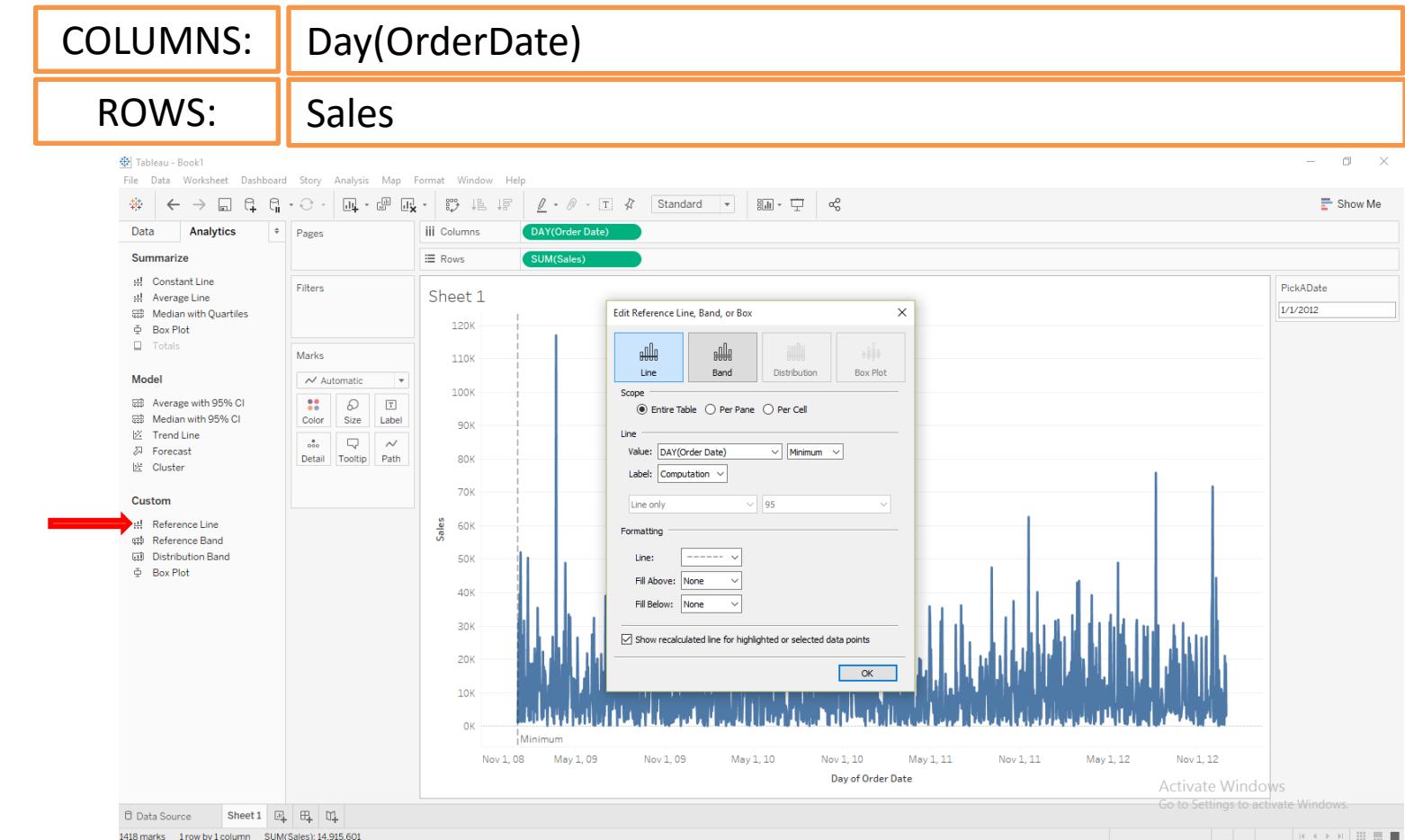


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Reference Line

Step 7

- Select parameter and line styling.

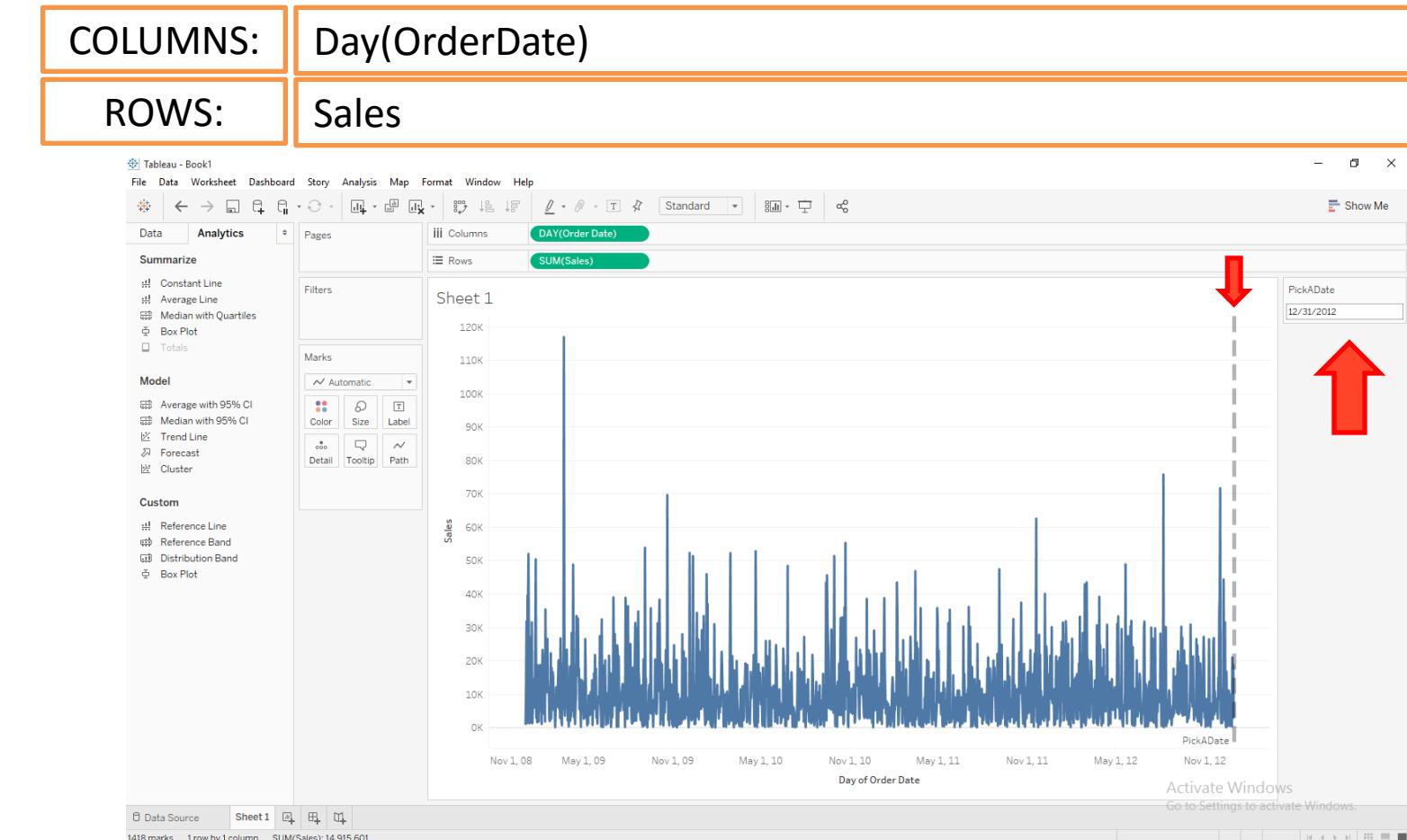


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Reference Line

Step 8

- Upon user interaction and user defined date 12/31/2012

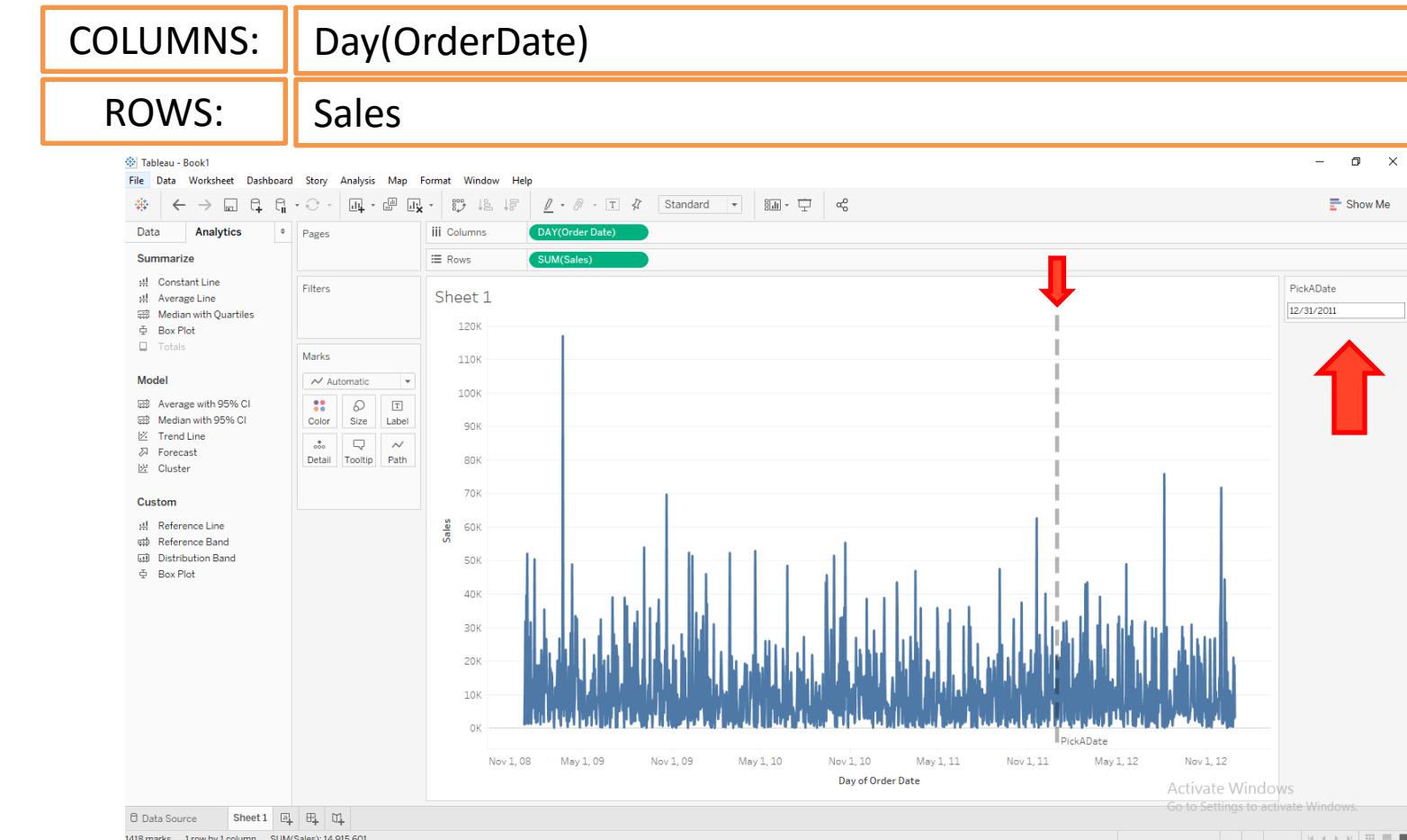


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Reference Line

Step 9

- Upon user interaction and user defined date 12/31/2011

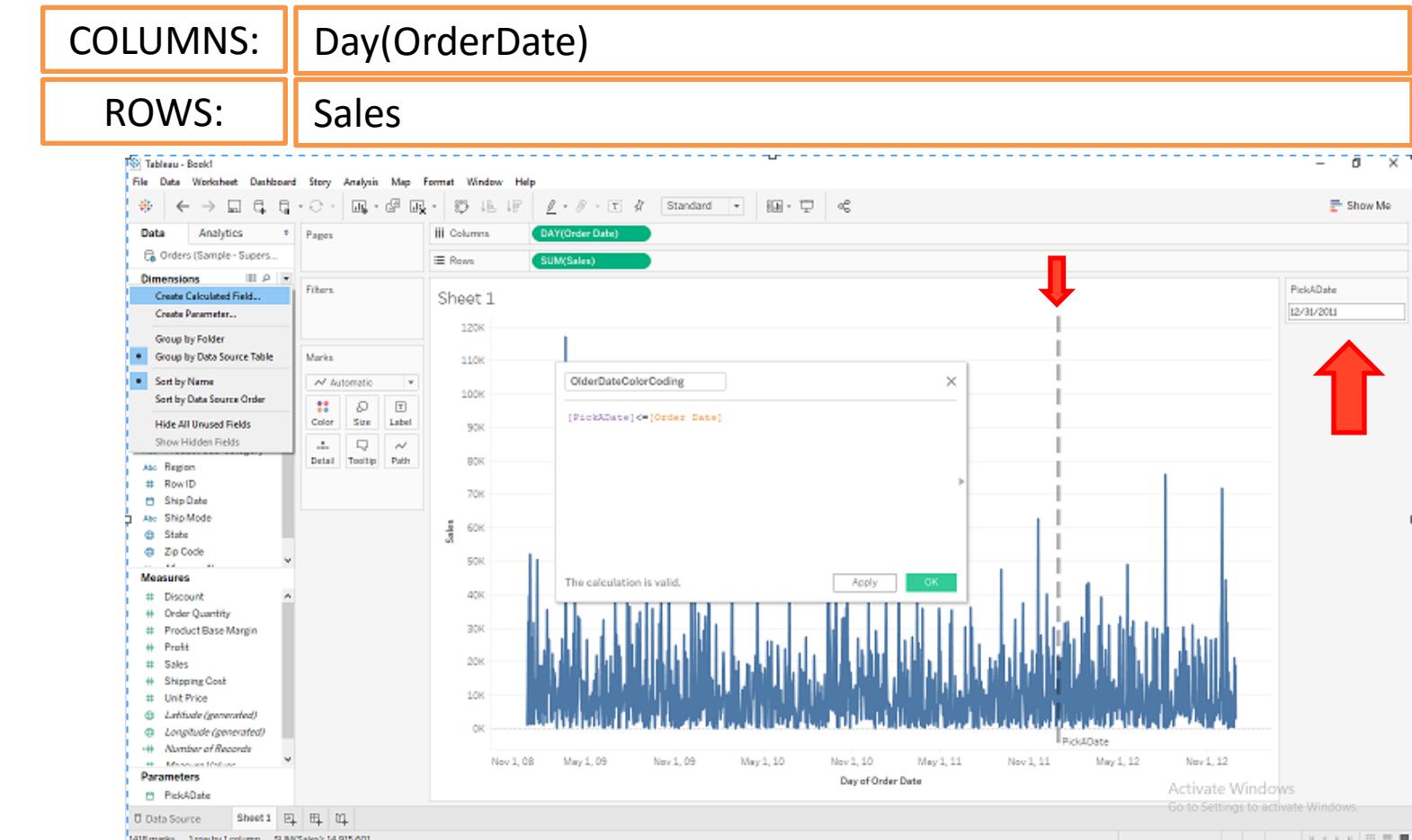


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Reference Line

Step 10

- Let us color code older dates than the user defined parameter by creating a calculated field.

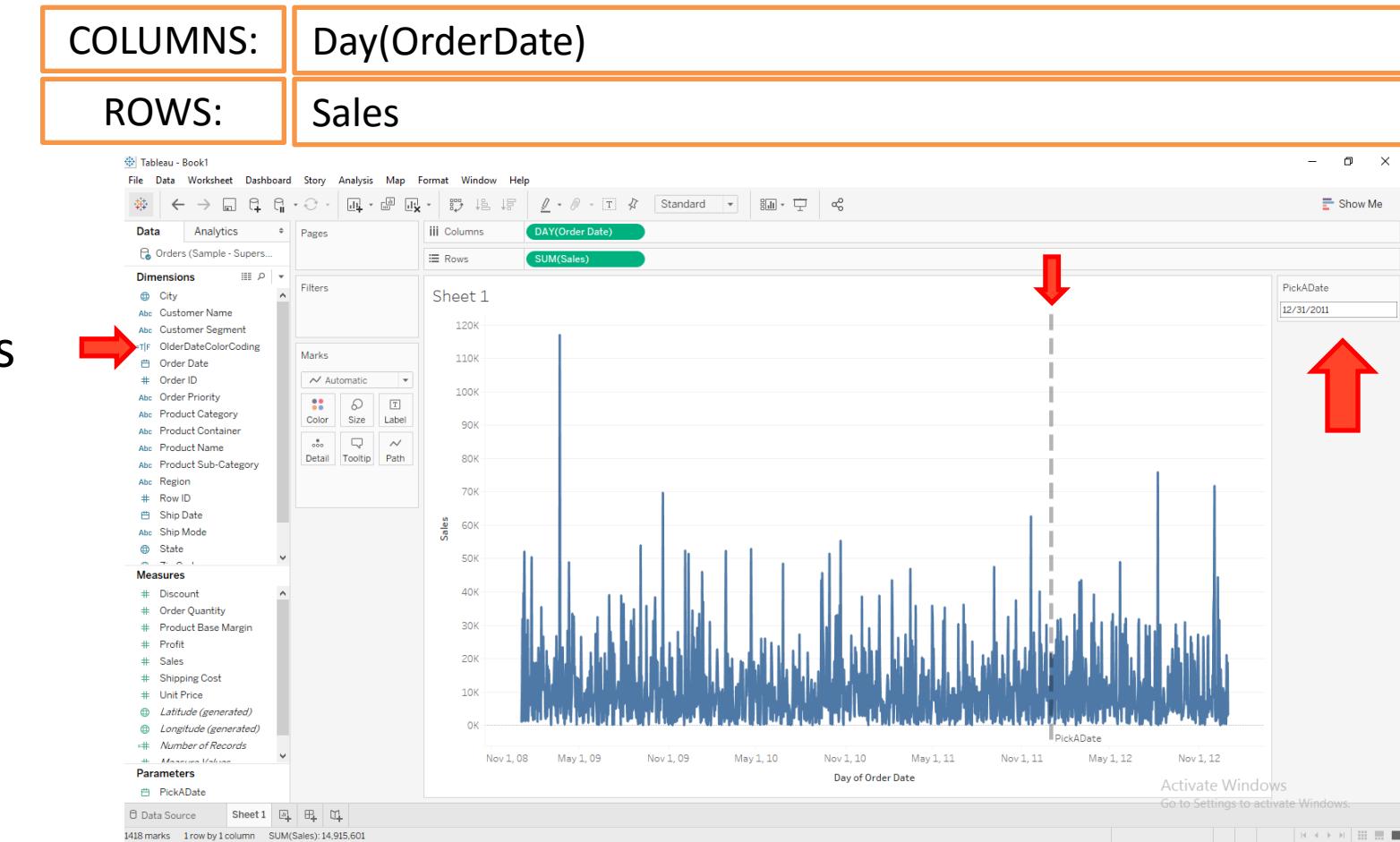


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Reference Line

Step 11

- We have created a **OlderDateColorCoding** calculated field, that returns a **boolean** type.
- Upon dragging the **OlderDateColorCoding** to the colors, older dates are color coded to selected color choice.

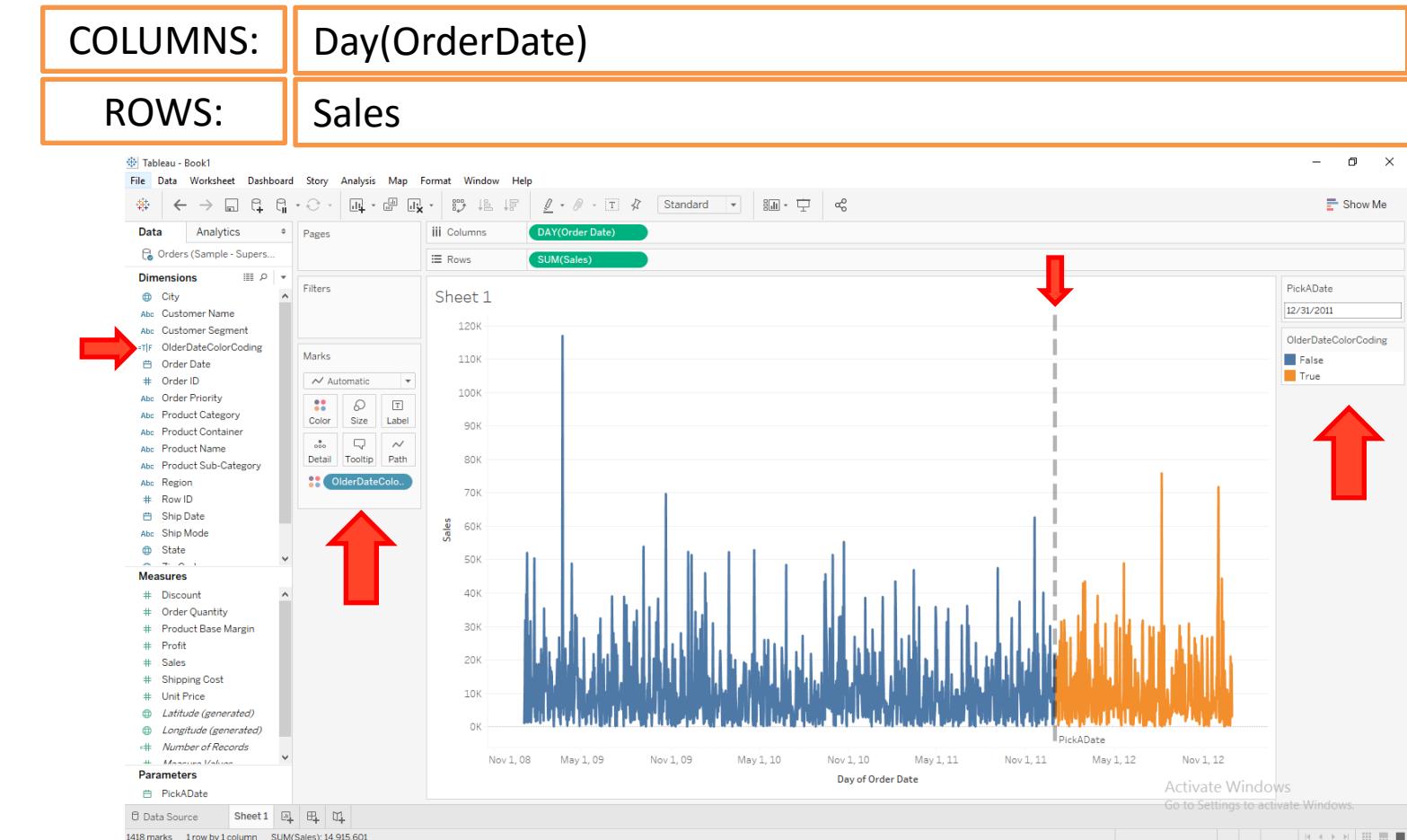


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Reference Line

Step 12

- Upon dragging the **OlderDateColorCoding** to the colors, older dates are color coded to selected color choice.

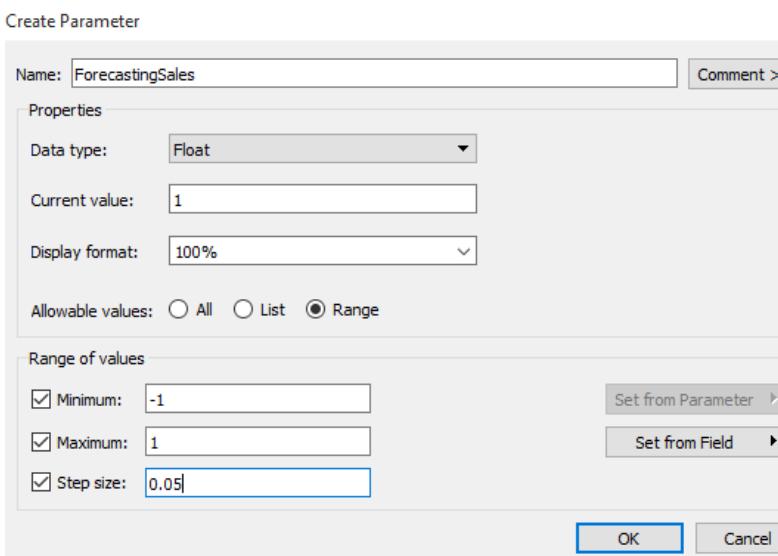


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

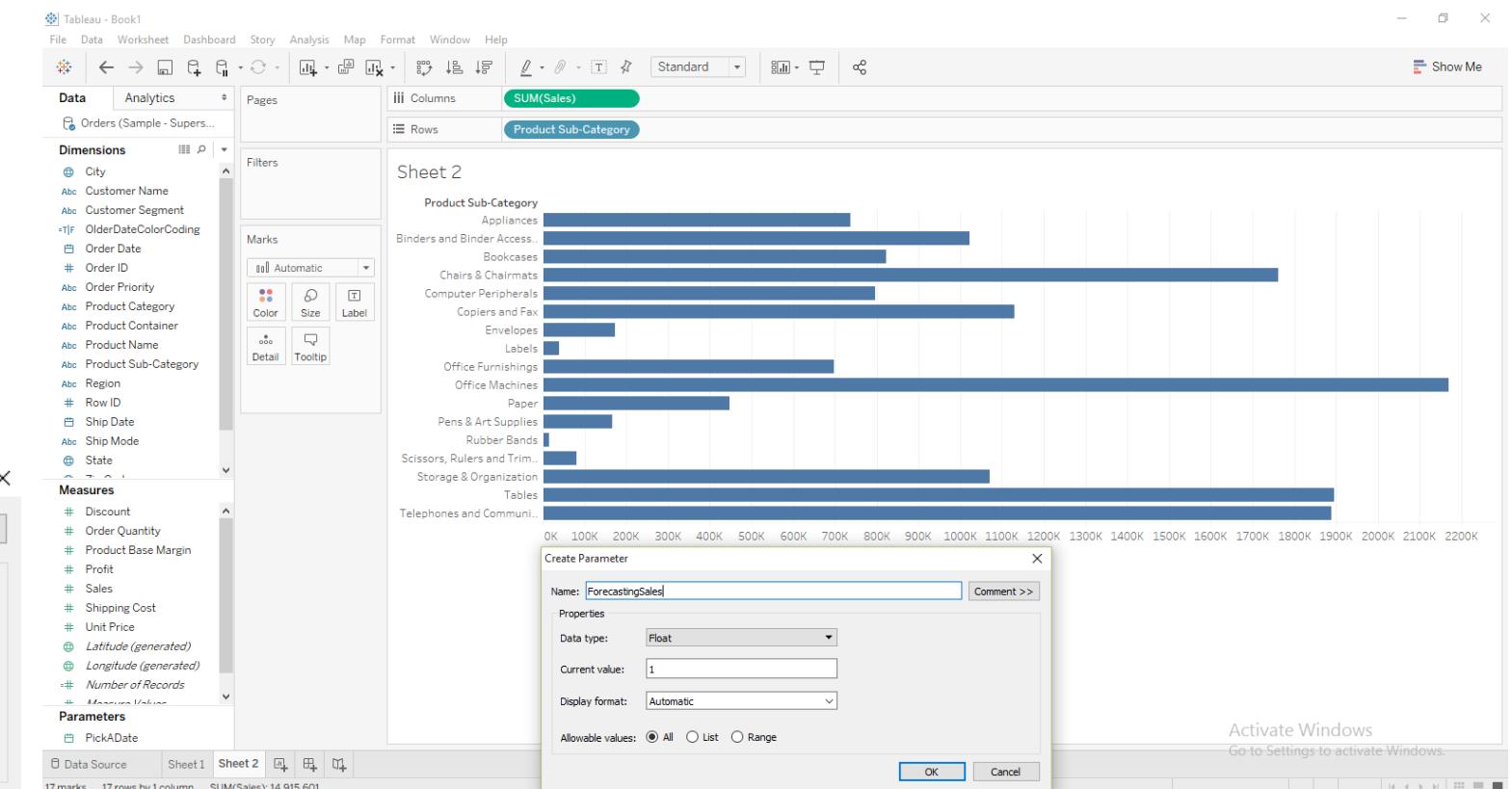
Use Case :Ref Date w/Calc

Step 1

- Create a parameter for forecasting sales for sales and product sub-category.



COLUMNS:	SUM(Sales)
ROWS:	Product sub-category

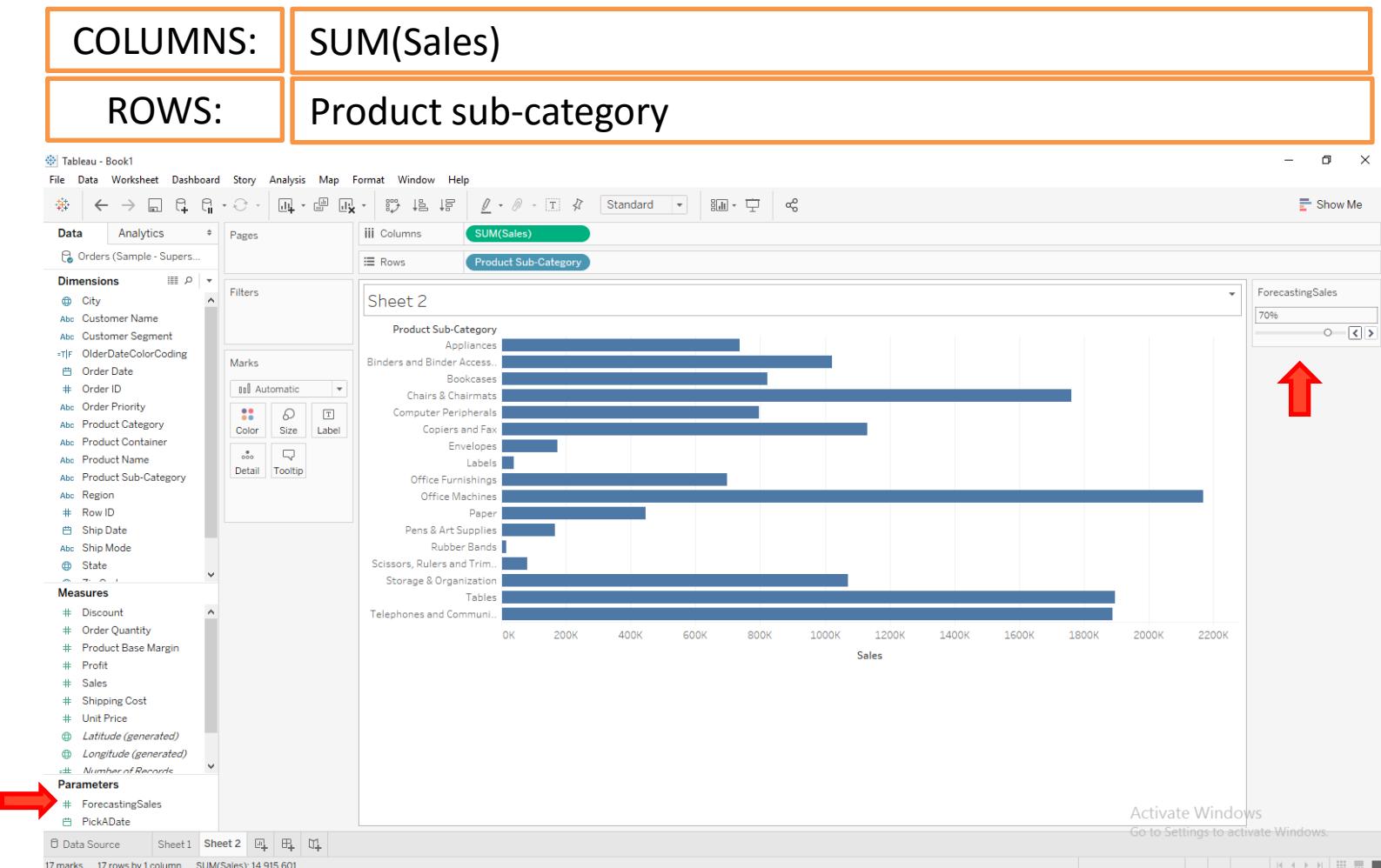


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Ref Date w/Calc

Step 2

- We have created a **ForecastingSales** parameter as shown in the figure.

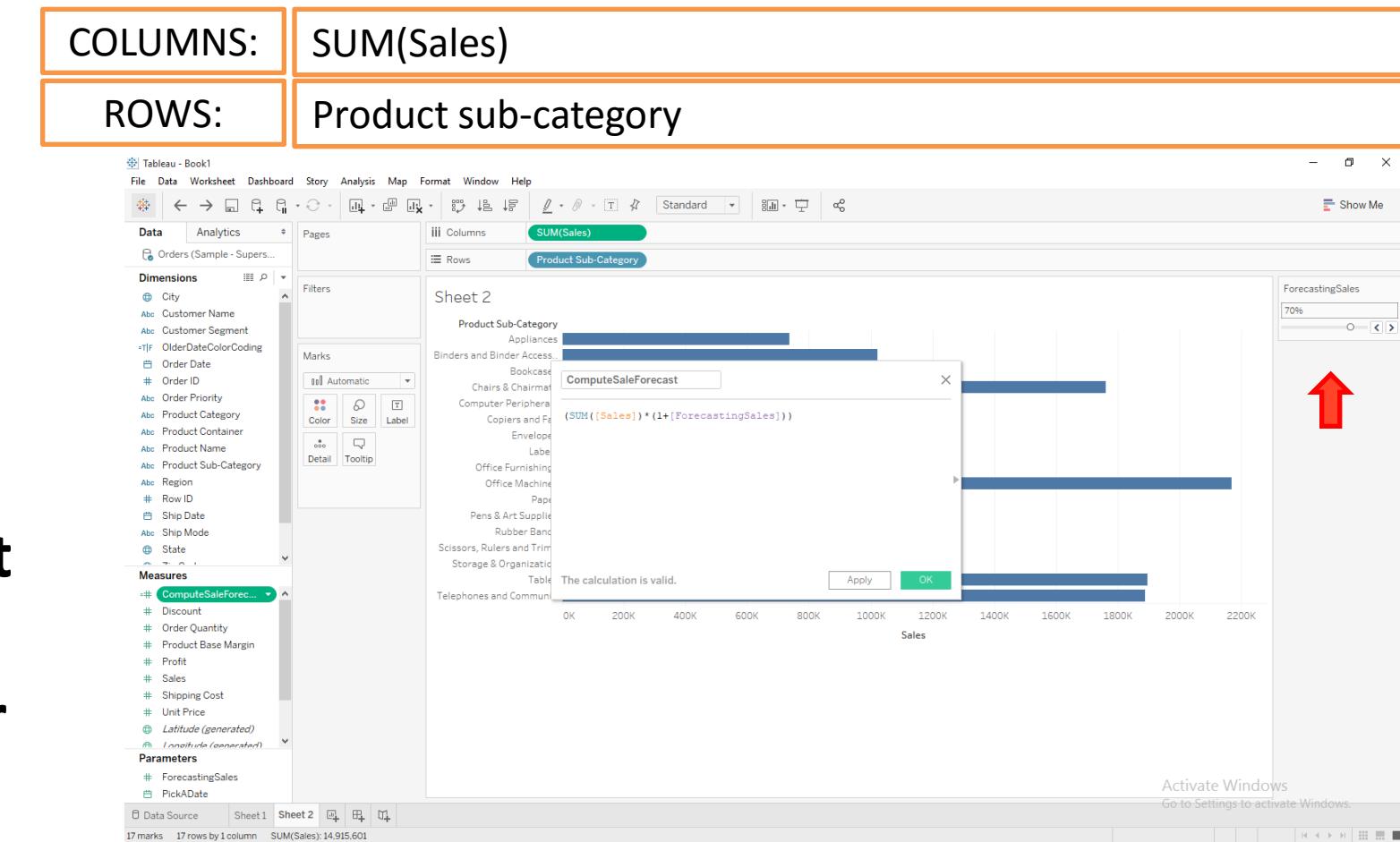


Use Case :Ref Date w/Calc

Step 3

- Now, we need to tie the **ForecastingSales** parameter with a calculated field.
- ComputeSalesForecast** calculated field

$$=(\text{SUM}([\text{Sales}]) * (1 + [\text{ForecastingSales}]))$$

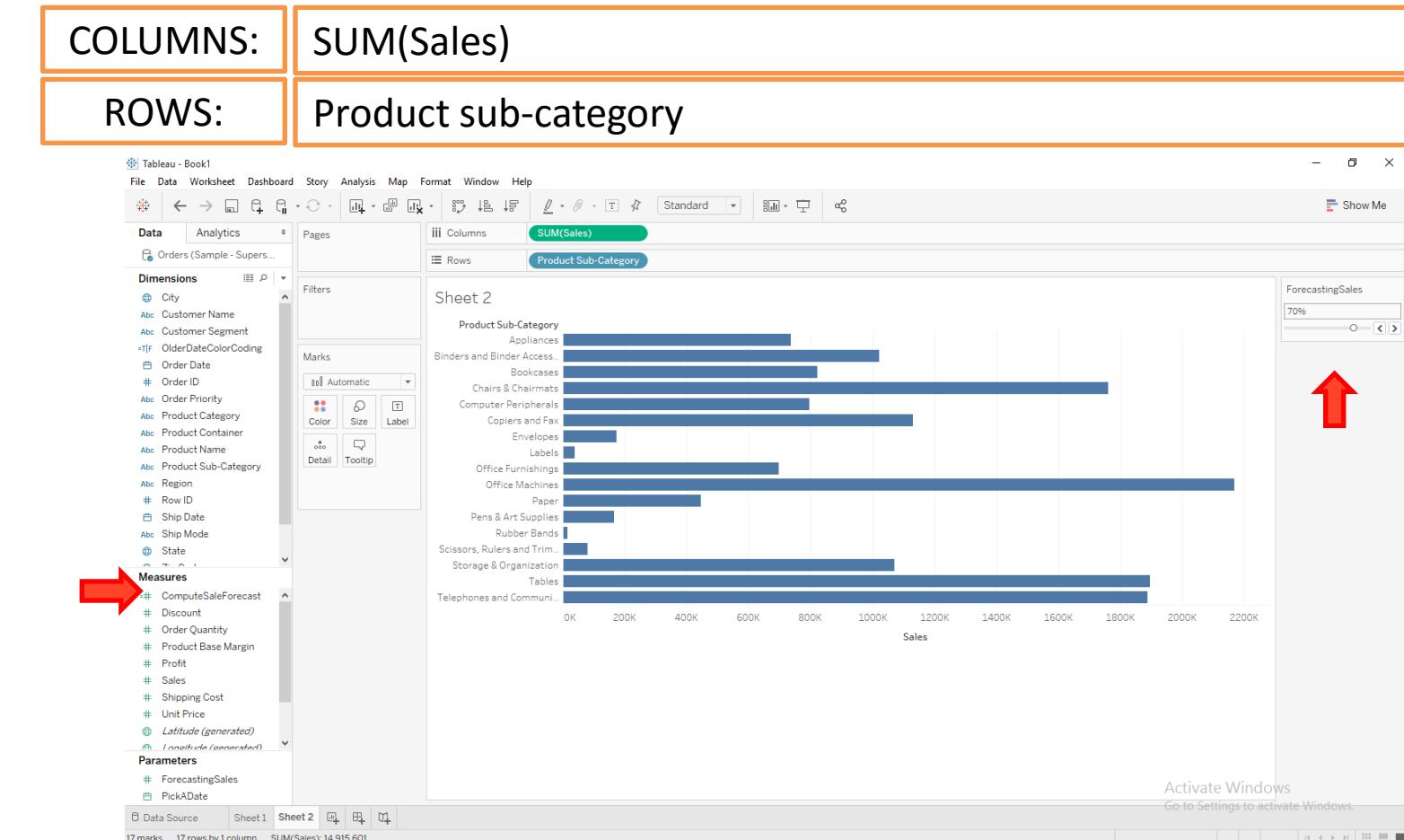


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Ref Date w/Calc

Step 4

- We have created a **ComputeSalesForecast** calculated field.

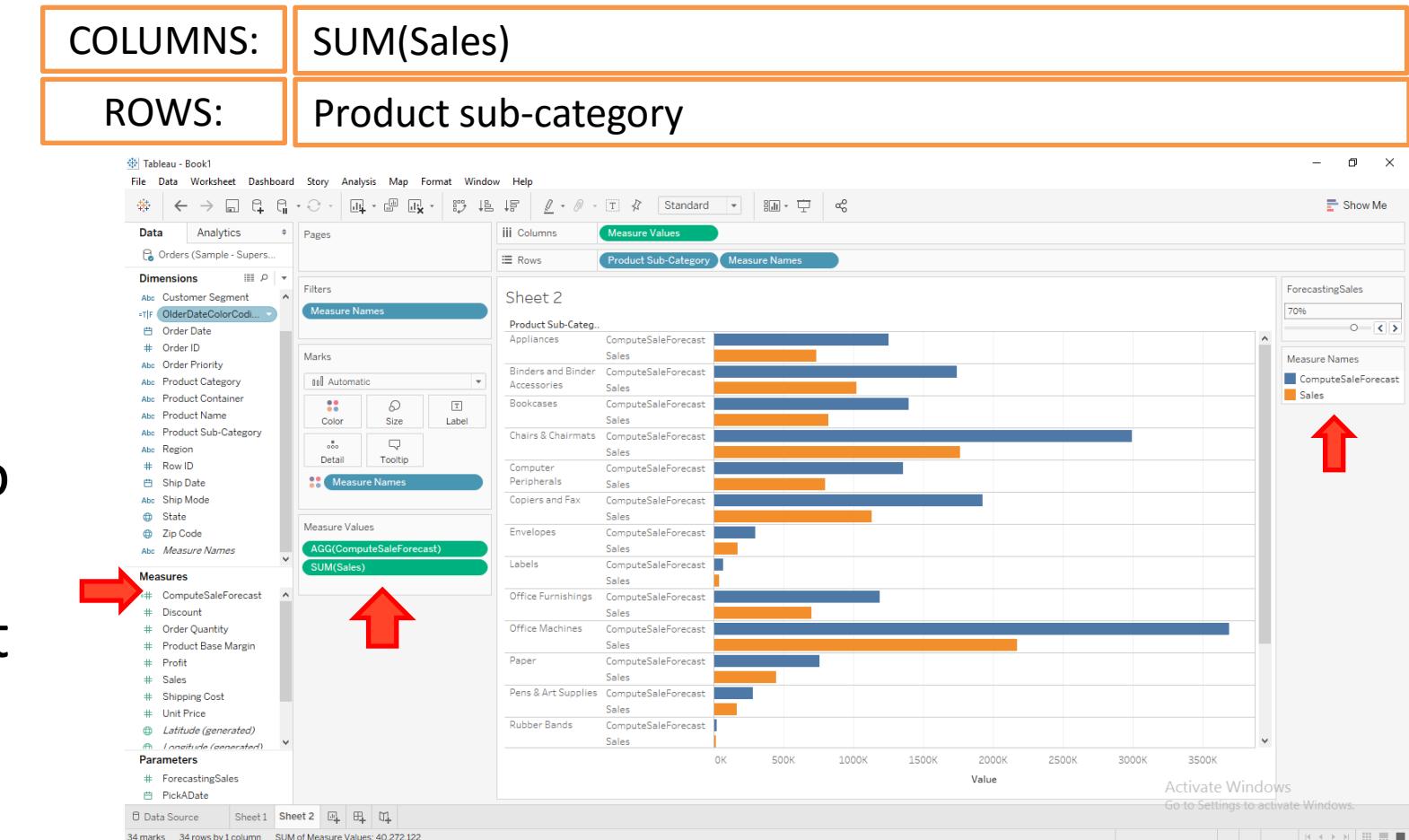


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Ref Date w/Calc

Step 5

- Drag the ComputeForecastSales on to the sales axis.
- Add measure names to color marks to visualize forecast with a different color as shown in the figure.

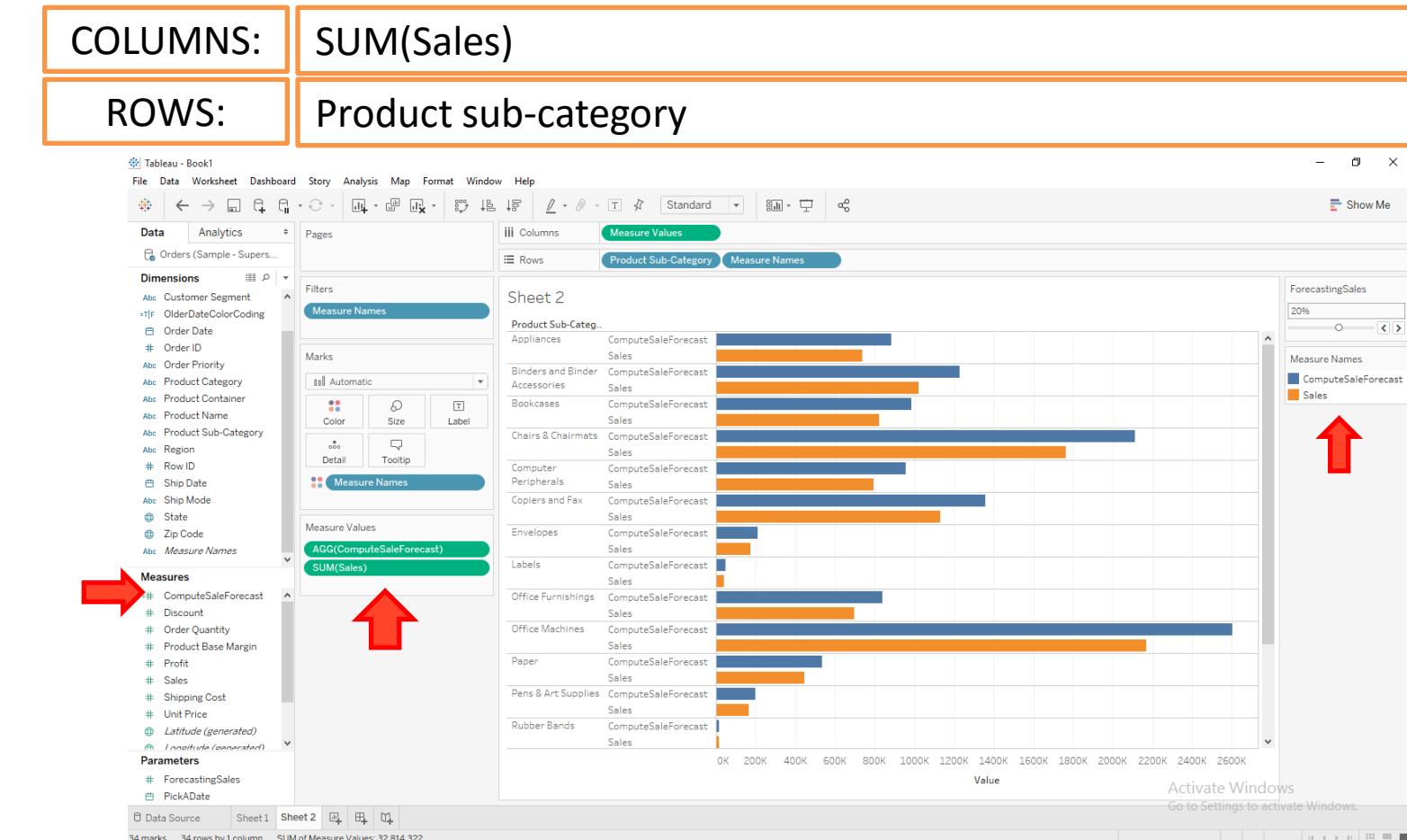


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Ref Date w/Calc

Step 6

- Upon user selection, we can see the sales forecast changing.



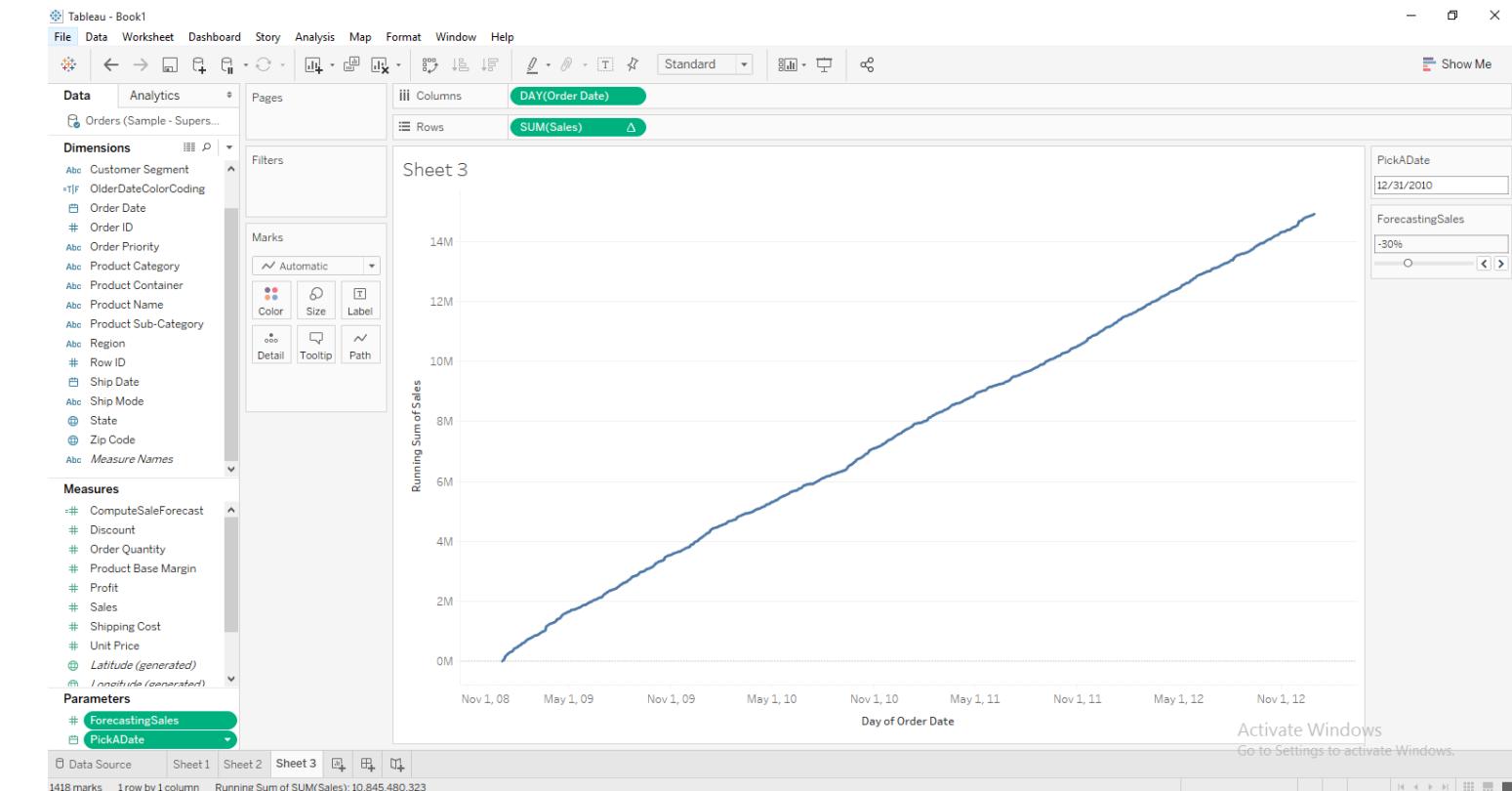
Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Sales Forecast

Step 1

- Let's plot Day(OrderDate) vs Sales(RunningTotal)
- Let's show the parameters created earlier.

COLUMNS:	Day(OrderDate)
ROWS:	Sales

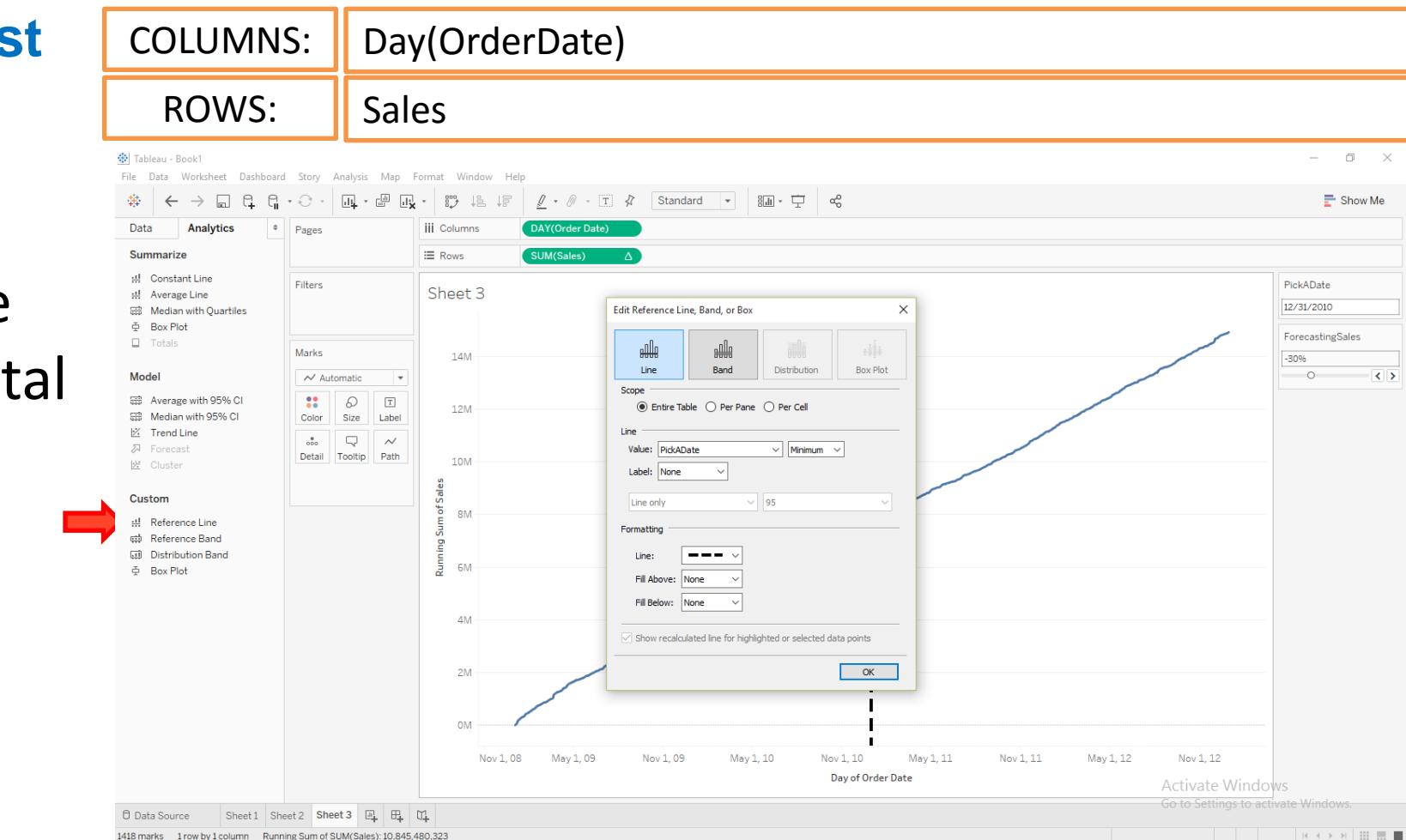


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Sales Forecast

Step 2

- Let's add a reference line to the running total plot of sales vs orderDate.



Please read terms of use for authorized access

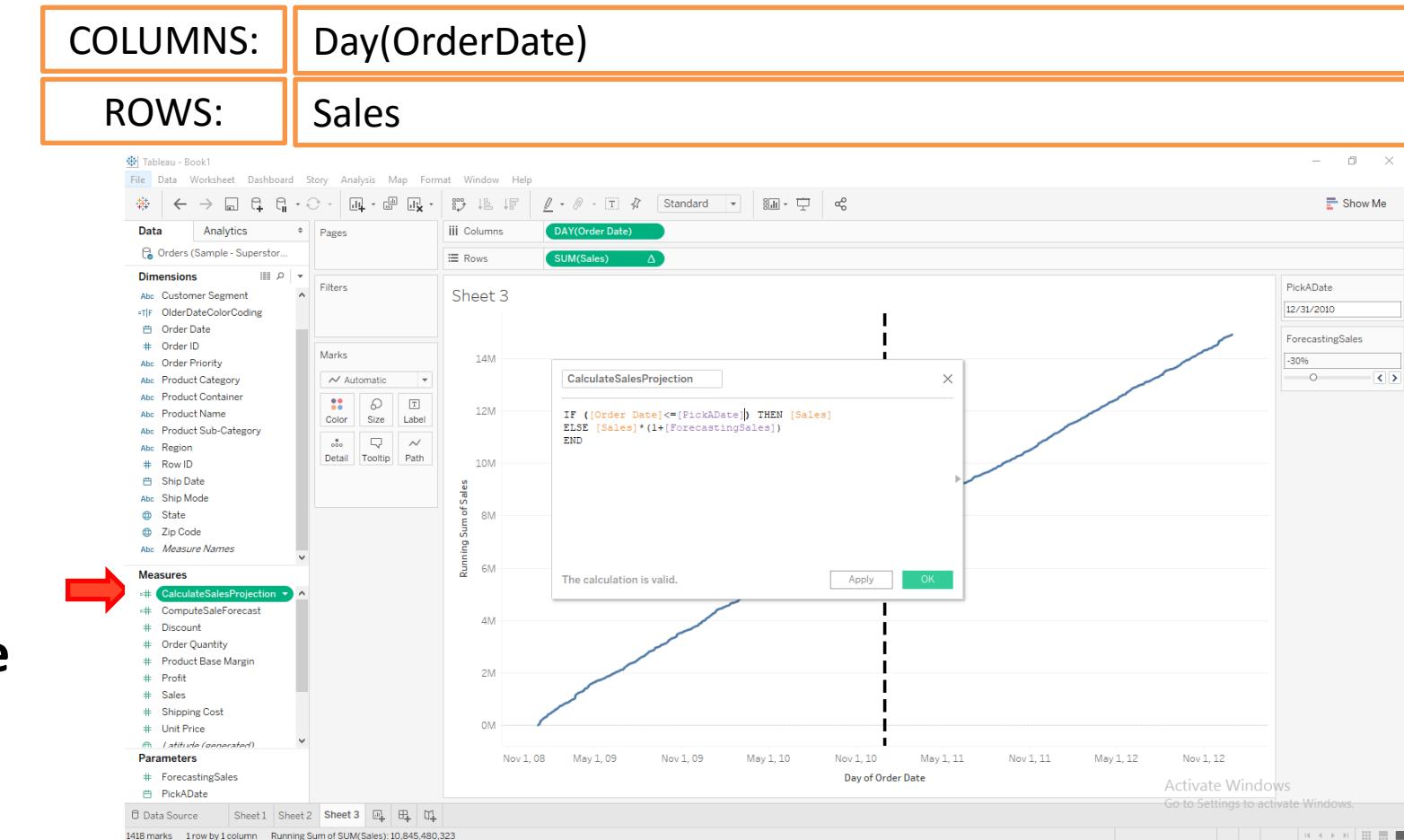
Original Series

Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Sales Forecast

Step 3

- Lets add calculated field
“ComputeSalesProjection”
= IF ([PickADate]<=[Order Date]) THEN [Sales]
ELSE
[Sales]*(1+[ForecastingSales])
END



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

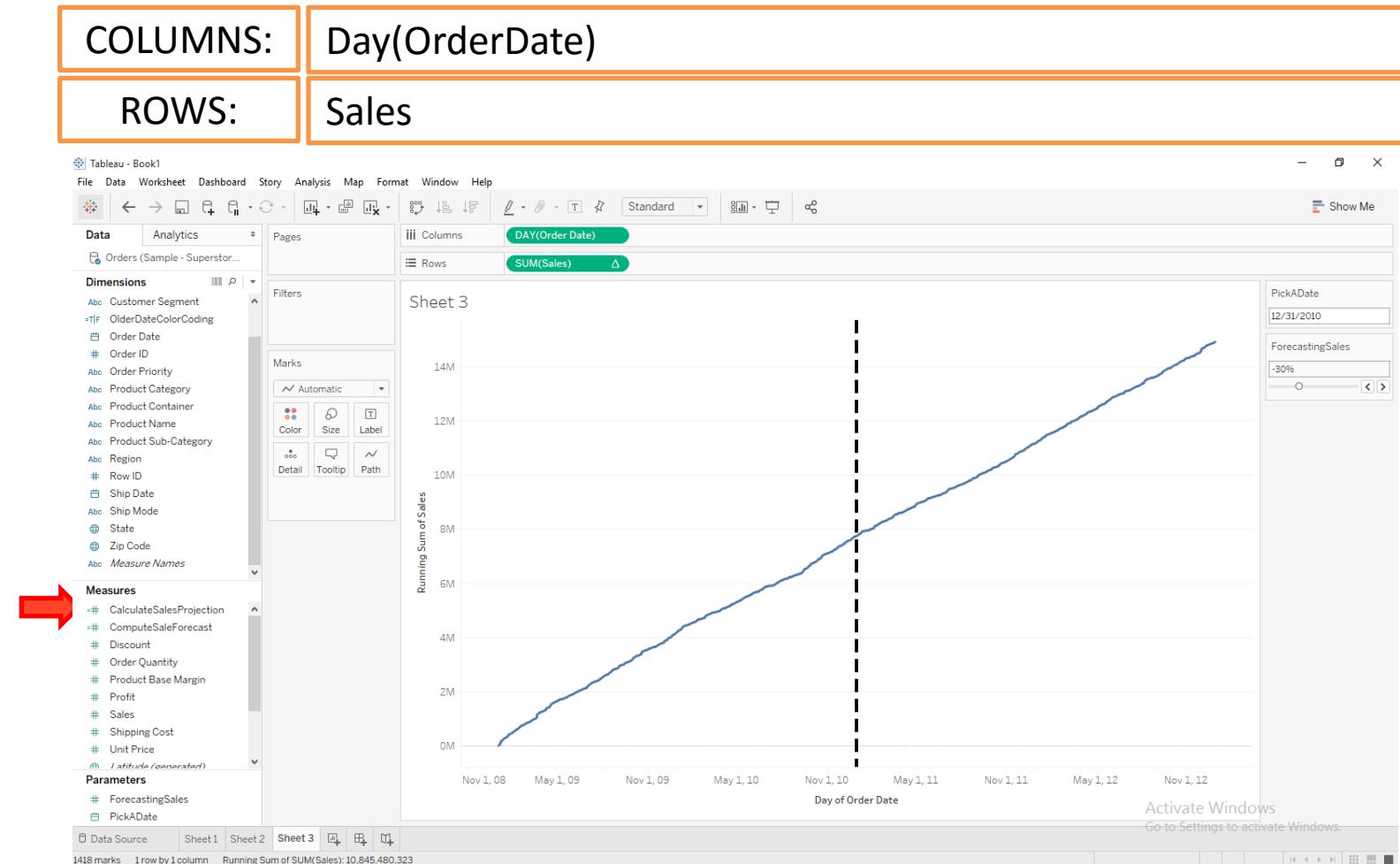
Use Case :Sales Forecast

Step 4

- Now we have created a ComputeSaleProjection

Please read terms of use for authorized access

Original Series

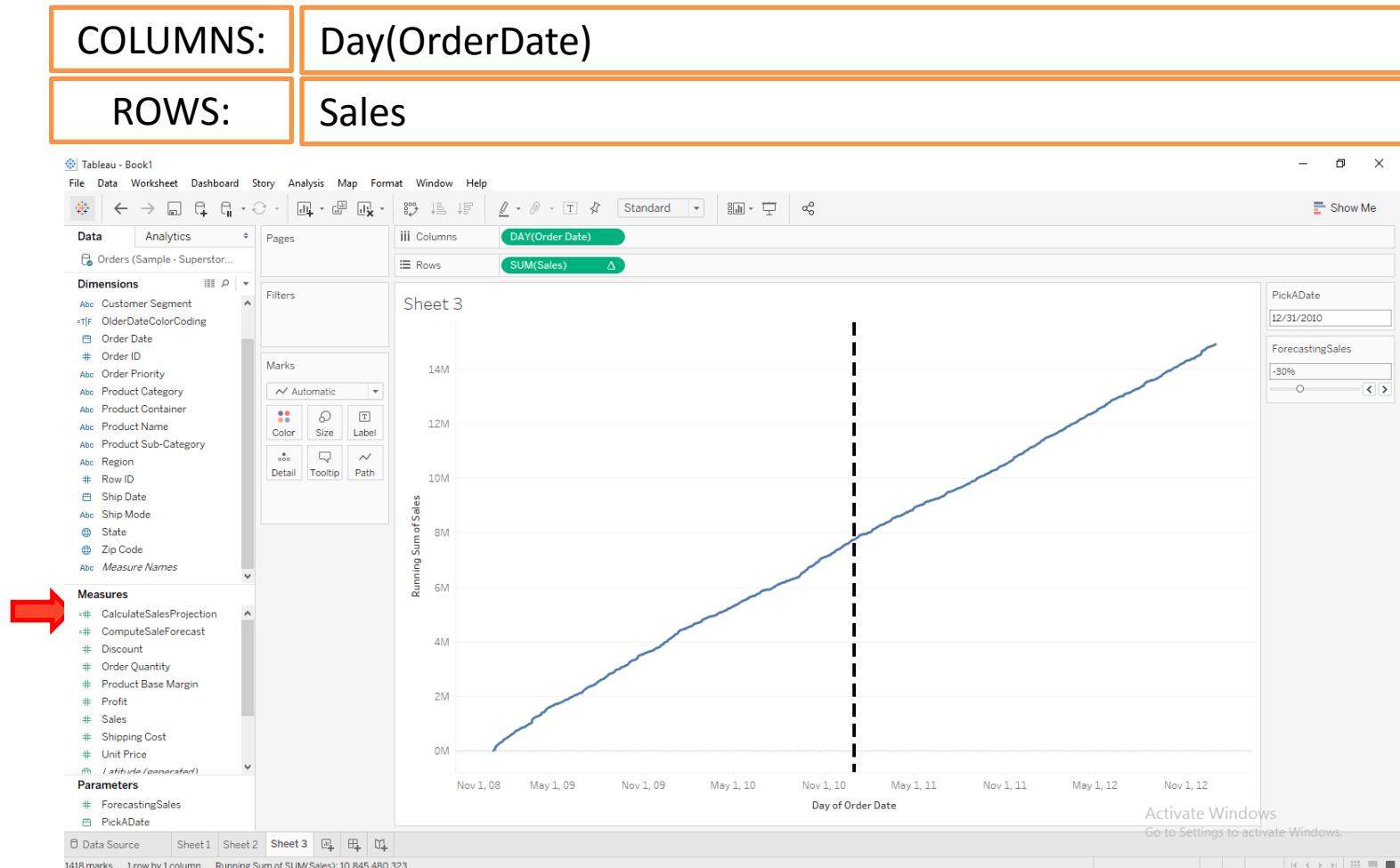


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Sales Forecast

Step 5

- Now we have created a ComputeSaleProjection

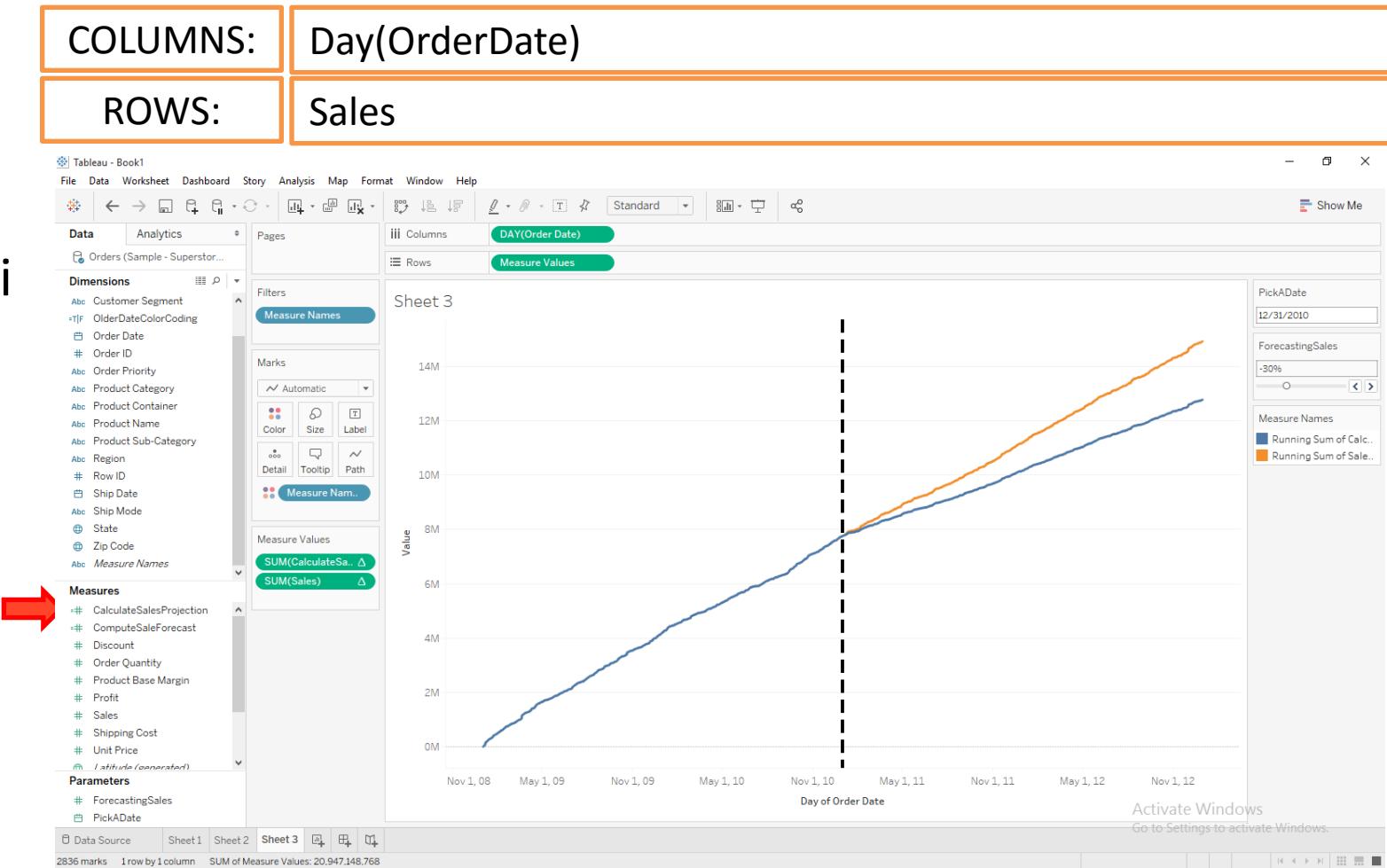


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Sales Forecast

Step 6

- Lets add Measure value(ComputeSalesProjection) to the values(y-axis)
- Select options => Quick Table Calculation => Running Total

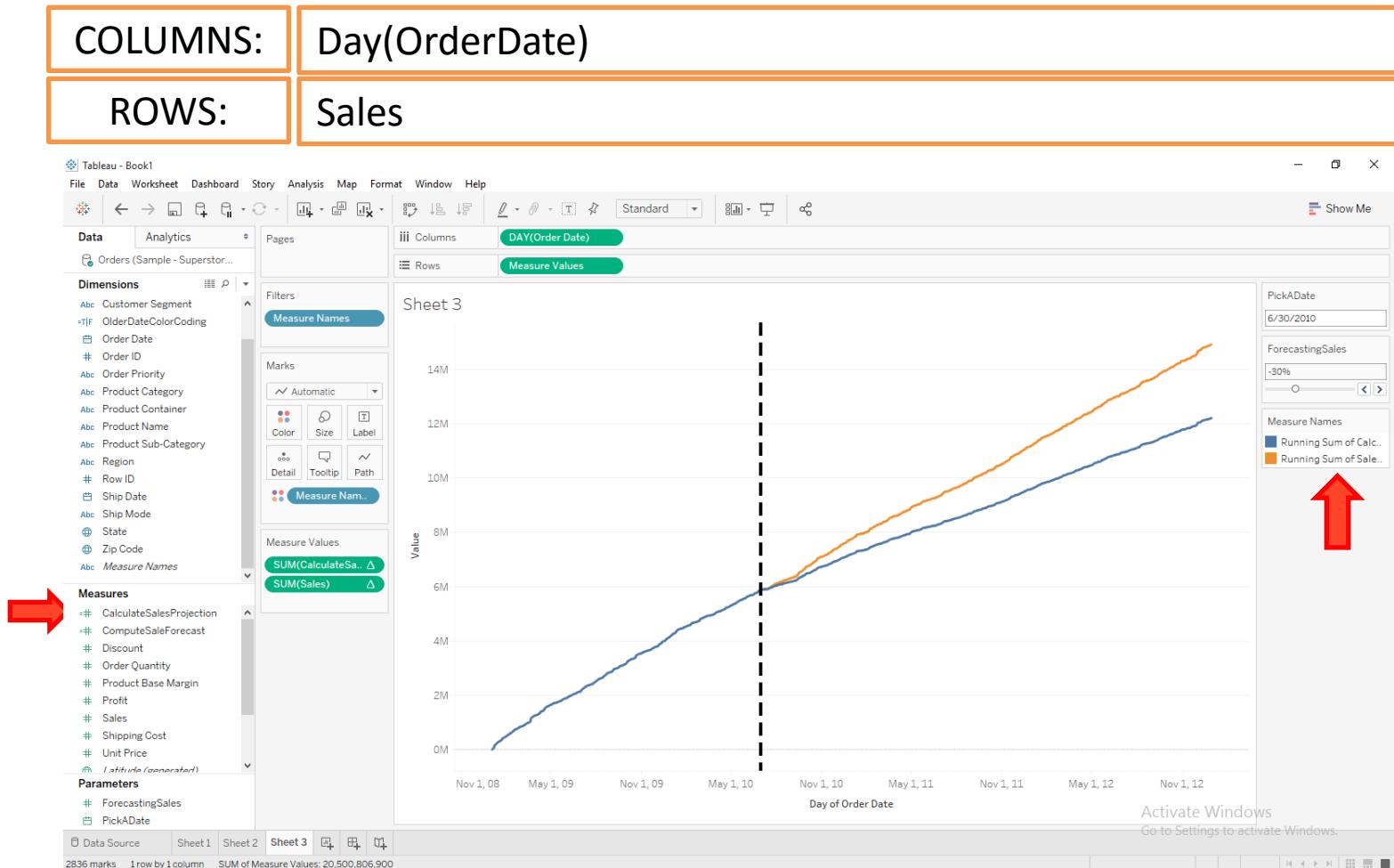


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Sales Forecast

Step 7

- Upon user defined date selection, we could see the reference line shift and subsequently, we could see the sales projections changing as shown in the figure.

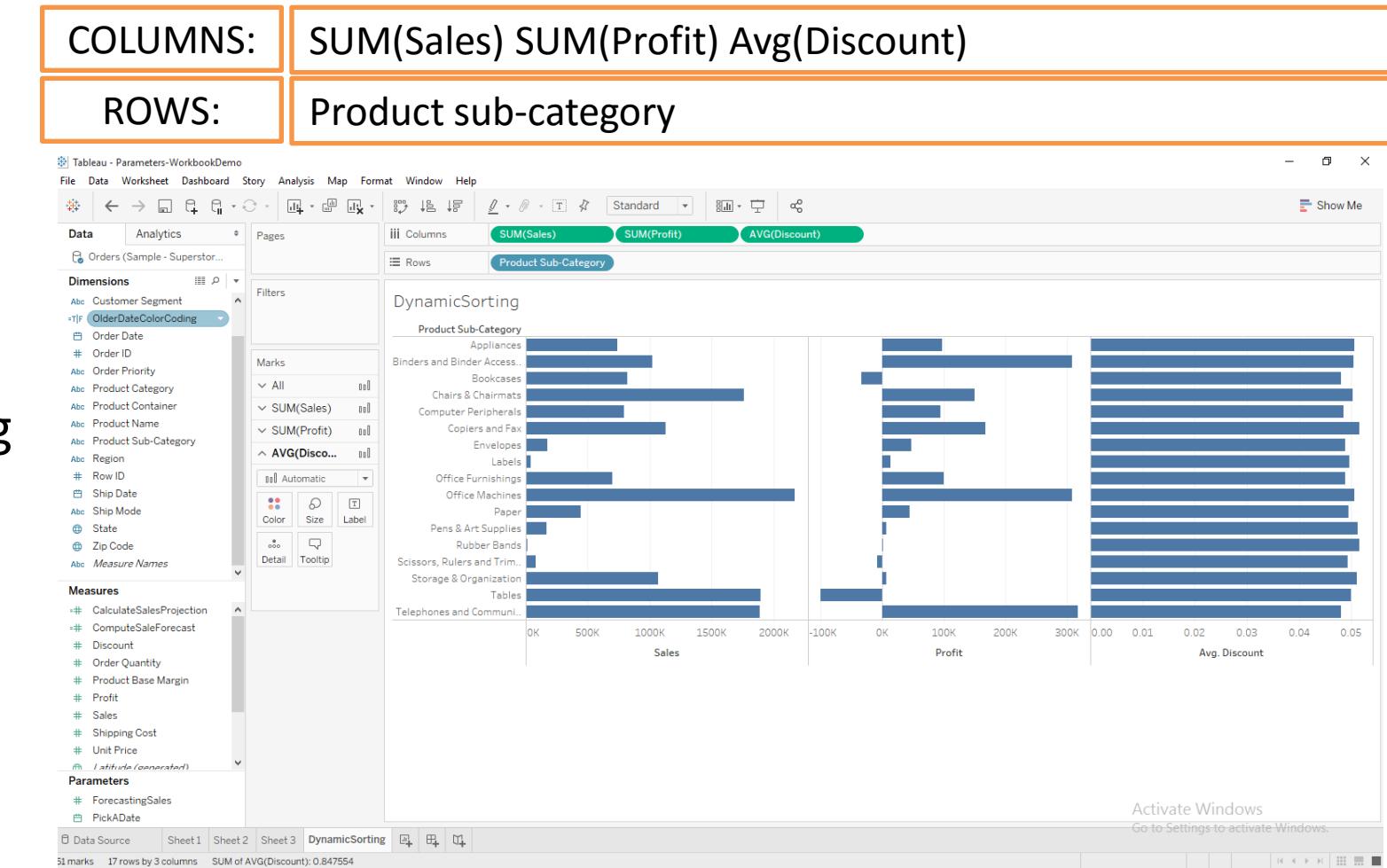


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Dynamic Sorting

Step 1

- Dynamic Sorting Demo
- Lets create a plot for Product Sub-category vs {Sum(Sales),Sum(Profit),Avg(Discount)}

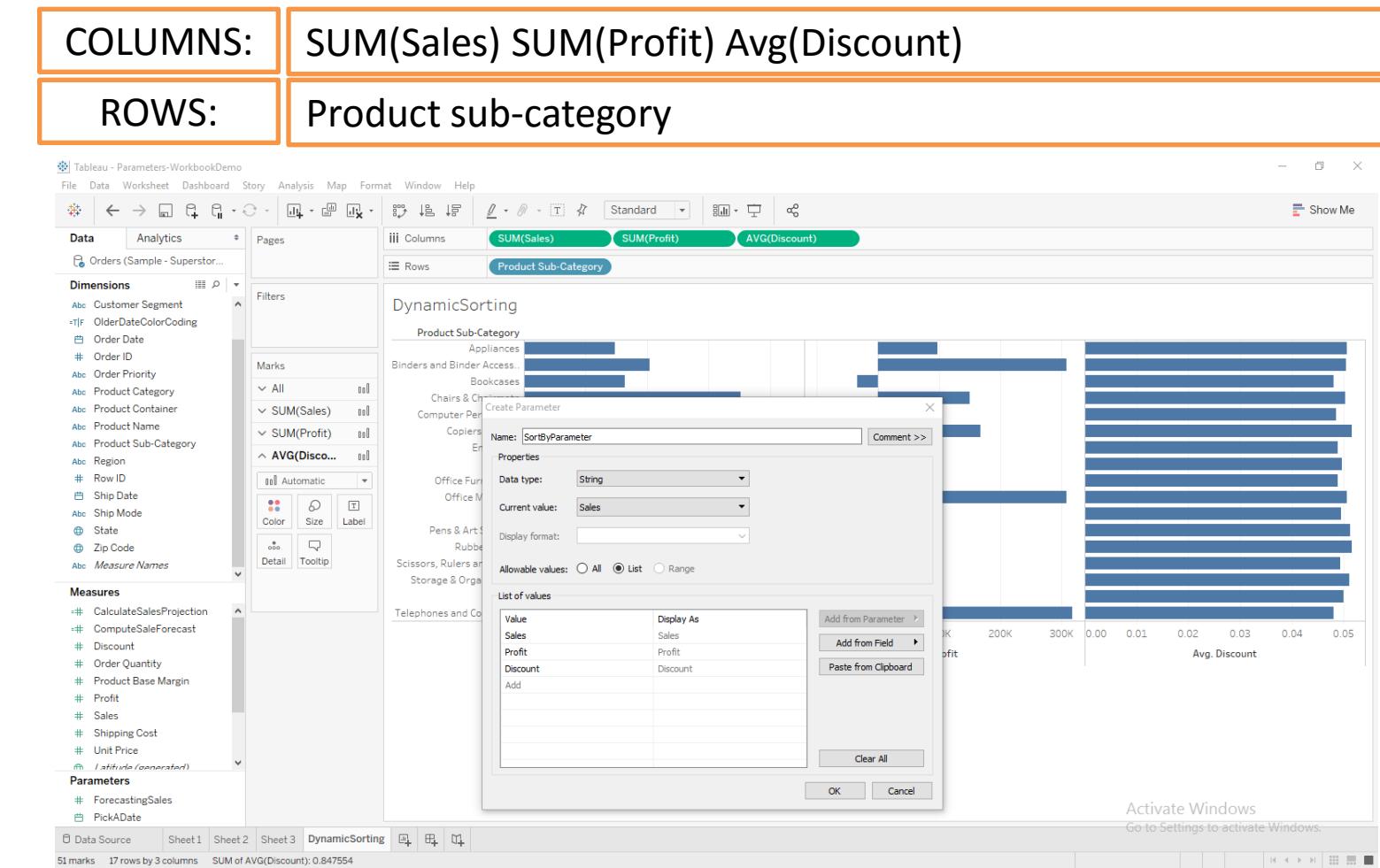


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Dynamic Sorting

Step 2

- Dynamic Sorting Demo
- Create “SortByParameter” for sorting the plot, this would be of the type “string” which takes in a list of values.



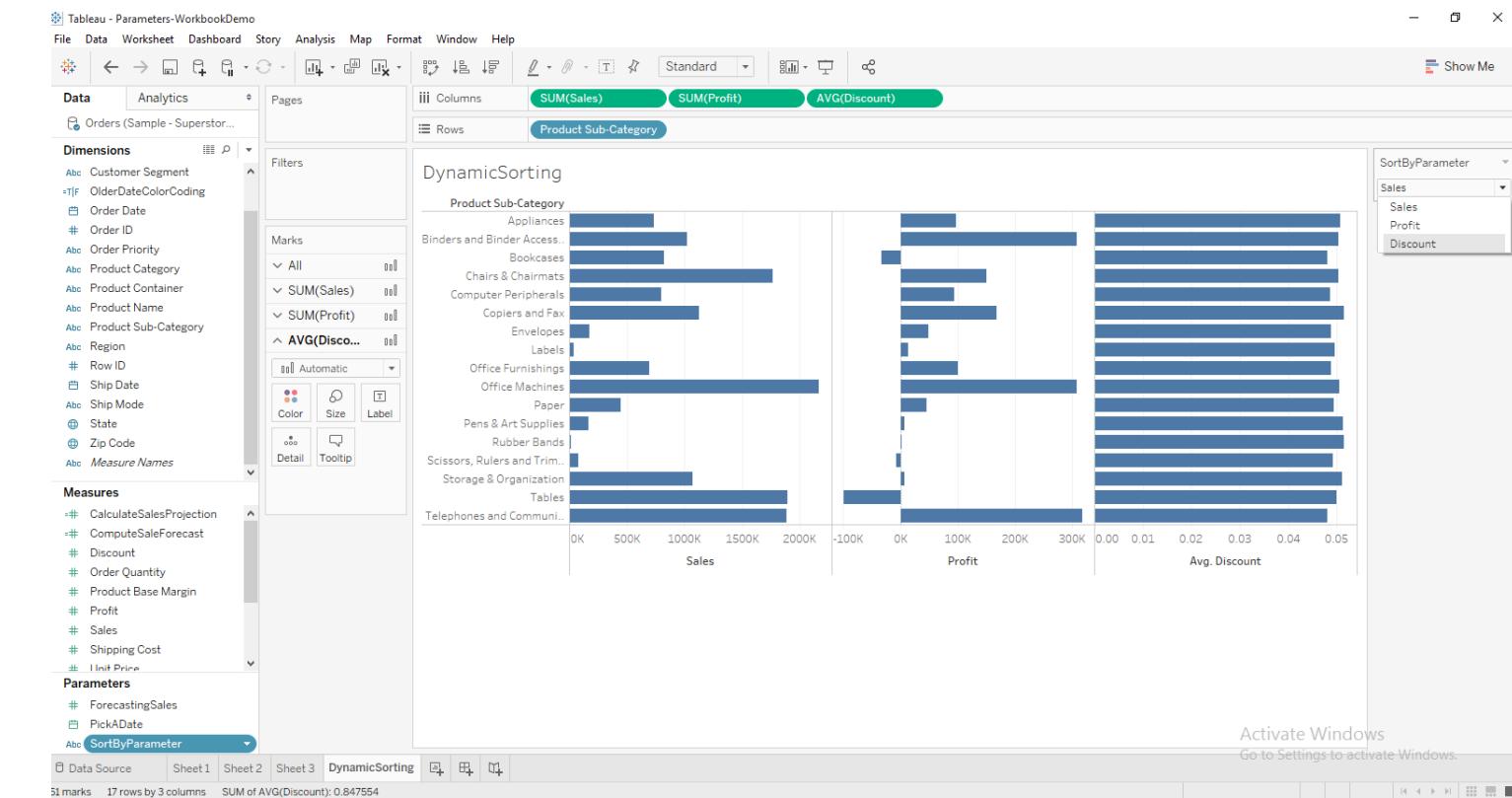
Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Dynamic Sorting

Step 3

- Dynamic Sorting Demo
- Lets add the parameter to the worksheet.
- Next step is to connect this to a calculated field to bind it to the sheet.

COLUMNS:	SUM(Sales) SUM(Profit) Avg(Discount)
ROWS:	Product sub-category



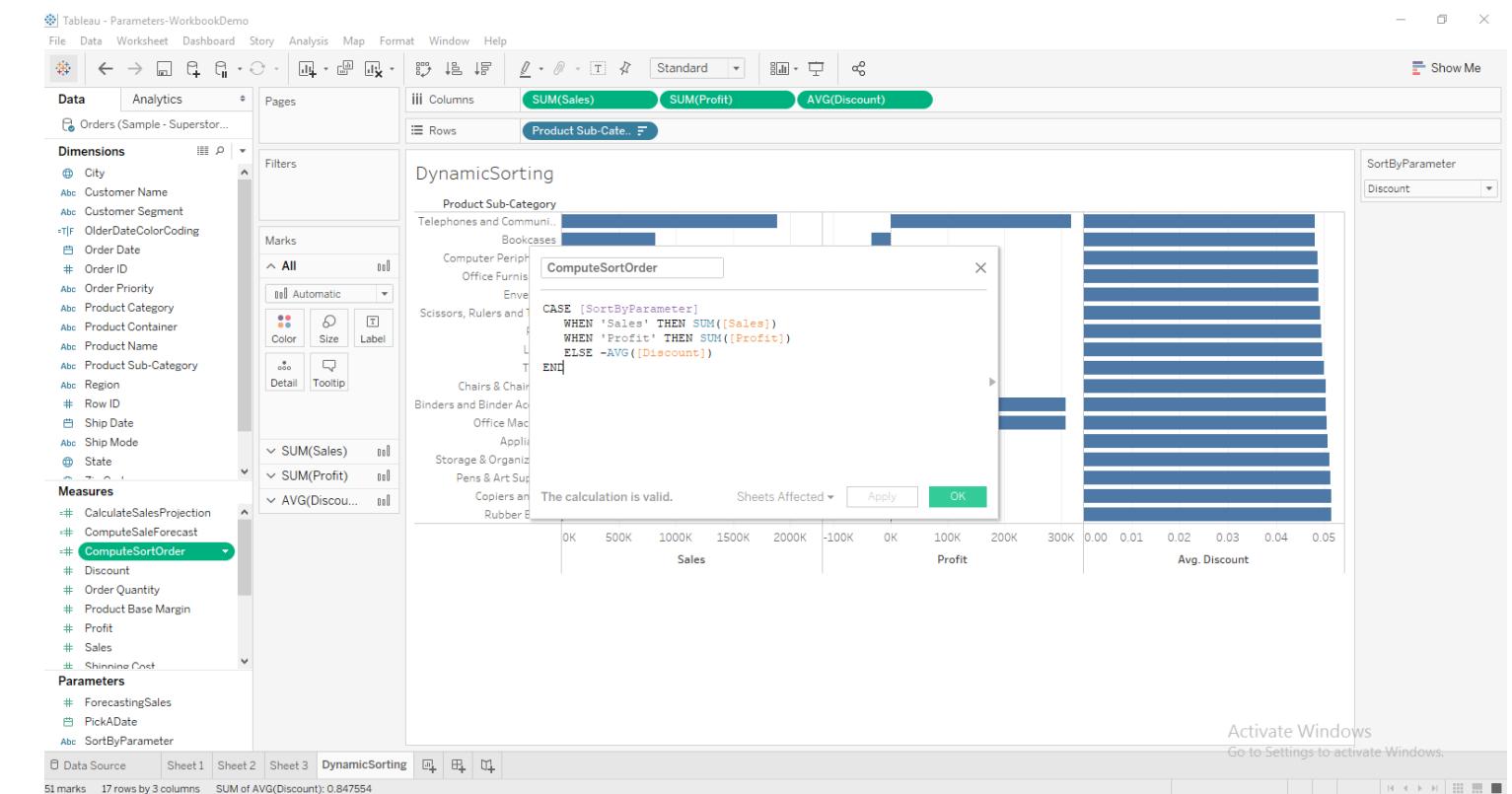
Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Dynamic Sorting

Step 4

- Dynamic Sorting Demo
 - Lets create a ComputeSortOrder calculatedfield

COLUMNS:	SUM(Sales) ,SUM(Profit) ,Avg(Discount)
ROWS:	Product sub-category

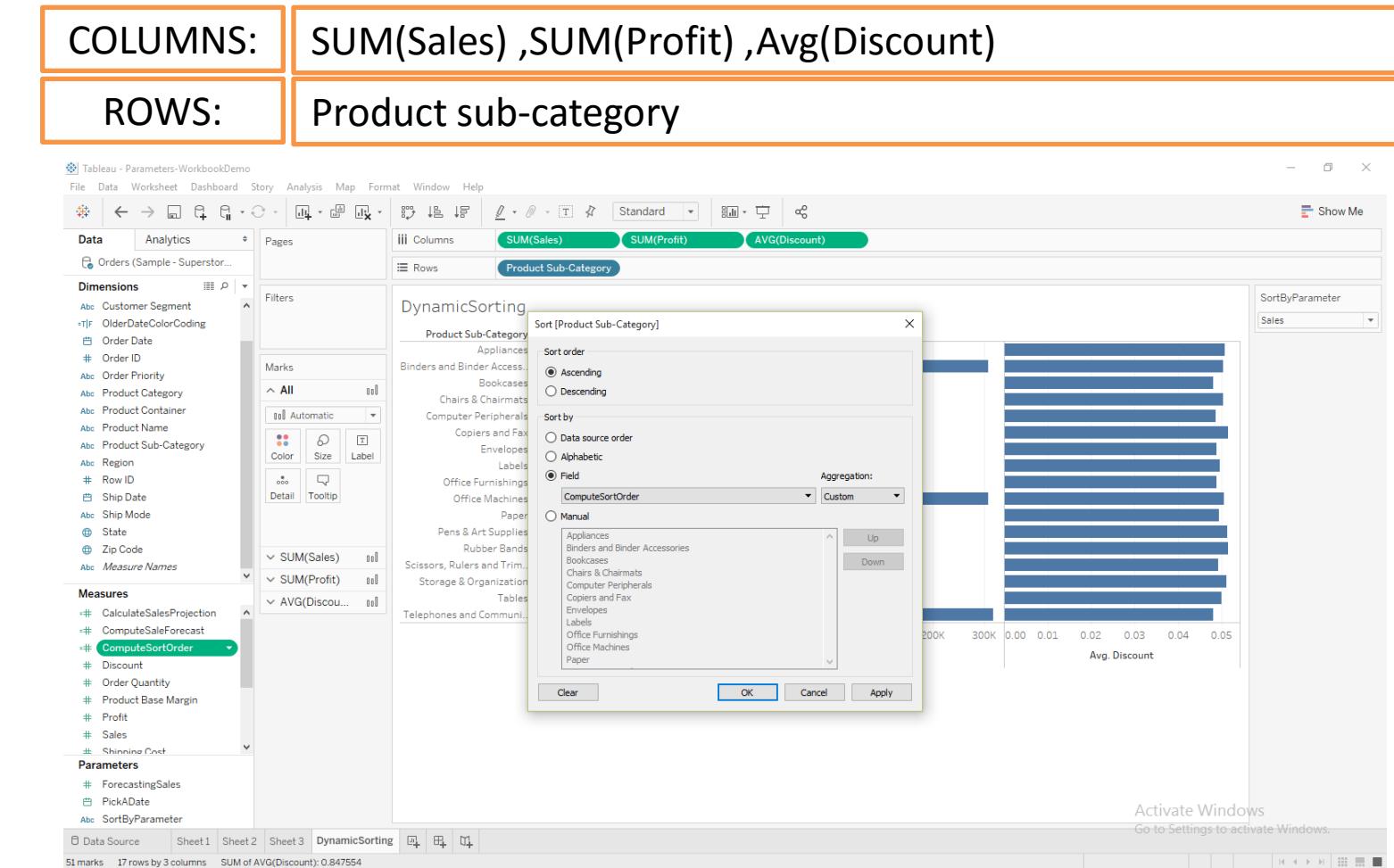


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Dynamic Sorting

Step 5

- Dynamic Sorting Demo
- Let us sort Product Sub-Category by “ComputeSortOrder” field as shown in the figure.



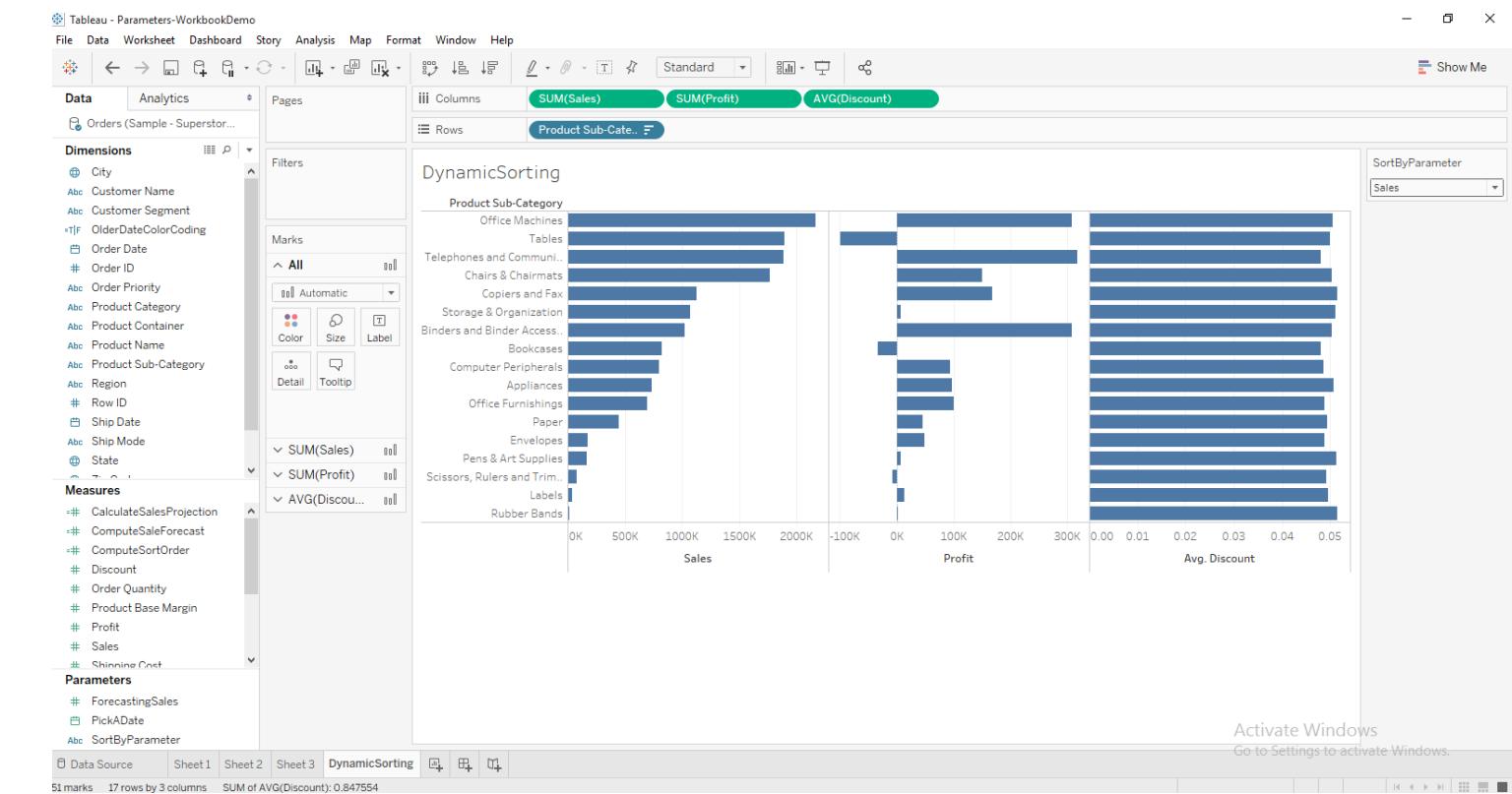
Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Dynamic Sorting

Step 6

- Dynamic Sorting Demo
- Upon user selection of the **SortbyParameter**, there is dynamic sorting of the views.

COLUMNS:	SUM(Sales) ,SUM(Profit) ,Avg(Discount)
ROWS:	Product sub-category



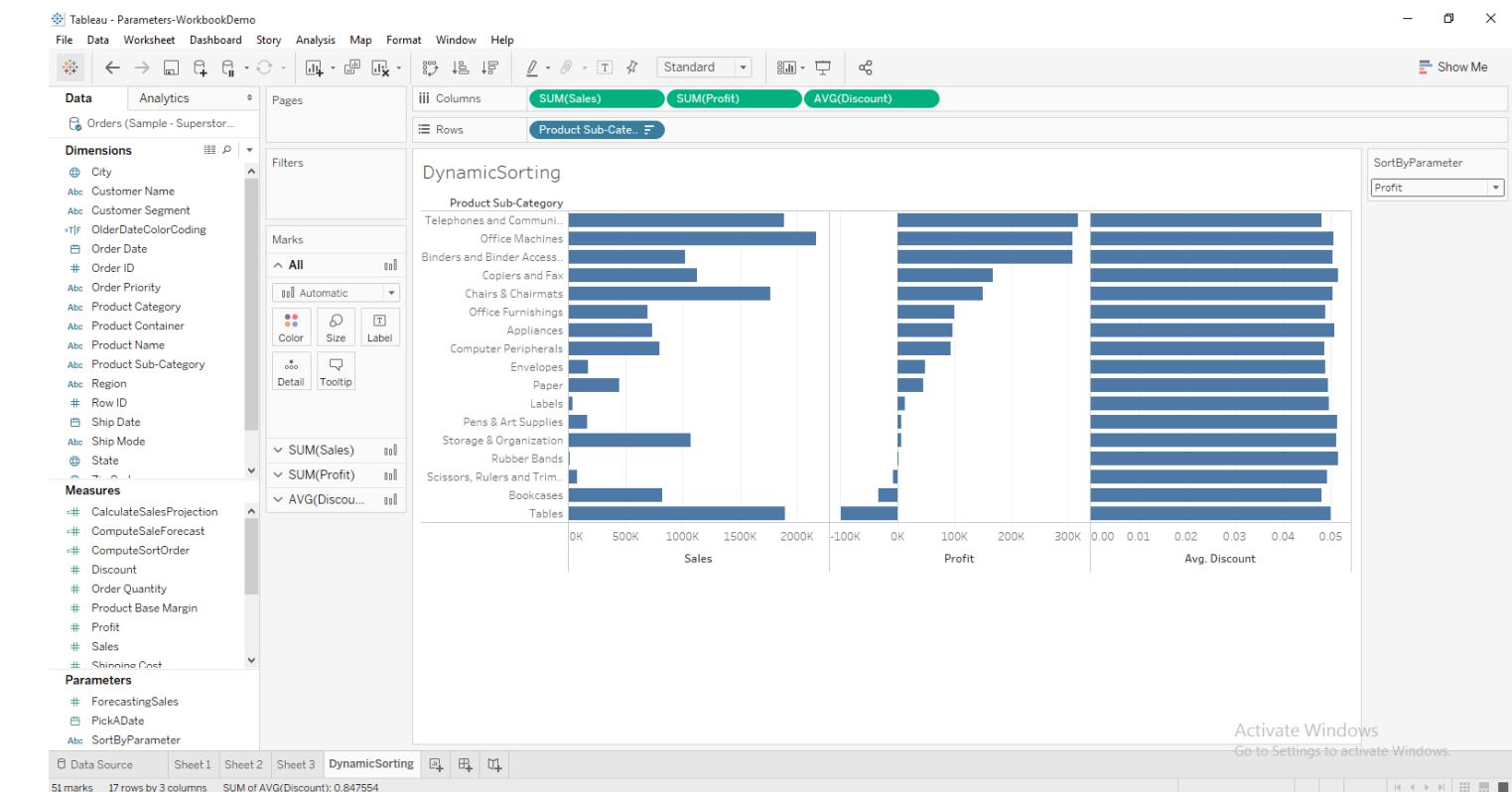
Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Dynamic Sorting

Step 7

- Dynamic Sorting Demo
- Upon user selection of the **SortbyParameter**, there is dynamic sorting of the views.

COLUMNS:	SUM(Sales) ,SUM(Profit) ,Avg(Discount)
ROWS:	Product sub-category



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

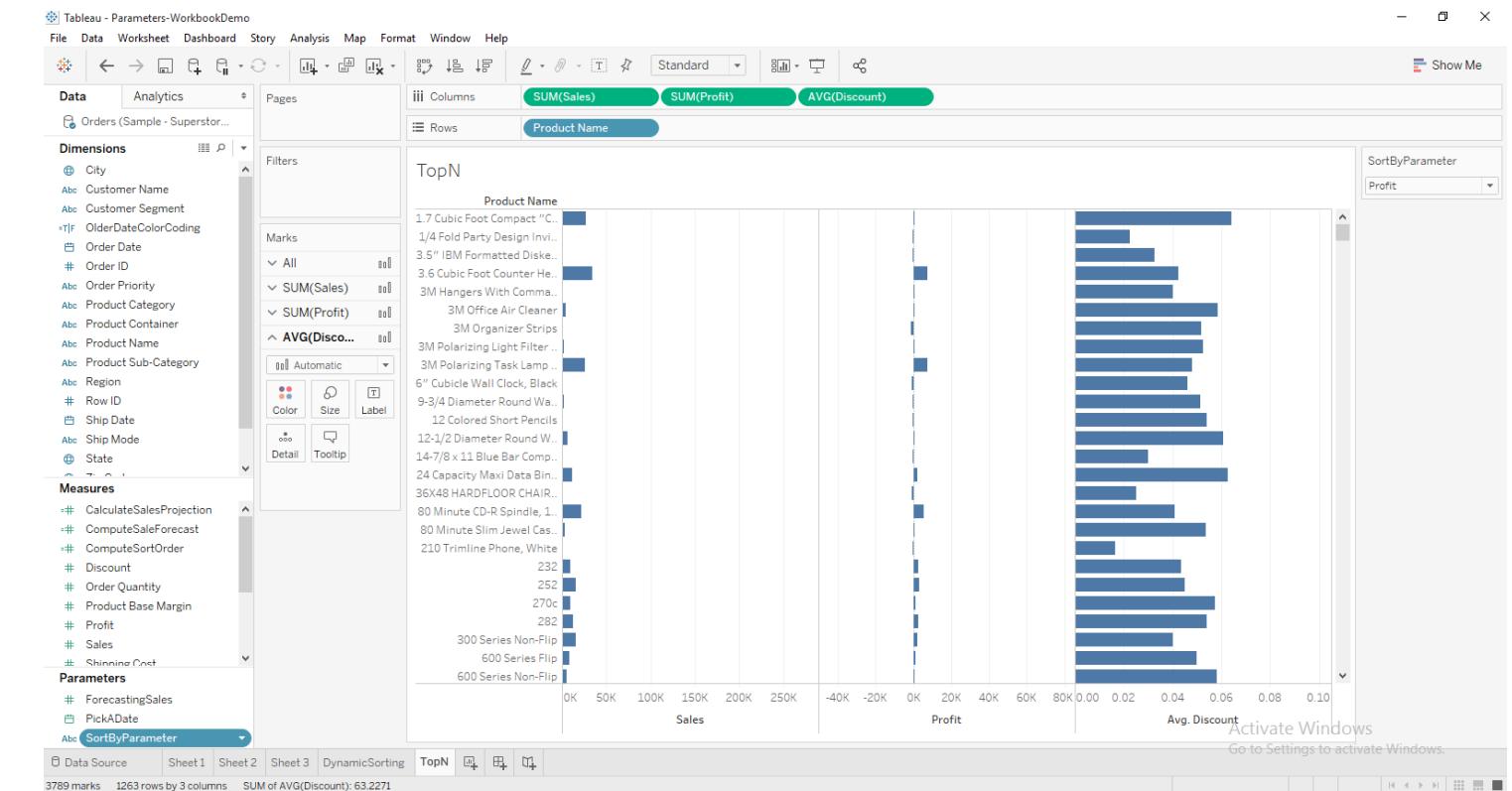
Use Case :Top N

Step 1

- Top N

- Lets create a plot with productNames vs {Sum(Sales),Sum(Profit),Avg(Discount)}

COLUMNS:	SUM(Sales) ,SUM(Profit) ,Avg(Discount)
ROWS:	Product Name



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

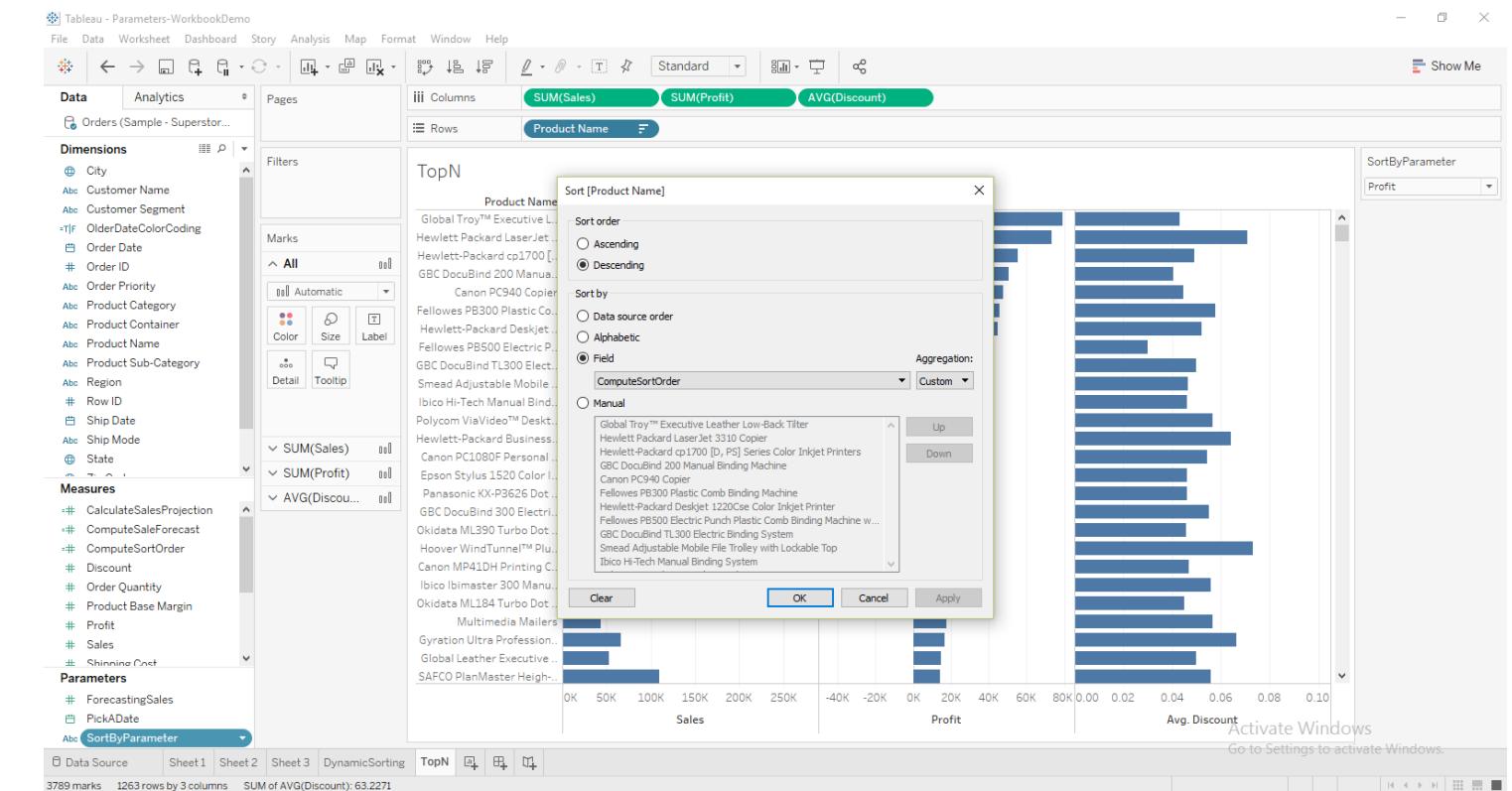
Use Case :Top N

Step 2

- Top N

- Now lets, add custom sort by “computesortorder” for the productName.

COLUMNS:	SUM(Sales) ,SUM(Profit) ,Avg(Discount)
ROWS:	Product Name



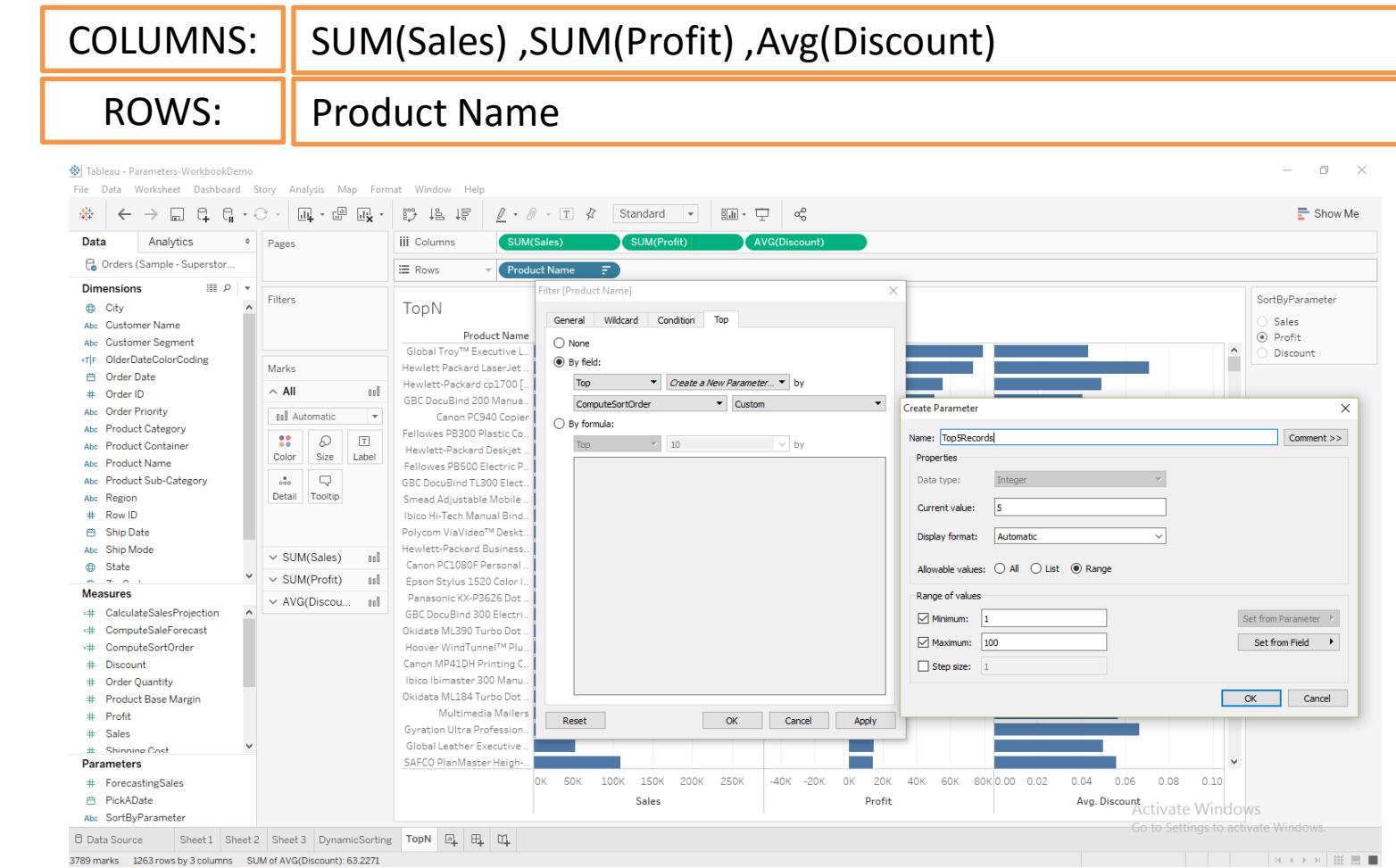
Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Top N

Step 3

- Top N

- Now lets create a filter for TOP N records from the selection.



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

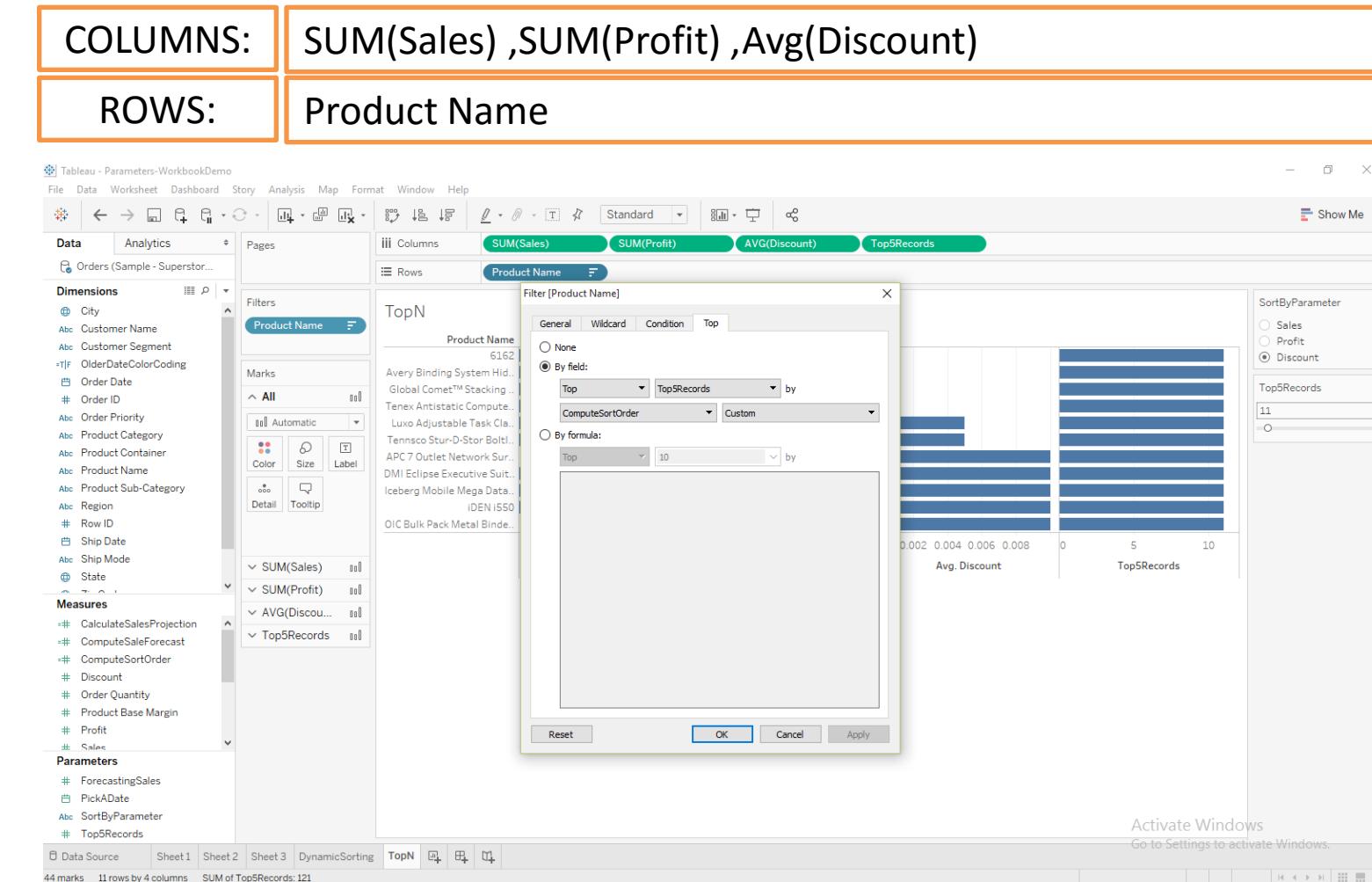
Use Case :Top N

Step 4

- Top N
- Now lets create a filter for TOP N records from the selection.

Please read terms of use for authorized access

Original Series



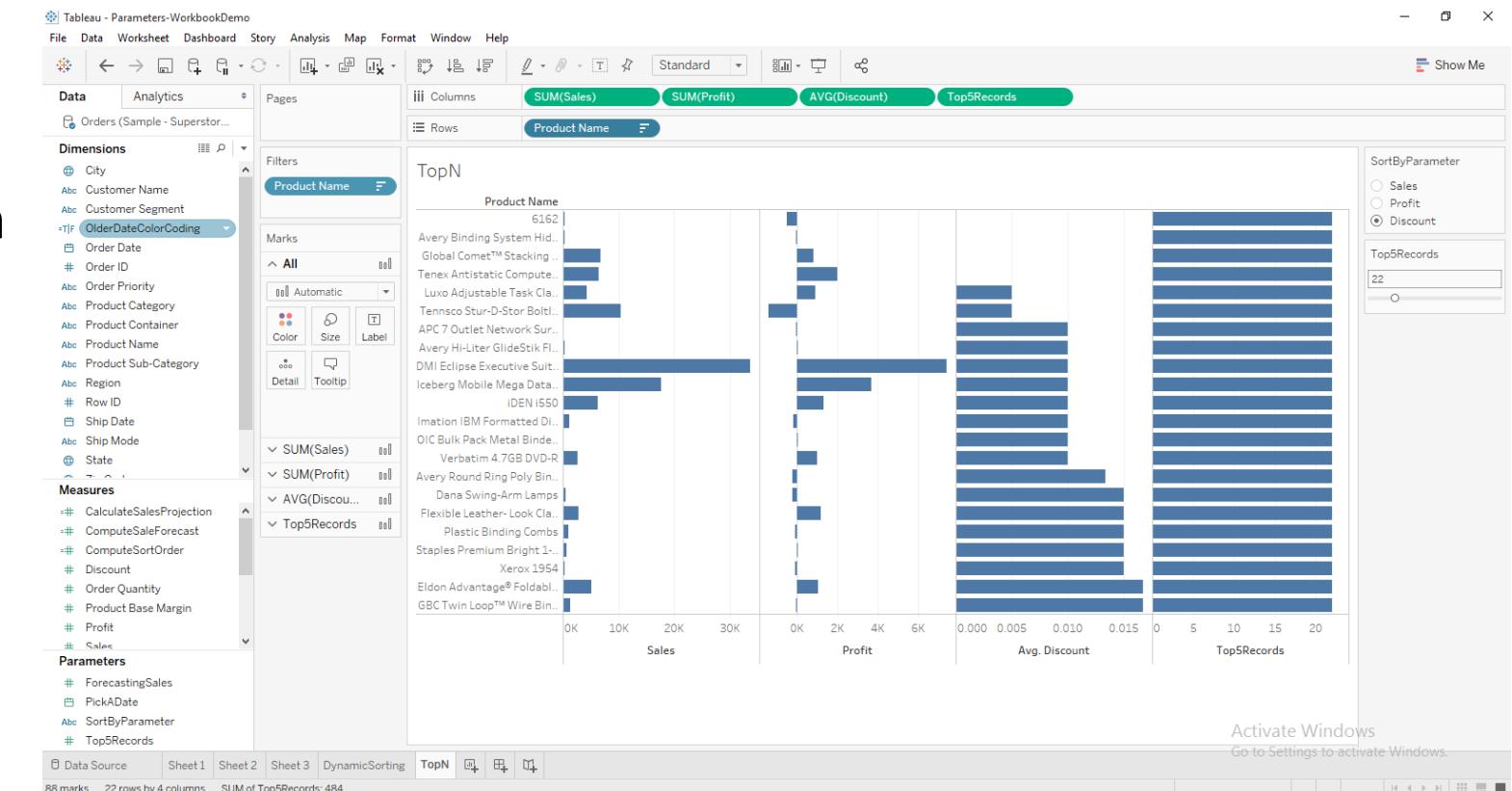
Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Top N

Step 5

- Top N
- Apply the filter to retrieve the top 22 records as shown in the figure.

COLUMNS:	SUM(Sales) ,SUM(Profit) ,Avg(Discount)
ROWS:	Product Name



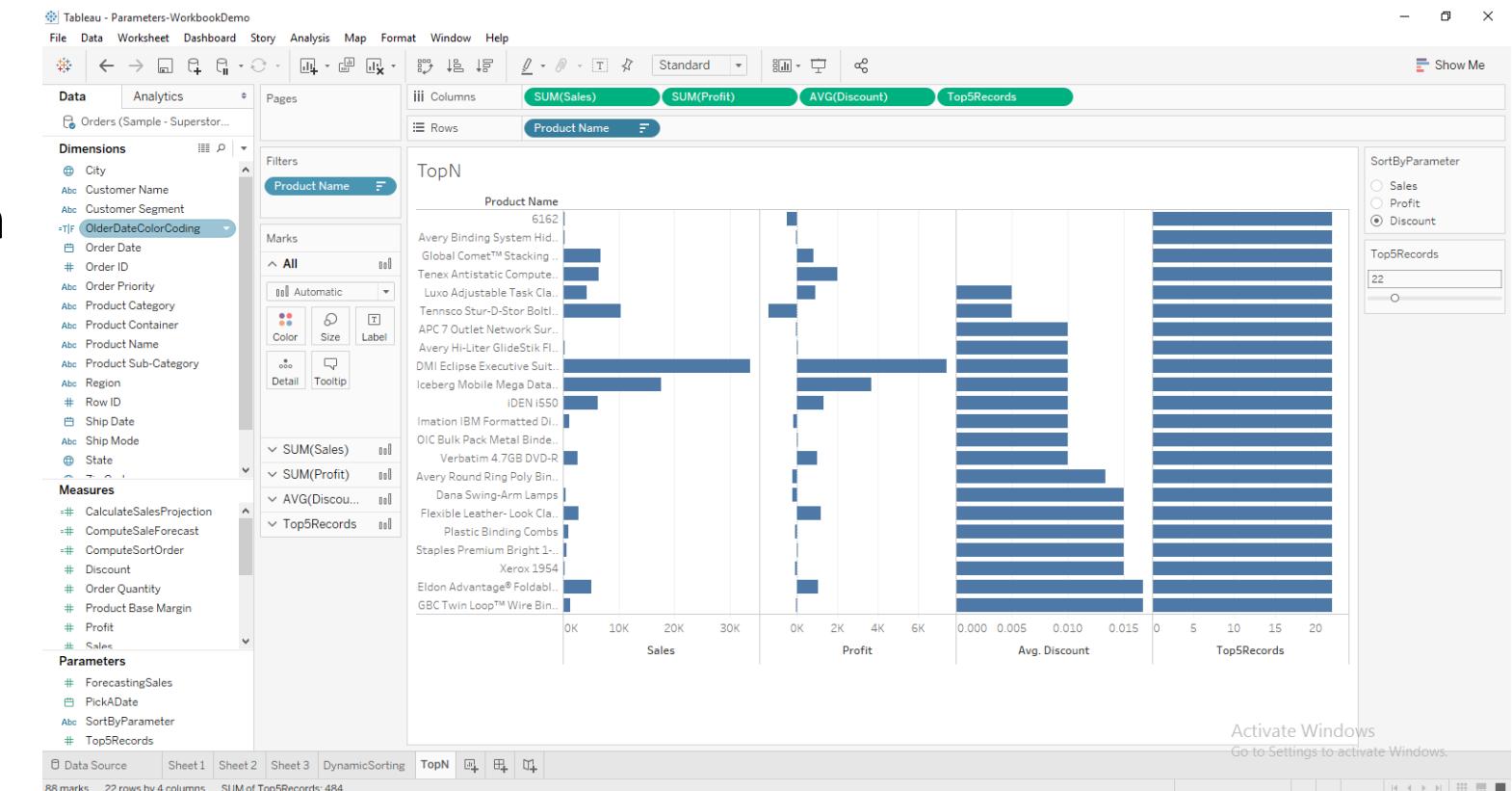
Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Top N

Step 5

- Top N
- Apply the filter to retrieve the top 22 records as shown in the figure.

COLUMNS:	SUM(Sales) ,SUM(Profit) ,Avg(Discount)
ROWS:	Product Name

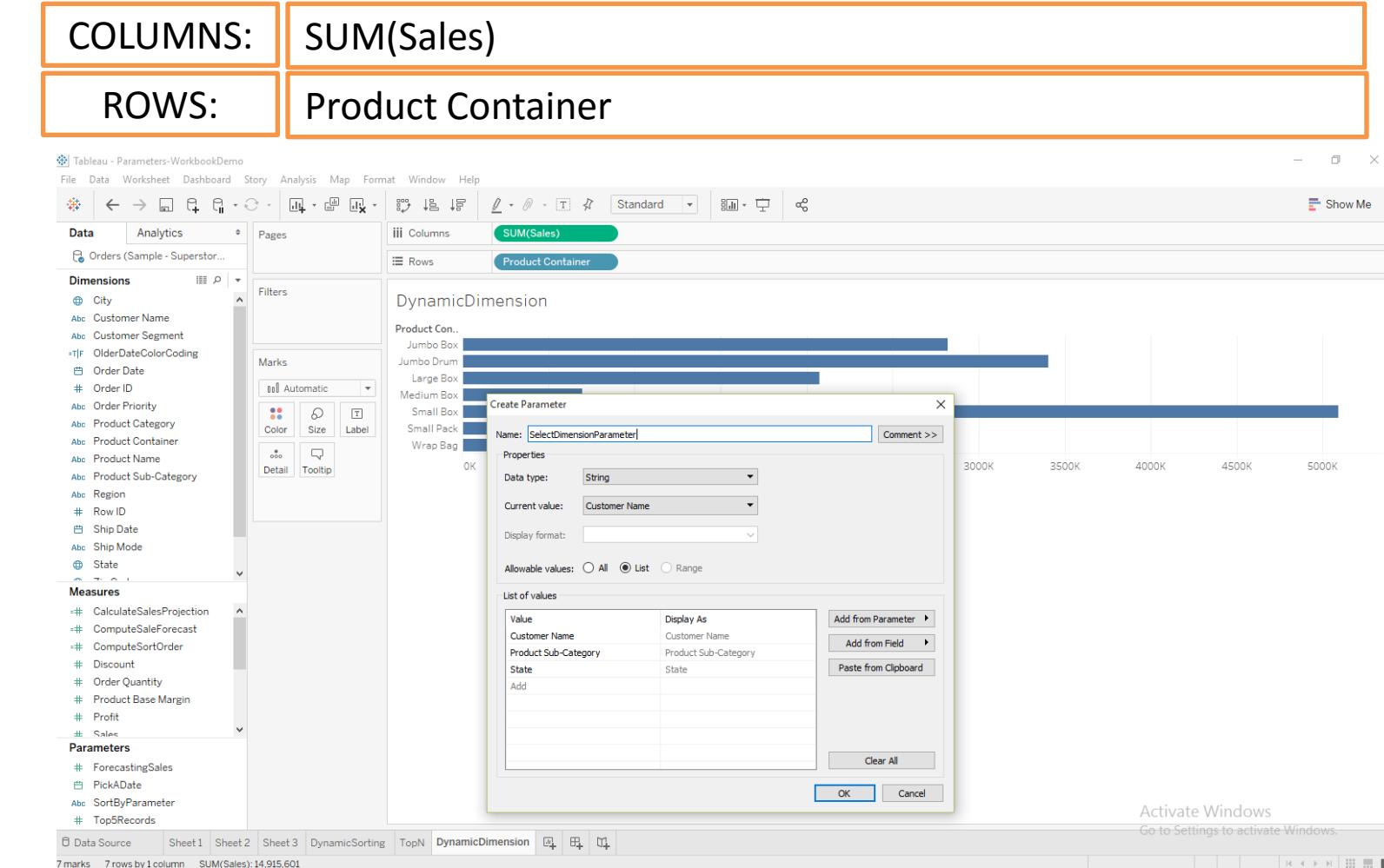


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Dynamic Dimension

Step 1

- Some times users would like to select a different dimension against a measured value.



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

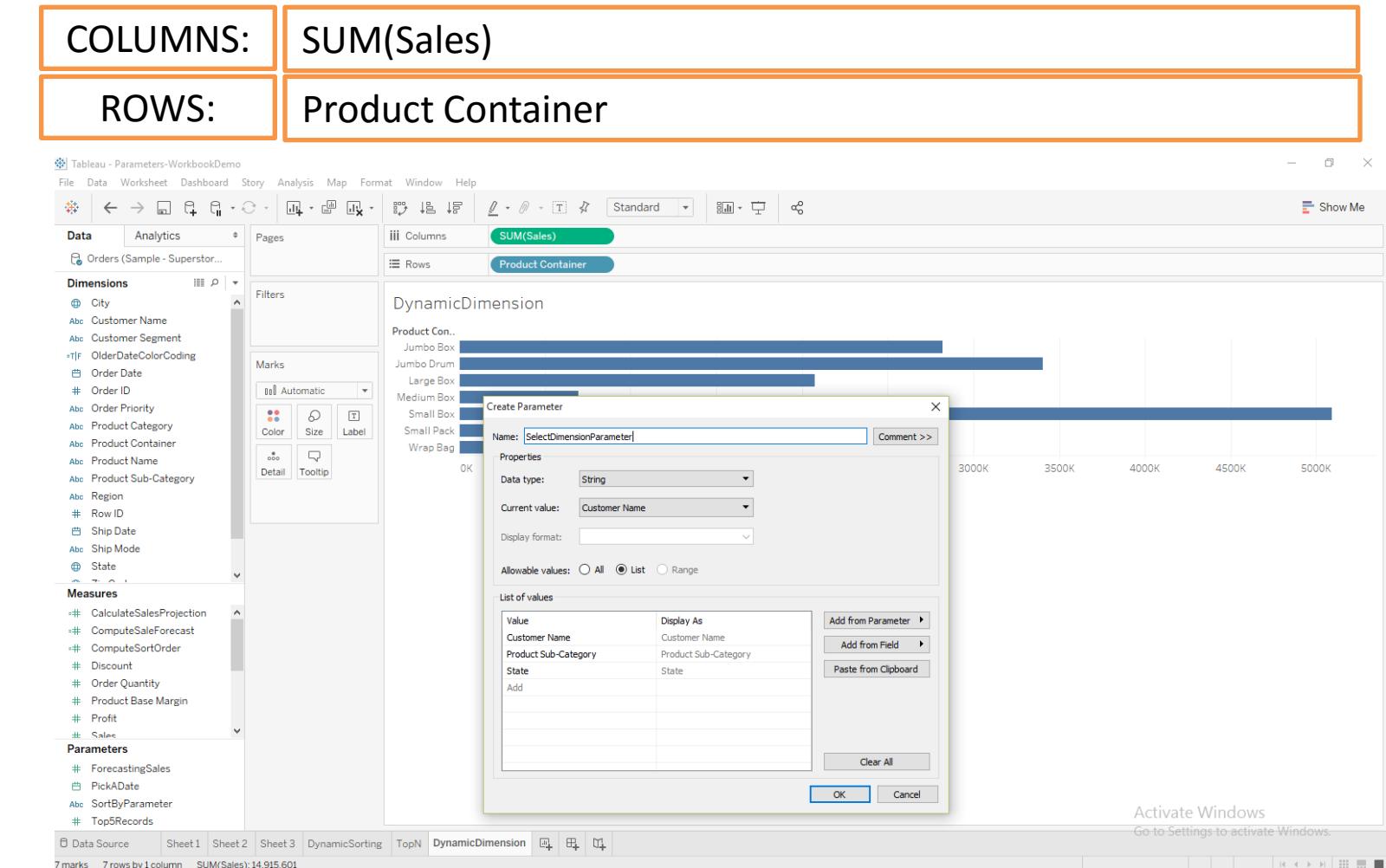
Use Case :Dynamic Dimension

Step 2

- Some times users would like to select a different dimension against a measured value.

Please read terms of use for authorized access

Original Series



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

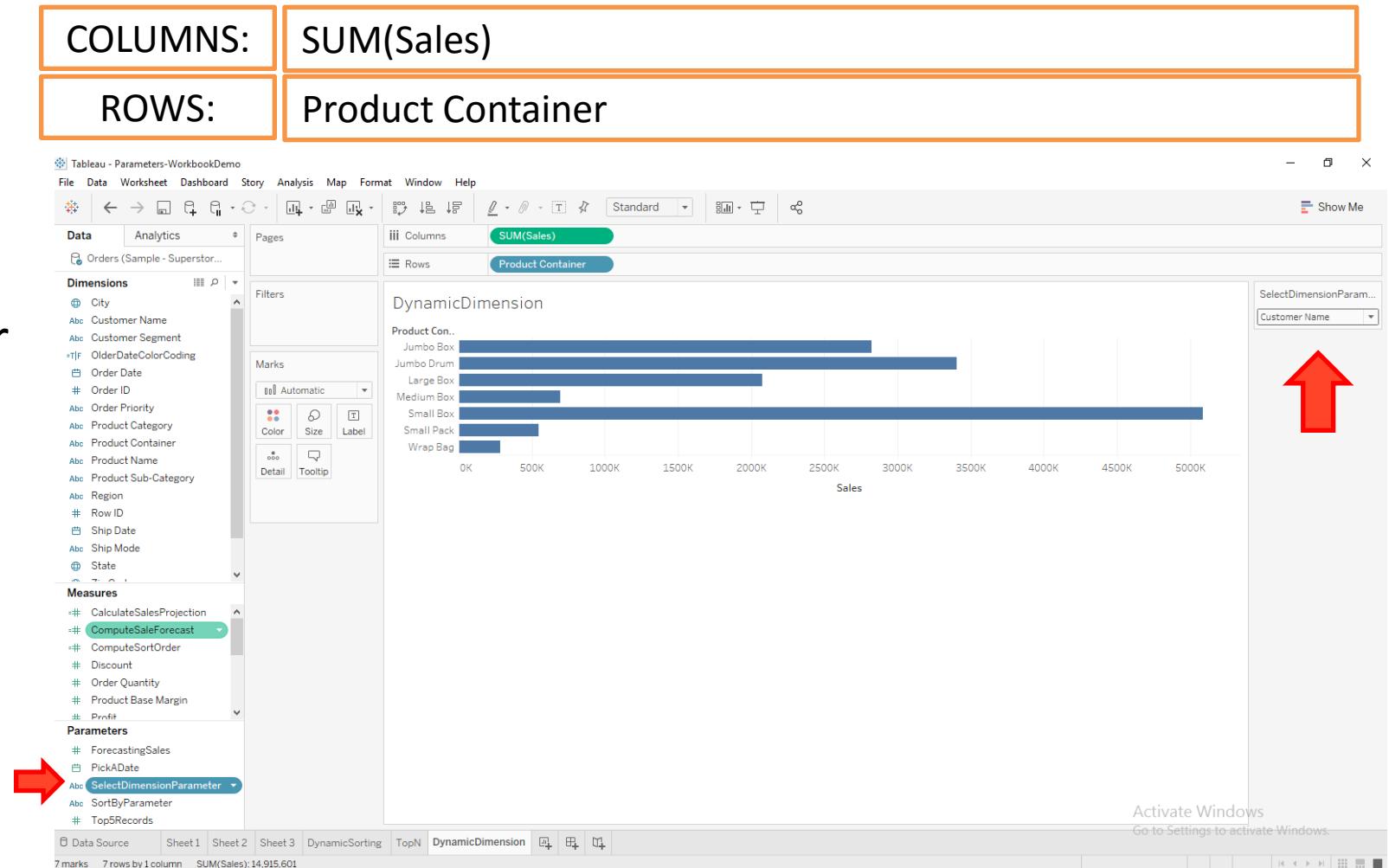
Use Case :Dynamic Dimension

Step 3

- We have created a parameter "selectadimensionparameter"

Please read terms of use for authorized access

Original Series

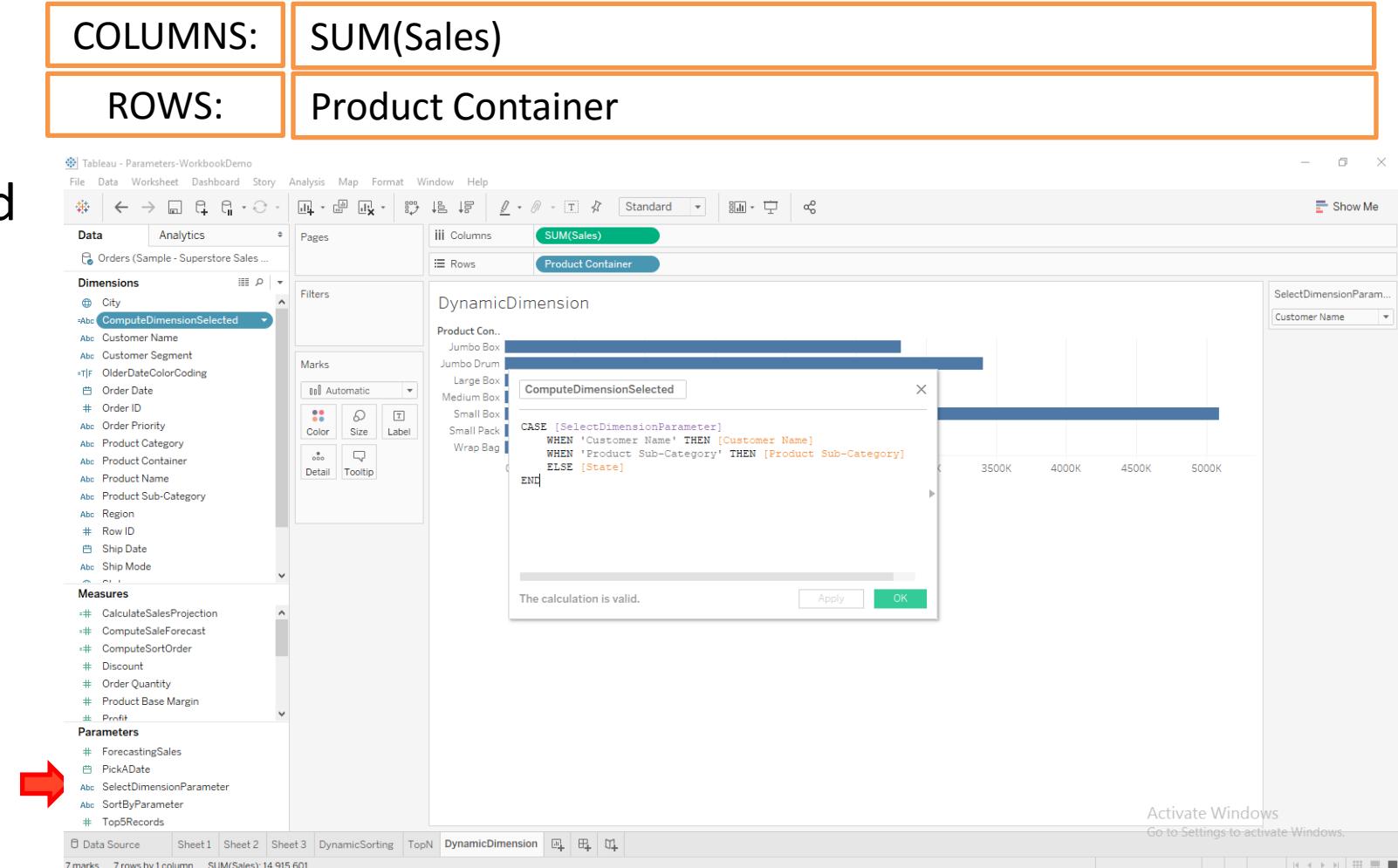


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Dynamic Dimension

Step 4

- Lets create a calculated field to select a dimension from the parameter defined earlier.

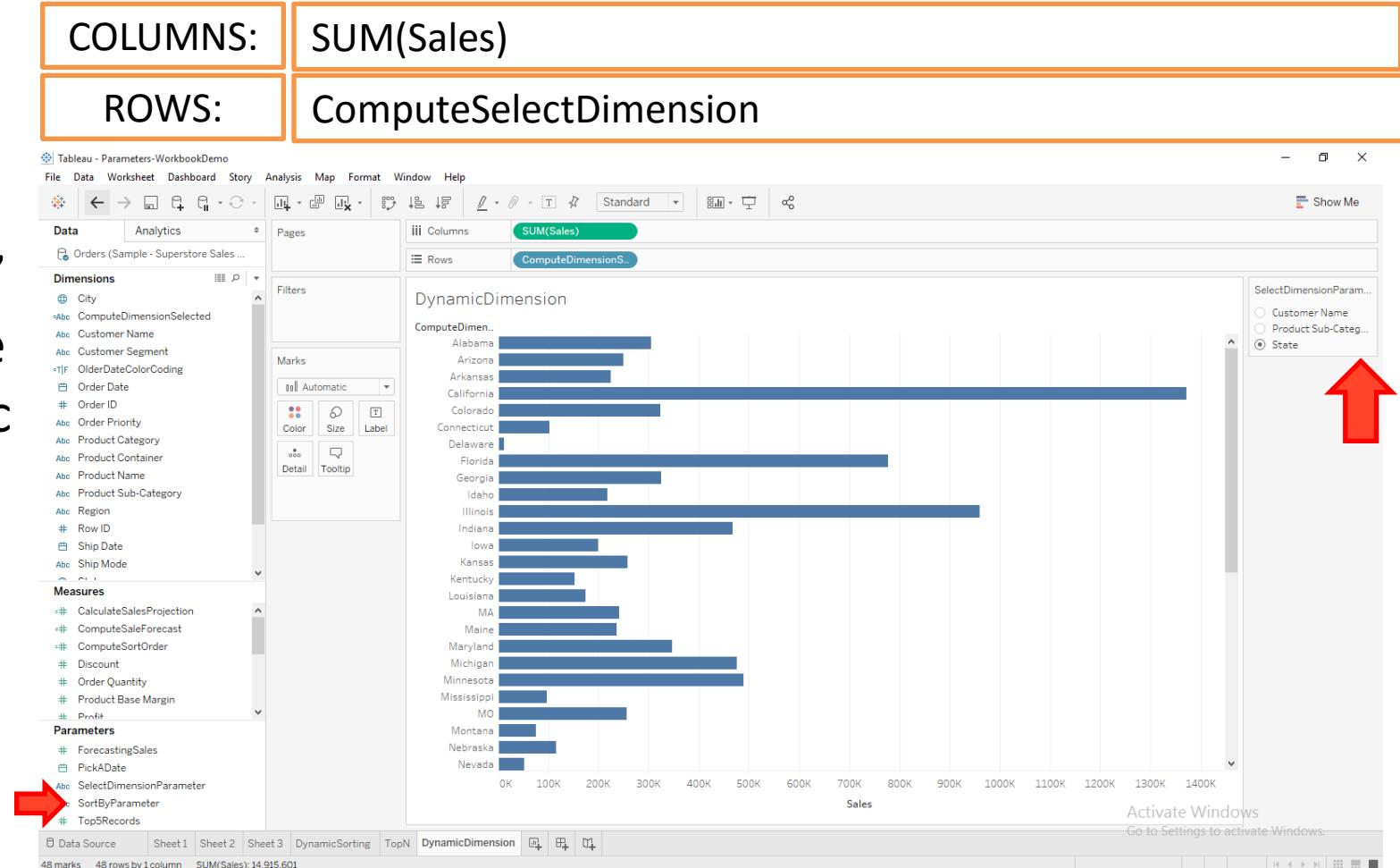


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Dynamic Dimension

Step 5

- Now lets add “computedSelectDimension” created to the rows, we have successfully created Dynamic Dimension Parameter, which changes based on user interaction/user choice.

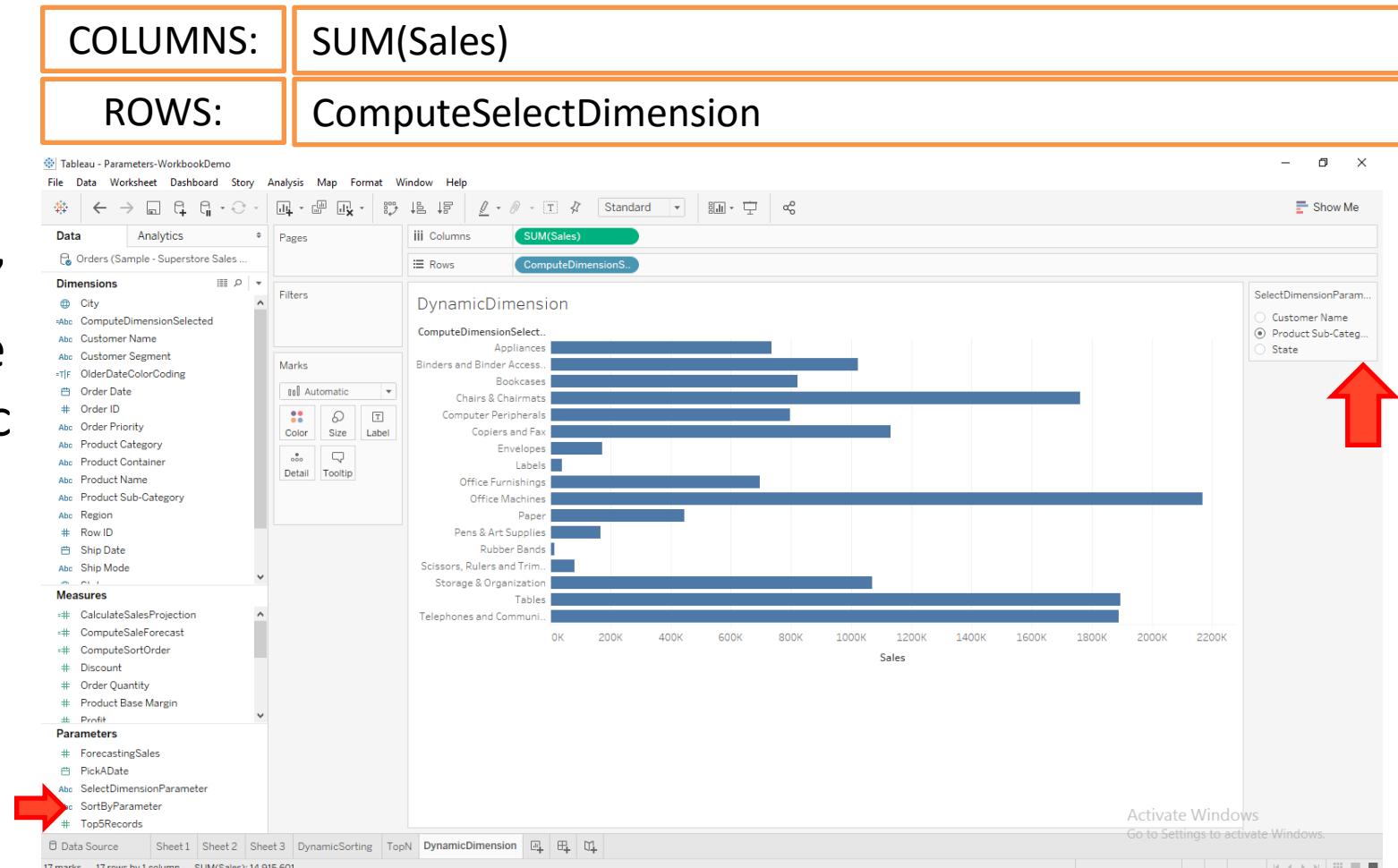


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Dynamic Dimension

Step 6

- Now lets add “computedSelectDimension” created to the rows, we have successfully created Dynamic Dimension Parameter, which changes based on user interaction/user choice.

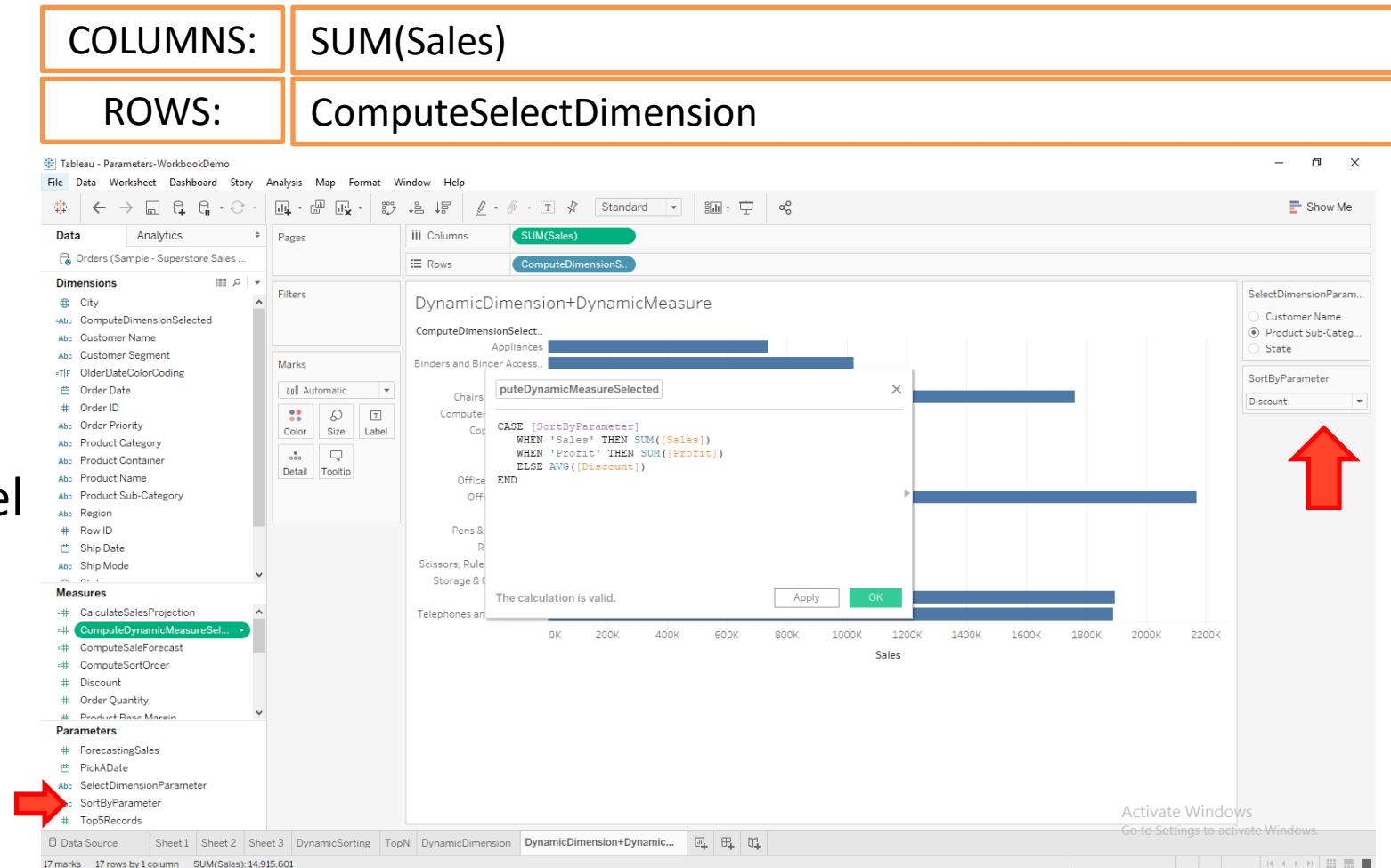


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Dynamic Dimension + Dynamic Measure

Step 1

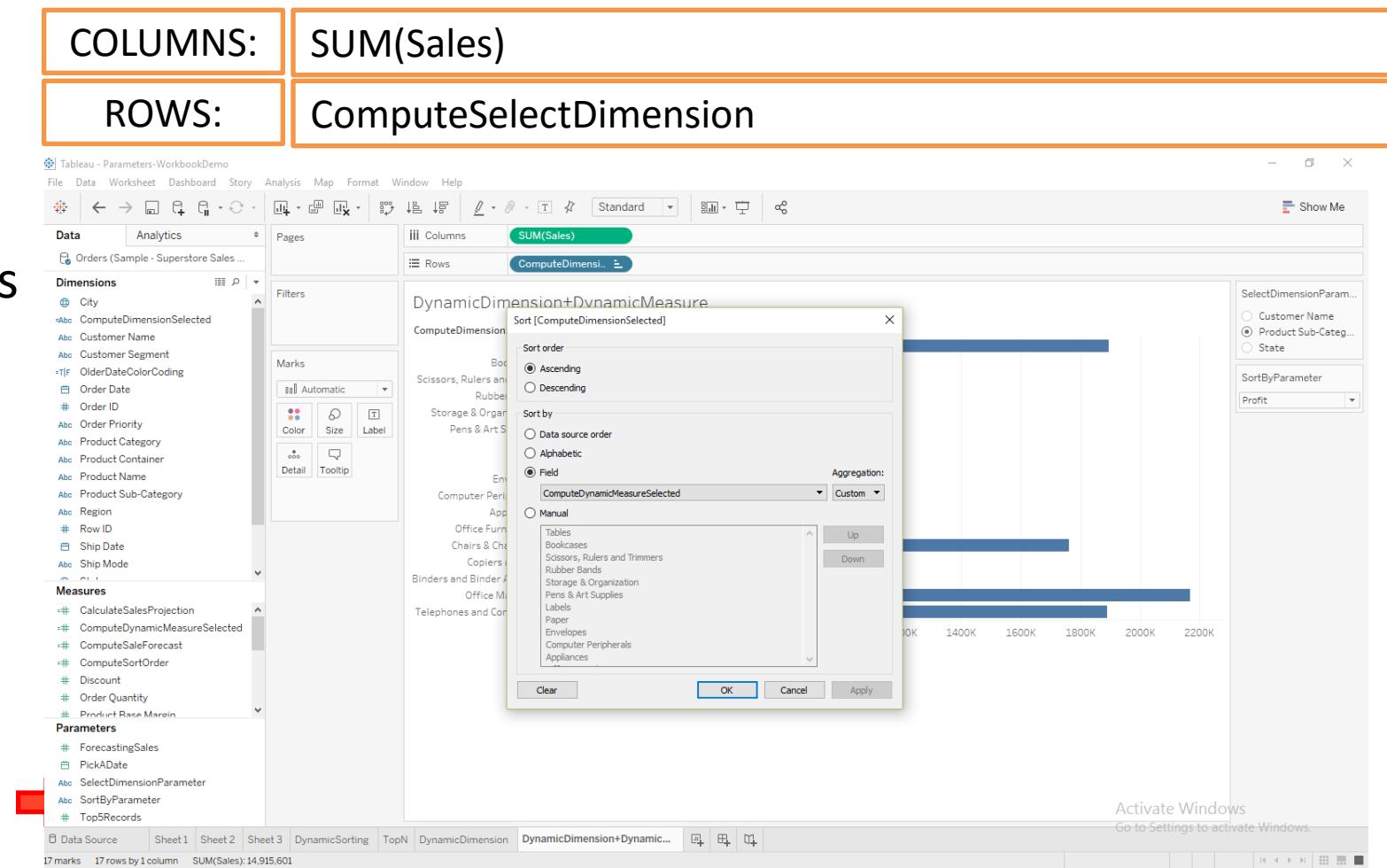
- Duplicate the Dynamic Dimension Worksheet
- Duplicate and rename the ComputeSortOrder to ComputeDynamicMeasureSelected



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Dynamic Dimension + Dynamic Measure Step 2

- Now apply sort to the productselecteddimension as shown in the figure.



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

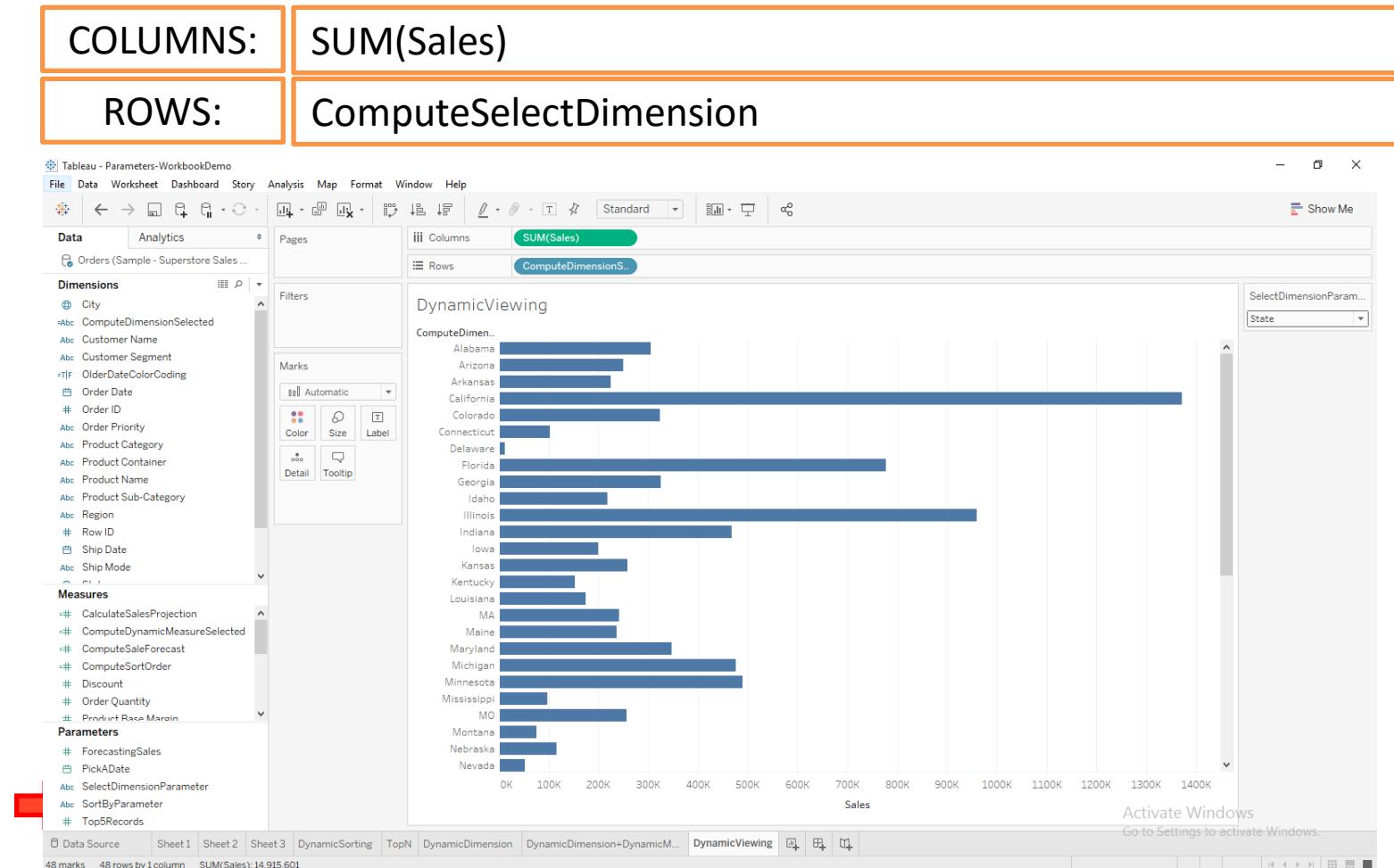
Use Case :Dynamic View

Please read terms of use for authorized access

Original Series

Step 1

- create a worksheet with ComputeSelectDimension and SUM(Sales) as shown in the figure.
- Add SelectDimensionParameter to the Worksheet.
- We would like the view to render a different perspective based on the dimension selected.



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

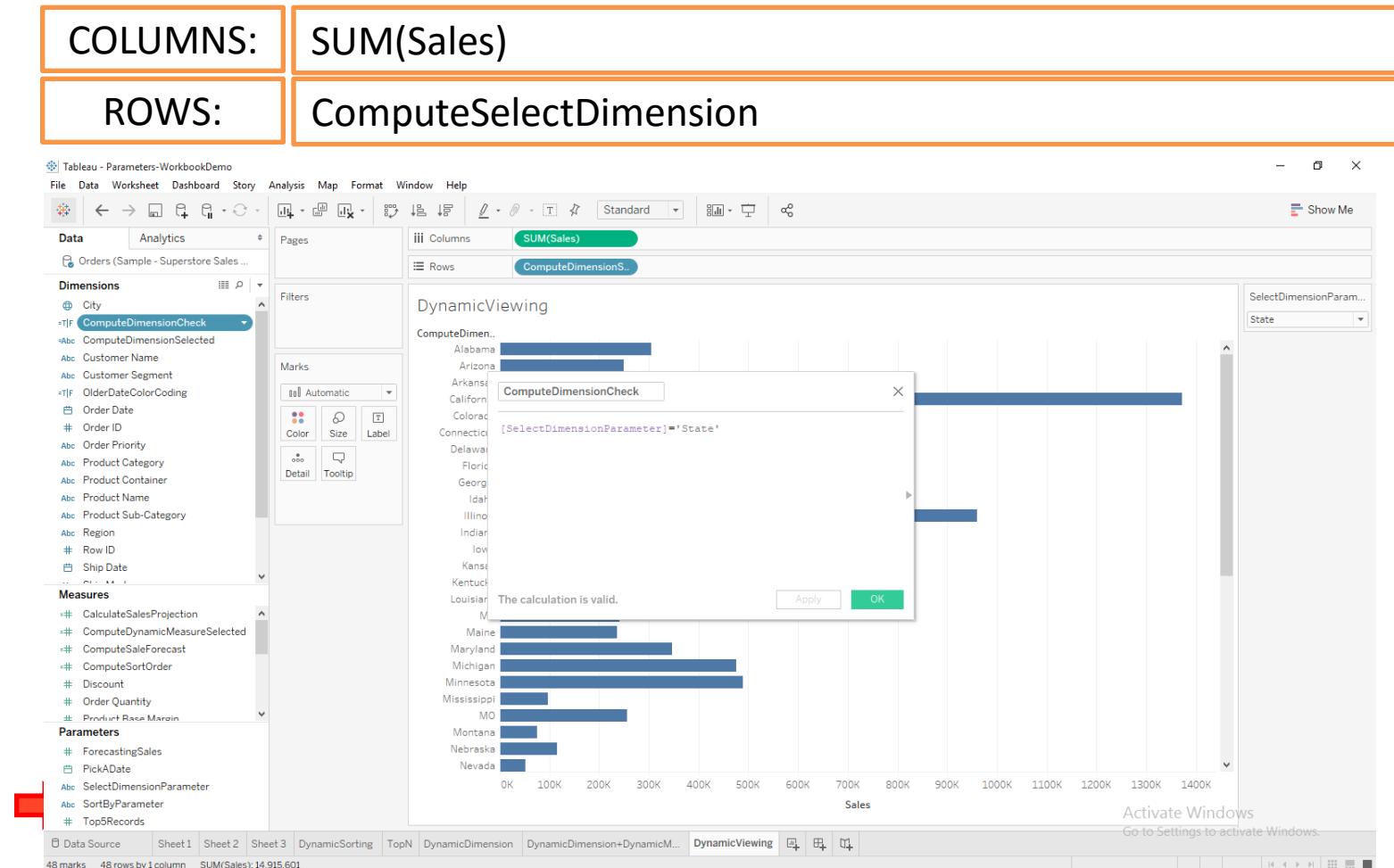
Use Case :Dynamic View

Please read terms of use for authorized access

Original Series

Step 2

- create a computed field to check, whether the selected dimension is of type="state" as shown in the figure.



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Dynamic View

Step 3

- lets apply ComputerDimensionCheck to filter and exclude for state by checking the state to “true” in filters.

COLUMNS:	SUM(Sales)
ROWS:	ComputeSelectDimension

The screenshot shows the Tableau desktop interface with the 'ComputeDimensionCheck' filter dialog open. The 'ComputeDimension...' button in the Filters shelf is highlighted with a red box. The 'ComputeDimensionCheck' dialog shows a single selection 'True' under 'Enter search text'. A red arrow points from the 'State' parameter in the top right corner of the main interface towards the 'ComputeDimensionCheck' dialog.

Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

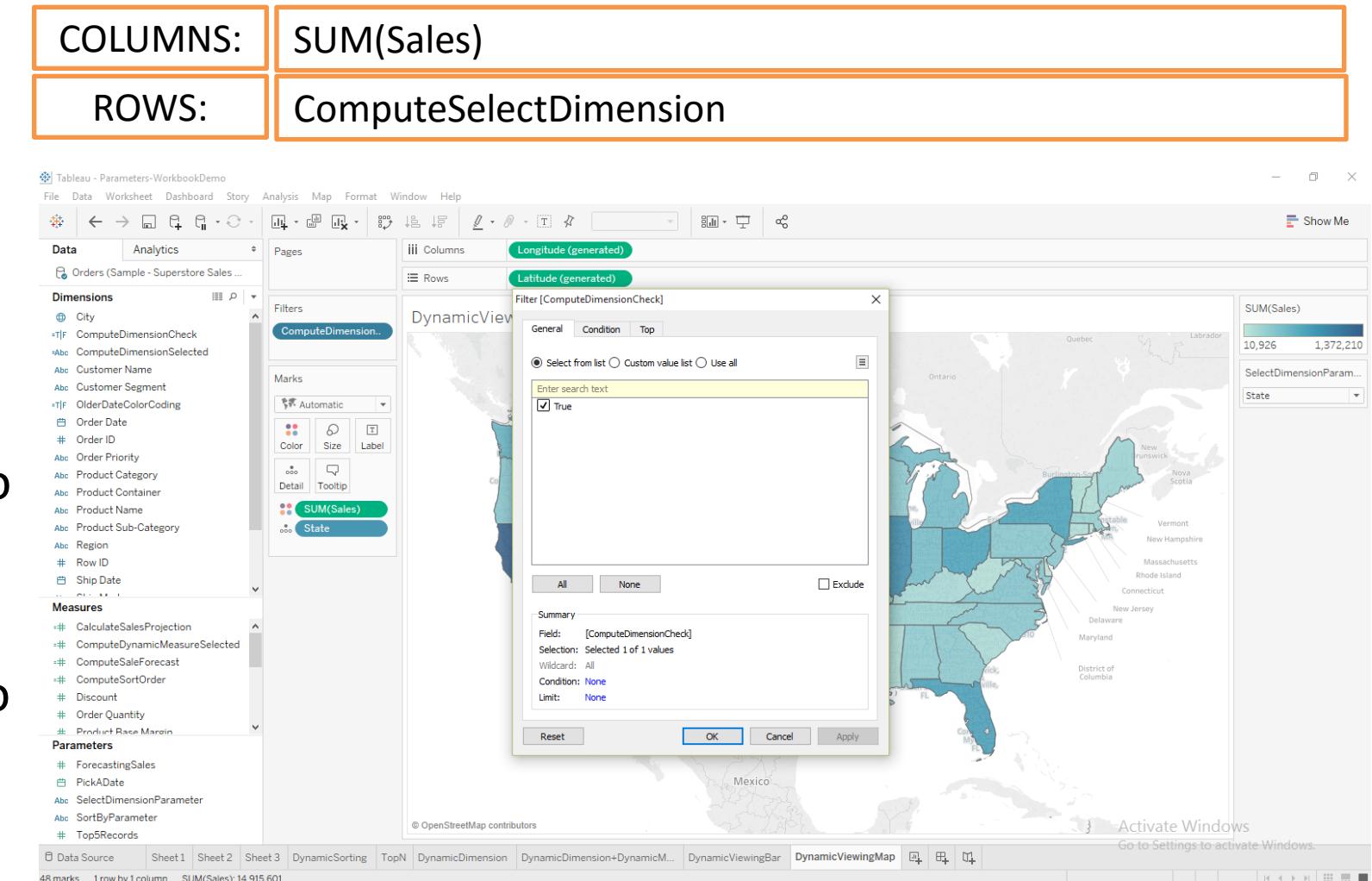
Use Case :Dynamic View

Step 4

- let create a new worksheet with states and sales(colors:marks)
- Now let us add selectdimensionparameter to the worksheet.
- Subsequently, lets add ComputerDImensionCheck to filters and enable it to true.

Please read terms of use for authorized access

Original Series



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

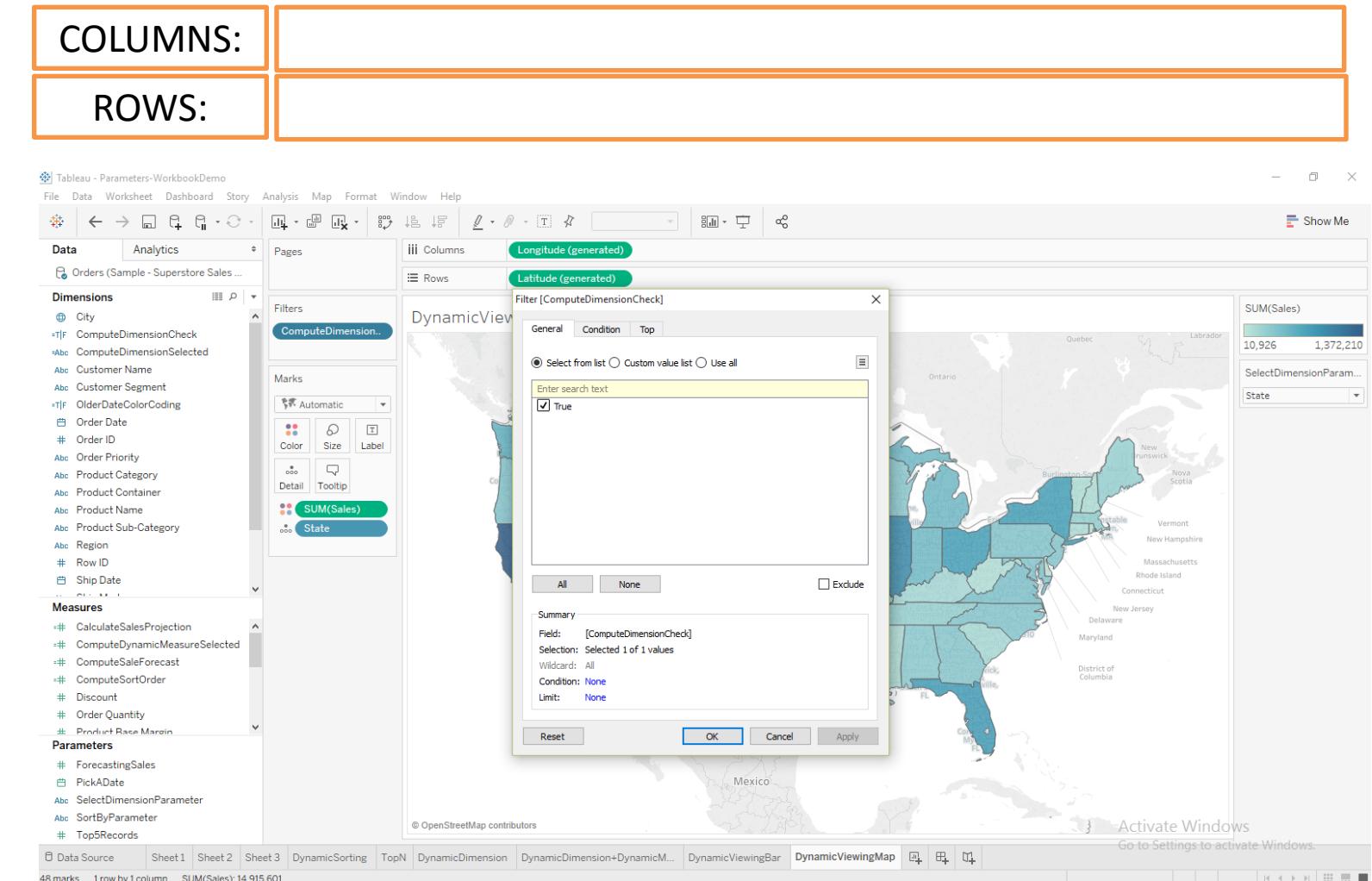
Use Case :Dynamic View

Step 5

- Now let us add “computeDimensionCheck” filter and enable it to “true”.

Please read terms of use for authorized access

Original Series

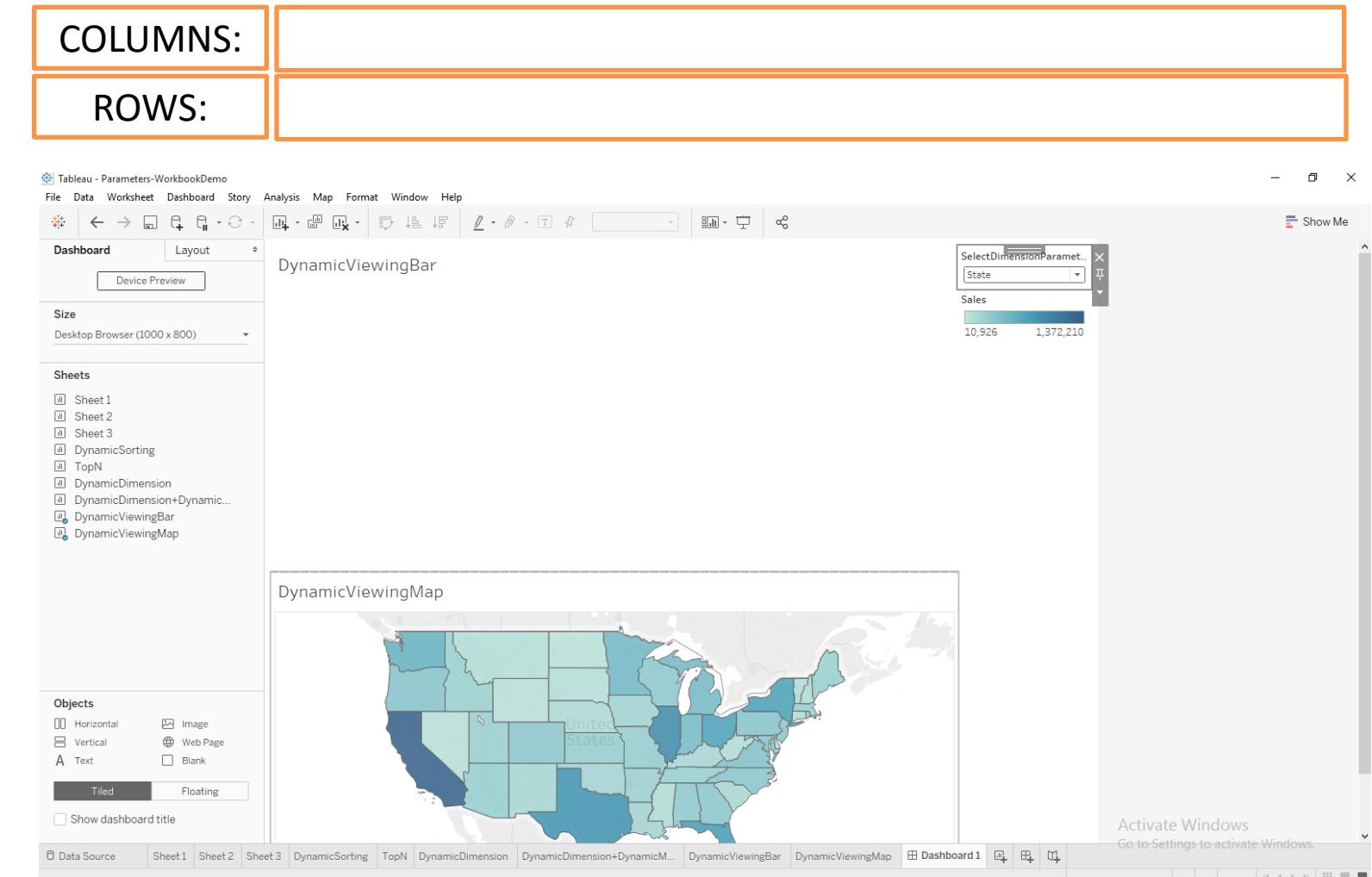


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Dynamic View

Step 6

- Now let us add a new dashboard and add the two worksheets
 - DynamicViewBar
 - DynamicViewMap



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Date Range

Step 1

- Now let us add a new dashboard and add the two worksheets
 - DynamicViewBar
 - DynamicViewMap

COLUMNS:	
ROWS:	



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

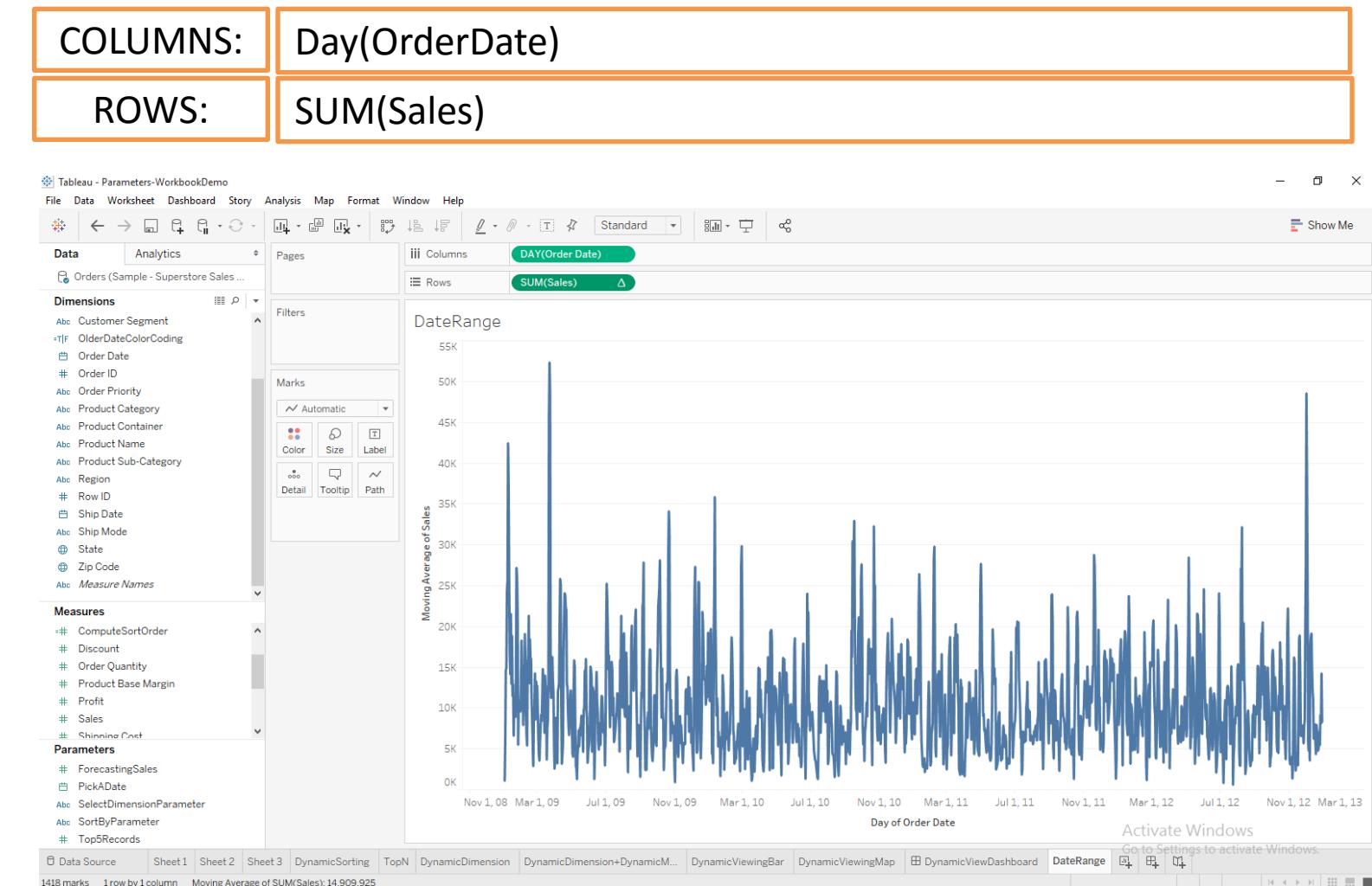
Use Case :Date Range

Step 1

- lets create a plot with OrderDate and Sum(Sales)(Moving Average)

Please read terms of use for authorized access

Original Series



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

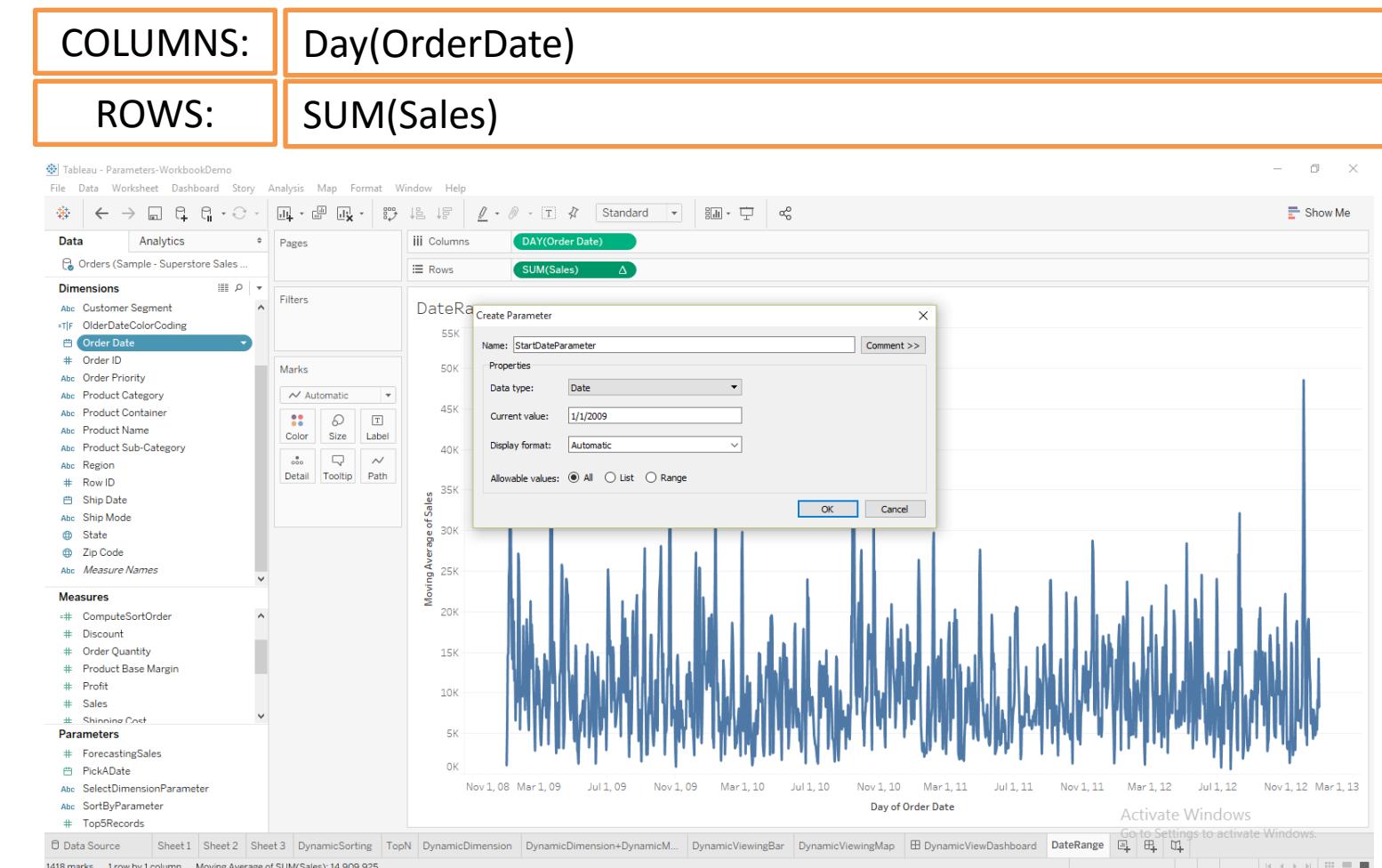
Use Case :Date Range

Step 2

- Create a startDate Parameter by selecting orderDate Dimension.

Please read terms of use for authorized access

Original Series



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

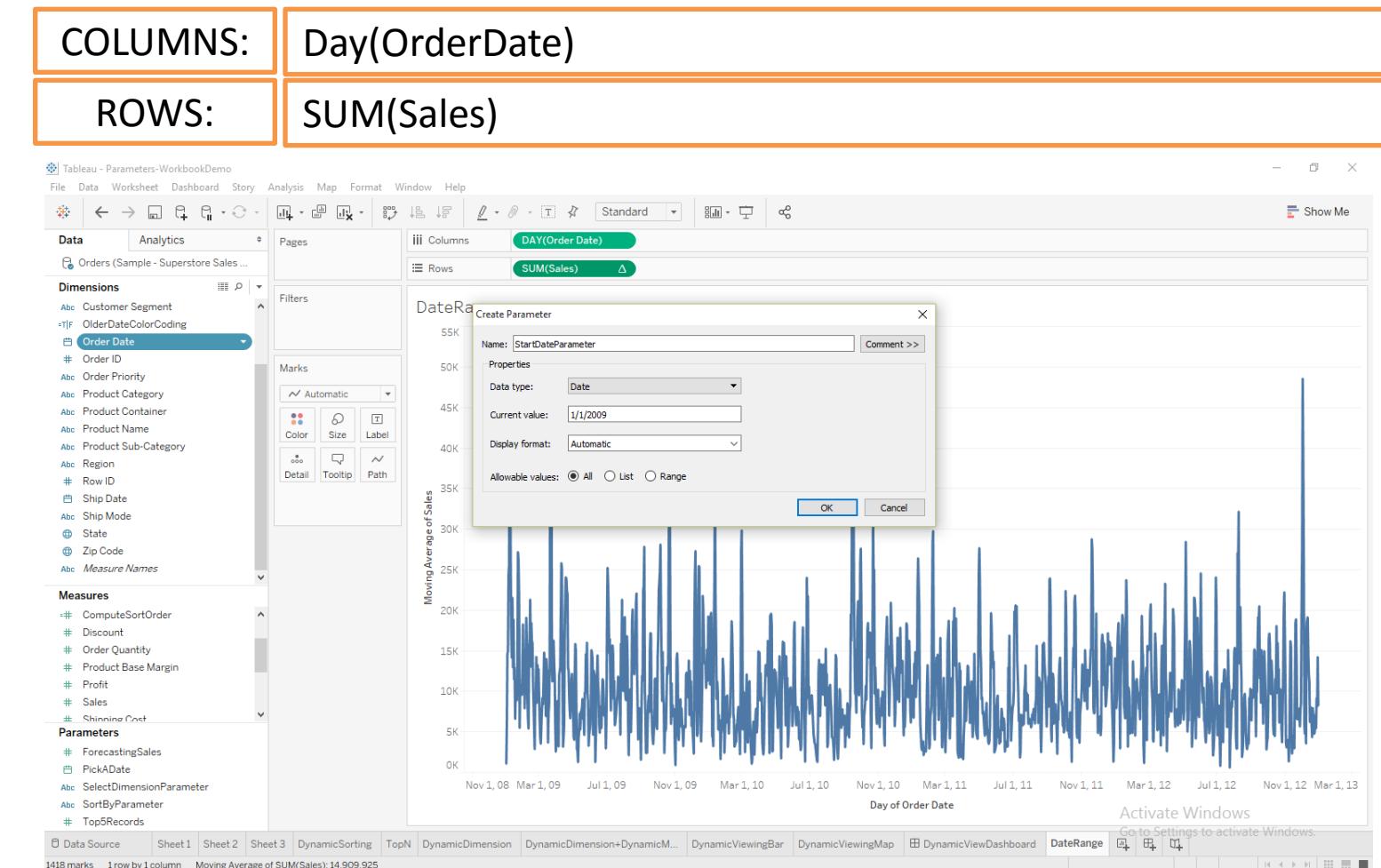
Use Case :Date Range

Step 3

- Create a startDate Parameter by selecting orderDate Dimension.
- Select startDateParameter and similarly duplicate to create endDateParameter

Please read terms of use for authorized access

Original Series



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

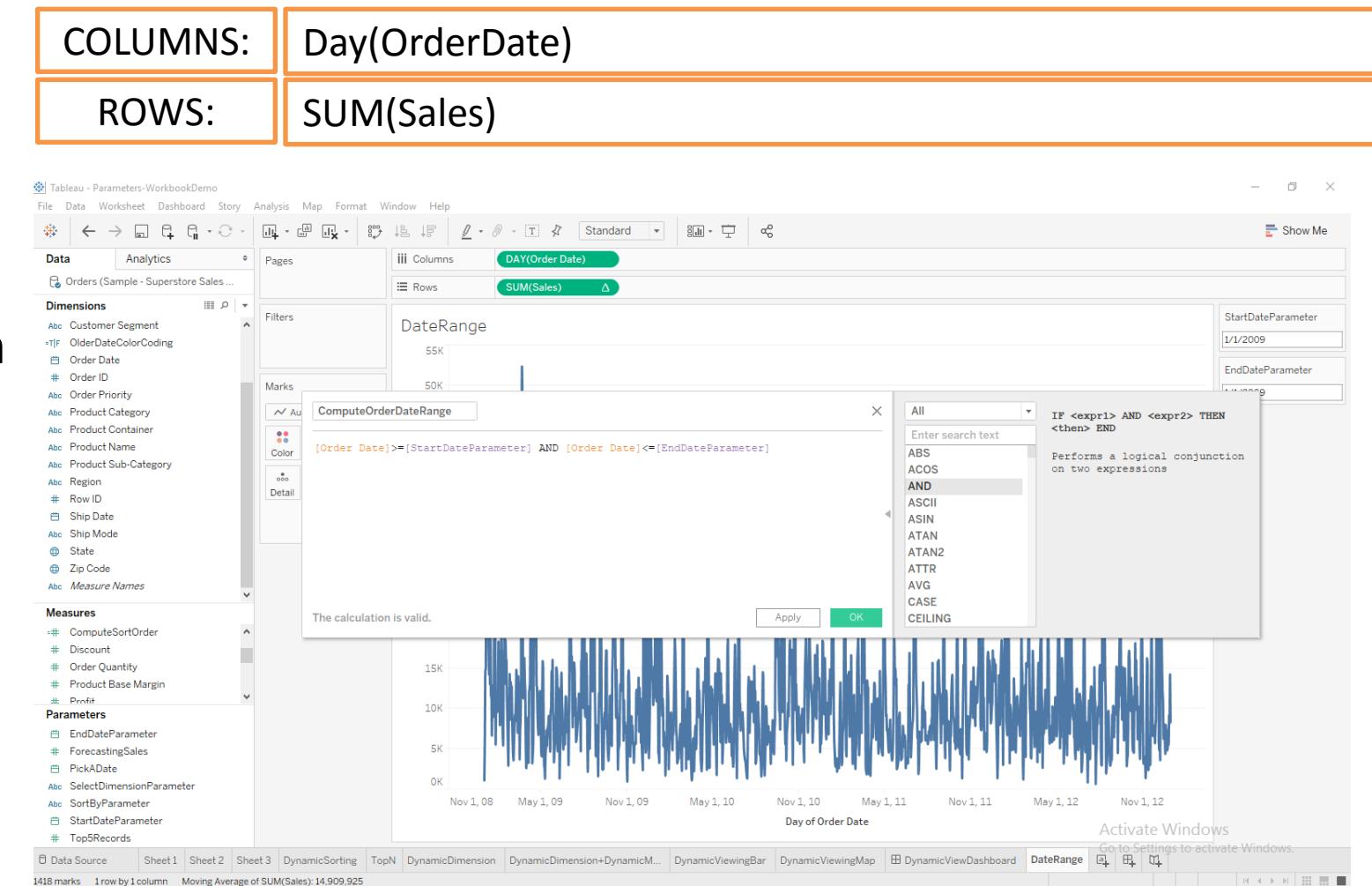
Use Case :Date Range

Step 4

- Create ComputeDateRange Calculated Field that computes the dates between the startDateParameter and EndDateParameter as shown in the figure.

Please read terms of use for authorized access

Original Series



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

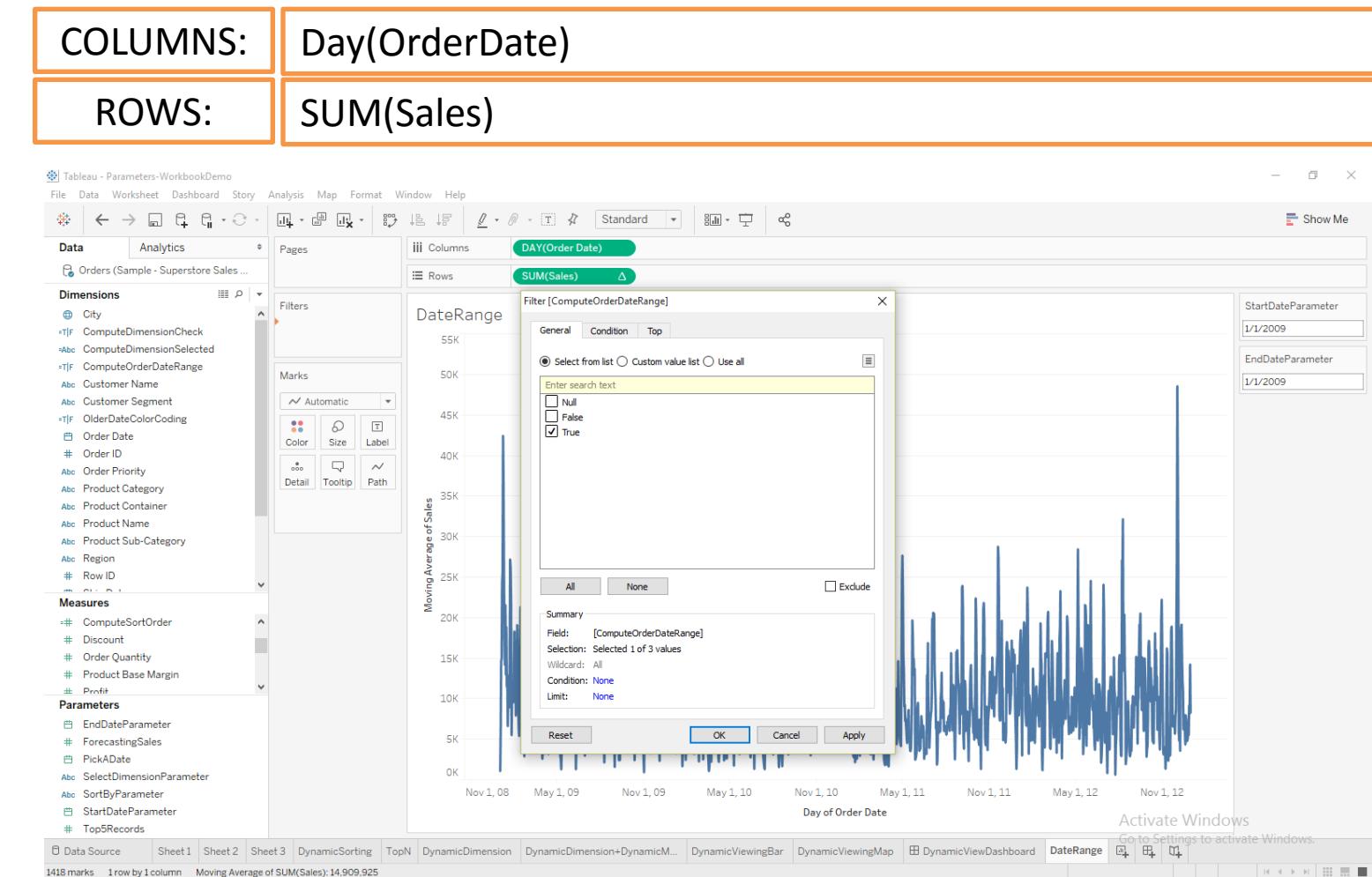
Use Case :Date Range

Step 5

- Now drag that ComputeOrderDateRange to the filters and enable it to TRUE.

Please read terms of use for authorized access

Original Series



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

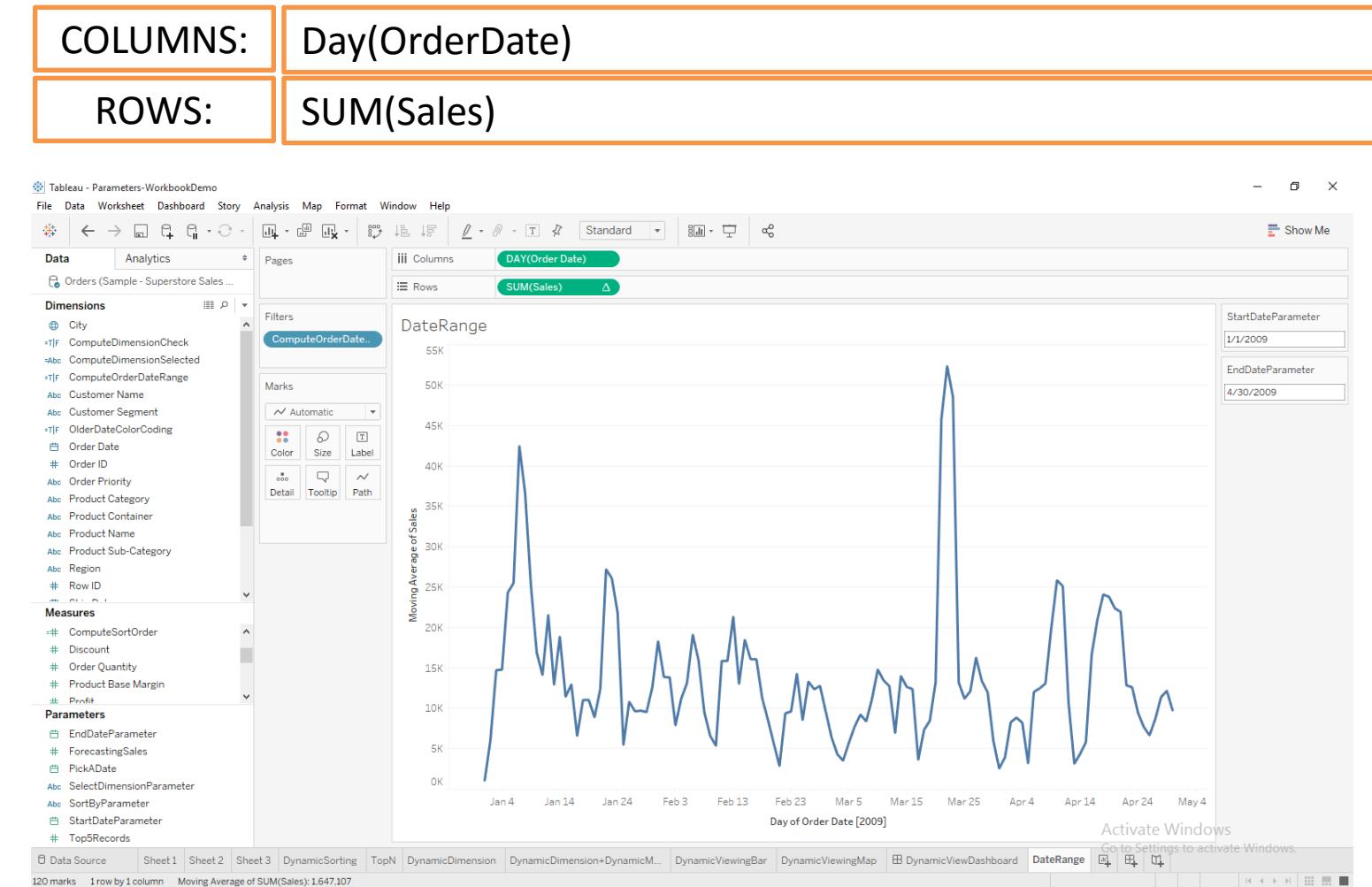
Use Case :Date Range

Step 6

- Upon user selection, we would like to add startDateParameter and endDateParameter
- We see data pruned to the user selected date range.

Please read terms of use for authorized access

Original Series

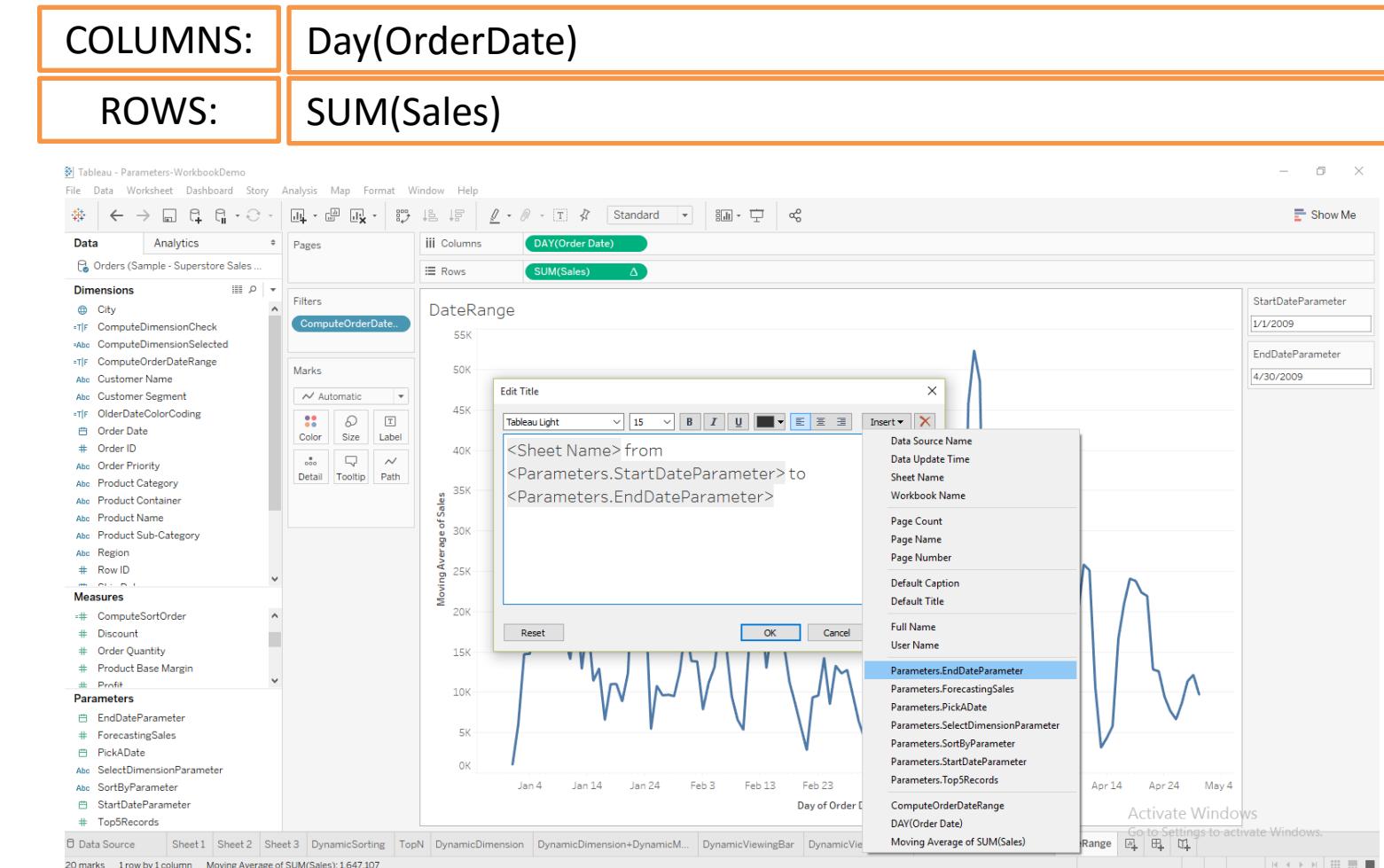


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :Date Range

Step 7

- Upon user selection, we would like to add startDateParameter and endDateParameter
- We see data pruned to the user selected date range.

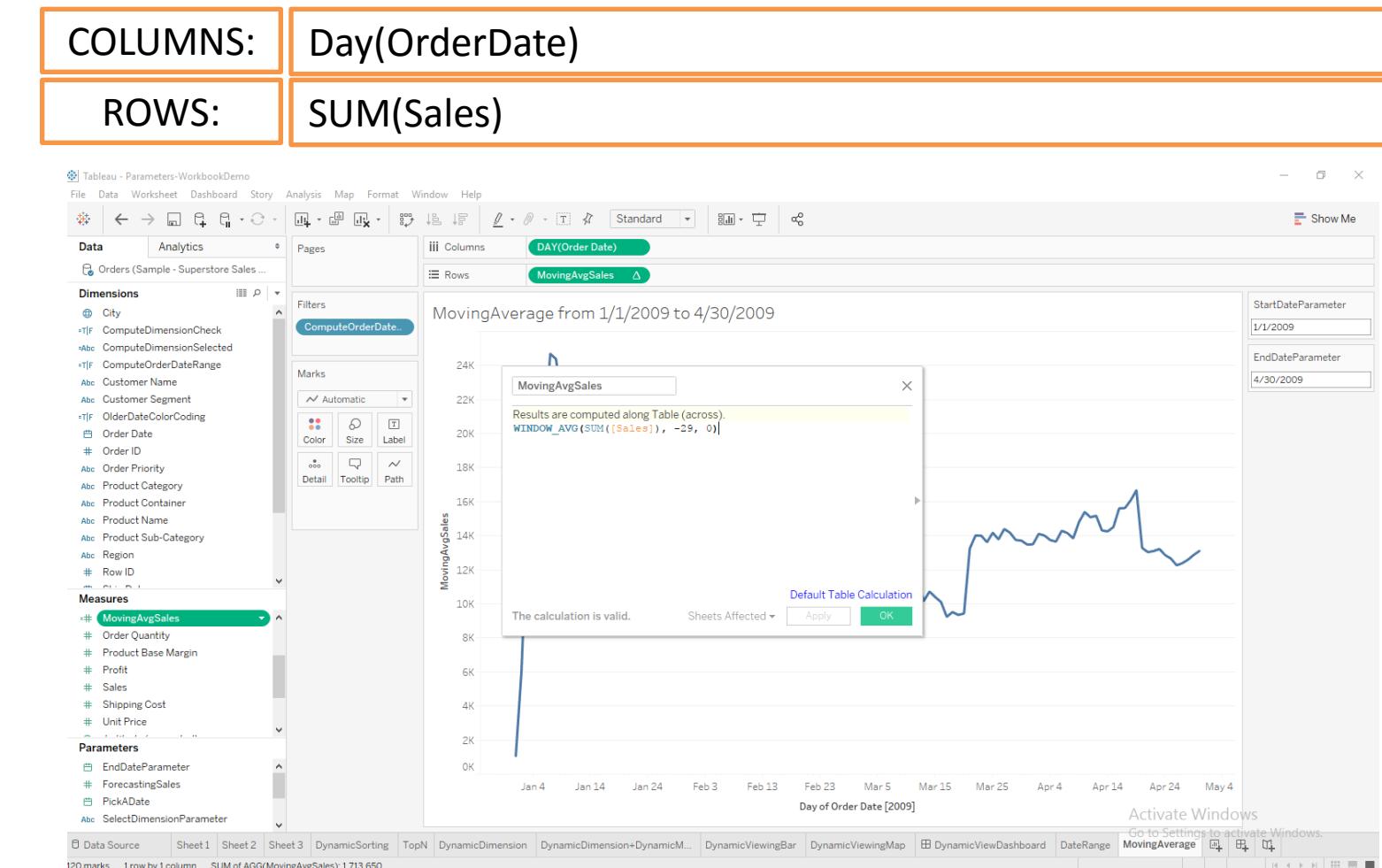


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :UserDefined Moving Average

Step 1

- drag the SUM(Sales) (MovingAverage) to the Measures and rename it as MovingAverage Sales Measure as shown in the Figure.



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

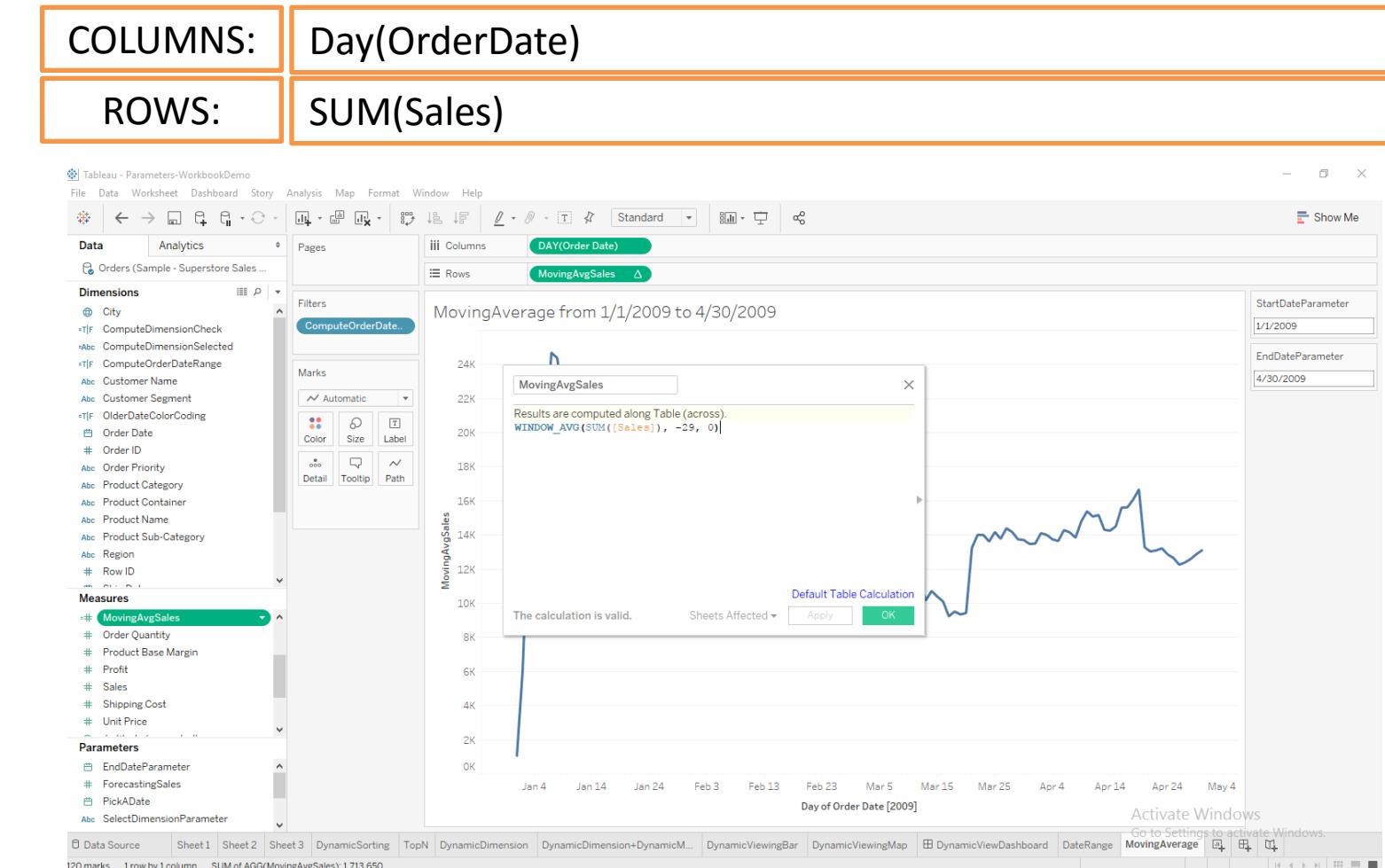
Use Case :UserDefined Moving Average

Step 2

- drag the SUM(Sales) (MovingAverage) to the Measures and rename it as MovingAverage Sales Measure as shown in the Figure.

Please read terms of use for authorized access

Original Series



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

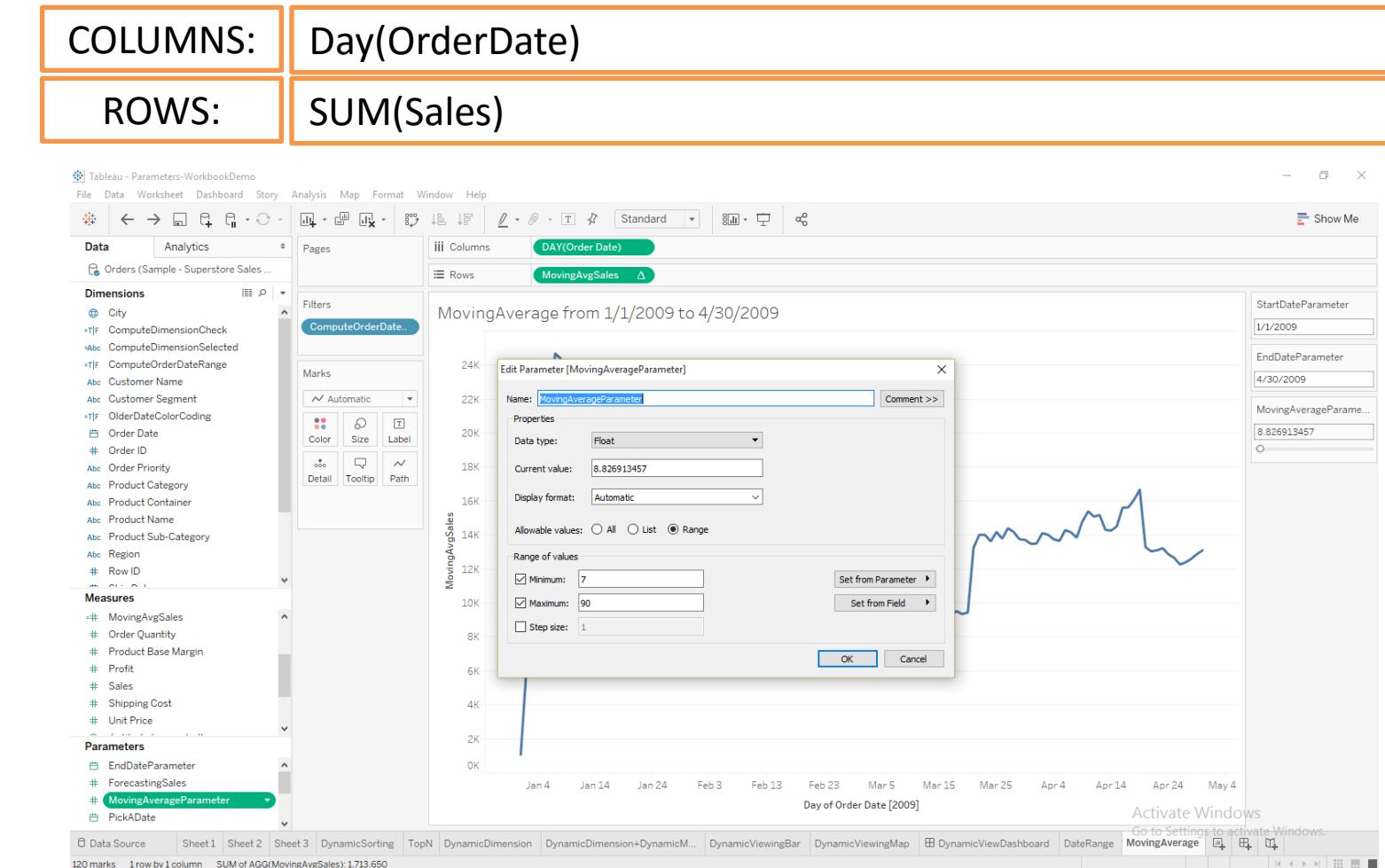
Use Case :UserDefined Moving Average

Step 3

- create a movingaverageparameter as shown in the figure. As a range from 7 days to 90 days

Please read terms of use for authorized access

Original Series

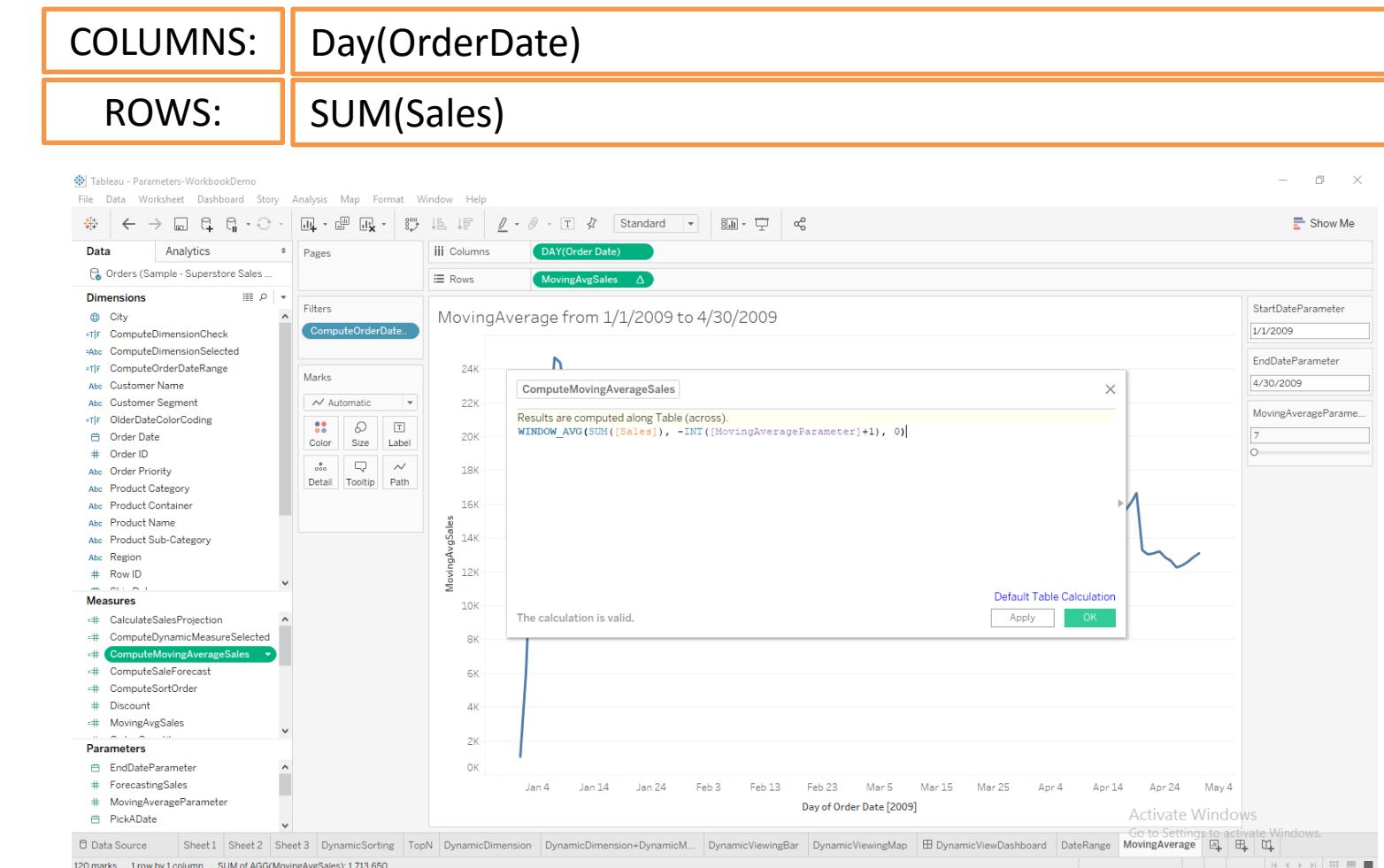


Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

Use Case :UserDefined Moving Average

Step 4

- Now create a moving average calculated field.



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx

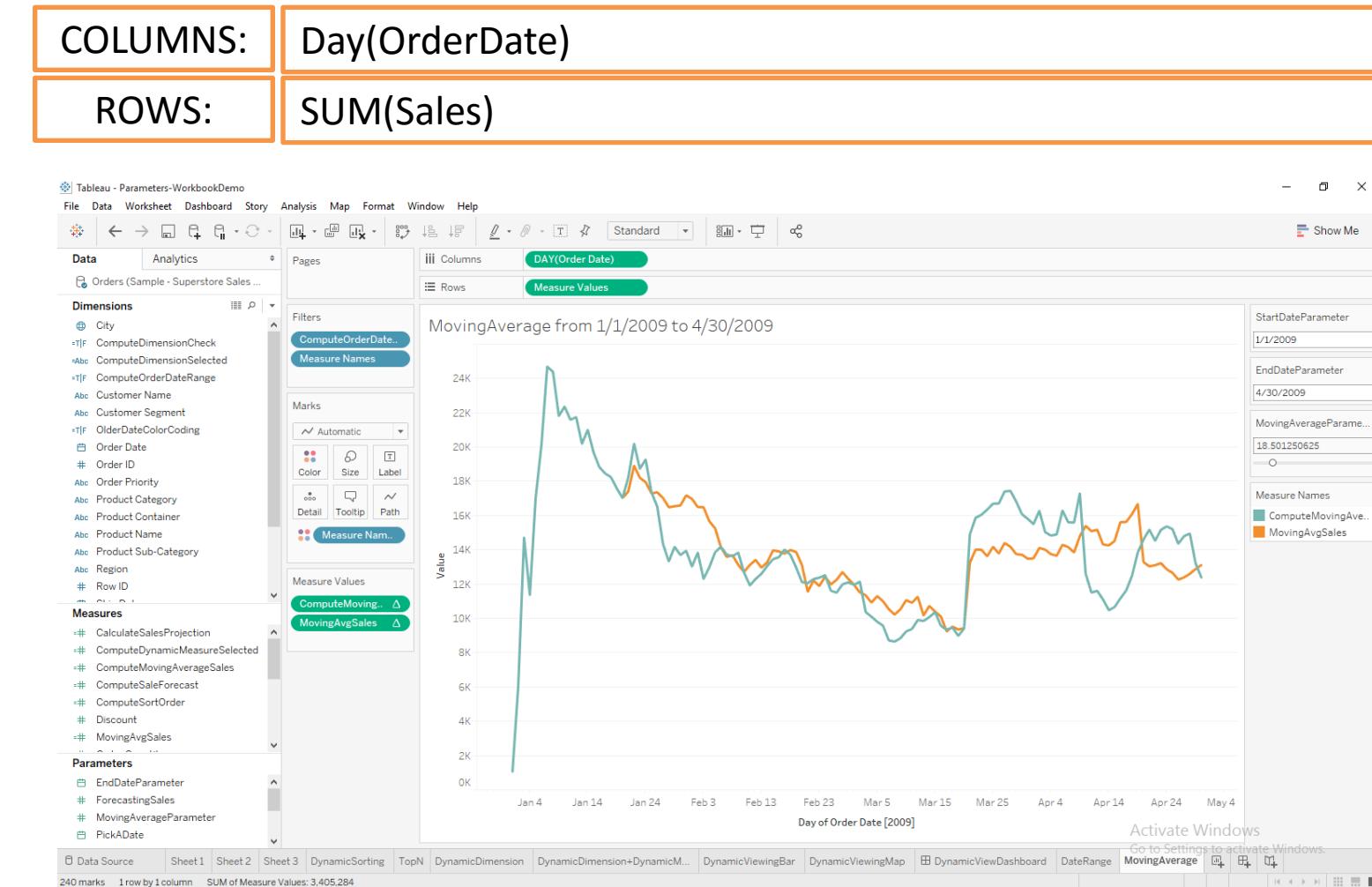
Use Case :UserDefined Moving Average

Step 5

- Now combine MovingAverageSales and ComputedMovingAverageSales on the Y-axis, we can see relative moving averages.

Please read terms of use for authorized access

Original Series



Data Source: demo1/ Sample - Superstore Sales (Excel).xlsx