

## Creating Charts and Dashboard with Tableau

**Objective:** Learn how to use Tableau's data visualization tools

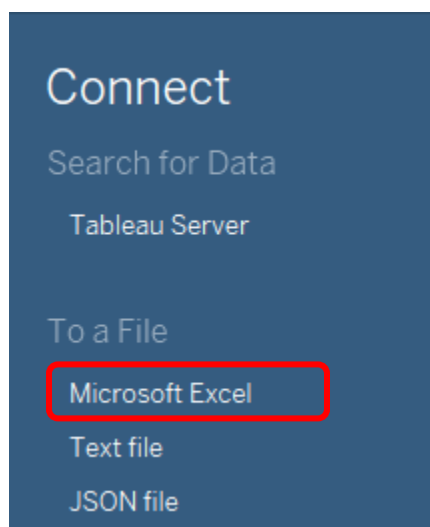
**Learning Outcomes:**

- Use advanced visualization toolkits in Tableau for effective presentation of data analyses
- Create a dashboard to view multiple visualizations at once, and generate interactive graphs.

This exercise will use the crime statistics in large U.S. cities for 2009-2014. This dataset is obtained from the Uniform Crime Reports (UCR) published by the FBI (<https://ucr.fbi.gov/crime-in-the-u.s/2014/crime-in-the-u.s.-2014>). This file includes the number of crime occurrences per population (crime rates), and the number of police officers killed or assaulted in the line of duty.

### Part 0. Understand and Load the Dataset

- 1) Download "Crimes 1999-2014.xlsx" from Canvas>Week 2
- 2) Open the file in Excel, and browse the data.
- 3) Check out the Data Dictionary tab, and understand what each crime data is for.
- 4) Start Tableau Desktop.
- 5) If the first screen you see is a new workbook, click the 'Data Source' tab in the bottom left corner.
- 6) Otherwise, click on 'Microsoft Excel' in the 'To a file' menu on the left side.



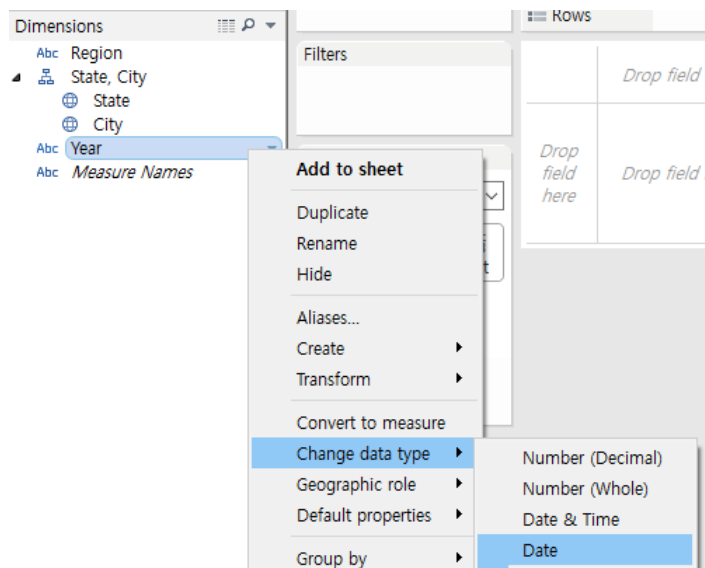
- 7) Navigate to the location where your data file (“Crimes 1999-2014.xlsx”) is stored and select it.
- 8) You’ll see a list of Excel worksheets on the left side of your screen in the data source tab.
- 9) Drag and drop the “Crimes 1999-2014” sheet to the workspace. This is the data for which we will generate graphs and charts.



- 10) Wait for the data to be loaded and click the “Sheet1” or “New Worksheet” tab at the bottom.

## Part 1. Line Chart

- 1) For us to draw a line chart over time, there must be at least one date-type dimension. If you look at Dimensions panel, Year dimension is designated as a text field. Right-click Year and select “Change Data Type” > “Date.”

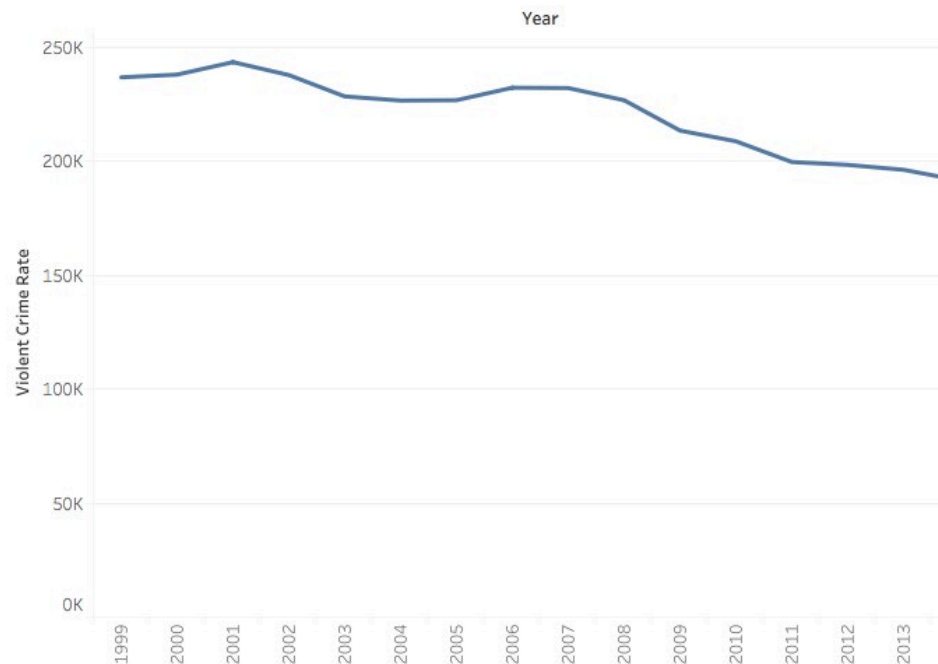


You will see a date 📅 icon next to Year.

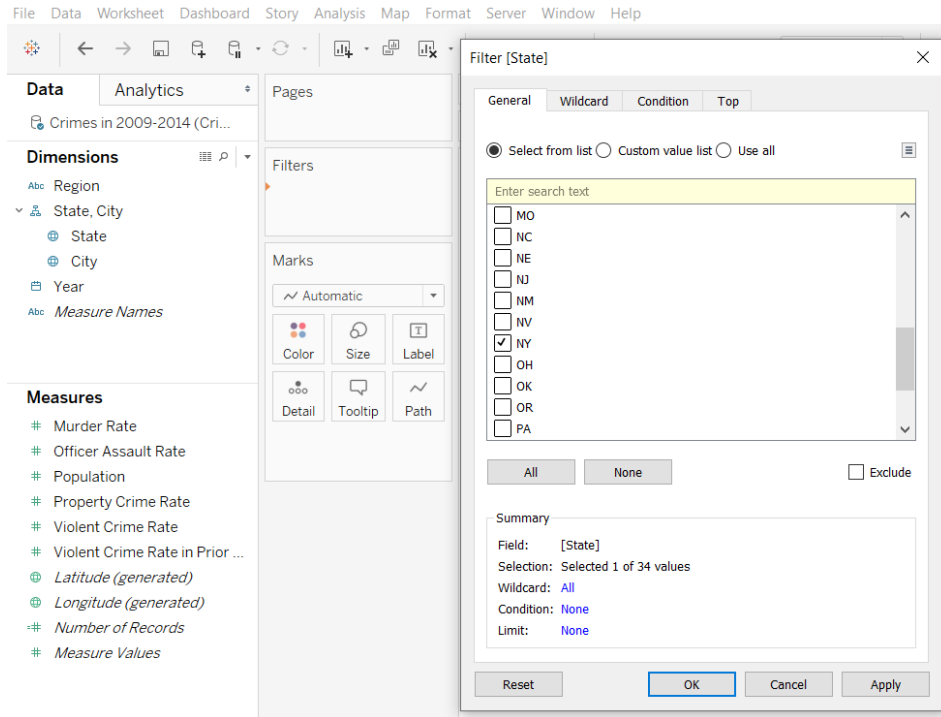
- 2) Drag “Year” from Dimensions and drop in the Columns box, and drag “Violent Crime Rate” Measures and drop in the Rows.

Columns	YEAR(Year)
Rows	SUM(Violent Crime R..

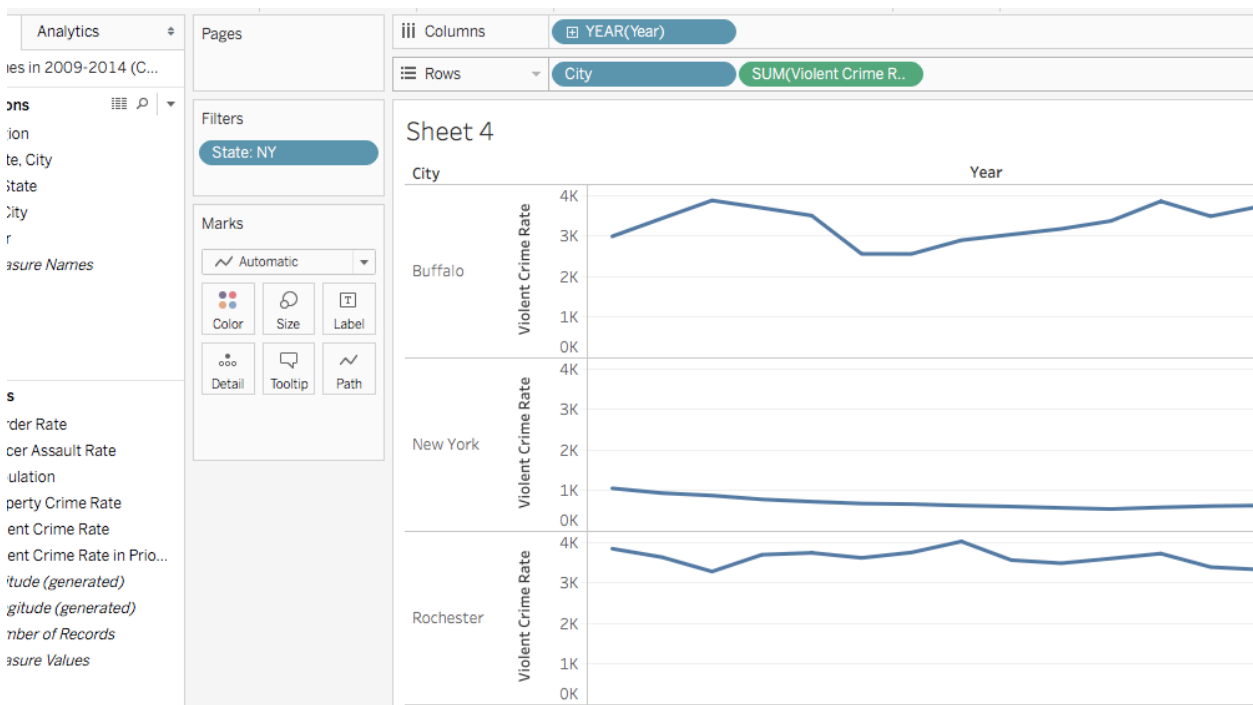
You will see a line charts – it is the aggregated violent crime rate across all cities in the dataset. Notice that Tableau guesses you want to add together all the values for each city (SUM).



- 3) Drag State from Dimensions to Filters and check NY.



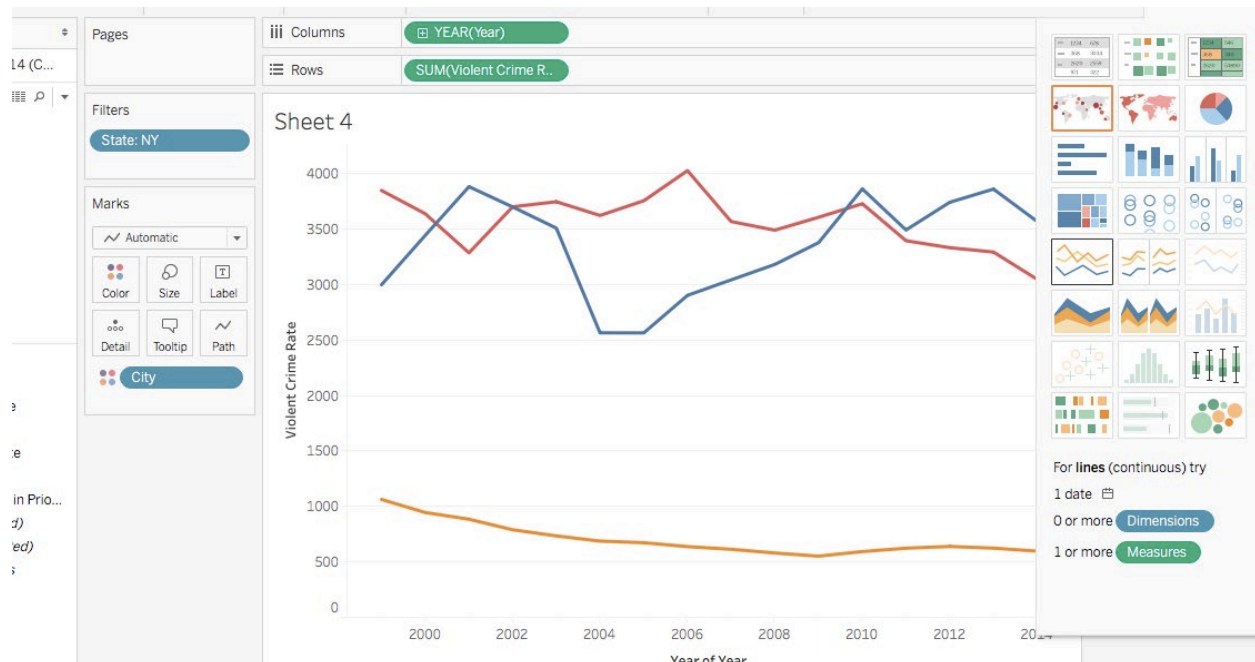
4) Drag City from Dimensions to Rows. You will see three separate line charts, one for each city.



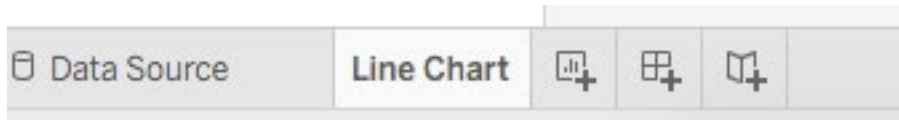
5) Click “lines(continuous)” on Show Me tab.




You will see that the three charts are combined into one, and City is moved to Color.



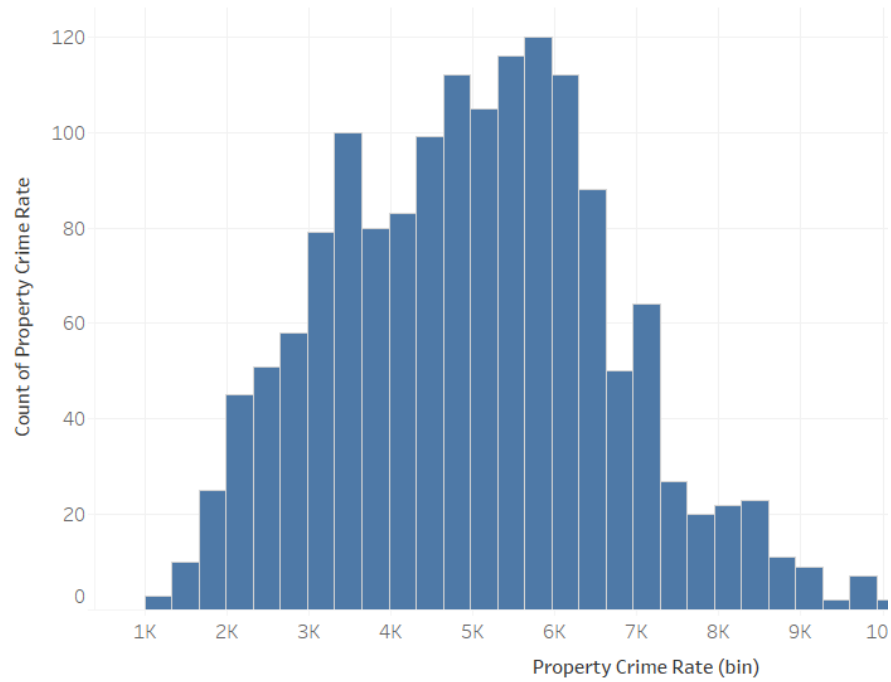
13) Rename “Sheet 1” to “Line Chart” and save Tableau. Save it as .twb file, so that you can restore your data and analysis later.



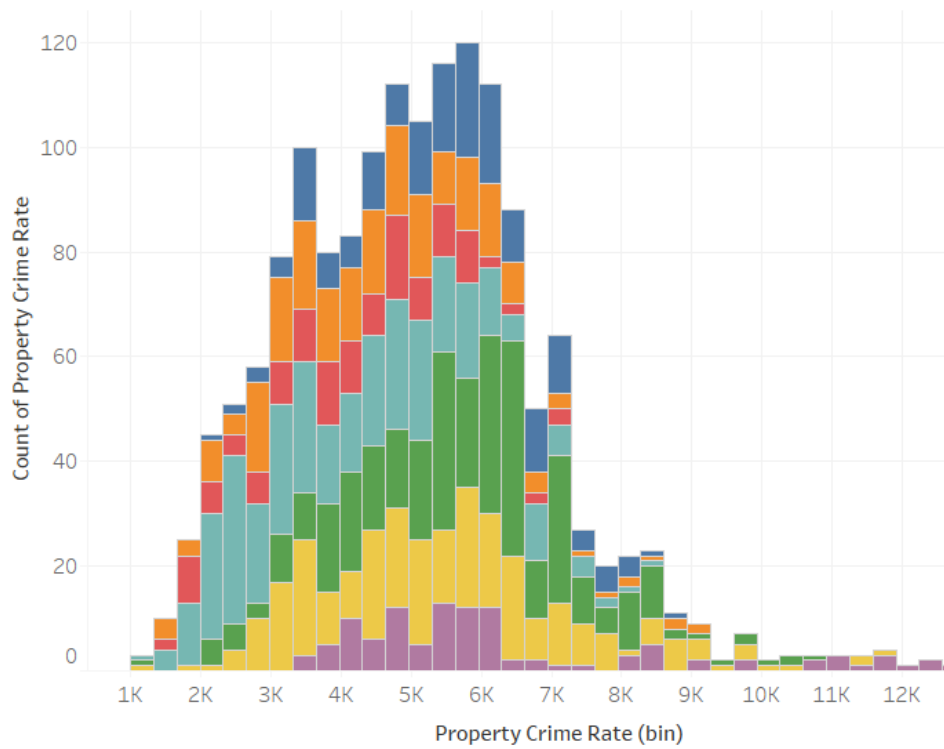
## Part 2. Histogram

- 1) Create a new Tableau worksheet by clicking on the (  ) icon at the bottom of the screen.
- 2) Click Property Crime Rate on Measures.
- 3) On Show Me tab, click Histogram.

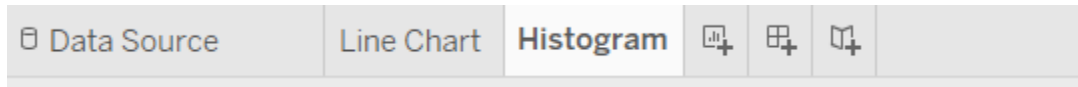




4) Drag Region from Dimensions to Color.

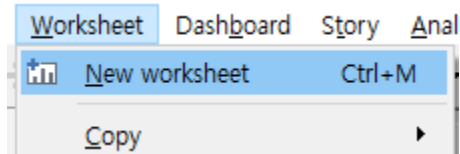


5) Rename “Sheet 2” to “Histogram” and save.

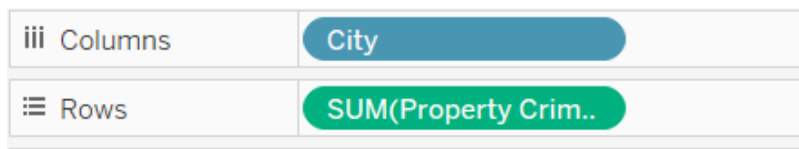


### Part 3. Box Plot

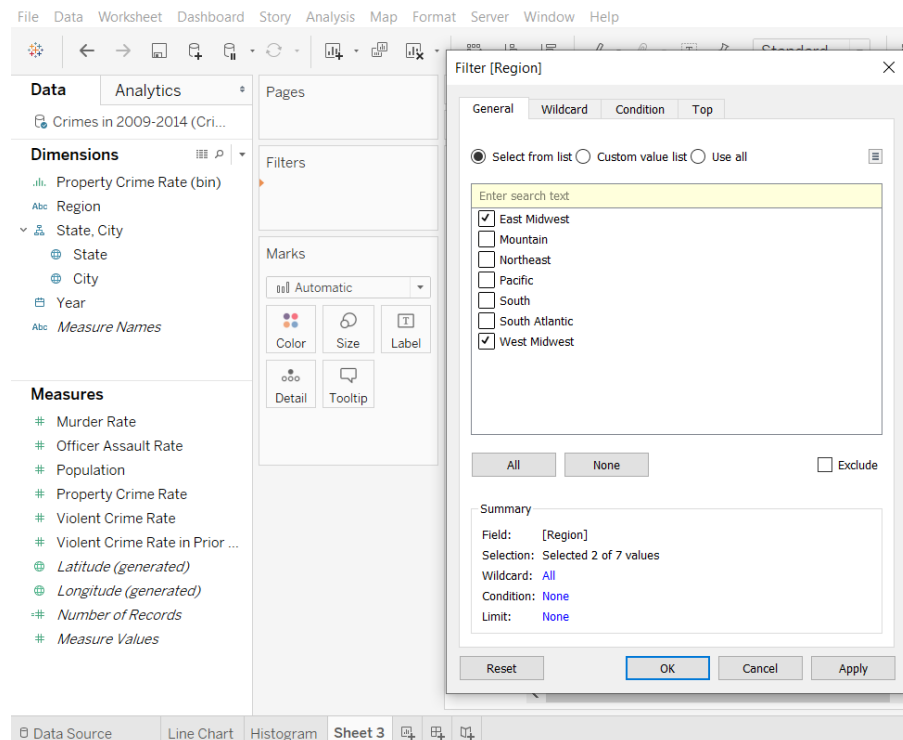
1) Create a new worksheet.



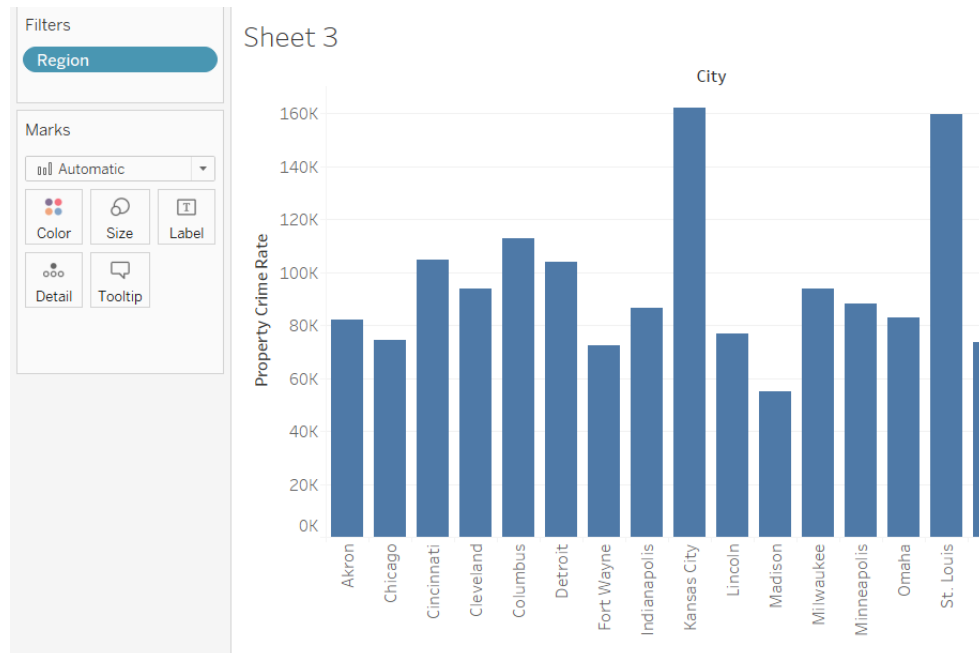
2) Drag City from Dimensions to Columns, and drag Property Crime Rate from Measures to Rows.



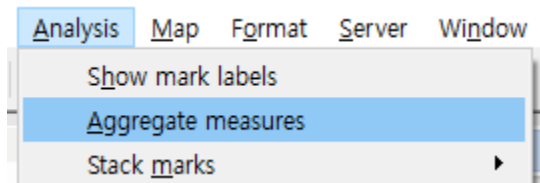
2) Let's focus on the cities in Midwest. Drag Region from Dimensions to Filter. Select East Midwest and West Midwest.



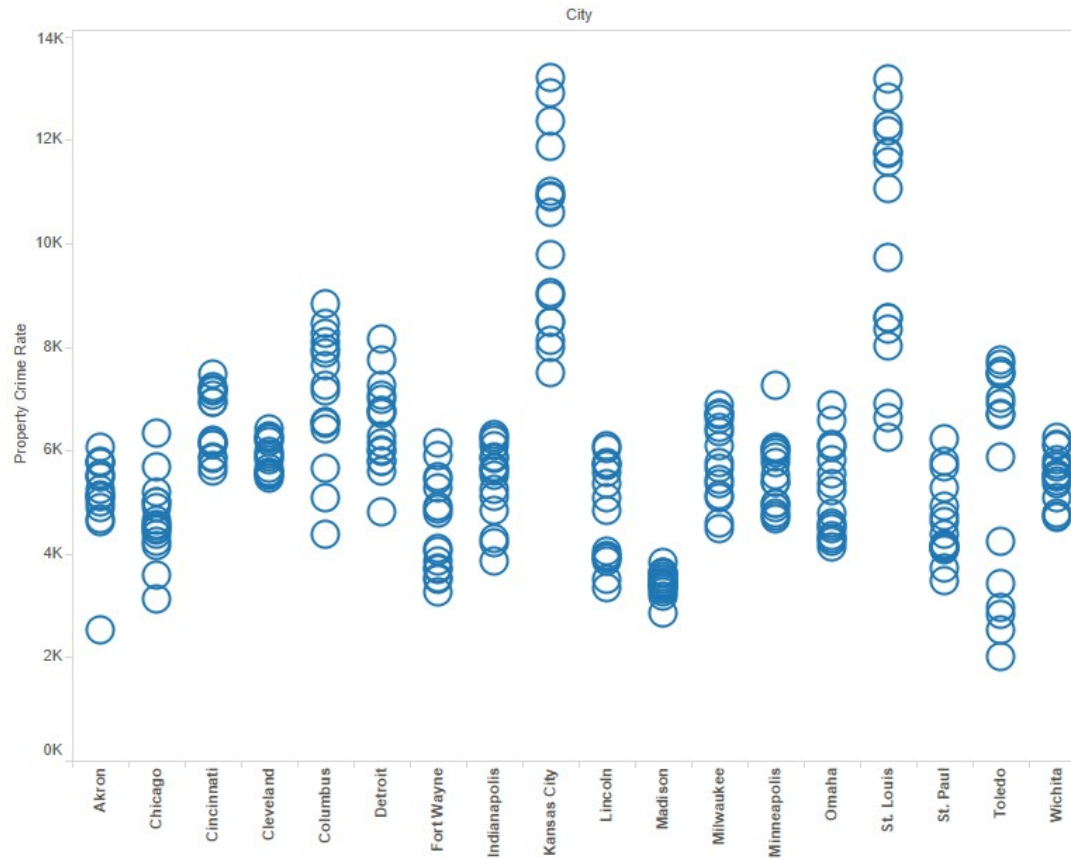




4) On the top menu, click Analysis and uncheck Aggregate Measures.

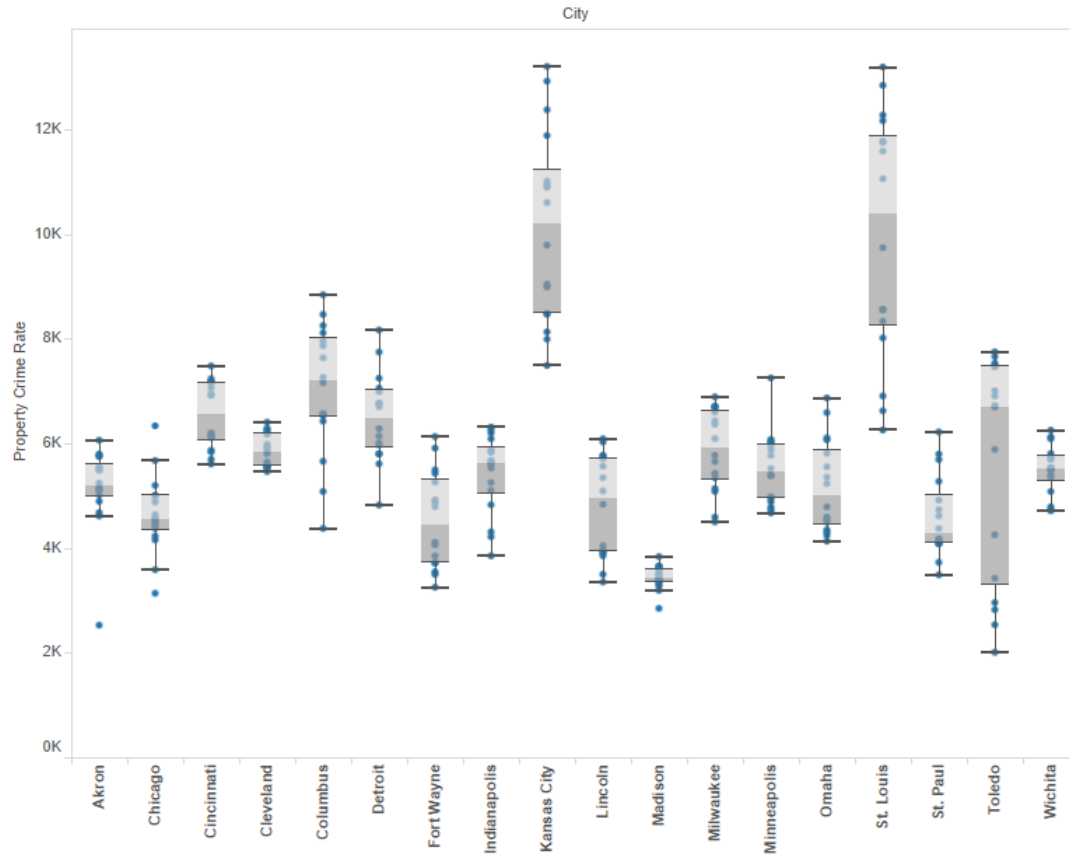


You'll see the property crime rate in each year of 1999-2014 appears as a circle.

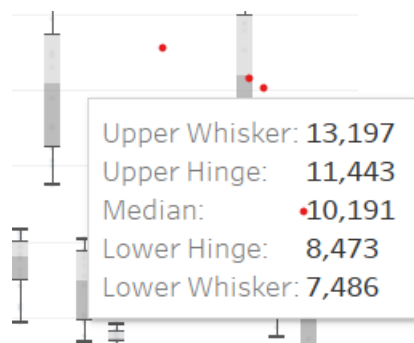


5) On Show Me tab, click “box-and-whisker plot.”





6) Move the mouse over a box, which shows the range of property crime rates in each city in 1999-2014 (minimum, maximum, 25%, 50% and 75% quartiles).



7) Rename "Sheet 3" to "Box Plot" and save.

#### Part 4. Bubble Chart

1) Create a new worksheet.

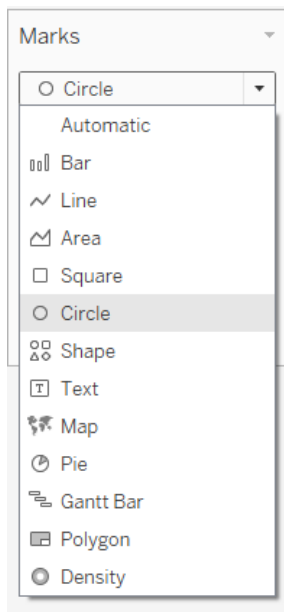
2) Drag Violent Crime Rate from Measures to Columns, and drag Property Crime Rate to Rows.

Columns	SUM(Violent Crime ..
Rows	SUM(Property Crim..

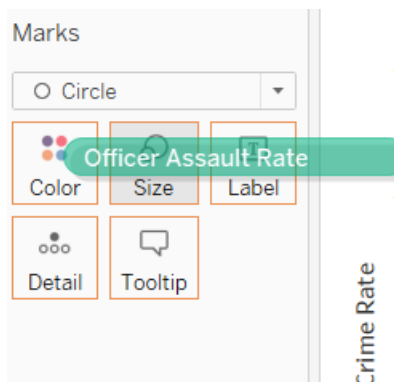
3) On the top menu, click Analysis and uncheck Aggregate Measures, which shows a scatter plot of violent and property crime rates. As expected, the two types of crimes are highly correlated.

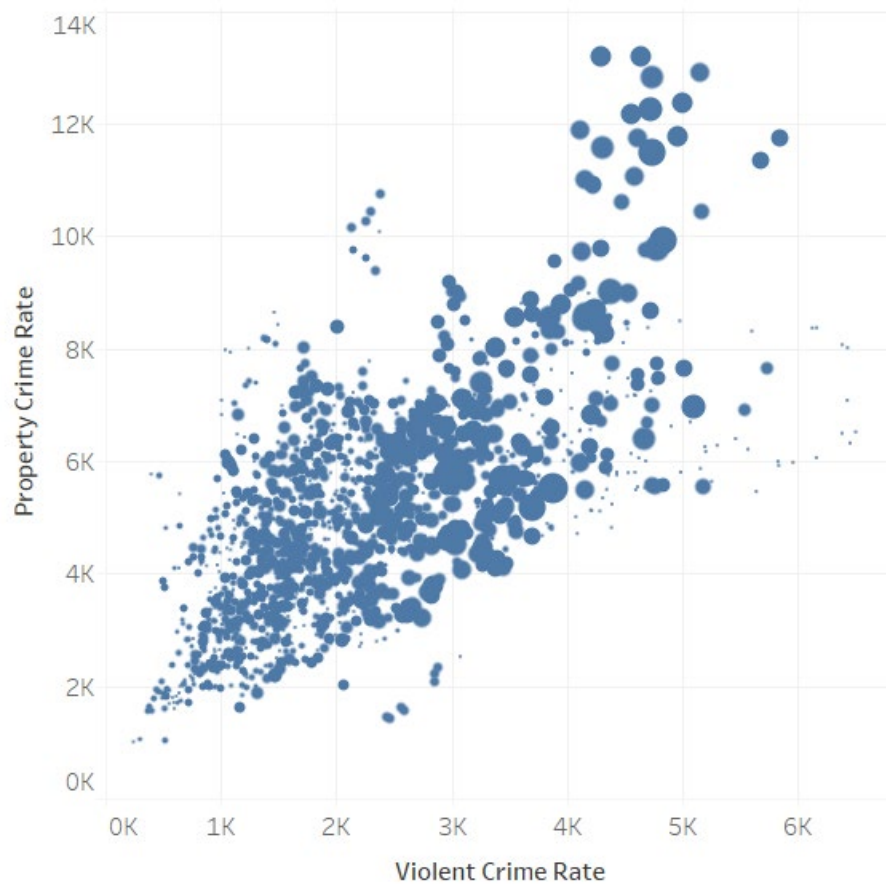


4) On Marks panel, change Automatic to Circle.



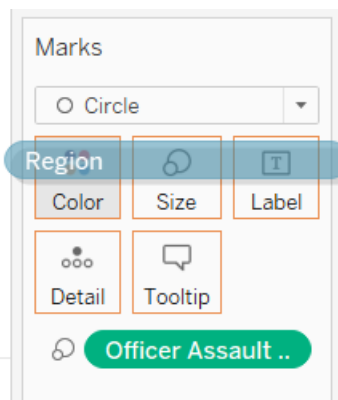
5) Drag Officer Assault Rate to Size on Marks panel.





Note that Officer Assault Rate is the number of police officers killed or assaulted in the line of duty. This bubble chart now shows that police officers are in more danger (as shown in bigger circles) in cities with higher crime rates.

6) Drag Region from Dimensions from Color on Marks panel.

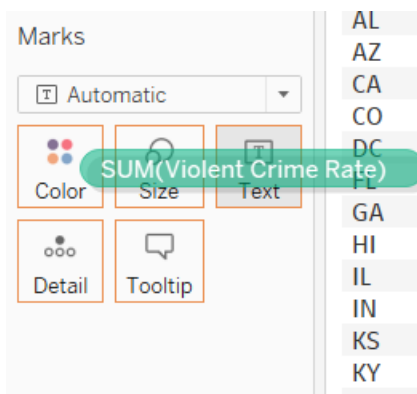


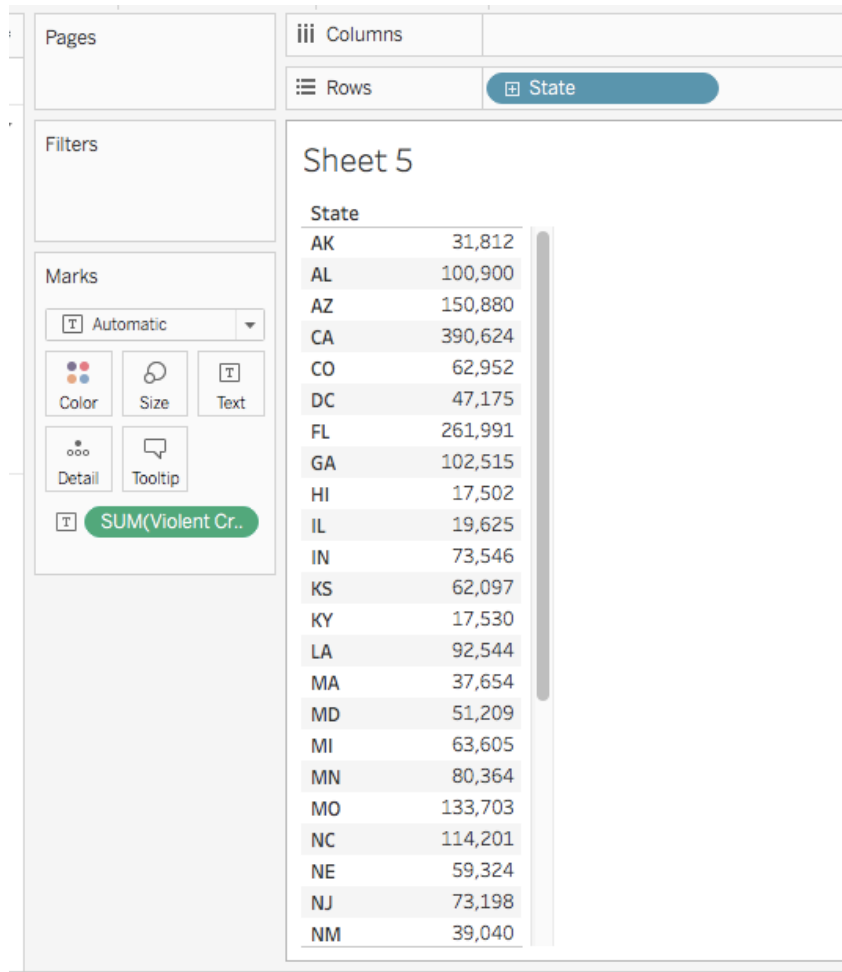


7) Rename “Sheet 4” to “Bubble Chart” and save.

## Part 5: Creating Maps

- 1) Create a new worksheet.
- 2) Drag the “State” Dimension to the Rows.
- 3) Now drag “Violent Crime Rate” to the Text area within Marks (how values will be displayed).  
You’ll now see this:

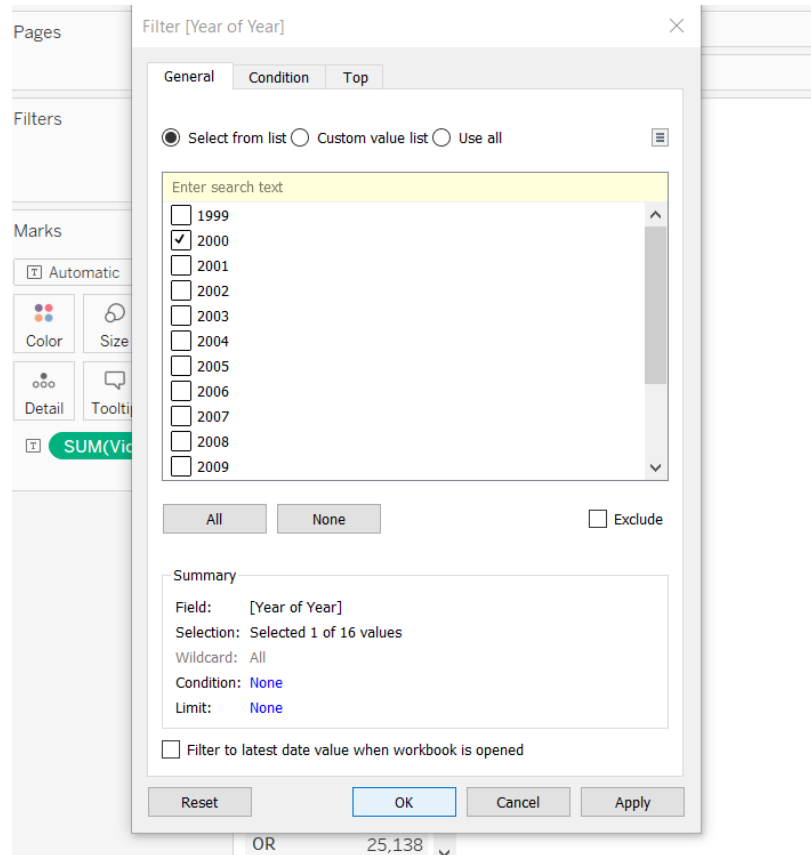




It is the sum of violent crime rate across all years in the dataset.



4) Drag Year from Dimensions to Filters and check Years, 2000.



5) Then drag the “City” dimension to the Rows shelf, next to State. You’ll now see a breakdown by city.

Pages	Columns	
	Rows	State City

Filters

YEAR(Year): 2000

Marks

Automatic

Color Size Text

Detail Tooltip

SUM(Violent C...

Sheet 5

State	City	
AK	Anchorage	1,714
AL	Birmingham	1,216
	Mobile	2,724
	Montgomery	1,619
AZ	Chandler	952
	Glendale	1,972
	Mesa	1,448
	Phoenix	1,875
	Scottsdale	762
	Tucson	2,938
CA	Anaheim	635
	Bakersfield	499
	Chula Vista	1,643
	Fresno	2,707
	Glendale	754
	Long Beach	1,511
	Los Angeles	2,160
	Modesto	1,639
	Oakland	2,536
	Riverside	2,346
	Sacramento	1,830
	San Diego	1,429
	San Francisco	1,571
	San Jose	1,303
	Santa Ana	1,089
	Stockton	2,599
CO	Aurora	2,054

3) Click on the symbol map icon in the “Show Me” tab:

Show Me

For symbol maps try

1 geo 

Dimension

0 or more 

Dimensions

0 to 2 

Measures

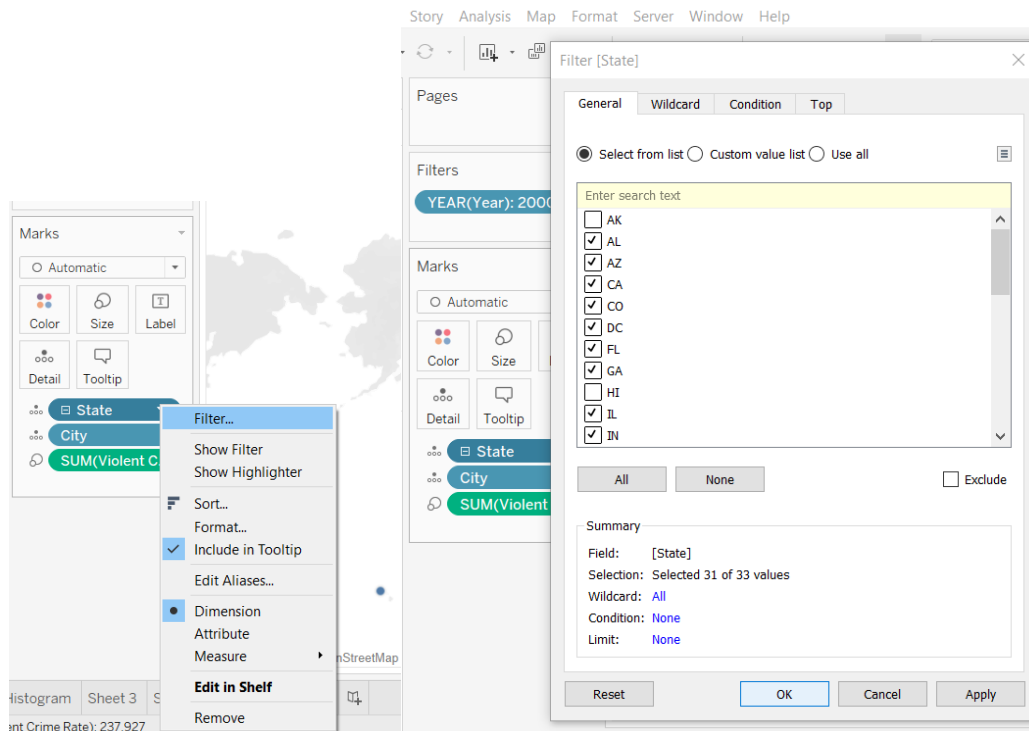
May use spatial measure in place of geo dimension

you'll see a symbol map of United States with the cities indicated with circles, where the size of symbol is proportional to the violent crime rate of the city. Notice that it also changed the values in Rows and Columns to Longitude and Latitude, and State, City, and Sum(Violent Crime Rate) are now in the Marks area.

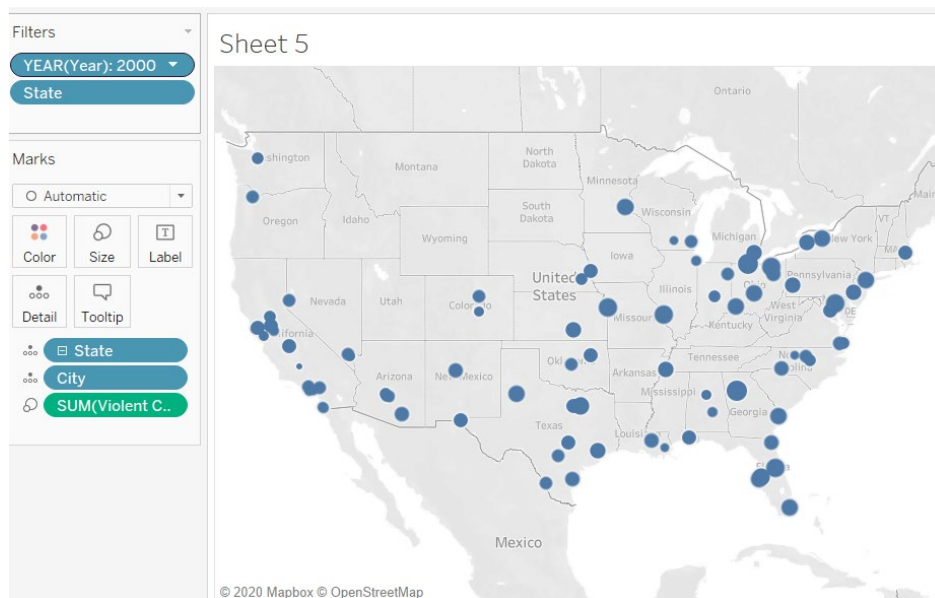
Sheet 5



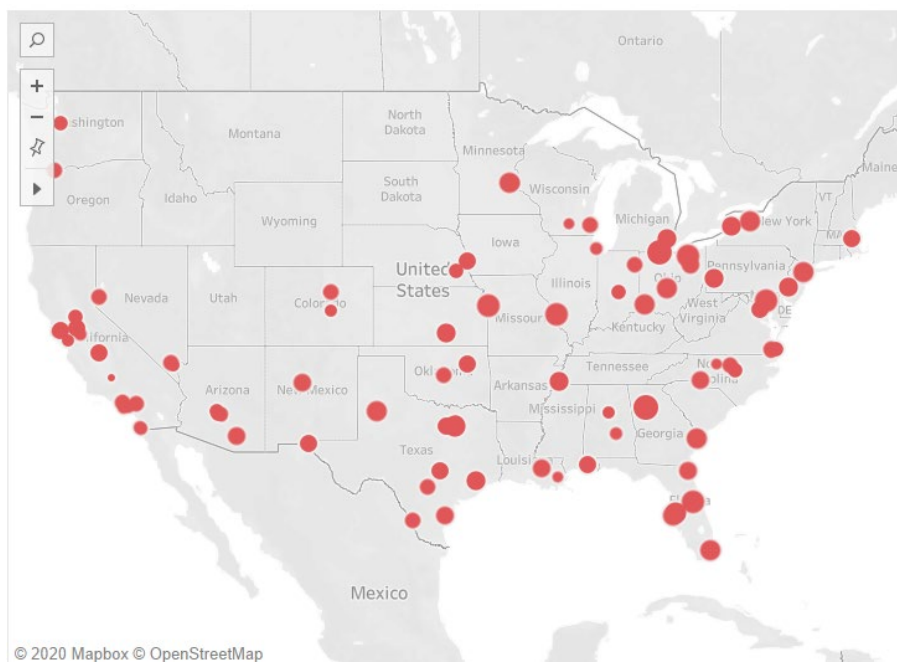
- 4) Right-click on “State” (now under the Marks area) and select “Filter” and unselect AK and HI, so that the map will show 48 states in the continental U.S.



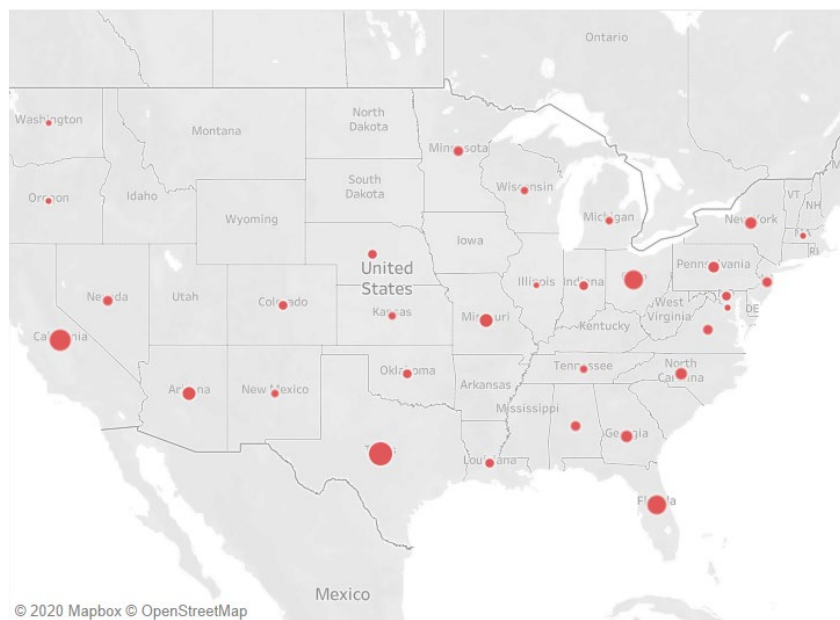
You'll now see a map like this:



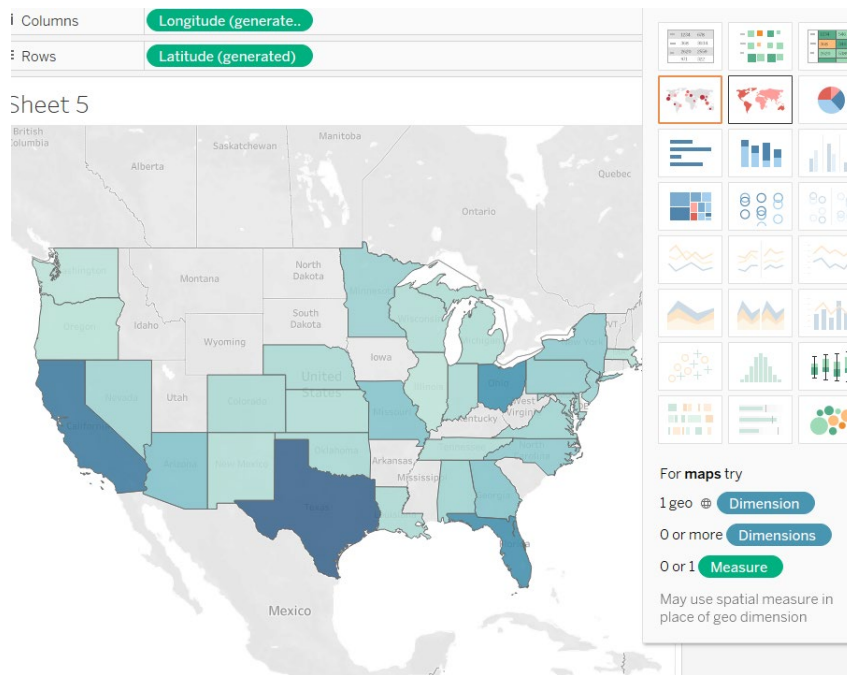
5) You can change the color. Click “Color” under Marks and then choose a different one.



6) Now let's view the map by states, not cities. Right-click “City” within the Marks area and select “Remove.”





7) Change a chart type to “maps”. You’ll now see this:



7) Rename “Sheet 5” to “Map Chart” and save.

## Part 6: Create an interactive dashboard

A dashboard is a collection of worksheets, arranged so that they are easy to view all at once.

- 1) Click on the  tab at the bottom of the screen to create a new dashboard. Not this  for a new worksheet.
- 2) Drag the “Line Chart” worksheet (under Dashboard) to the “Drop sheets here” whitespace.
- 3) Now drag the “Bubble Chart” worksheet to the bottom half of the workspace. When you’re in the right spot, you’ll see the bottom half of the map shaded light gray.
- 4) Now drag the “Map Chart” worksheet to the bottom right corner of the workspace.
- 5) Click one of the state on the map. It will not change the other two charts. Let’s make the dashboard interactive.
- 6) Click the map. In the top right corner, you will see the filter icon. If you move the cursor over it, it will tell “Use as Filter”. Click it.



- 7) Now, the map is used as a filter. Click any state on the map. It will change the other two charts to show the information of the selected state (reproduce the same style chart by using the data from the selected state only).

### Part 7: Export as PowerPoint

Export your Tableau visualization as PowerPoint. Click “File>Export As Powerpoint”, and include “**This View**”. It will create a PPT file that includes a snapshot of the dashboard. Submit this ppt file through Blackboard as your answer for Question 6.

