

MIS 0855 – Data Science (Section 006) – Fall 2017 In-Class Exercise (Day 22-23) – Visualizing with Maps

Objective: Learn how to use Tableau’s powerful mapping tools

Learning Outcomes:

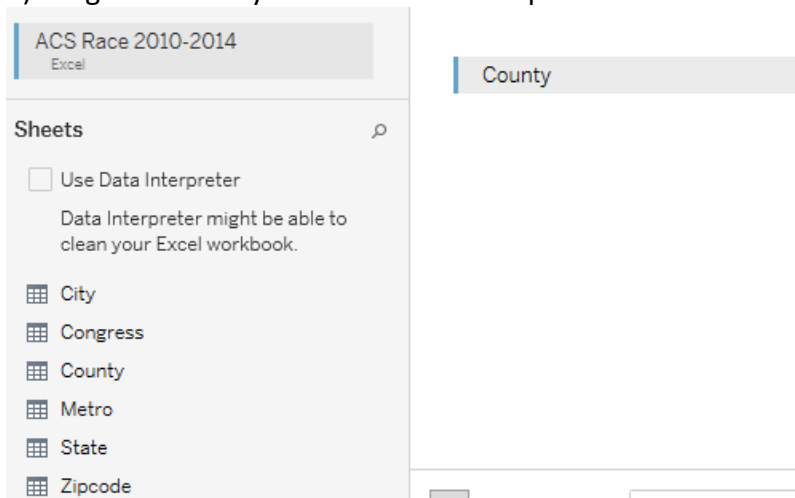
- Learn at what levels (e.g. city, zipcode, congressional districts) Tableau can create maps
- Understand how to format fields for geographic information so that Tableau can identify as such
- Create maps with multiple visualization components.

Tableau has very powerful mapping functions which help you come up with cool visualization at various levels including very granular ones such as cities, zipcodes, and congressional districts.


In this exercise, we will use the data on population race make-ups from the American Community Survey in 2010-2014 published by the U.S. Census Bureau (<https://www.census.gov/programs-surveys/acs/>.) In particular, we will use the percentage of population in each race (White, African American, Hispanic, and others) for analyses.

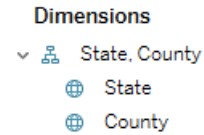
Part 1. County

- 1) Download “ACS Race 2010-2014.xlsx” and save it to your computer. Remember where you saved it!
- 2) Start Tableau.
- 3) Click on “Microsoft Excel” under “In a file.”
- 4) Navigate to the location where your data file (“ACS Race 2010-2014.xlsx”) is stored and select it.
- 5) Drag the “County” sheet to the workspace.

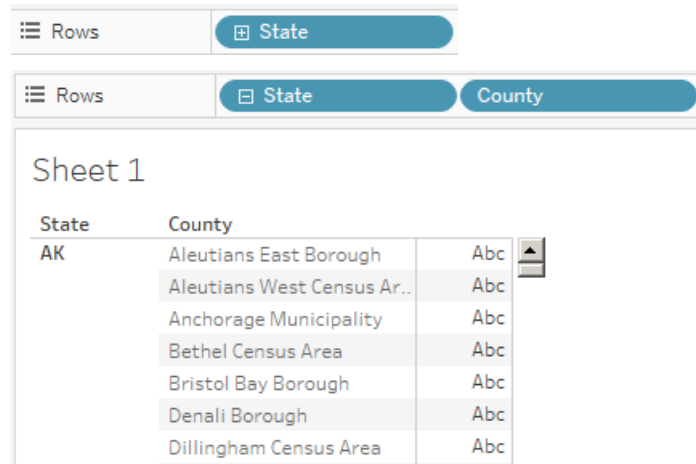


6) Click “Sheet 1” to Go to Worksheet.

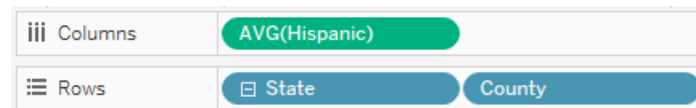
7) You will see that State and County appear as Dimensions with two globe  icons, which means that Tableau automatically recognizes that these dimensions represent geographic locations.



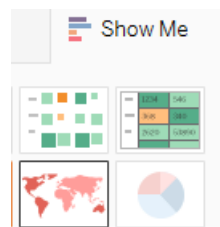
8) Drag “State, County” to Rows and click “+” left to State, so that it shows County.



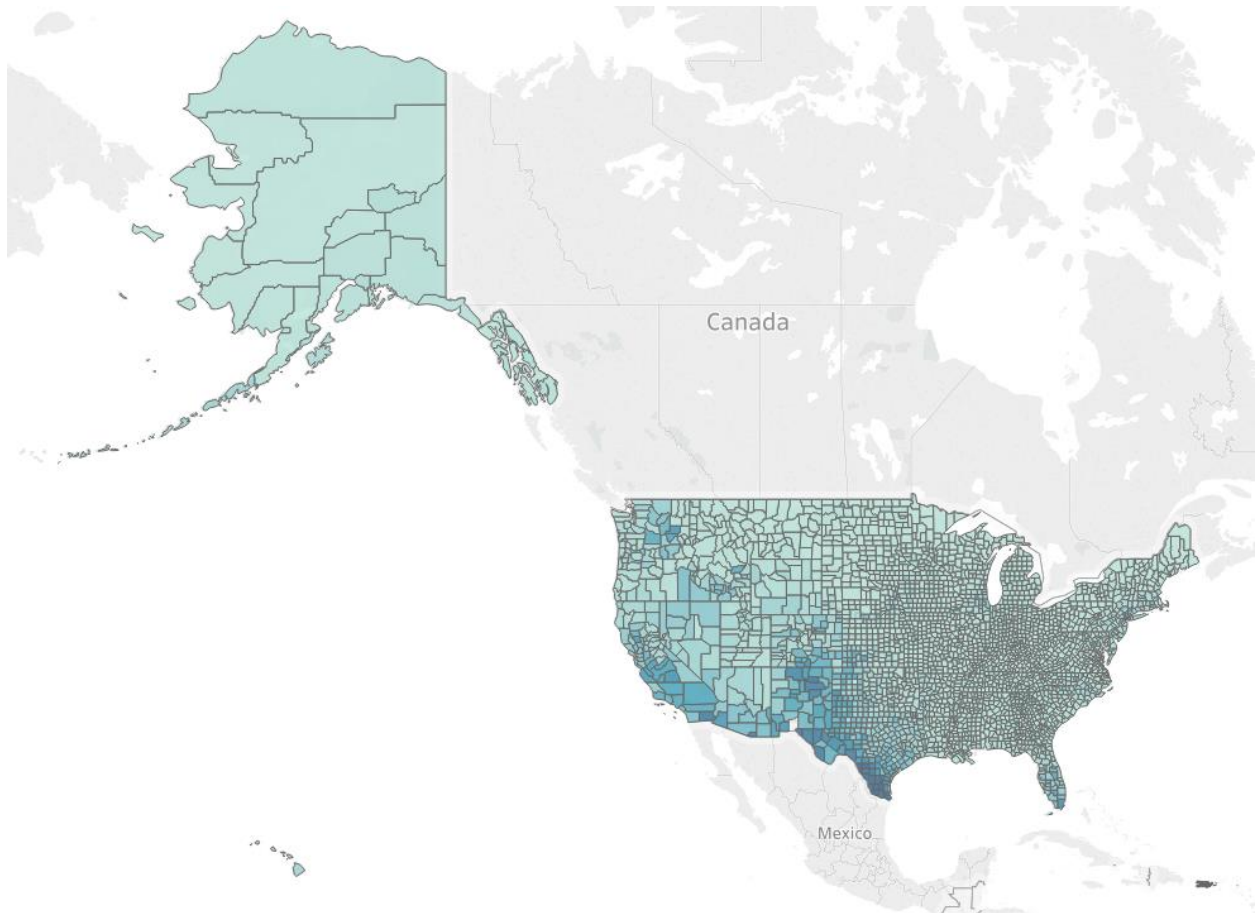
9) Drag “Hispanic” to Columns and change it to Average.



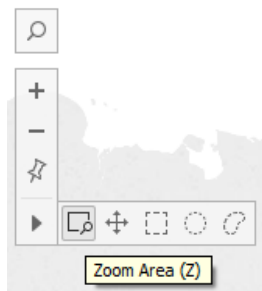
10) Click “Filled Maps” on Show Me tap.

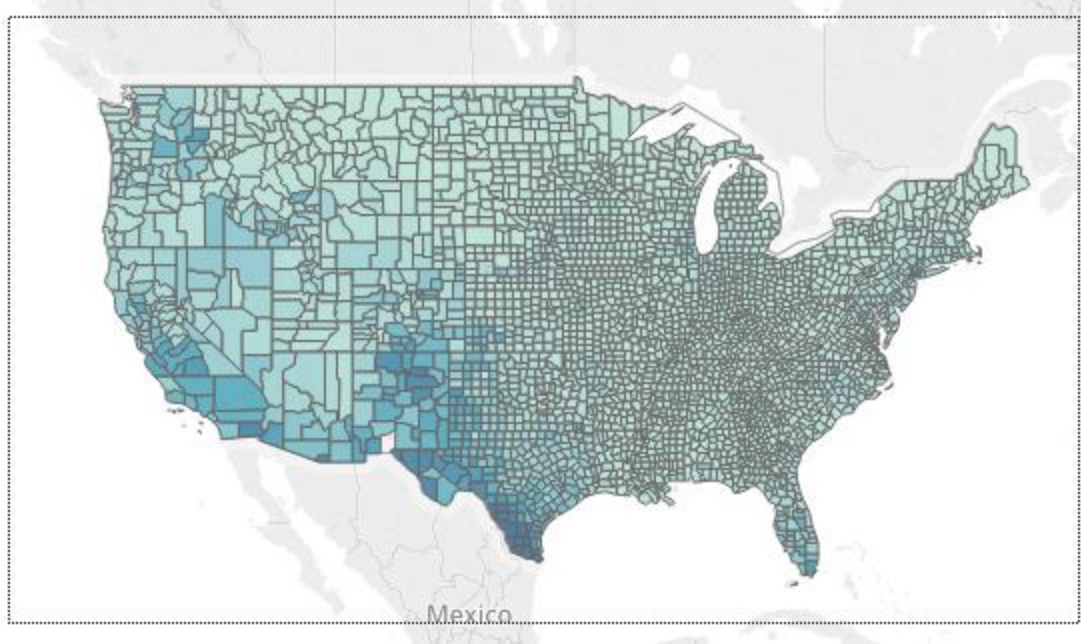


11) You'll see a county map of the U.S, in which dark green indicates a large proportion of Hispanic population in a county.



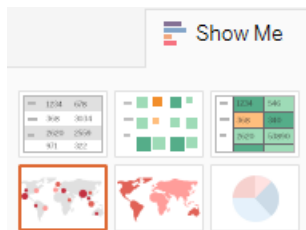
12) Use Zoom Area tool to zoom out the continental U.S.



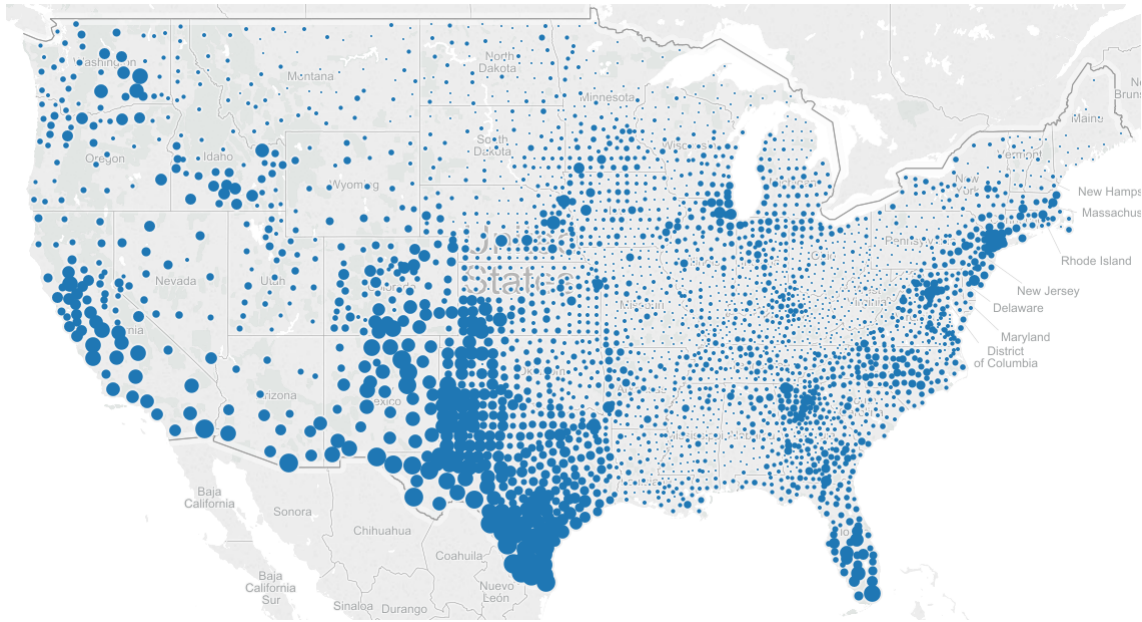


You will see the map over the Continental U.S.

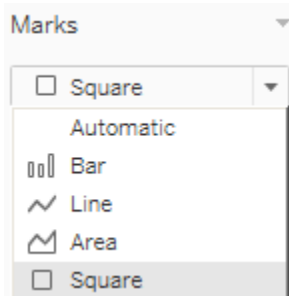
13) Select “Symbol Maps” on Show Me tap.



You'll see a different kind of map, in which the size of circle represents the percentage of Hispanic population in each county.

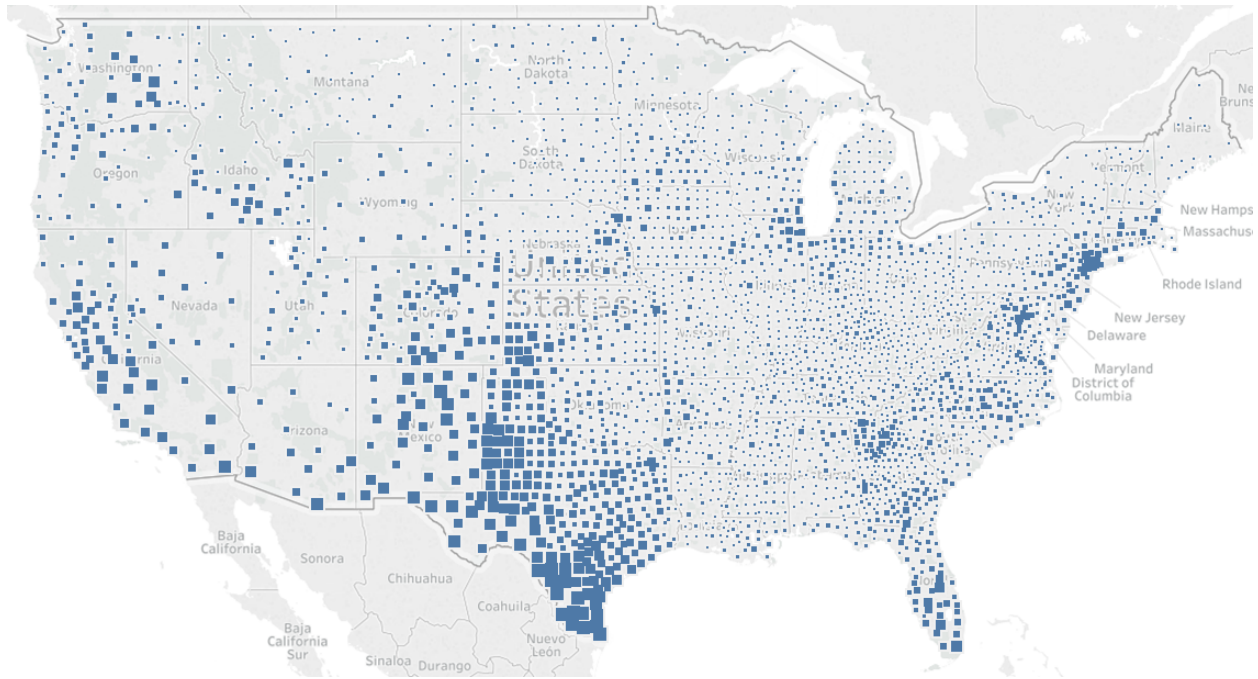


14) Select "Square" on Marks and the circles change to squares.



15) Use Size bar to make squares a little bit smaller.

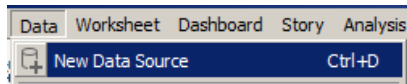




16) Rename the worksheet to “County” and save.

Part 2. Metropolitan Areas

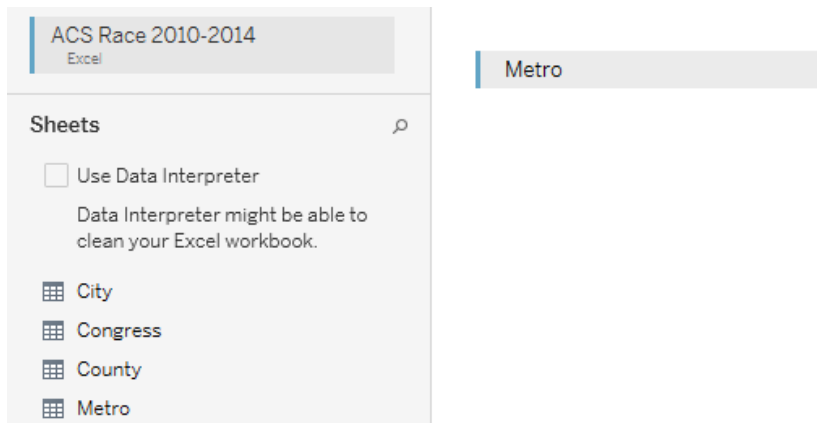
1) Select Data > New Data Source from the menu.



2) Click on “Microsoft Excel” under “In a file.”

3) Navigate to the location where your data file (“ACS Race 2010-2014.xlsx”) is stored and select it.

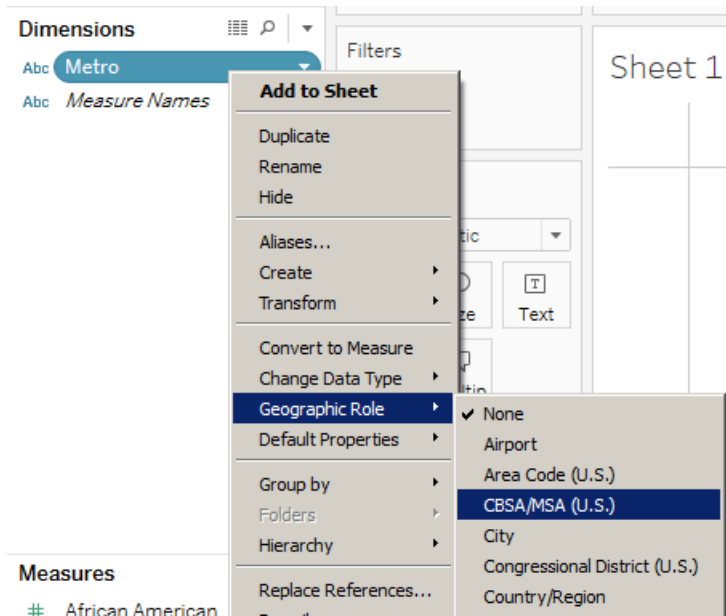
4) Drag the “Metro” sheet to the workspace





5) Go to Sheet 2.

6) On Dimensions, we do not see a globe icon next to Metro, which means that Tableau does not identify it as a geographic indicator. We can force it to do so.

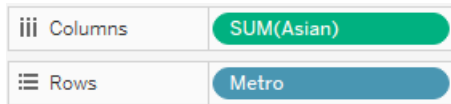
Right-click Metro and select “Geographic Role” -> “CBSA/MSA.” (MSA stands for Metropolitan Statistical Areas, where at least 50,000 people live.)



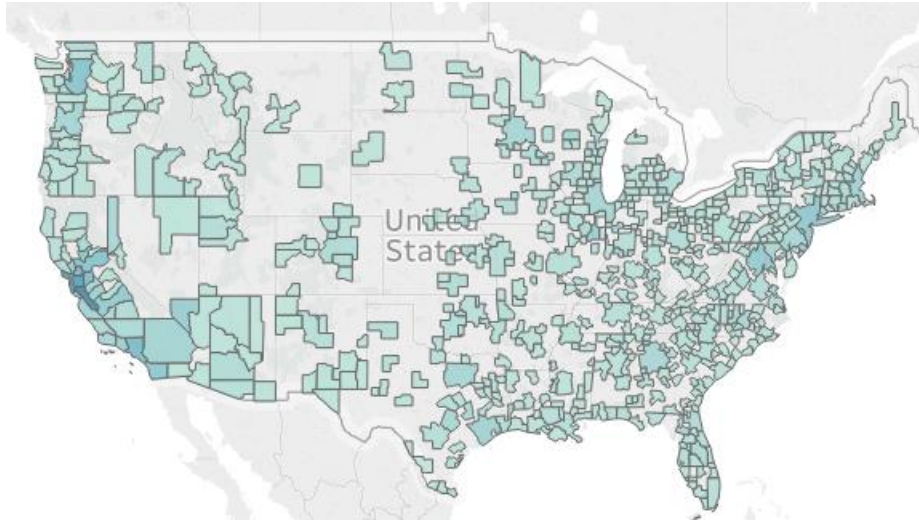
7) Now you will see a globe icon with Metro and “Latitude” and “Longitude” measures on the bottom-left, which are automatically generated by Tableau.

-  *Latitude (generated)*
-  *Longitude (generated)*

8) Drag Metro from Dimensions to Rows, and drag Asian from Measures to Columns.



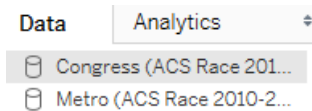
9) Select Filled Maps from Show Me tab. Now you'll see a map of US large metropolitan areas.



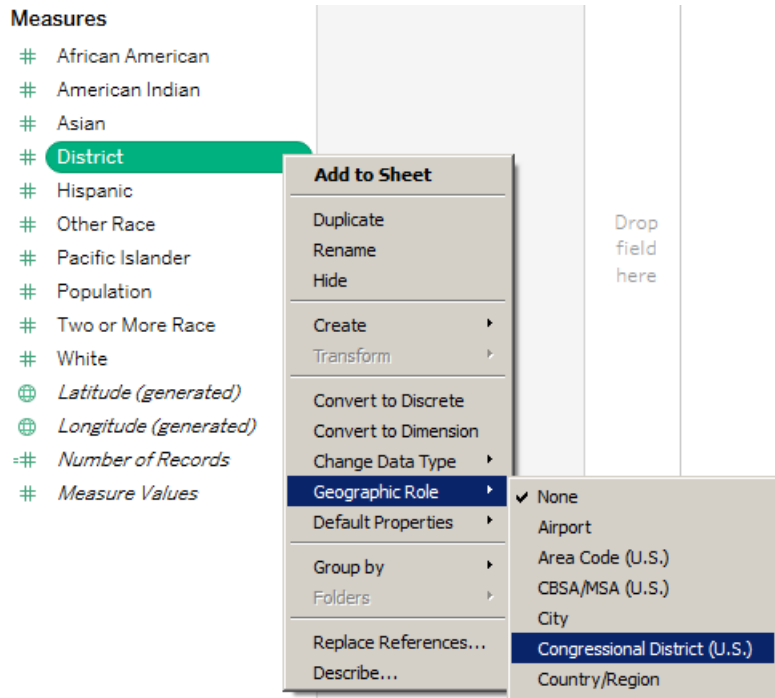
10) Rename Sheet 1 to "Metro" and save.

Part 3. Congressional District

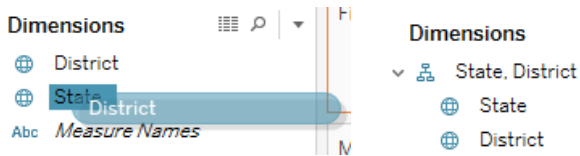
- 1) Select Data > New Data Source from the menu.
- 2) Click on "Microsoft Excel" under "In a file" and select "ACS Race 2010-2014.xlsx" again.
- 3) This time, drag the "Congress" sheet to the workspace.
- 4) Select New Worksheet icon at the bottom-left.
- 5) Make sure "Congress" was selected as a data source.



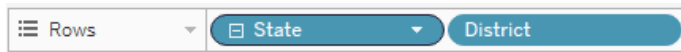
6) On Measures, right-click District and select Geographic Role > Congressional District.



7) On Dimensions, drag District over State to create a hierarchy. Click Ok next.

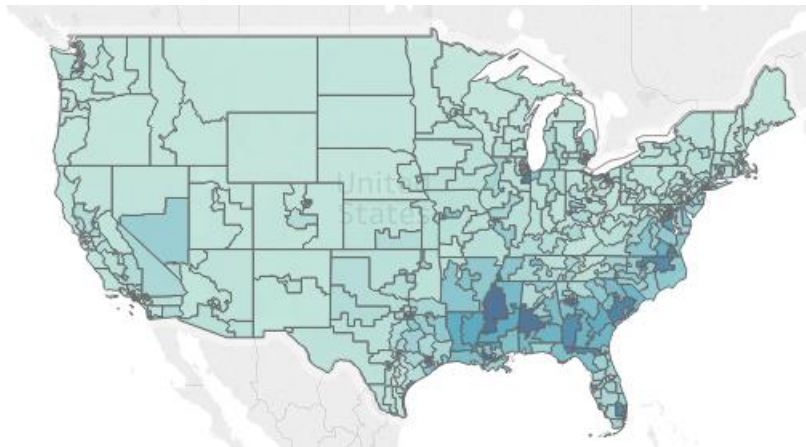


8) Drag “State, District” to Rows and click “+” next to State.

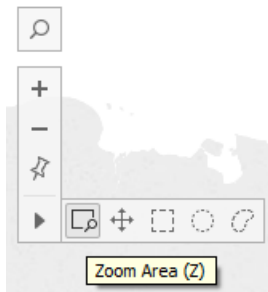


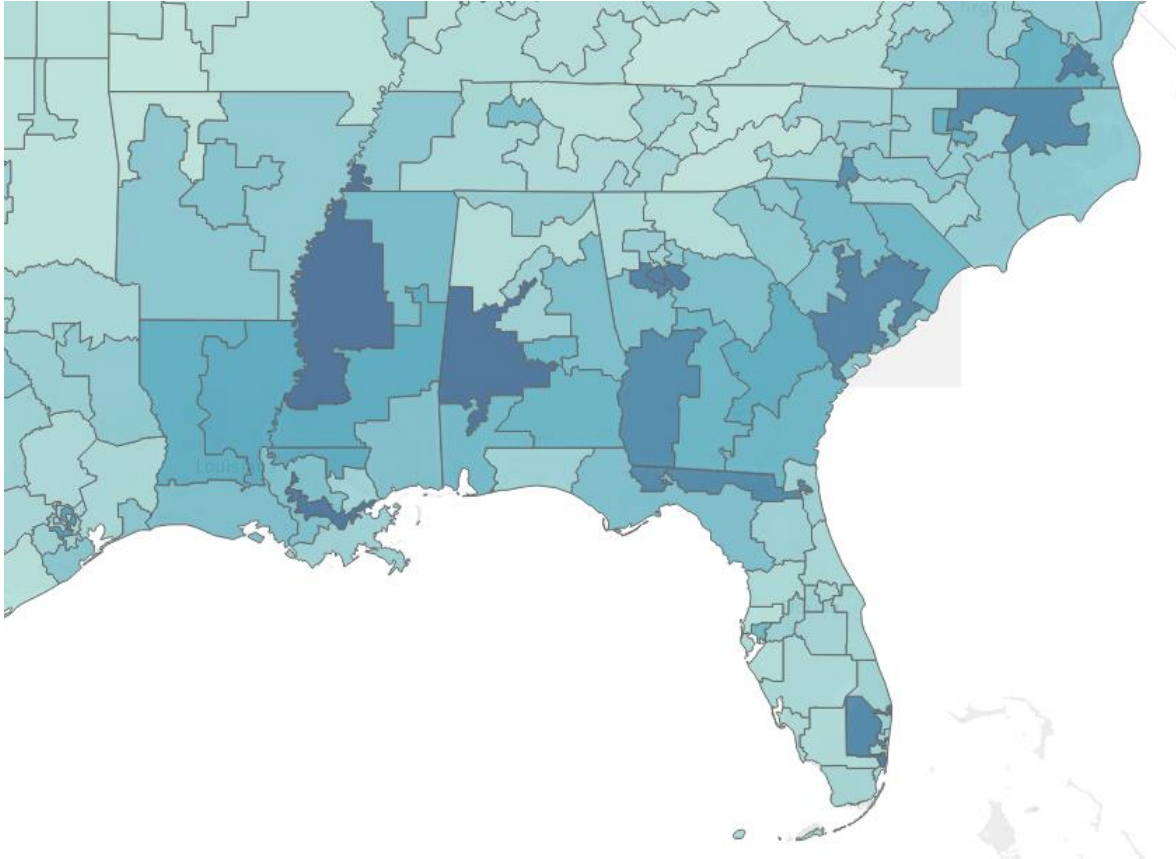
9) Drag African American from Measure to Columns and change SUM to AVG.

10) Click “Filled Maps” on Show Me and you’ll see the U.S. map with congressional districts, with dark green indicating large African American population.



11) Use Zoom Area to take a close look at southern states.



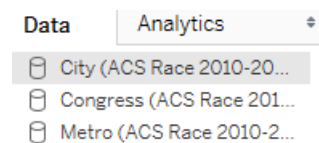


Q: This map describes what?

12) Rename Sheet 2 to “Congress” and save.

Part 4. U.S. Cities

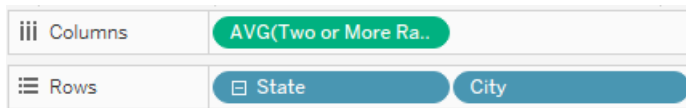
- 1) Select Data > New Data Source from the menu.
- 2) Click on “Microsoft Excel” under “In a file” and select “ACS Race 2010-2014.xlsx” again.
- 3) This time, drag the “City” sheet to the workspace.
- 4) Select New Worksheet icon at the bottom-left.
- 5) Make sure “City” was selected as a data source.



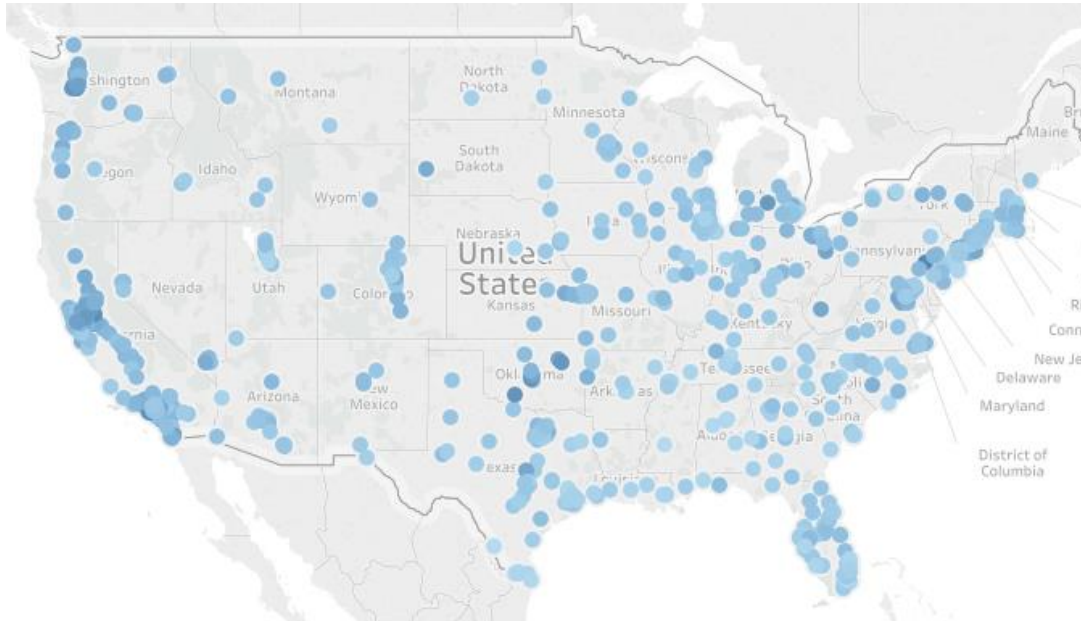
The good news is that Tableau automatically recognizes City as a geographic dimension.

6) Drag “State, City” from Dimensions to Rows and “Two or More Race” to Columns. Change SUM to AVG.

7) Click “+” next to State.

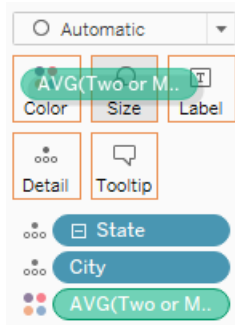


8) Click “Filled Maps” on Show Me.

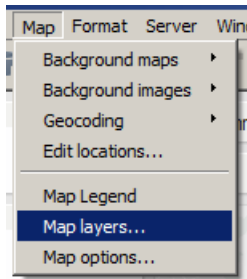


You'll see that Tableau came up with a Symbol Map, not with a Filled Map. Tableau does not support a Filled Map with City, because there are too many of them.

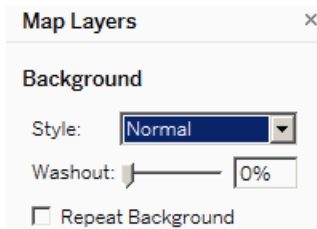
9) On Marks panel, drag “AVG(Two or More Race)” over Size.



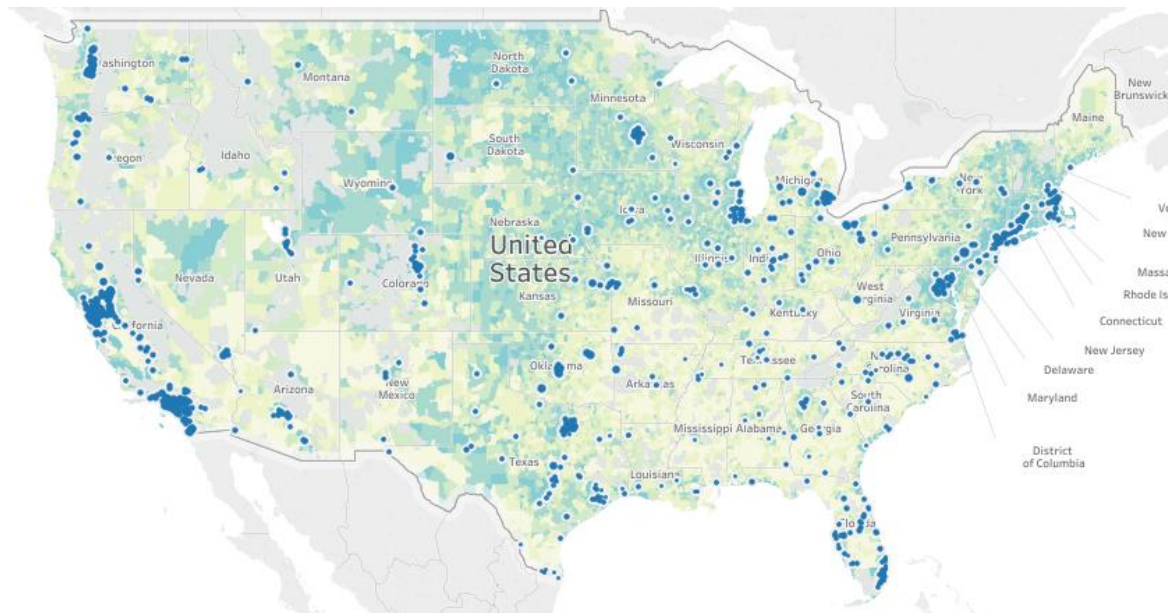
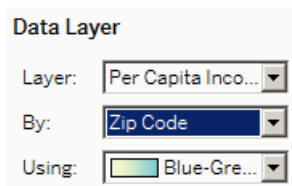
10) Let's make the map cooler. Select Map > Map Layers on the top menu.



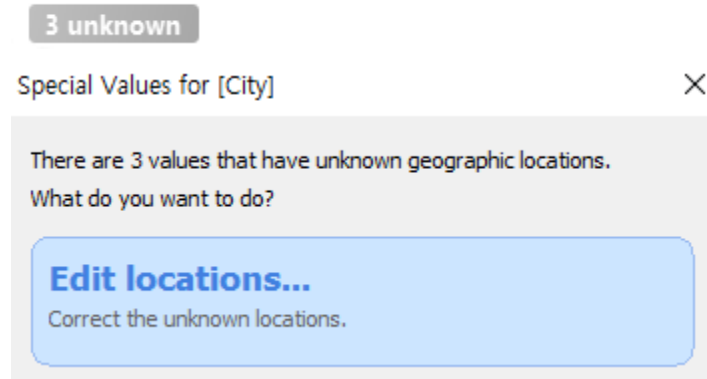
11) On Map Options panel, change the map style to Normal.



12) On the right-bottom of Map Options, you'll see Data Layer. Select "US Occupations" > "Per Capita Income" on Layer and Zip Code for By.



13) You can also notice “3 unknown” on the bottom-right.” Click it, and select Edit Locations...



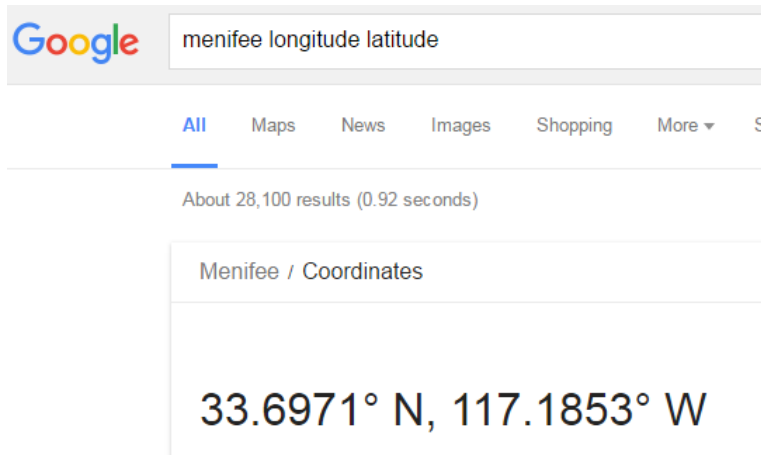
14) We are seeing this because Tableau cannot identify these three cities.

! City State/Province	
Your Data	Matching Location
Boise City	Unrecognized
Menifee	Unrecognized
Weymouth Town	Unrecognized

15) Let's change Boise City to Boise and Weymouth Town to Weymouth.

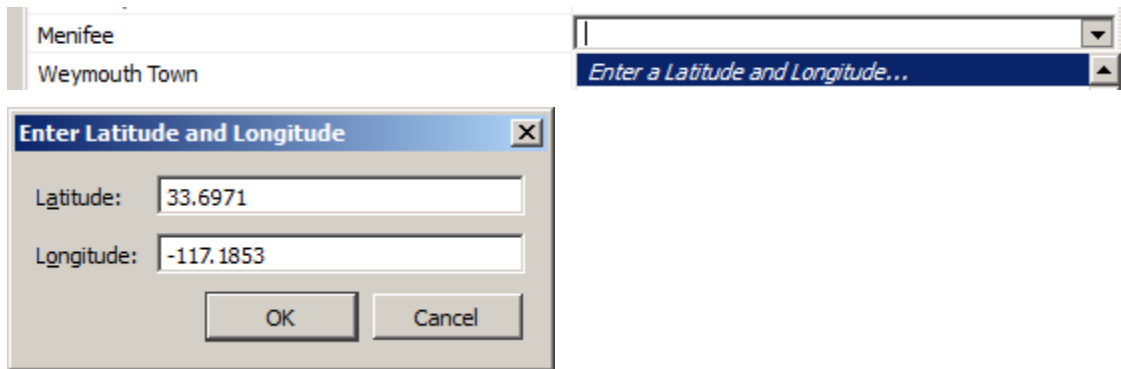
! City State/Province	
Your Data	Matching Location
Boise City	Boise
Menifee	Unrecognized
Weymouth Town	Weymouth

16) We can't find Menifee on the list of cities Tableau provides. Don't worry.



Google says that Menifee, CA, locates at 33.6971 N and 117.18 W. We can put this information into Tableau.

Make sure to put "-117.1853" to Longitude. (Minus means West.)



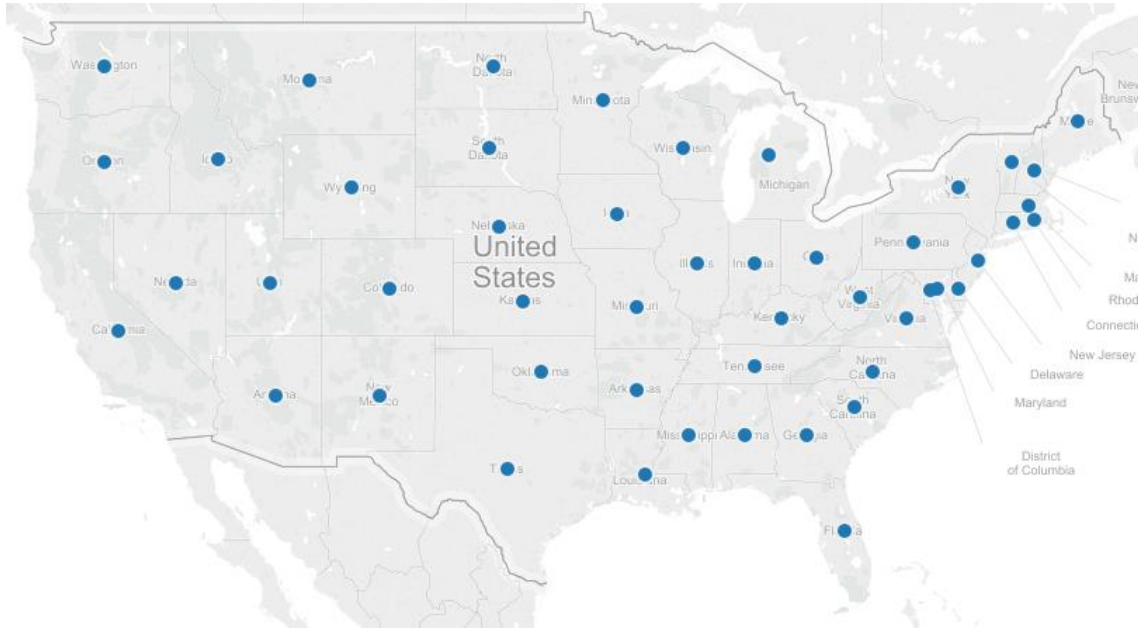
Now you can see that all cities are identified.

17) Rename Sheet 3 to "City" and save.

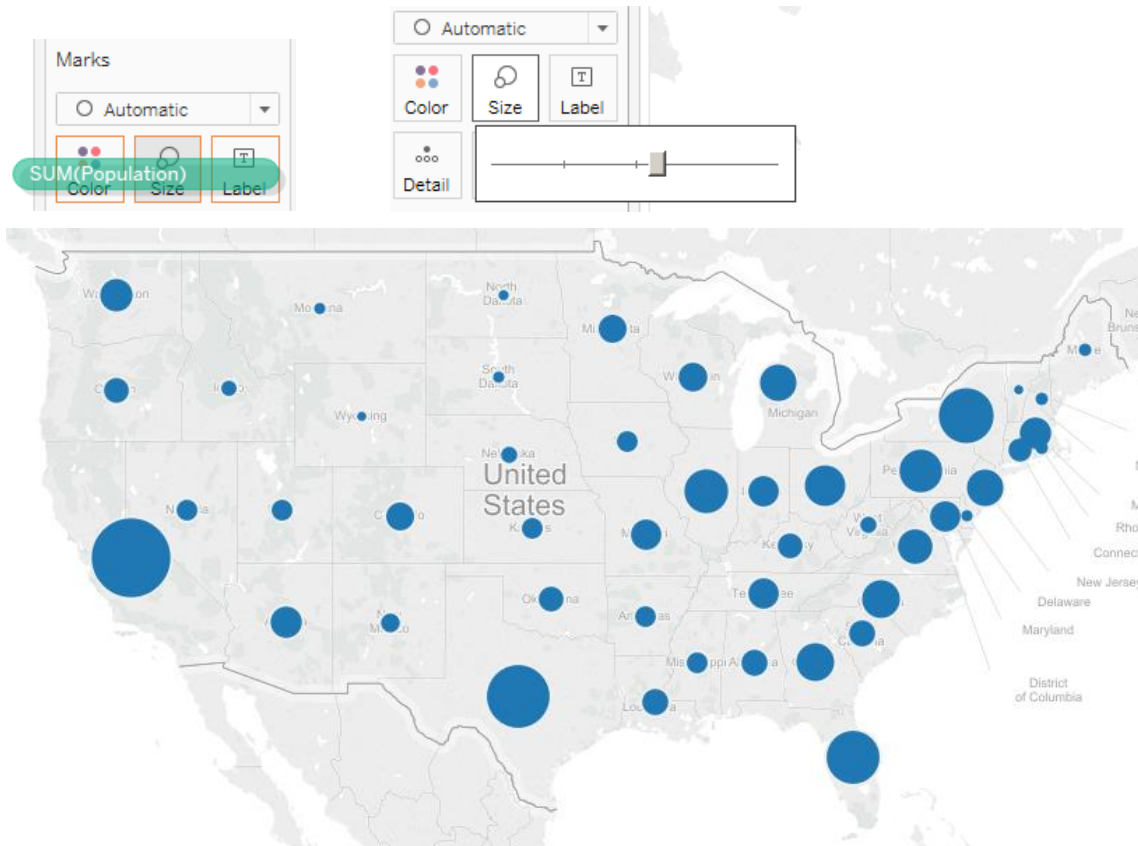
Part 5. U.S. States Map with Pie Charts

- 1) Select Data > New Data Source from the menu.
- 2) Click on "Microsoft Excel" under "In a file" and select "ACS Race 2010-2014.xlsx" again.
- 3) This time, drag the "State" sheet to the workspace.
- 4) Select New Worksheet icon at the bottom-left.
- 5) Make sure "State" was selected as a data source.
- 6) Drag State from Dimension to Rows.

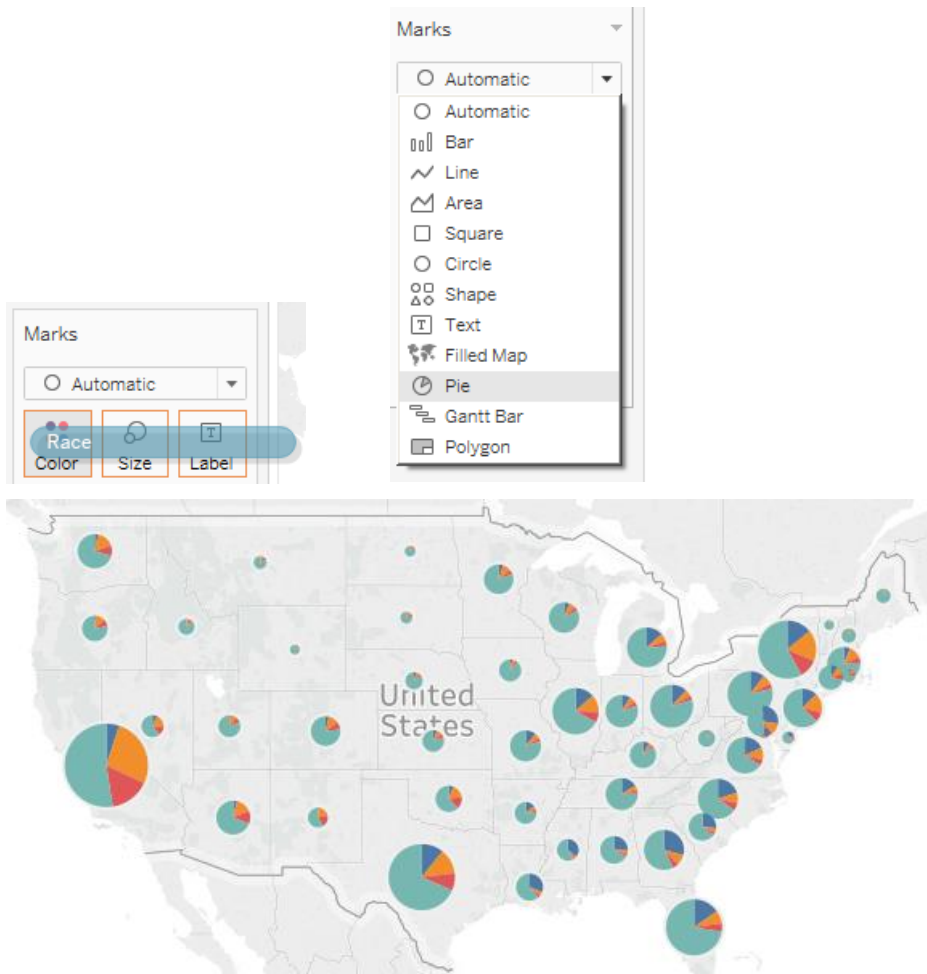
7) Click "Symbol Maps" on Show Me.



8) Drag Population from Measures to Size on Marks panel, and click Size to make the circles a little bigger.

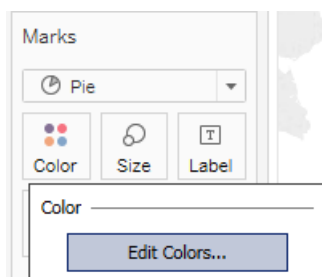


9) Drag Race from Dimension to Color on Marks. Then change Automatic to Pie.

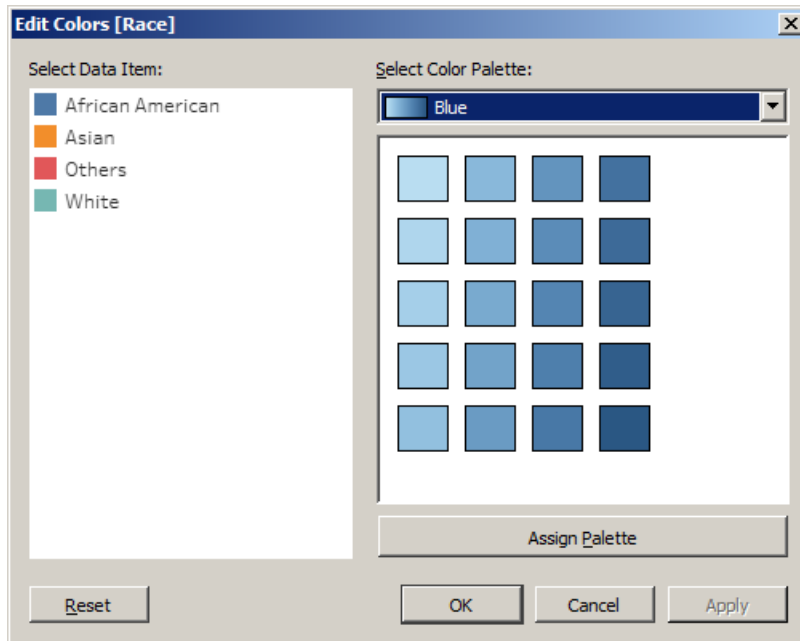


This map uses two components to deliver different information. The size of circle represents the size of population, and the pie charts show the racial make-up of each state.

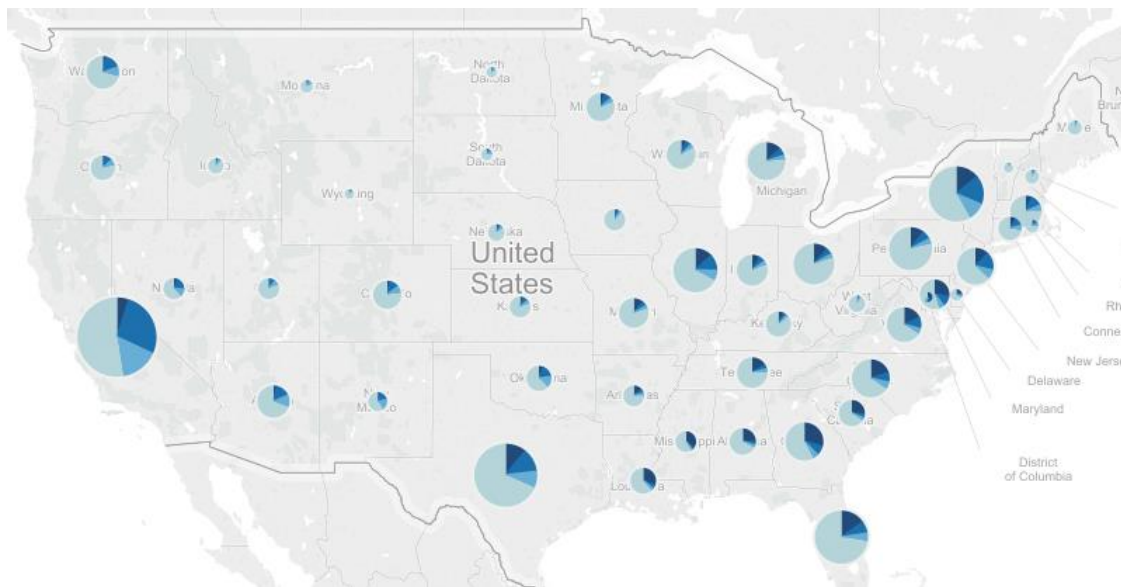
10) This is not a good visualization, however. It is better to use one color gradually. On Marks panel, select Color > Edit Colors.



11) On Color Palettee, select Blue.



12) Click each race, and select one color for each race.



This is a much better, more visually-appealing map.

13) Rename Sheet 4 to "State" and save.

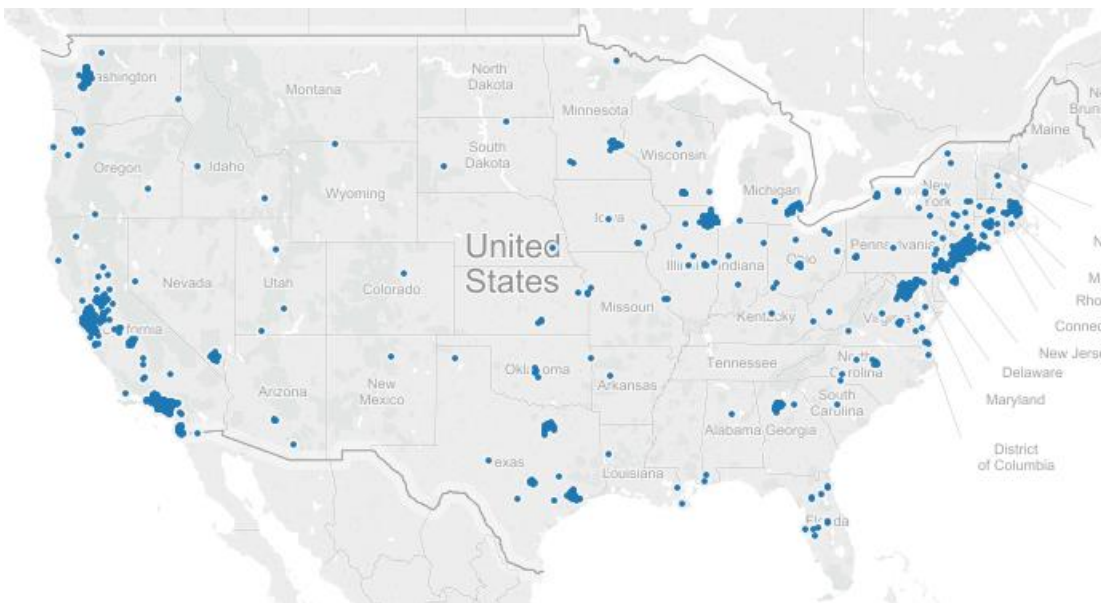
Part 6. Do It Yourself!

1) Create a Pennsylvania map to display the percentage of Hispanic population in each zipcode of Pennsylvania.



Hint: Use State as a filter.

2) Create a U.S. map to show the zipcodes where the percentage of Asian population is 10% or higher.



Hint: Use Asian as a filter.