Programming Assignment 6
Population Density Map (9 points)
Due Date: March 5, Monday, 11:59pm
No late submission
Demo to instructor

Your task is to create a population density map of one of the 49 states of the United States (other than California) for the latest year the data is available on US Census.

You are required to choose a state in class. If you have not chosen a state in class, you will be assigned a state. Every student must choose a different state.

Visualization will be similar to the CA Population Density example created by Mike Bostock with following additions/variations:

1. You will use exactly the *same normalization for population density* as used in California Population Density, and *same color binding/legend and same data quantization*, so that the visualization of the population density of your state could mesh seamlessly with California Population Density map.

2. You will create a variation where a different color binding and color legend is chosen (different shades of one color where deeper shade is more dense) so that it brings out the variations of population density within your state better. You will provide a clickable button (unobtrusive button under the legend with something like "Change Legend Color" on the visualization) that will flip between the two visualizations.

3. You will create a variation where the visualization will toggle (display or not display) state-boundary and census tract boundaries using the following button names "Toggle State Boundary", "Toggle Census Tract Boundary". County boundaries will always be shown.

In addition,
1. Host above visualization on github.
2. Add a Bold Title at the top something like, "New York Population Density, 2018".
3. Add your name and affiliation with the class at the bottom as follows:
Github Link (clickable)
Your Name
Instructor: Suresh Lodha
CMPS 263: Data programming for Visualization
Winter 2018

Submission Requirements
Submit the following on canvas:
1. stateabbreviation.json (for example, NY.json)
2. StatePopDensity.html (for example NYPopDensity.html)
3. Any intermediate data files generated
4. A clickable weblink for visualization

You will need to install a number of softwares such as curl, unzip, node, npm, mapshaper (to view shape files), and homebrew (recommended for MAC OS), shapefile (that allows you to convert from shp to json files), d3-geo-projection (that allows you to geo-project using command line), geo2svg (to view the projected geometry), to create the census tract files. You are required to install these softwares on your laptop. At the time of demo, it will be checked whether you have installed these softwares on your laptop. The final project is required to be demonstrated in person to the instructor.

Suggestions: Follow the instructions on [Command-Line Cartography Four Part Tutorial](#) by Mike Bostock to (i) extract the census files for your state. You will need to know the [FIPS Code](#) for your state, (ii) to project the census tract file using a projection system that is appropriate for your state and using the parameters that are applicable for your state. Mike Bostock offers the following advice: "If you're not sure [what projection](#) to use, try https://github.com/veltman/d3-stateplane or search http://spatialreference.org/"

In order to toggle between census tracts boundaries and state boundaries, look for statename.objects.tracts and statename.objects.counties inside your statname.json files. Please note that in CA population density by Mike Bostock, only inner county boundaries are shown. To display state boundary, you will have to display the state-border, which is the outer boundary of counties.

Bonus Points:
Instead of creating a population density map of a US state, if you create a population density map (or some other socio-economic data) of any other region or country of the world at a *high resolution*, you can receive upto a total of 14 points for this assignment (this is equivalent to 5 bonus points). The challenge will be to find shape files at high resolution, convert them to geojson/topojson format, find population density data (or any other socio-economic data) at the same high resolution, and link the two. If you pursue this direction, you can develop your final project on geospatial mapping for that region.