CS 4630/5630 Kresman Bonus Activity

Spatial & Data Science: Covid-19 has had a devastating effect, and north of 27K have lost their lives. Scientific experts (and, hopefully, policy makers😊) use many variables in analyzing the spread to help uncover mitigation strategies and possible date(s) for reopening segments of our country. One such variable we are exposed to in the social media & TV is spatial visualization of the # of causalities across the country. (We gave an overview of ArcGIS in class, and) GIS service providers such as ArcGIS have APIs to create digital maps of the Covid-19 epidemiological datasets. [While we don’t work with ArcGIS b/c of the sudden change to the online class format, we will work with ArcGIS shape file (see ArcGIS unit)]

**Problem 1 [10 points]**: Use Google Maps API to create a spatial visualization of the coronavirus epidemiological dataset and show the count (of deaths) for all counties in US, through date X, X is user input. The Center for Systems Science and Engineering (CSSE) at Johns Hopkins University harvests Covid-19 data and makes it available to the public (perhaps you may already be familiar with CSSE’s online dashboard). The Covid-19 map output should include these items:

* US map layer with state boundaries, with Zoom in/out. A legend or some that shows date X and your name
* Markers @ the (centroids\* of) counties with a label that shows count (of causalities)

**Problem 2 [5 points]**: Extend Problem 1 - use ESRI shape files [see shapeData folder; Hint: install pyshp to help read this geometry file] to extract (county) centroids’ latitude/longitude

**Problem 2 [5 points]**: Extend Problem 1 (or 2) to a timeseries map, with a slider - as one drags the slider, date range expands with corresponding map update

**Notes**

* Problem 1 Output.doc: gives an idea of how the map may look - just an idea, does not cover all elements of Problem 1!
* Covid-19 pandemic dataset @ <https://github.com/nytimes/covid-19-data/blob/master/us-counties.csv> [read from this url in the program]
* May need to complete a few steps for Google Maps to work, for example: get map key from Google; conda install -c conda-forge gmaps; etc. Googling to get things rolling! [Note: store your map key in a file, MapKeyFile.txt, and read the file in the program.]
* The free version of Google Maps is fine - may have to click ‘OK’ for the map output to show with the note, ‘For development …’
* I will run your submission with my Google Map key for grading. [As an alternate, you can supply your MapKeyFile.txt – if so, you are authorizing my use of your key for this limited purpose; if you disagree, do NOT submit your key file]
* You will be docked if the submission includes bells and whistles not relevant to what is asked. Grading is binary for each problem, no partial credit.

**Canvas** submissions (do not zip): lastnameBonus.ipynb (each problem in a different cell), a word doc of run snapshot; (optional) MapKeyFile.txt

(\*) County info such as longitude/latitude of centroids are available on the web