Statistics for Geography (GEOG 533) Lab 10

1. Use R package **`UScensus2010county`** to complete the following tasks: (20 pt.)
    a. Plot a map of New York counties using the **`plot`** function.
    b. Plot a map of New York counties using the **`qtm`** function.
    c. How many counties in New York State?
    d. What's the 3-digit **`fips`** code of Broome County?
    e. Compute descriptive statistics of the population column (**`P0010001`**), including total, minimum, maximum, mean, median, and skewness.
    f. Create a histogram and a boxplot of the population.
2. Use R package **`UScensus2010tract`** to complete the following tasks: (20 pt.)
    a. Plot a map of New York census tracts using the **`plot`** function.
    b. Compute the total population based on census tracts.
    c. Select all census tracts in Broome County and plot the map.
    d. What's the total population of Broome County?
    e. Create a histogram and a boxplot of population based on census tracts of Broome County.
    f. Select the first five columns of the shapefile of Broome County census tract; add a new population ratio column (= census tract population / county population); save the new shapefile to the hard drive.
3. Use R packages **`raster`** and **`ncdf4`** to complete the following tasks: (20 pt.)
    a. Load the multi-band raster dataset "**`NDVI.nc`**" into R.
    b. Get the basic information about the dataset, including the number of rows, columns, cells, and bands; spatial resolution, extent, bounding box, and projection.
    c. Aggregate all bands to generate a mean NDVI raster and a maximum NDVI raster; save the two new raster datasets to the hard drive.
    d. Plot the maps of monthly NDVI of the year 2001
    e. Create histograms of monthly NDVI of the year 2001.
    f. Plot the NDVI map of July 2000; click any location with data on the map and retrieve the NDVI time series for all years; plot the NDVI time series of the selected location.

What to submit:

1. An R Markdown document that contains the script for each question.
2. An HTML document that contains the script/output for each question.
3. GitHub.io URL for the html document.

File name convention for assignment submissions: lastname_firstname_lab10.zip