Programming Assignment 4

Creating an Animated Multi-Line Chart (9 points + Bonus Points)

Due Date: April 23, Monday, 11:59pm

(Assignment must be demoed and explained in person to receive any credit)

Your task is to create an animated multi-line chart for 6 countries (BRICS – Brazil, Russia, India, China, South Africa, and USA) from the data that we have provided: data.csv. This data file contains Energy Consumption per Capita in Million BTUs per person for 11 year period from 2000 to 2010 for a large number of countries.

Your visualization must be clear (neat and elegant without clutter) and understandable. This means that x-axis and y-axis be properly labeled with appropriate tickmarks. The graph must have a title. A sample output is enclosed. An example of the final output with animation will be shown in the class.

Your task may be simplified if you prepare a **new dataset** by *deleting the extraneous data* and *transposing rows and columns* to create a new data set in csv format similar to the ones used in References [2,3] with 7 columns and 12 rows where the top row is reserved for country names and the leftmost column stores the years. *Call this new data set BRICSdata.csv.*

In order to create this visualization, you may have to learn and utilize a few new features of D3:

(i) d3.extent (compute domains) used in [1]
(ii) d3.line (display line shape) used in [1]
(iii) d3.scaleTime (encoding time along x-axis) used in [1]
(iv) d3.parseTime (parse date) used in [1]
(v) d3.map (copies properties from an object into a map) used in [2]
(vi) d3.columns.slice (allows you to take a slice of columns) used in [2]

In addition, your visualization should have the following features:

1. Names of countries must appear next to the lines as in Multi-Series Line Chart (Reference [2]).
2. Each line should be **interpolated** using “curveBasis” or some other interpolation mechanism appropriate to the data (Reference [2])
3. Color associated with each of the six lines must be different (use **d3.schemeCategory10** or some other scheme) to define color scale.
4. **Thin grid line** (as shown in line graph of Apple’s stock prices shown at the end of this document). This can be achieved by creating style sheet associated with grids, creating new functions gridXaxis, gridYAxis, and then calling these functions with appropriate parameters.
5. Add animation/**transition** to the lines as shown in the class similar to Reference [3] on “Animate path in D3”.

Resources/References (concepts/code needed to complete the assignment):

1. Line Chart by Mike Bostock http://bl.ocks.org/mbostock/3883245
   (discusses d3.extent, d3.line, d3.scaleTime, d3.timeParse)
2. Multi-Series Line Chart by Mike Bostock
   http://bl.ocks.org/mbostock/3884955
   (discusses,in addition, d3.map, d3.columns.slice, d3.curveBasis, and d3.schemeCategory10)
3. Animate Path in D3 http://bl.ocks.org/duopixel/4063326 (this code has a mechanism for animating paths)[1]

Submission Requirements

Submit four separate files titled:

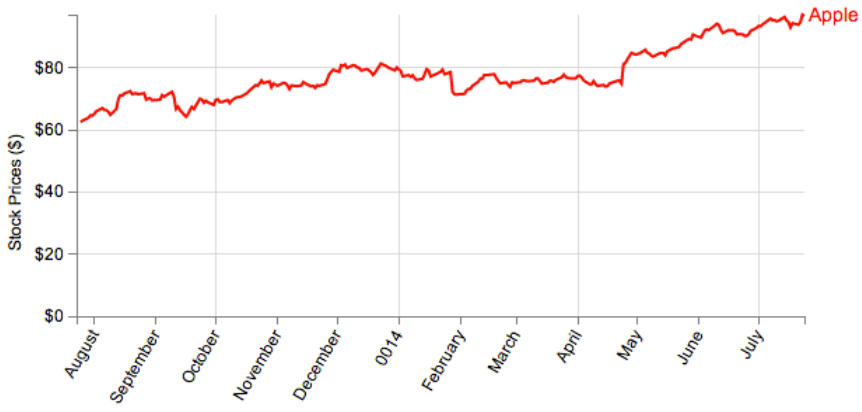
- MultiLineindex.html
- MultiLinestylesheet.css
- MultilineChart.js
- BRICSdata.csv or any other data files

Please do not submit zip files. Please make sure that you use the following script command in your html file to link to D3:

<script type="text/javascript" src=http://d3js.org/d3.v4.min.js></script>

Please submit structured well organized code and insert comments generously.

Example of Thin grid lines:



[1] Additional Reference on Animation: This reference is older and uses D3 V3 version (so, you may have to translate this to D3 V4 version if you use these ideas)
Notes on Animating Line Charts with D3 http://big-elephants.com/2014-06/unrolling-line-charts-d3js/

This may be a non-trivial assignment and requires learning a few new commands. It is strongly recommended that you get started on this assignment as soon as possible!

Late Submission Penalty:
1. If submitted after due date but on or before April 25, Wednesday, 11:59pm, 2 points will be deducted.

2. If submitted after the date mentioned in line 1 above, but on or before April 30, Monday, 11:59pm, 5 points will be deducted.

3. If submitted after the date mentioned in line 2 above, but on or before May 2, Wednesday, 11:59pm, 7 points will be deducted.

4. If not submitted by May 2, you will accrue -10 (negative 10 penalty points) and you will be at a risk of failing the class. You will be required to meet with the instructor before you continue with this class.

Bonus Points (5 points maximum): Due date: You have two extra weeks upto May 7, Monday, 11:59pm to submit this extra assignment.

Students striving to receive an A+ or A grade should attempt one of the following additional features to be added *without peer assistance*.

1. User-choice in selecting the countries: Use radio-buttons as implemented in the weblink listed below so that the user can choose the countries. The default display should still show only the 6 BRICS countries chosen. (3 points)

2. A moving vertical line that displays the data associated with each country as implemented in the weblink listed below (possibly with some additional effort to reduce the clutter due to overlapping of displayed data). (3 points)

https://sureshlodha.github.io/CMPS263_Winter2018/CMPS263FinalProjects/PrescriptionDrugs/index.html
(This is pdf file. Copy and paste may not work. You may have to type out this link to access this example)
Superbonus (1 point):
1. If you read the dataset as it is without transposing rows and columns, then you receive these extra superbonus points.

Submission requirements (for bonus and Superbonus):
1. Submit the html, css, js, and csv files in Bonus Section with a prefix MultiLineExtra such as MultiLineExtra.html
2. The bonus assignment must be demonstrated in person to the instructor.