EECS 428 / ECE 578
DATA VISUALIZATION
Spring 2017

ASSIGNMENT 4
Due Date: *10/05/2017 23:59*
(14 Points)

Assignment Submission: *Turn in your assignment by the due date through LMS*. *Prepare and upload* **one zip file** *that you will name as* **<your first name>_<your last name>_ assignment4**.

You can and are encouraged to discuss HTML, CSS, SVG, JavaScript and D3 with each other. ***However, all work in questions (implementation) must be your own; you must neither copy from nor provide assistance to anybody else (including online resources). If you need guidance for any question, talk to the instructor or TAs.***

In this assignment, you will use the same data of 119 countries that you used in the previous assignments (*countries.json*). As you remember, the file contains information about the population, GDP, life expectancy, and many other aspects for various countries from 1995 to 2012. You will mainly plot the GDP information in a hierarchical representation and you will enable exploration of the data through various interactive features that you will develop.

The main visual will be a hierarchical (organized as a tree) collapsible directed graph. The leftmost node of this graph (the root of the tree) represents the **world**. The next level of nodes represents **continents**. Next and final level (leaf nodes) represents **countries**. A country node is connected to the corresponding continent node (i.e., the leaf node that represents Germany is connected to the node that represents Europe). The size of leaf nodes (countries) should be proportional to the GDP of **the year 2012** of the corresponding country.

You should provide radio buttons to tinker with the layout, color and sorting criteria of your graph as shown in Figure 4.1.

All the continents in your graph should have different colors, and countries within the same continent should have the same color as their respective continents.

If the color option is changed to None, all nodes in the tree should have same gray color.
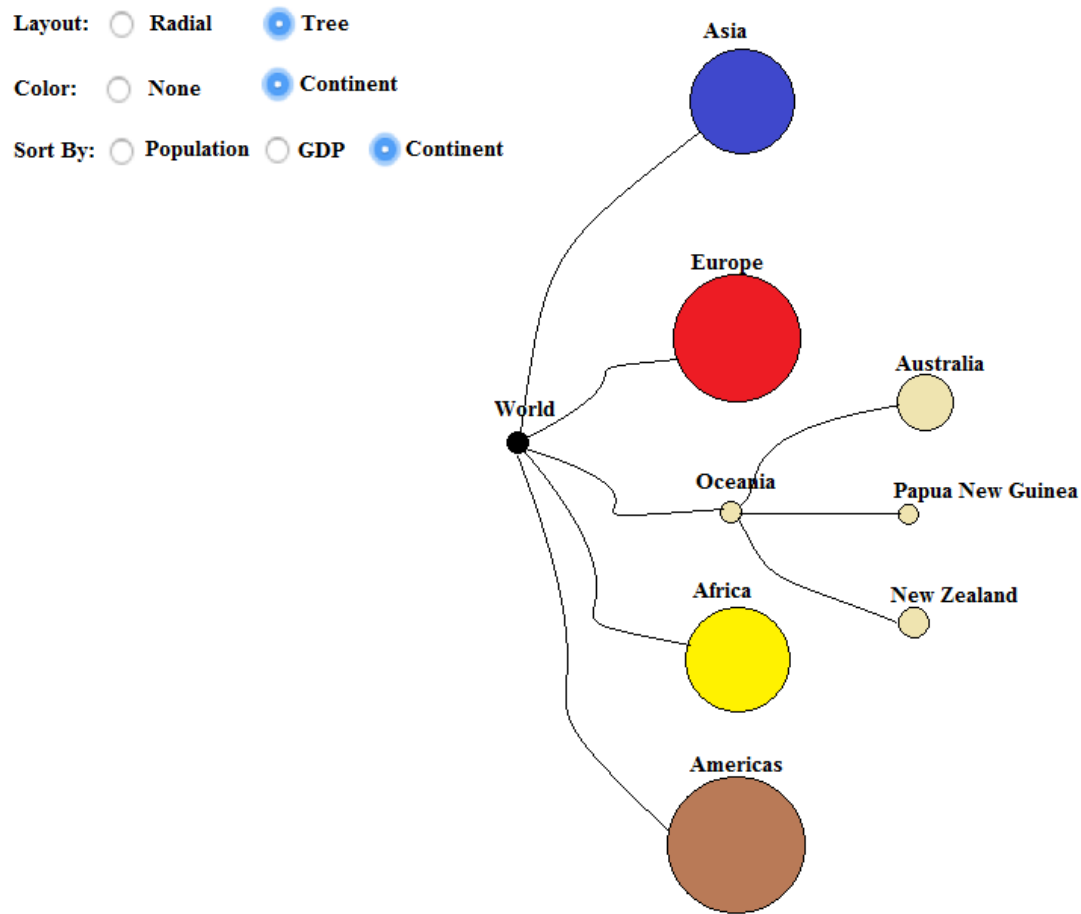
Figure 4.1 – Tree layout representing countries in different continents. In this particular instance all the continents (except for Oceania) are collapsed nodes

When layout is changed to Radial, your visual that is depicting the countries should switch to the radial tree structure shown in Figure 4.2 below.
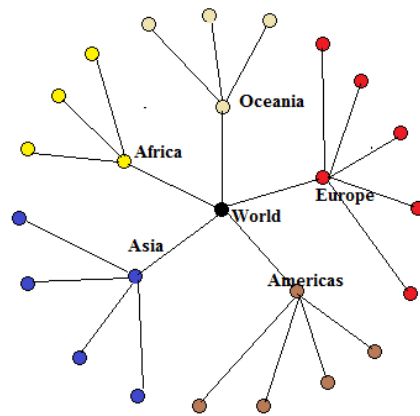
Figure 4.2 – Radial Layout representing countries in different continents

Although it is not shown in the diagram above, you should also have labels for the country nodes, specifying the country the corresponding node is referring to.

Under the radial layout scheme, the country nodes will have the same size. You should also be able to sort the country nodes according to various aspects. In Figure 4.2, the country nodes are sorted by continent (countries that are in the same continent are next to each other). If the "sort by" criterion is changed, your visuals should be updated to reflect that change. For example, if population is selected, country nodes will be rearranged to order them based on the population in the year 2012.

You need to support 'Sort By' feature only in the Radial layout configuration.

Events:

Mouse Over: When a mouse moves over a node, a tooltip should appear with the name, GDP and population information (for the year 2012) of the country/continent/world. You can create and style the tooltip anyway you prefer. For continents, the GDP is total GDP of the corresponding countries and, for world, it is total GDP of all countries. The same goes for the population (see Figure 4.3).

Click: When a ***click*** event occurs on ***any continent/world node*** in the graph, it should collapse into a single node (hiding all corresponding countries or all continents in case of world), which has a size that ***is proportional to the total GDP*** of all corresponding countries. When you ***click*** again on ***a collapsed node***, it should open up and return to the original form.

When a click event occurs on a **country node**, a tooltip should appear with a line graph showing the GDP trends of that country from 2000 to 2012 (see Figure 4.4). Your line graph should have properly updated axes and tick marks to show the GDP figures.
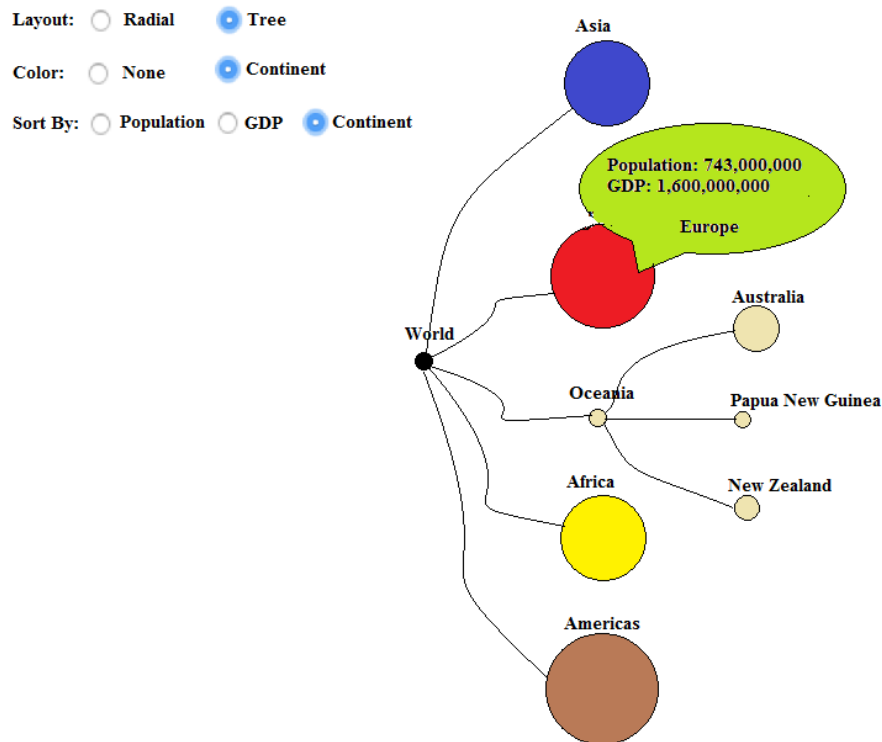

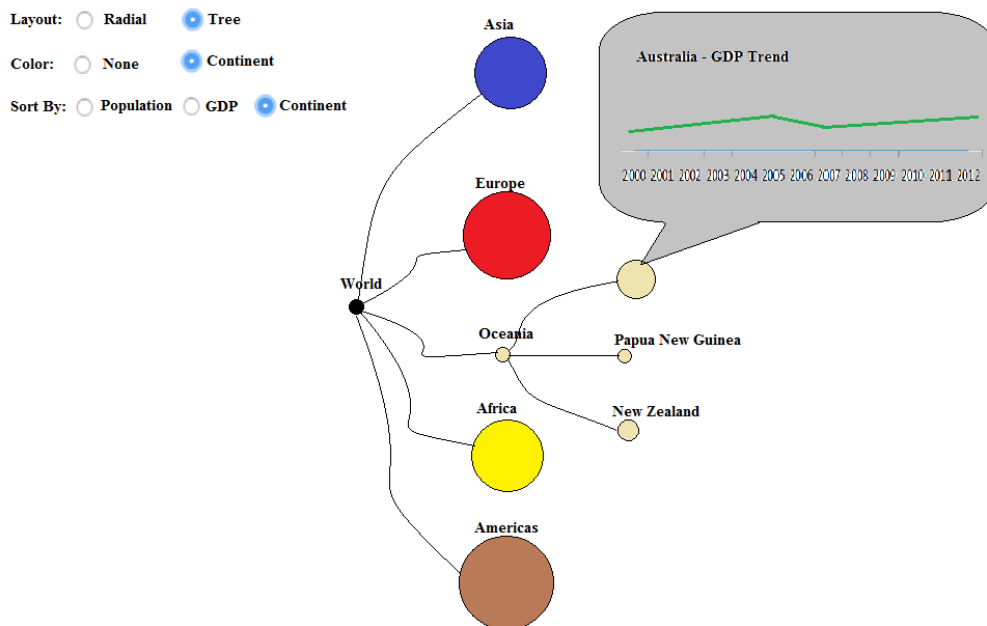Figure 4.3 – Mouse Over event for the tree layout

Figure 4.4 – Click event for the tree layout

Please return in a directory:

- All your HTML, JavaScript and CSS files (you can have sub-directories if you prefer). Your main HTML file should be named as ***index.html***. When we open *index.html* in our web browser (*Chrome* will be used for grading), the visuals should show up in the main page.