

**Due Friday, March 24, 11.59pm**

This project will use USGS earthquake dataset to cluster quakes by magnitude, and demonstrate a number of graph algorithms, and computing metrics based on the graph structure. This project will be in 2 parts, and will use BRIDGES for visualizing the required output of each task.

In part 1 (this project), you will read in the given dataset and display the graph using an adjacency list representation. You will also cluster the retrieved quake data by magnitude. Prior to starting the project, **First, review the graph examples that you worked on in the lab assignment, prior to beginning this project.**

**Dataset:** We will use the USGS earthquake dataset for this project; similar to the IMDB dataset, a call to get the earthquake data is as follows (you will need to import the two classes, USGSaccount and EarthquakeUSGS) and make the following calls:

```
int num_quakes = 1000;
USGSaccount acct = new USGSaccount("earthquake");
List<EarthquakeUSGS> eq_list = Bridges.getEarthquakeUSGSData(acct, num_quakes);
```

where *eq\_list* is a Java List containing *num\_quakes* earthquake records.

**Tasks.**

Here you will do a set of preliminary tasks that will be useful to complete the full project. Your application should have the following components ready and tested(all using BRIDGES).

1. **Create Magn. Range Nodes:** In order to create a clusters of earthquakes by magnitude ranges, you will first create a set of graph nodes to represent those ranges. We will have 6 such nodes, labeled as **0-1.0, 1.0-2.0, 3.0-4.0, 4.0-5.0, 5.0-6.0, >6.0**; connect the nodes into a ring. See for example, <http://bridges-cs.herokuapp.com/assignments/101/kalpathi60> (Hit 'l' to display the labels). **Call the Bridges visualize() method to create a visualization.**
2. **Create the graph:** Iterate through the list of earthquakes, retrieve the earthquake objects (of type EarthquakeUSGS) using the getValue() method. Refer to the full description of this class on the BRIDGES API (<http://bridgesuncc.github.io/doc/java-api/current/html/index.html>). Create a new node for this quake, create a label (put in its magnitude, location, time, etc using the methods of EarthquakeUSGS – use “\n” for new lines for formatting). Retrieve the magnitude of this quake and add a link to its appropriate range node. **Call the Bridges visualize() method to create a visualization. Example visualization at [http://bridges-cs.herokuapp.com/assignments/19/bridges\\_public](http://bridges-cs.herokuapp.com/assignments/19/bridges_public)**
3. **Color Coding the quakes.** We would like to color code the quakes to imply its magnitude. There are several ways you can do this. **Try the following 3 ways and generate visualizations of each:**
  - **By Opacity.** Choose any arbitrary color (refer to the documentation of ElementVisualizer to see the supported colors by name or you can specify R,G, B values) and vary the opacity, ranging from highly opaque( high magnitude) to highly transparent(low magnitude). Ensure all quakes are clearly visible.
  - **By Color.** You can use a color range, say from blue to red to map the magnitude.
  - **By Size.** You can change the size of the node (ranges from 10-50 for nod size) and map that to the magnitude.

**Evaluation:**

- By interactive demo; a schedule will be set up to show your implementation by the teaching assistant.

- You will download your submission during the demo and run your program and demonstrate the results.
- Turn in your source code to Canvas by the deadline; **Source code must be well documented for full credit.**