

# CSE 6242 / CX 4242: Data and Visual Analytics

## Georgia Tech, Spring 2020

### Homework 2 : Tableau, D3 Graphs and Visualization

Prepared by our 32+ wonderful TAs of [CSE6242A,Q,QSZ,OAN,001,O3/CX4242A](#) for our 1100+ students

## Submission Instructions and Important Notes

It is important that you carefully read the following instructions and those about deliverables at the end of each question, or **you may lose points**.

1. Always check to make sure you are using the **most up-to-date assignment** (version number at bottom right of this document).
2. Submit a **single zipped file**, called "HW1-GTusername.zip", containing all the deliverables including source code/scripts, data files, and readme. Example: "HW1-jdoe3.zip" if GT account username is "jdoe3". Your GT username is the **one with letters and numbers**. Only .zip is allowed; no other format will be accepted.
  - a. At the end of this assignment, we have specified a folder structure **you must use** to organize your files. **5 points will be deducted for not following this strictly**.
  - b. Due to the large class size, we may need to use auto-grading scripts to grade some of your deliverables, to help speed up grading, so we can return graded work to you sooner. Thus, it is extremely important that you strictly follow the instructions.
  - c. **Do not include any intermediate files** you may have generated while working on the task, unless your work is absolutely dependent on it to get the final result — there are rarely any situations that would justify such a need.
  - d. Wherever you are asked to write down an explanation for the task you perform, **stay within the word limit** or you may lose points.
3. You may discuss high-level ideas with other students at the "whiteboard" level (e.g., how cross validation works, use hashmap instead of array) and review any relevant materials online. **However, each student must write up and submit his or her own answers**.
4. All incidents of suspected dishonesty, plagiarism, or violations of the [Georgia Tech Honor Code](#) will be subject to the institute's Academic Integrity procedures (e.g., reported to and directly handled by the [Office of Student Integrity \(OSI\)](#)). **Consequences can be severe, e.g., academic probation or dismissal, grade penalties, a 0 grade for assignments concerned, and prohibition from withdrawing from the class**.
5. You should submit your work by the official **Due** date on Canvas, the same date specified on the course schedule.
  - a. Every homework assignment deliverable comes with a 48-hour "grace period". You do **not** need to ask before using this grace period.
  - b. You may re-submit your work before the grace period expires **without penalty**, but Canvas will mark your submission as **"late"**.

- c. [Canvas automatically appends a “version number” to files that you re-submit](#). You do not need to worry about these version numbers, and there is no need to delete old submissions. **We will only grade the most recent submission.**
- d. **Any deliverable submitted after the grace period will get 0 credit.** We recommend that you submit your work before the grace period begins.
- e. **We will not consider late submission of any missing parts** of a deliverable. To make sure you have submitted everything, download your submitted files to double check. If your submitting large files, you are responsible for making sure they get uploaded to the system in time. You have 48 hours to verify your submissions!

## Grading

The maximum possible score for this homework is 100 points.

Students in the CX4242 undergraduate section can choose to complete any 85 points worth of work to receive the full 15% of the final course grade. For example, if a CX4242 student scores 100 pts, that student will receive  $(100 / 85) * 15 = 17.65$  points towards the final course grade. To receive the full 15% score, students in the CSE6242 sections will need to complete all questions correctly.

## ===== Important Prerequisites =====

1. **Download the [HW2 Skeleton](#)** that contains files you will use in this homework.
2. Use the **latest Firefox browser** to complete this homework. We will grade your work using **Firefox 72.0 (or newer)**.
3. You will work with **version 5** of D3 in this homework. You provided to you in the **lib** folder use any D3 libraries (d3\*.js) other than the ones provided in the **lib** folder.
4. **You may need to setup a local HTTP server in the root (hw2-skeleton) folder to run your D3 visualizations**, depending on your web browser, as discussed in the D3 lecture (OMS students: the video “Week 5 - Data Visualization for the Web (D3) - Prerequisites: Javascript and SVG”. Campus students: see [lecture slide](#)). The easiest way to start a local server is to use http.server for Python 3.x, or SimpleHTTPServer for Python 2.x (for more details, see [link](#)).
5. **All d3\*.js files in the lib folder must be referenced using relative paths**, e.g., “../lib/<filename>” in your html files. For example, suppose the file “Q2/graph.html” uses d3, its header should contain:  

```
<script type="text/javascript" src="../lib/d3.v5.min.js"></script>
```

**It is incorrect to use an absolute path such as:**  

```
<script type="text/javascript" src="C:/Users/polo/hw2-skeleton/lib/d3.v5.min.js"></script>
```
6. For questions that require reading from a dataset, **you may be required to submit the dataset in the deliverables too**. For such questions, in your html/js code, use a **relative path** to read in the dataset file. For example, suppose a question reads data from `earthquake.csv`, the path should simply be “earthquake.csv” and **NOT** an absolute path such as “C:/Users/polo/hw2-skeleton/Q/earthquake.csv”.
7. You can and are encouraged to decouple the style, functionality and markup in the code for each question. That is, you can use separate files for css, javascript and html.

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## Q1 [10 points] Designing a good table. Visualizing data with Tableau.

a. **[5 points] Good table design.** You want to help a retail store analyze its global sales and profit in the years 2015 and 2016. Create a well-designed table to visualize the data contained in *sales.csv*. You can use any tool (e.g., Excel, HTML) to create the table.

For each year and for each region, your table should clearly communicate :

1. The total number of units sold
2. The total profit, rounded to 2 decimal places
3. The item type with the highest sales, determined based on the total number of units sold. For example, suppose 70 units of Item A have been sold and 95 units of Item B have been sold; then item B is the one with the highest sales.
  - a. If a region has only one item type sold in a year, then that item type has the highest sales.
4. Percentage of total profit that comes from the item type with the highest sales, rounded to 2 decimal places (you need to calculate this percentage)
5. **Save the table as table.png**

**Note:** If a region has no sales in a particular year, use '0' for Total Units, Total Profit , Percentage of Total Profit and 'NA' for Item type with highest sales.

You may decide on the most meaningful column names to use, the number of columns, and the column order. Keep suggestions from lecture in mind when designing your table. You are not limited to use only the techniques described in lecture. For OMS students, the online lecture video pertaining to this topic is *Week 4 - Fixing Common Visualization Issues - Fixing Bar Charts, Line Charts*). For campus student, please review slide 43 and onwards of the [lecture slides](#).

### b. [5 points] Tableau.

You want to help your organization better understand the sales in different regions from different channels. Visualize *sales.csv* as a grouped bar chart. Your chart should display regions (e.g., Asia, Australia) along the horizontal axis and number of units sold along the vertical axis. Also show offline and online channels sales for each region.

Our main goal here is for you to try out Tableau, a popular information visualization tool. Thus, we keep this part more open-ended, so you can practice making design decisions. **We will accept most designs from you all.** We show one possible design in the figure below, based on the tutorial from [Tableau](#), and you are not limited to the techniques presented there.

Instructions:

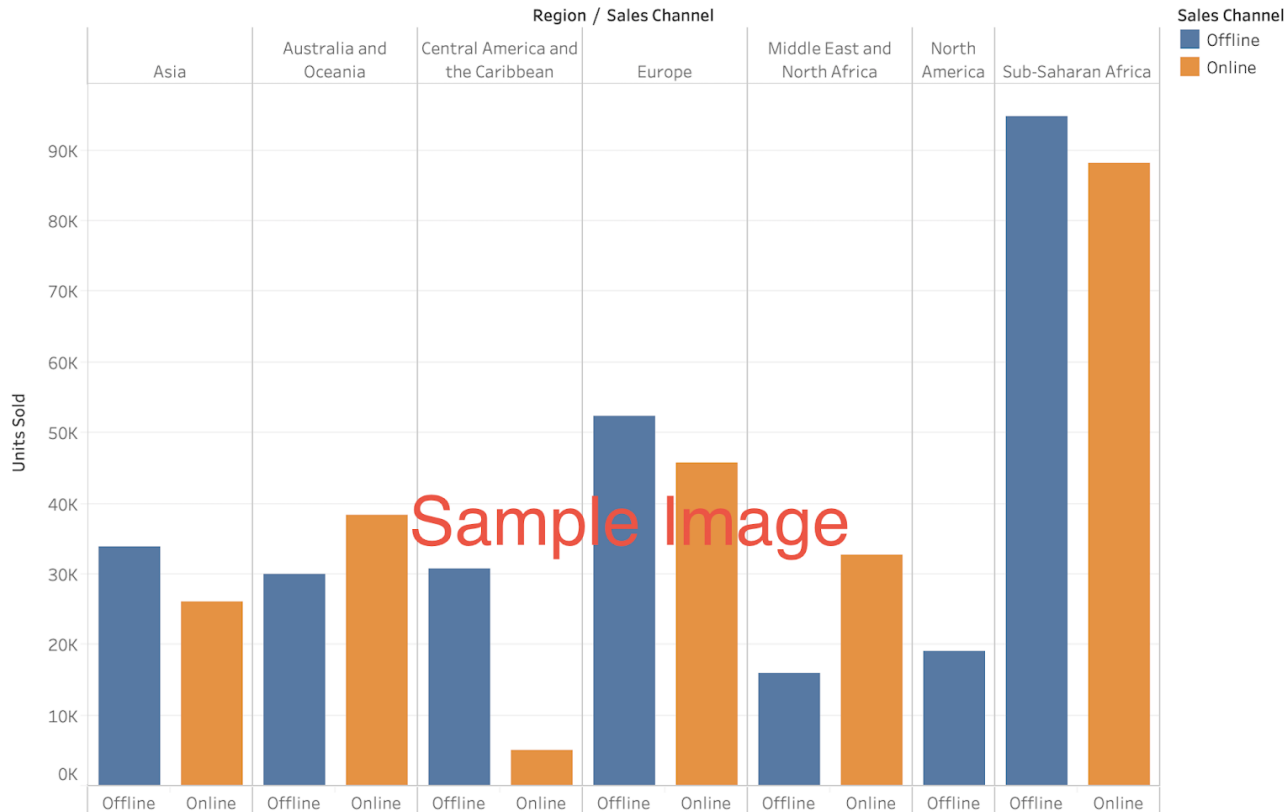
1. Your design should be grouped bar chart, showing units sold for each channel for each region.
2. Your design should have clear label axes and a clear chart title. Include a legend for your chart.
3. **Save the chart as barchart.png**

Tableau has provided us with student licenses for *Tableau Desktop*, available for Mac and Windows. Go to [tableau](#) and select "Tableau Desktop". After installation, you will be asked to provide an activation key, which you can find on the Canvas page for this assignment. This key is for your use in this course only. **Do not share the key with anyone.**

If you do not have access to a Mac or Windows machine, please use the 14-day trial version of *Tableau Online*:

1. Visit <https://www.tableau.com/trial/tableau-online>
2. Enter your information (name, email, GT details, etc)
3. You will then receive an email to access your Tableau Online site
4. Go to your Site and create a workbook

One final option, if neither of the above methods work, is to take advantage of [Tableau for Students](#). Follow the link and select "Get Tableau For Free". You should be able to receive an activation key which offers you a one-year use of Tableau Desktop at no cost by providing a valid Georgia Tech email. Note that it is unclear whether Tableau intends for these licenses to be renewable, so you may only be eligible to receive one in the event that you have never used a *Tableau for Students* license before.



**Figure 1:** Example of a grouped bar chart

### Q1 Deliverables:

The directory structure should be as follows:

Q1/

table.png  
barchart.png  
sales.csv

- **table.png** - An image/screenshot of the table in Q1.a (png format **only**).
- **barchart.png** - An image of the chart in Q1.b (png format **only**), Tableau workbooks will not be graded!). The image should be clear and of high-quality.
- **sales.csv** - The dataset provided

## Q2 [15 points] Force-directed graph layout

You will experiment with many aspects of D3 for graph visualization. To help you get started, we have provided the graph.html file (in the Q2 folder).

**Note:** You are welcome to split graph.html into graph.html, graph.css, and graph.js. **Make sure that all paths in your code are relative paths. Nonfunctioning code will result in a five point deduction.**

a. **[2.5 points] Adding node labels:** Modify graph.html to show the node label (the node name, i.e., the source) at the bottom right of each node in **bold**. If a node is dragged, its label must move with it.

b. **[3 points] Styling edges:** Style the edges based on the “value” field in the links array. Assign the following styles:

If the value of the edge is equal to 0, the edge should be **blue**, **thick**, and **solid**.

If the value of the edge is equal to 1, the edge should be **black**, **thin**, and **dashed**.

c. **[3 points] Scaling nodes:**

1. **[1.5 points]** Scale the radius of each node in the graph based on the degree of the node (you may try linear or squared scale, but you are not limited to these choices).

**Note:** Regardless of which scale you decide to use, you should avoid extreme node sizes, which will likely lead to low-quality visualization (e.g., nodes that are mere points, barely visible, or of huge sizes).

**Note:** D3 v4 (and above) does not support d.weight (which was the typical approach to obtain node degree in D3 v3). You may need to calculate node degrees yourself. Example relevant approach: <https://stackoverflow.com/questions/43906686/d3-node-radius-depends-on-number-of-links-weight-property>

2. **[1.5 points]** The degree of each node should be represented by varying colors. Pick a meaningful color scheme (hint: color gradients). The number of color gradations is up to you, but it must be visually evident that the nodes with higher degree use darker/deeper colors and the nodes with lower degrees use lighter colors. You can find example color gradients at [Color Brewer](#).

d. **[6 points] Pinning nodes** (fixing node positions):

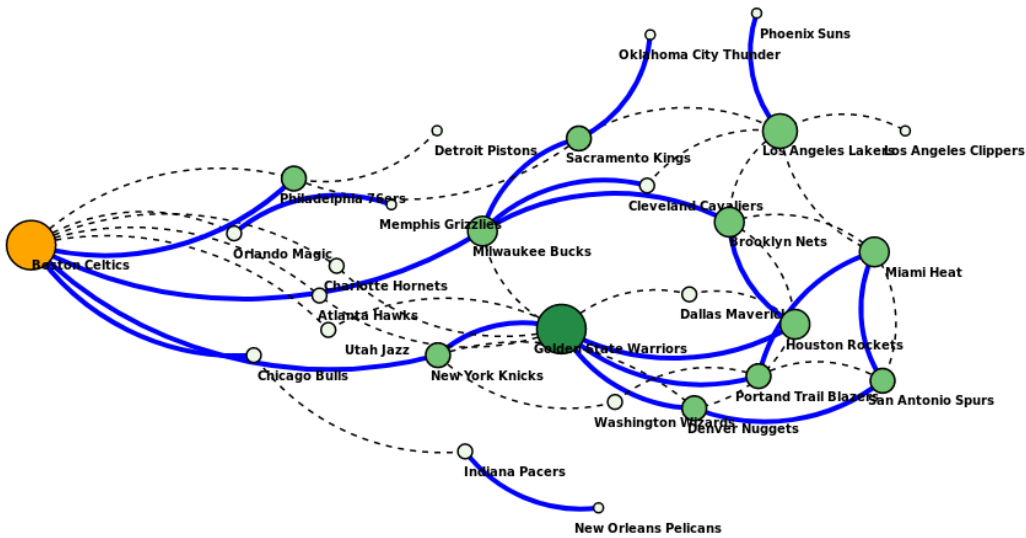
1. **[2 points]** Modify the code so that when you double click on a node, it pins the node's position such that it will not be modified by the graph layout algorithm (note: pinned nodes can still be dragged around by the user but they will remain at their positions otherwise). Node pinning is an effective interaction technique to help users spatially organize nodes during graph exploration.

2. **[2 points]** Mark pinned nodes to visually distinguish them from unpinned nodes, e.g., pinned nodes are shown in a different color, border thickness or visually annotated with an “asterisk” (\*), etc.

3. **[2 points]** Double clicking a pinned node should unpin (unfreeze) its position and unmark it.

e. **[0.5 points] Add GT username:** Add your Georgia Tech username (usually includes a mix of letters and numbers, e.g., gburdell3) to the top right corner of the force-directed graph (see example image).

gburdell3



**Figure 2a.** Example Visualization with pinned node (orange)

## Q2 Deliverables:

The directory structure should be as follows:

Q2/

graph.(html / js / css)

- **graph.(html / js / css)** - the html file created, and the js / css files (if you decide to save js and css in their own separate files)

## Q3 [15 points] Line Charts

Use the dataset<sup>[1]</sup> provided in the file *earthquakes.csv* (in the Q3 folder) to create line charts.

Refer to the tutorial for line chart [here](#).

**Note:** You will create four plots in this question, which should be placed one after the other **on a single HTML page**, similar to the example image below (Figure 3). Note that your design need NOT be identical to the example.

**a. [5 points] Creating line chart.** Create a line chart that visualizes the number of earthquakes worldwide from 2000 to 2015 (inclusively), for the four magnitude ranges: ['5\_5.9', '6\_6.9', '7\_7.9', '8.0+']. Use the color scheme provided below for the magnitude ranges. Add a legend at the top right corner of the chart showing the magnitude-color mapping.

- Chart title: Earthquake Statistics for 2000-2015
- Horizontal axis label: Year
  - Use `scaleTime` like you did in HW1Q3

- Vertical axis label: Num of Earthquakes
  - Use linear scale for this part a
- Colors scheme: {'5\_5.9': '#FFC300', '6\_6.9': '#FF5733', '7\_7.9': '#C70039', '8.0+': '#900C3F'}

**b. [5 points] Adding symbols and scaling symbol sizes.** Create a line chart for this part (append to the HTML page) whose design is a variant of what you have created in part a. Start with your chart from part a. Then modify the code to visualize each data point in the chart as a solid symbol according to the Symbols scheme, whose size is proportional to “Estimated Deaths”. Use a good scaling coefficient (your choice) to make the chart legible, visually attractive and meaningful. Keep the legend.

- Chart title: Earthquake Statistics for 2000-2015 with Symbols
- Symbols scheme: {'5\_5.9': circle, '6\_6.9': triangle, '7\_7.9': diamond, '8.0+': square}

**c. [5 points] Axis scales in D3.** Create two line charts for this part (append to the HTML page) to try out two axis scales in D3. Start with your chart from part b. Then modify the vertical axis scale for each chart: the first chart uses the square root scale for its vertical axis (only), and the second plot uses the log scale for its vertical axis (only). Keep the legend and symbols. At the bottom right of the last chart, add your **GT username** (see Figure 3c-2 for example). In **explanation.txt**, explain when we may want to use such nonlinear scales as square root scale and log scale in charts, in no more than 50 words.

**Note:** the horizontal axes should be kept in linear scale, and only the vertical axes are affected.

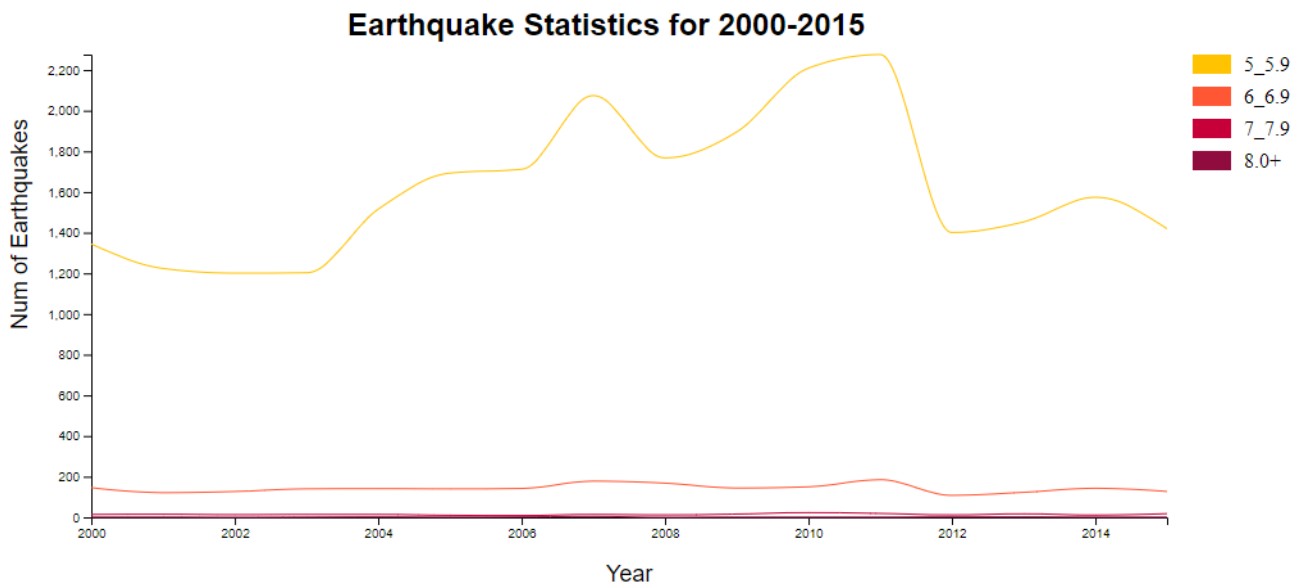
**Hint:** You may need to carefully set the scale domain to handle the 0s in data.

#### ■ First chart

- Chart title: Earthquake statistics for 2000-2015 (Square root Scale)
- This chart uses the square root scale for its vertical axis (only)
- Other features should be the same as part b.

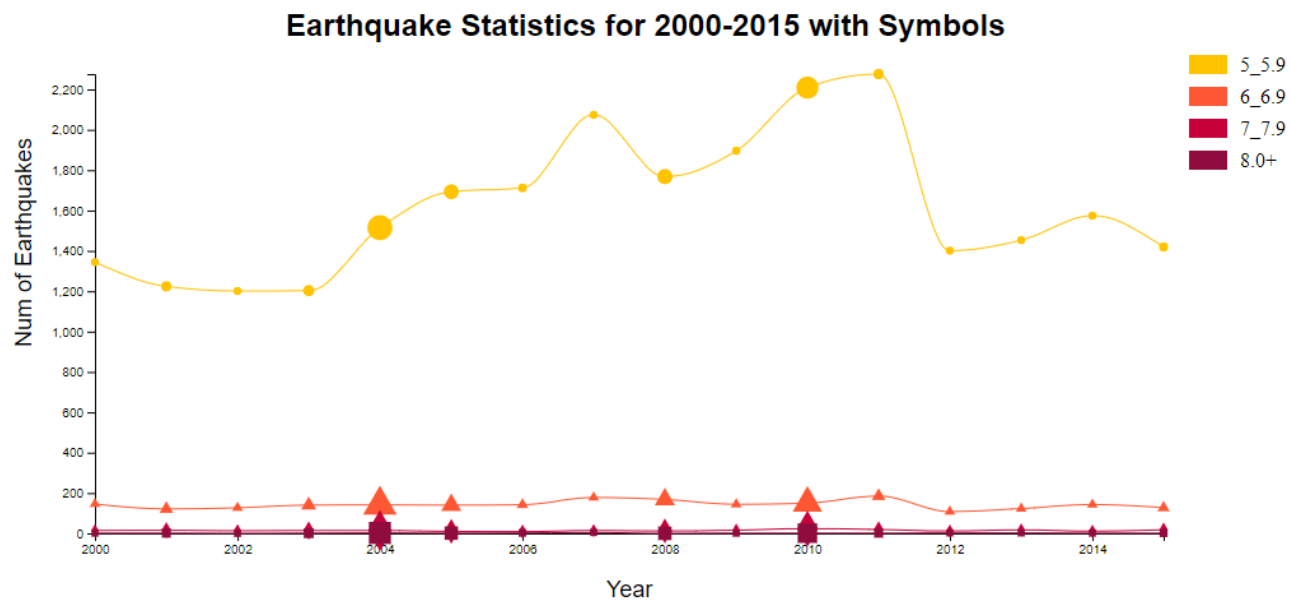
#### ■ Second chart

- Chart title: Earthquake statistics for 2000-2015 (Log Scale)
- This chart uses the log scale for its vertical axis (only)
- Other features should be the same as part b.

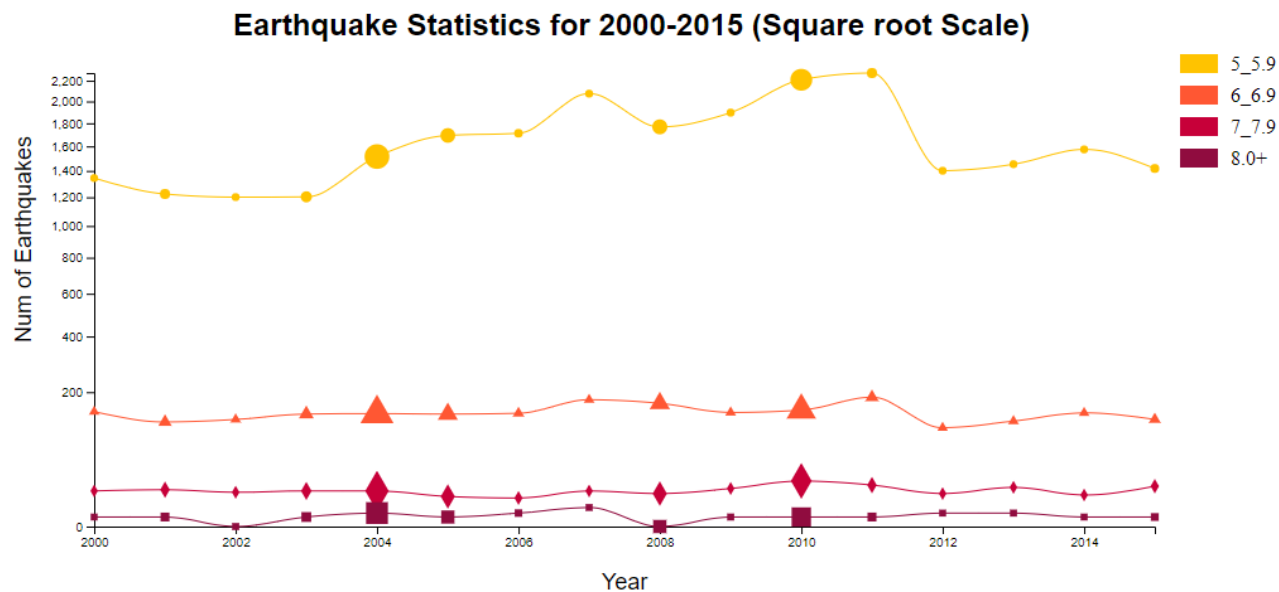


**Figure 3a:** Example line chart



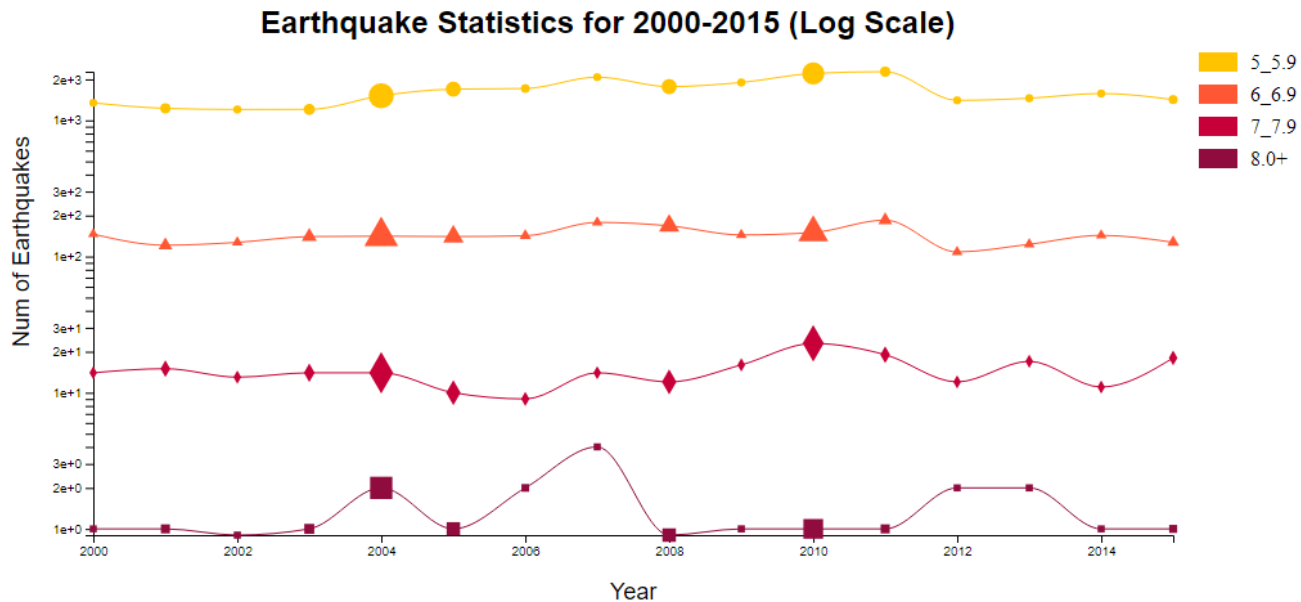


**Figure 3b:** Example line chart with symbols



**Figure 3c-1:** Example line chart using square root scale





gburdel13

**Figure 3c-2:** Example line chart using log scale

### Q3 Deliverables:

The directory structure should be organized as follows:

Q3/

earthquakes.csv  
 linecharts.(html / js / css)  
 linecharts.pdf  
 explanation.txt

- **earthquakes.csv** - the dataset.
- **linecharts.(html / js / css)** - the html file created, and the js / css files (if you decide to save js and css in their own separate files).
- **linecharts.pdf** - a PDF document showing the screenshots of the four line charts created above (one for Q3.a, one for Q3.b and two for Q3.c). You should print the HTML page as a PDF file, and each PDF page shows one plot ([hint: use CSS page break](#)). Clearly title the plots as instructed (see examples in Figure 3).
- **explanation.txt** - the text file explaining your observations for Q3.c.

## Q4 [20 points] Interactive Visualization

Use the dataset `state-year-earthquakes.csv` provided in the Q4 folder to create an interactive line chart and sub-chart.

This dataset<sup>[2]</sup> contains the earthquake counts by U.S. state and region, in the years 2011 to 2015 (inclusively). In the data sample below, each row under the header represents a state, its region, year, and count of earthquakes.

```
state, region, year, count
Hawaii, West, 2011, 34
Hawaii, West, 2012, 40
```

### a. [3 points] Create a line chart.

Summarize the data by displaying the count of earthquakes by region for each year. You will need to sum the count of earthquakes by year for all states in their respective regions. Then, display one line for each

of the 4 regions in the dataset.

Axes: All axes should automatically adjust based on the data. Do not hard-code any values.

- The vertical axis will represent the total count of earthquakes for a region. Display these values using a linear scale.
- The horizontal axis will represent the years. Display these values using a time scale.

**b. [3 points] Line styling, legend, title and username.**

Lines: Each line should use a different color of your choosing to differentiate between regions. Display a dot shape over each data point in the line chart (i.e., a line should have one dot displayed for each year).

Legend: Display a legend on the right-hand portion of the chart that maps the line color to the name of the region.

Title: Display the title "US Earthquakes by Region 2011-2015" at the top of the plot.

Username: Add your GT username (usually includes a mix of lowercase letters and numbers, e.g., gburdell3) beneath the title (see example figure 4b).

The line chart should be similar in appearance to the chart provided in figure 4b.

**Note:** The data provided in `state-year-earthquakes.csv` requires some processing for aggregation. **All aggregation must only be performed in javascript; you must not modify `state-year-earthquakes.csv`.** That is, your code should first read the data from `.csv` file as is, then you may process the loaded data using javascript.

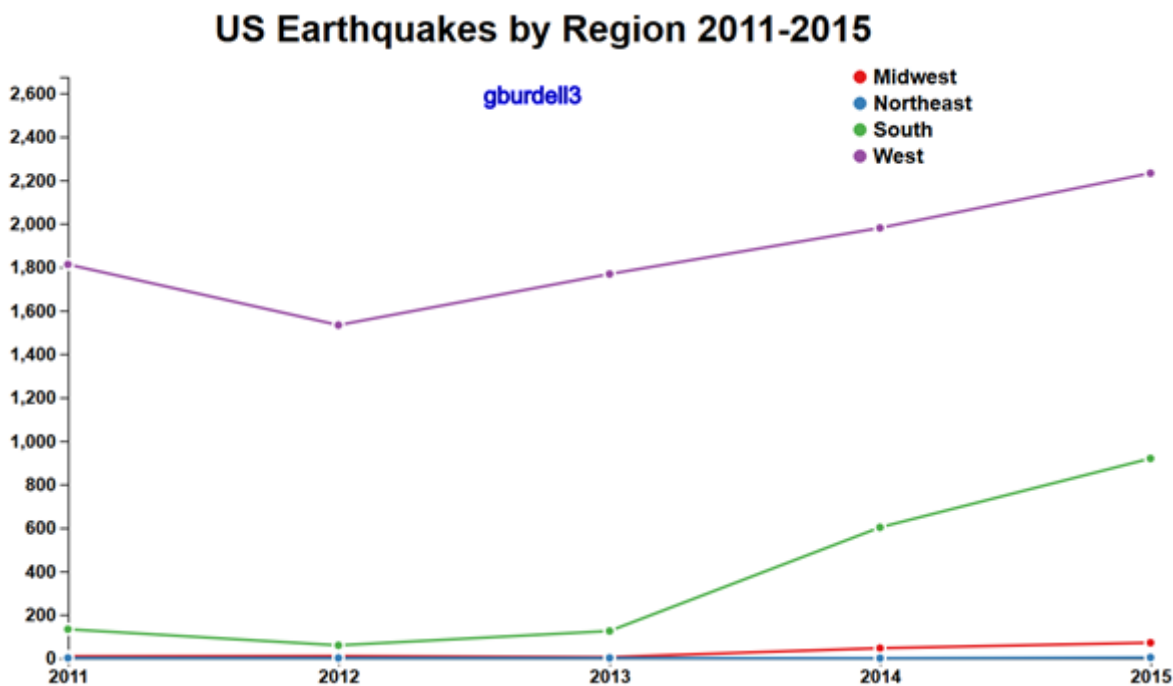


Figure 4b. Line Chart representing count of earthquakes by year for each region

**Interactivity and sub-chart.** In the next few parts of this question, you will create event handlers to detect mouseover and mouseout events over each dot shape that you added in Q4.b, so that when hovering over a dot, a horizontal bar chart representing the earthquake count for each state in a region will be shown below the line chart (for the year of that dot). For example, hovering over the dot for the West region in 2011 will display the bar chart for all states in the Western region and their individual earthquake counts in 2011. See Figure 4c for an example.

## Western Region Earthquakes 2011

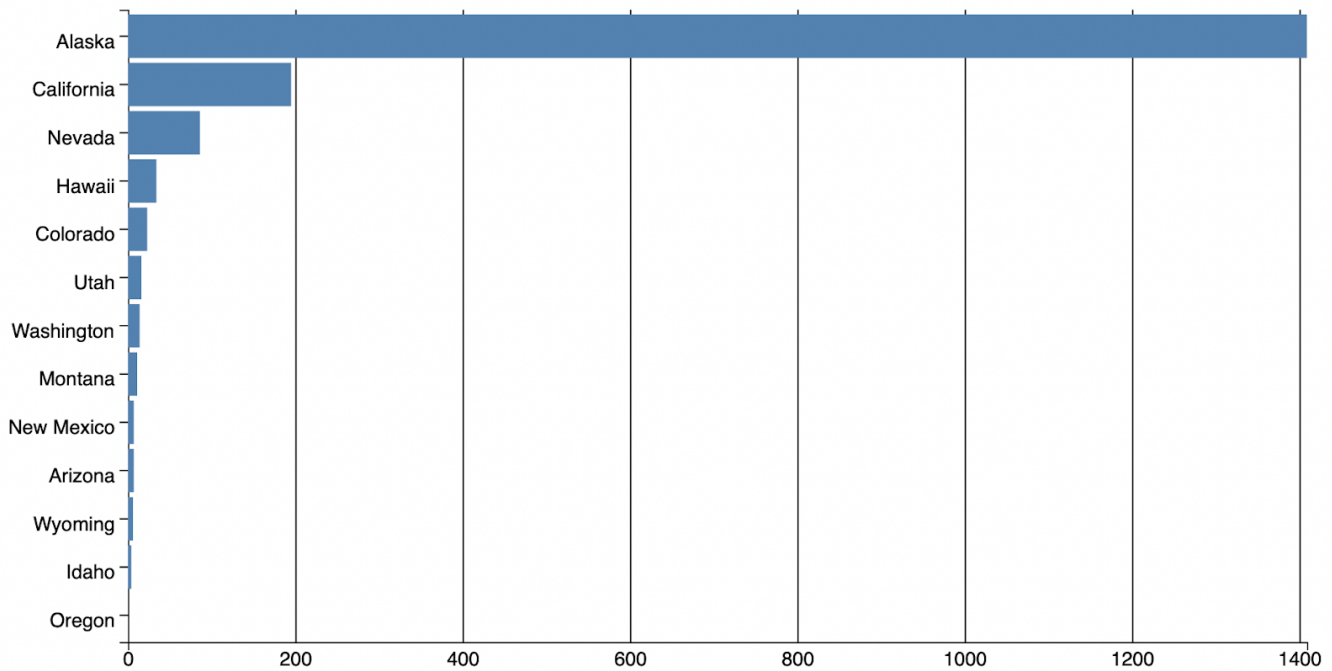


Figure 4c. Bar chart representing count of earthquakes for the Western region in 2011

### c. [5 points] Create a Bar chart

Use a horizontal design for the bar chart, with one bar per state in the selected region. Each bar represents the count of earthquakes for one state in the selected year.

Axes: All axes should automatically adjust based on the data. Do not hard-code any values.

- The vertical axis represents states in a region. The state names should be sorted in ascending order on the vertical axis where the state with the lowest amount of earthquakes is at the bottom and the state with the highest order of earthquakes is at the top.

**Note:** If a region has multiple states with an equivalent count of earthquakes, then order those state names in ascending alphabetical order. e.g., Alabama, Delaware, and Florida have 0 earthquakes in 2013. They will be ordered as:

...
Florida
Delaware
Alabama

- The horizontal axis represents the count of earthquakes for the selected year. Display these values using a linear scale.

### d. [3 points] Bar styling and title

- Bars: All bars should have the same color and a fixed bar width.
- Title: Display a title with format "<Region>ern Region Earthquakes <Year>" at the top of the plot where <Region>, and <Year> are the variables set by hovering over a dot in the line chart. e.g., If displaying earthquakes for the South in 2015, the title would read: "Southern Earthquakes 2015"

### e. [3 points] Mouseover Event Handling

- The barchart and its title should only be displayed during mouseover events for a dot in the line chart.

- The dot in the line chart should change to a larger size during mouseover to emphasize that it is the selected point.

#### f. [3 points] Mouseout Event Handling

- The barchart and its title should be hidden from view on mouseout and the dot previously mouseovered should return to its original size.

The graph should exhibit interactivity similar to the .gif in Figure 4f.

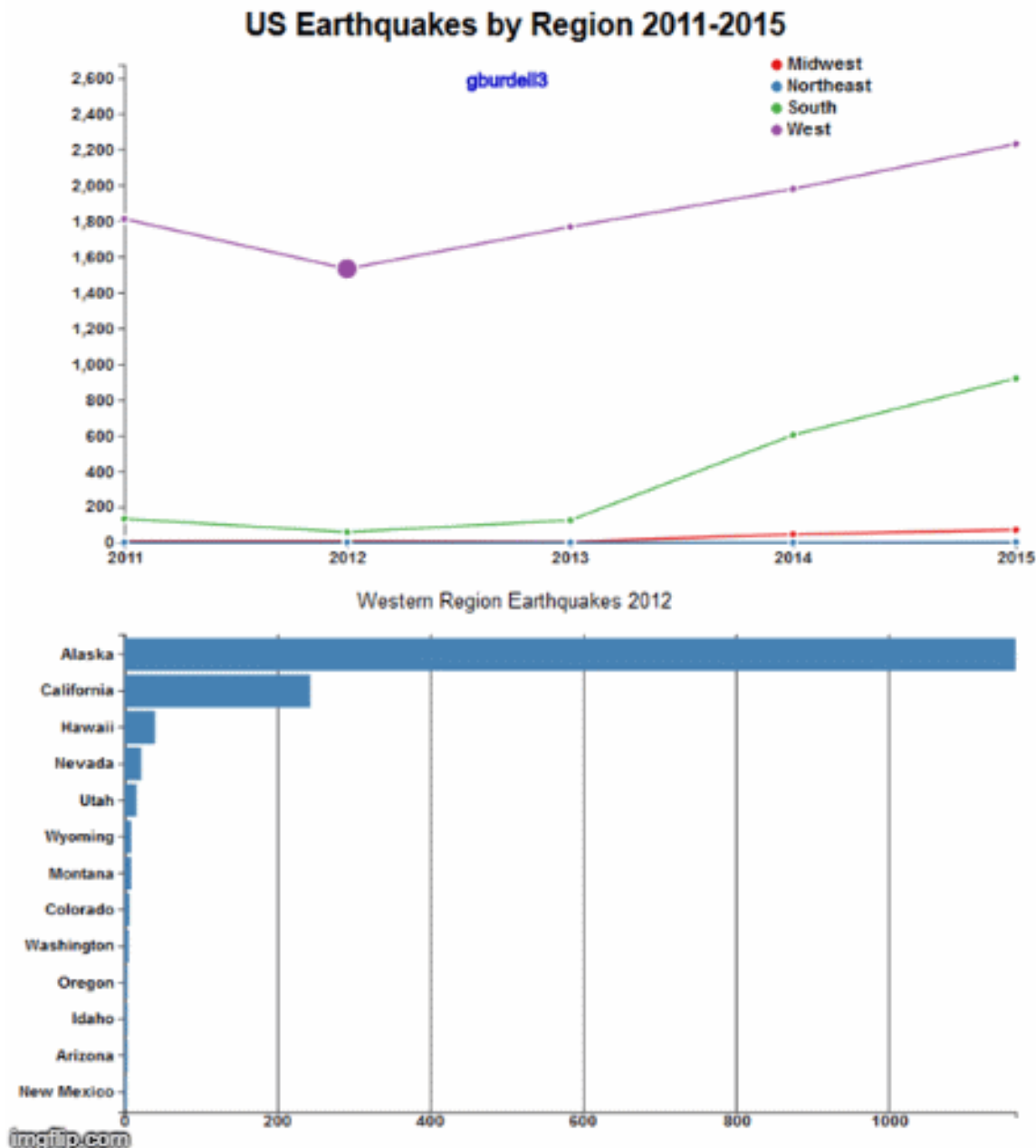


Figure 4f. Line Chart+BarChart demonstrating interactivity

#### Q4 Deliverables:

- The size of the dot in the line chart should be reset.

The directory structure should be as follows:

Q4/

interactive.(html/js/css)

state-year-earthquakes.csv

- **interactive.(html/js/css)** - The html, javascript, css to render the visualization in Q4.
- **state-year-earthquakes.csv** - The datasets used to show the information of each state.

## Q5 [15 points] Stacked Bar plot and select box

### Relevant Example Visualizations: [Stacked Bar Plot](#), [Select Options](#)

Use the dataset provided in *earthquake.csv* (in the Q5 folder) that describes the earthquake counts for different states for years 2017 and 2018 in the US. Visualize the data using D3 stacked bar plot. (Optional reading: the effectiveness of stacked bar charts is often debated --- sometimes, [they can be confusing, difficult to understand, and may make data series comparison challenging.](#))

- [2 pts]** Create a file named *stacked.html*. Within this file, create a stacked bar plot of the earthquakes for different states. Place the state name on the horizontal axis and the earthquake count on its vertical axis.
- [3 pts] Stacks:** Add stacks for each bar representing the number of earthquakes for a given state for the earthquake intensity 7.0+, 6-6.9 and 5-5.9 (as shown in the example visualization in Figure 5). Above each bar, display the total number of earthquakes in the state, for the year chosen in the select box (e.g., in Figure 5, the year “2017” has been chosen).
- [2.5 pts] Color:** In a stacked-bar plot, color scheme is a very important design element that directly affects how easily different stack components may be differentiated. Use the following color scale:
  - 7.0+ maps to color #b33040
  - 6\_6.9 maps to color #d25c4d
  - 5\_5.9 maps to color #f2b447
- [3 pts] Drop Down Select Box:** Create a drop-down [select box](#) with D3 for selecting the year. Place it on top of the plot. When the user selects a year in this select box, the stacked bar plot should be updated with values corresponding to the selected year.
- [2 pts] Legend:** Display a legend on the right-hand portion of the chart that to show the mapping between the stack colors and the earthquake intensities.
- [2 pts] Titles:**
  - Add the plot title “Visualizing Earthquake Counts by State” in 20px font size
  - Add the y-axis title “Number of Earthquakes” and x-axis title “State”, both in 15px font size
- [0.5 pts]:** Add your GT username (e.g., gburdell3) to the bottom-right corner of the plot.

**Note:** If you need to “reshape” the data provided, the reshaping **must only be performed in javascript**; you **must not modify earthquake.csv**. That is, your code should first read the data from earthquake.csv file as is, then you may reshape that loaded data using javascript, and then use it to generate the plot.

**Note: Axes:** Both axes must automatically adjust based on the data. **Do NOT hard-code any axis values.**

- The vertical axis will represent the earthquake count for the stacked bars.
- The horizontal axis will represent the state

Select year: 2017

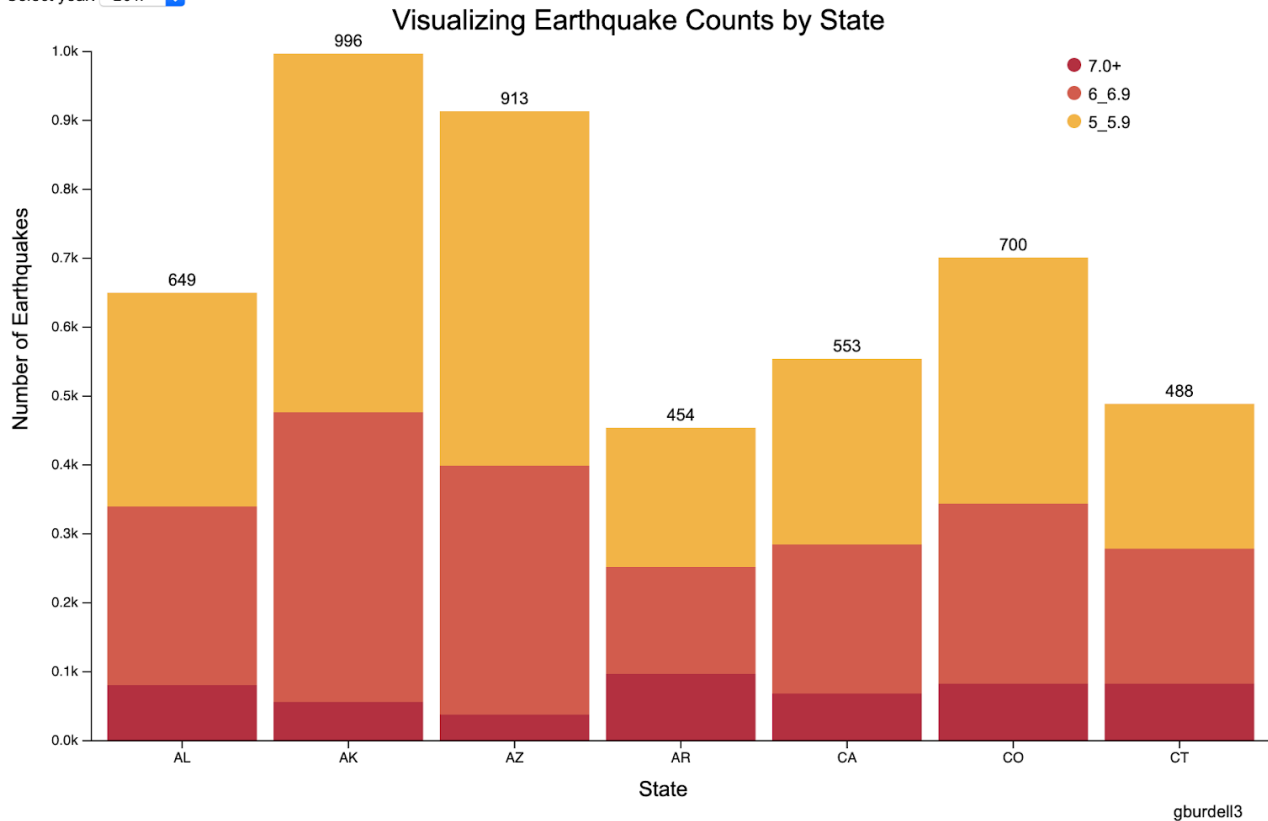


Figure 5: example stacked bar plot

**Q5 Deliverables:**

The directory structure should look like:

Q5/

stacked.(html / js / css)

earthquake.csv

- **stacked.(html / js / css)** - the html file created, and the js / css files (if you decide to save js and css in their own separate files)
- **earthquake.csv** - the dataset

**Q6 [25 points] Choropleth Map of State Data**Example of choropleth map: [Unemployment rates](#)

Use the dataset<sup>[3]</sup> provided in the file **state-earthquakes.csv** and **states-10m.json** (in the Q6 folder) and visualize them as a choropleth map.

- Each record in **state-earthquakes.csv** represents a state and is of the form `<State,Region,2010,2011,2012,2013,2014,2015,Total Earthquakes>`, where
  - **State**: the name of the state. e.g., Alabama.
  - **Region**: the region which the state belongs to. e.g., South.
  - **2010, ..., 2015**: the number of earthquakes in that state in 2010, ..., 2015, respectively.
  - **Total Earthquakes**: the total number of earthquakes in that state during 2010-2015 (the number of earthquakes in the state-earthquakes.csv file have been slightly modified from the original values and do not represent the official figures).

- The *states-10m.json* file is a [TopoJSON topology](#) containing two geometry collections: *states*, and *nation*.

- a. [20 points] Create a choropleth map using the provided datasets, use Figure 6a and 6b below as references.
1. [10 points] Load the data from *state-earthquakes.csv* and create a choropleth map such that the color of each state in the map corresponds to the **log** of earthquakes that occurred in that state for a **particular year** (we recommend that you use 2010). That is, darker colors correspond to higher total earthquakes in that state and lighter colors correspond to lower total earthquakes in that state **in log scale**. Use gradients of only **one** particular hue. When the user selects a different year (see part a.3), the map colors and legends should update (see Figure 6a).

Use [promises](#) (part of the *d3.v5.min.js* file present in the *lib* directory; there is no need to download or install anything) to easily load data from multiple files into a function. Use [topojson](#) (present in the *lib* folder) to draw the choropleth map.

**Note:** A few states have very low numbers of earthquakes which may lead to a very light gradation of color on the scale. We recommend that you set the color of state-borders to **black** so that states with lighter colors are visible.

2. [5 points] Add a **vertical** legend showing how colors map to the number of earthquakes for a particular year. You must use **exactly 9** color gradations in your submission. Also, **display your GT username** (e.g., *gburdell3*) beneath the map.

3. [5 points] Sliders are often used on dashboards to enable filtering of data based on specific attributes. Create an interactive slider (see example in Figure 6a) using the [d3-simple-slider.min](#) library (in the *lib* folder), for users to filter the data by year (2010 - 2015). Set the default year value to 2010. Moving the thumb of the slider to a particular value should set **year** to that value and update both the choropleth map and the legend accordingly (for example, show data for 2011 when 2011 is selected on the slider). **Note that the legend needs to be updated because the range of earthquake frequencies varies from year to year.**

- b. [5 points] Add a tooltip using the [d3-tip.min](#) library (in the *lib* folder). On hovering over a state, the tooltip should show the following information on separate lines: (1) state name, (2) region, (3) year, and (3) earthquakes in that year (Figure 6b demonstrates this for Wyoming). The tooltip should appear when the **mouse** hovers over the state. On mouseout, the tooltip should disappear. We recommend that you position the tooltip some distance away from the **mouse cursor**, which will prevent the tooltip from “flickering” as you move the mouse around quickly (the tooltip disappears when your mouse leaves a state and enters the tooltip’s bounding box). Please ensure that the tooltip is fully visible (i.e., not clipped, especially near the page edges).

**Note:** You **must** create the slider by **only** using **d3-simple-slider.min.js** in the *lib* folder.

**Note:** You **must** create the tooltip by **only** using **d3-tip.min.js** in the *lib* folder.



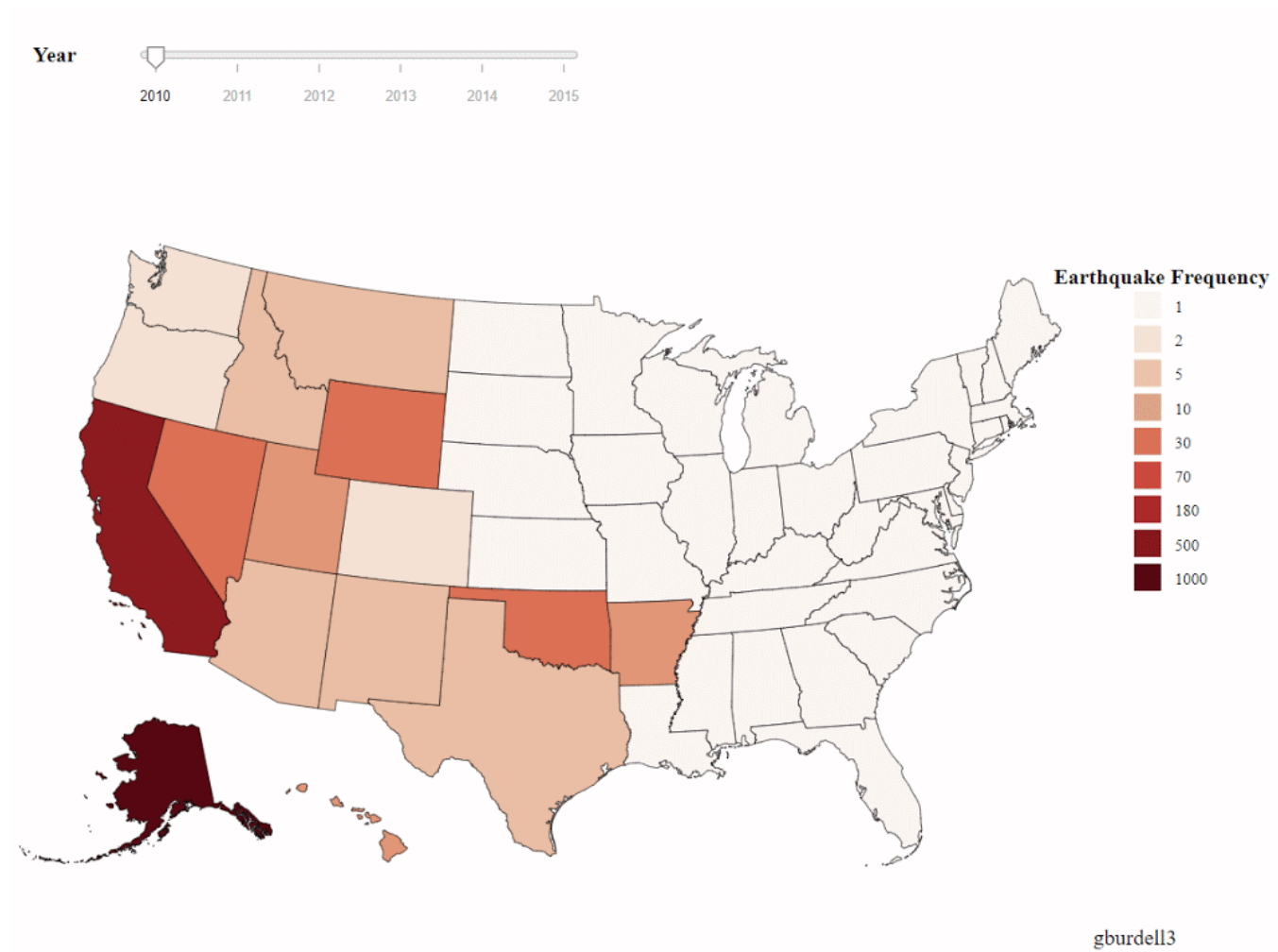


Figure 6a. Reference example for Choropleth Maps showing slider interaction for years 2010 - 2015

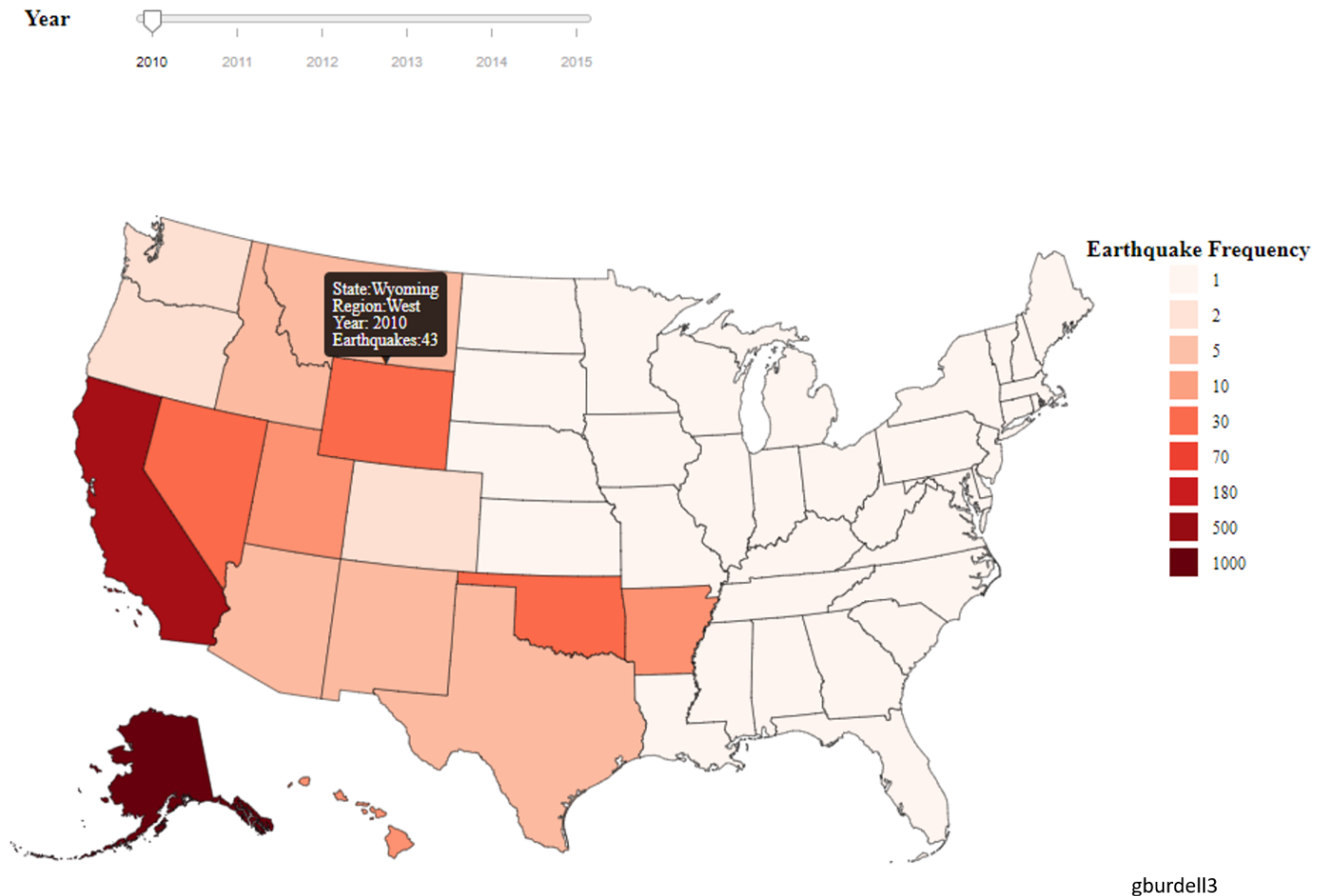


Figure 6b. Reference example for Choropleth Maps showing tooltip for Wyoming

#### Q6 Deliverables:

The directory structure should be organized as follows:

Q6/

choropleth.(html/js/css)  
state-earthquakes.csv  
states-10m.json

- **choropleth.(html /js /css)**- The html/js/css file to render the visualization.
- **state-earthquakes.csv** - The datasets used to show the information of each state.
- **states-10m.json** - Dataset needed to draw the map.

Important: folder structure of the zip file that you submit

You are submitting a single zip file HW2-GTUsername.zip (e.g., HW2-gburde113.zip, where “gburdell3” is your GT username), which must unzip to the following directory structure (i.e., a folder “HW2-gburde113”, containing folders “Q1”, “Q2”, etc.). The files to be included in each question’s folder have been clearly specified at the end of each question’s problem description above.

```
HW2-GTUsername/  
  lib/  
    d3.v5.min.js  
    d3-tip.min.js  
    d3-scale-chromatic.v1.min.js  
    d3-dsv.min.js  
    d3-fetch.min.js  
    d3-simple-slider.min.js  
    topojson.v2.min.js  
Q1/  
  table.png  
  barchart.png  
  sales.csv  
Q2/  
  graph.(html / js / css)  
Q3/  
  linecharts.(html / js / css)  
  linecharts.pdf  
  earthquakes.csv  
  explanation.txt  
Q4/  
  interactive.(html / js / css)  
  state-year-earthquakes.csv  
Q5/  
  stacked.(html / js /css)  
  earthquake.csv  
Q6/  
  choropleth.(html / js / css)  
  state-earthquakes.csv  
  states-10m.json
```

Version 0

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[1] Source: USGS <https://earthquake.usgs.gov/earthquakes/browse/stats.php>

[2] Source: USGS <https://earthquake.usgs.gov/earthquakes/browse/stats.php>

[3] Source: USGS <https://earthquake.usgs.gov/earthquakes/browse/stats.php>

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