

Assignment 1

Date Posted: January 7, 2018

Five Questions, 10 marks each

Due: see Moodle

Question 1

The following list contains the student names of a chemistry class ordered (high to low) by their Assignment 1 scores: [Liz, Mat, Ron, ... , Joe, Ivy, Nim]. Given the success of a Periodic Table for visualizing elements, the instructor thought of a visualization that fills the Periodic Table as follows.

[illegible]

Based on the class lecture, list all the benefits and limitations of this visualization that you can think of.

(Bonus) Can you propose a beautiful visualization for this scenario?

Note: If Periodic Table is unfamiliar to you see (Wiki link). For any clarification on this question, post in Piazza (sec hw1). Discussion among students is encouraged (no written communication). Any help must be acknowledged in your answer script.

Question 2 (RED)

The national bird-watcher's club decided to print a magazine containing a list of 1000 experienced members with their year of experience, locations and phone numbers. The club will mail the magazine to all the newly enrolled members. The goal is to connect new members with the experienced community. The default printing system prints a table where the rows are ordered alphabetically by the names.

Name	Year's of Experience	Location	Phone Numbers
S. Anderson	7	Riding Mount.	204-222-2222
M. Angela	8	Portage La p.	519-555-5555
C. Brodsky	6	Banff National	306-888-8888
G. Brown	7	Portage La p.	306-587-5877
D. Smith	9	Riding Mount.	204-666-6666
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How effective is this table to achieve the goal? Can you propose a better way to reorder the table?

(Bonus) Can you propose a beautiful visualization for this scenario?

Note: This is a Red Question. No discussion among students is allowed. You are welcome to read from internet, but do not post asking help on the internet. For any clarification on this question, post in Piazza (sec hw1).

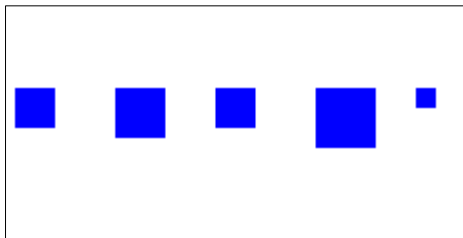
Question 3

Given a set of tuples (team, score), the goal is to draw a blue square for each team such that the side length of the i th square corresponds to the score of the i th team. You must modify A1Q3.html to complete this assignment.

Sample Input:

```
var team = ["A", "B", "C", "D", "E"];  
var score = [20, 25, 20, 30, 10];
```

Sample Output:



***Note:** For any clarification on this question, post in Piazza (sec hw1). Discussion among students is encouraged (no written communication). Any help must be acknowledged in your answer script. You are welcome to read from internet, but do not post asking help on the internet.*

Allowed d3 functions: select, append, attr, selectAll, data, enter.

All built-in JavaScript functions are allowed.

Hint: Recall that to draw a circle we called `selectAll("circle")` and then used the attributes `"cx"`, `"cy"`, and `"r"`. In this assignment, you may call `selectAll("rect")` and use the attributes `"x"`, `"y"`, `"width"`, `"height"`. Here `(x,y)` and `(x+width, y+height)` are the top-left and the bottom-right coordinates of the rectangle, respectively.

Question 4 (RED)

This question asks to enhance the visualization that you created for Q3. To better visualize the team performances, you are asked to draw a black square on top of each team's square. The side length of the black square equals the average score of all the teams.

Note that if the team's square is smaller than the black square, then the black square would hide the team's square. Hence in such scenarios, the black square must be drawn below the team's square.

You must modify A1Q4.html to complete this assignment.

Sample Input:

```
var team = ["A", "B", "C", "D", "E", "F"];  
var score = [20, 25, 20, 30, 10, 40];
```

Sample Output:



Note: This is a Red Question. No discussion among students is allowed. You are welcome to read from internet, but do not post asking help on the internet. For any clarification on this question, post in Piazza (sec hw1).

Allowed d3 functions: select, append, attr, selectAll, data, enter.

All built-in JavaScript functions are allowed.

Functions Provided: computeAverage (see the Read Only Section on A1Q4.html)

Hint: Note that you have team.length blue squares and you need to draw an additional team.length black squares. You may want to create an auxiliary array of size (2*team.length), and create (2*team.length) squares by iterating over the auxiliary array.

Question 5

Read the given dataset (ChinaExportData2015.csv), which lists the countries imported metals and minerals from China in 2015 along with the value in 1000 USD.

Your job is to create a scatterplot for the countries, as shown in the sample output. You must modify A1Q5.html to complete this assignment.

Open ChinaExportData2015.csv and observe that a country may appear in multiple rows. Create a dictionary such that the keys represent the countries and the value represents the sum of the values that the country imported. For example,

```
dictionary["Belgium"] = 781446035.6433593899
```

Take the maximum m of all the values of the dictionary. The radius of a country is now computed by multiplying its dictionary value by 10, dividing that m , and finally taking the floor of the resulting amount. For example, "Belgium" has a radius of 1.

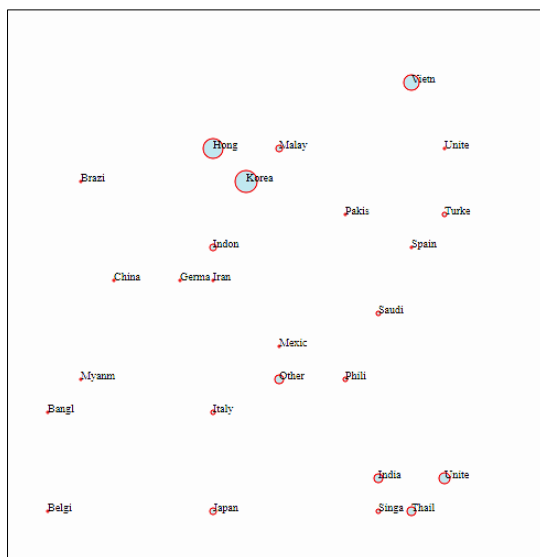
```
Math.floor((10*dictionary["Belgium"])/m)
```

The center of the i th country is at the location

```
(30+Math.floor(i/15)*30, 30+(i%15)*30);
```

Show the label of a country only if the country has a non-zero radius. Only the first 5 letters of the country name should be displayed.

Sample Output:



***Note:** For any clarification on this question, post in Piazza (sec hw1). Discussion among students is encouraged (no written communication). Any help must be acknowledged in your answer script. You are welcome to read from internet, but do not post asking help on the internet.*

Allowed d3 functions: `select`, `append`, `attr`, `selectAll`, `data`, `enter`, `text`.

All built-in javascript functions are allowed.

Hint: To draw a "circle" use the attributes `"cx"`, `"cy"`, `"r"`, `"stroke"`, `"stroke-width"`, `"fill"`. Set `"stroke"` to `"red"`, `"stroke-width"` to `"1"`, and `"fill"` to `"lightblue"`. To draw a "text" use `"x"`, `"y"`, `"font-size"`. Set `"font-size"` to `"10px"`;

FAQ

1. How to create and use a dictionary?

```
var dictionary = {};  
dictionary["A"] = 10.5;  
if("A" in dictionary)  
    dictionary["A"] = dictionary["A"] + parseFloat(5.5);
```

2. What is the role of the following line in A1Q5?

```
if(isNaN(parseFloat(d.Value))) return;
```

→ Real life dataset is not always clean. It says if the data cannot be correctly parsed (not a number), then ignore it.

3. In the `.data(dataset)`, we need an array. But the `dictionary` is an object. How to get an array containing countries from the dictionary?

→ Use `Object.keys`
`.data(Object.keys(dictionary))`

4. How to get the first 5 letters of a country name?

→ Use the javascript function `substring`
`countryname.substring(0,5)`