# Programming Exercise 2

Due Date: 04/04/2021

The Document Object Model (DOM) is a programming interface for HTML and XML documents. It defines the logical structure of documents so that the documents can be accessed and manipulated by using scripts or programming languages like JavaScript. In this exercise, you are going to practice how to bind arbitrary data to a DOM and manipulate it with D3. Learn how to use different methods of D3 from this link https://github.com/d3/d3-selection/tree/v2.0.0 and how to load and handle data from https://www.tutorialsteacher.com/d3js/loading-data-from-file-in-d3js.

We will begin by making a bar and line chart, which are the common types of graphs. A bar chart is useful to summarize a set of categorical data and to compare the values while a line chart displays a series of data points with a continuous line connecting those to show the trend. You will visualize the data in the form of a bar and line chart for your exercise submission, so be familiar with handling data and making charts with D3 before you begin. Here we provide the guideline that you should follow in order to get full credit.

You will be given two .csv files, called *world_pop* and *world_co2*. *world_pop.csv* is a dataset that contains the population and area information of countries and *world_co2* includes an annual change in global $CO_2$ emissions. You should draw [1]**a bar graph with *world_pop.csv*** and [2]**a line graph with *world_co2.csv***, following the instruction provided below. You will get **6 points total** if you follow all the tasks correctly; otherwise, you lose 1 point for each task. Please keep in mind that the goal of this exercise is not to earn the point, but **not to lose the point.** For example, if you fail to succeed more than 6 tasks for your submission, you will get only 1 point, which is given for the submission by default.

**For the bar graph,**

- Display *Population density* on the **x-axis**.
  - Set the x-axis range from 0 to the tick that is right after the maximum value. For example, if the maximum value is 91 and the tick is spaced in every 10, the limit of the x-axis would be 100.
  - Calculate the population density of a country with the population and area inside of the code. *Do not change any value in .csv file.*
  - Draw evenly spaced ticks with the number for each tick written. (You can choose the space on your own.)
- Display *Country* on the **y-axis**.
  - Show only the top-15 countries for their population density *without modifying .csv file.*
  - Label the categories along with the axis.

**For the line graph,**

- Display *Time* on the **x-axis**.
  - Draw the tick in every year of 5.
- Display $CO_2$ *Emission* on the **y-axis**.
  - Set the unit for the value as 1 thousand kt. (It does NOT mean the tick.)
  - You can choose the ticks for the axis on your own.

**For both graphs,**

- Use the different colors for the bar graph and line graph.
- Display two graphs on the same page, meaning do not use separate .html file.
- Add axis titles.

Additional function to the graph is welcomed if you want to practice more, but check whether you follow all the guidelines carefully. You can ask on the blackboard discussion to make sure you understand. The file title should be *studentID_firstname.html*. Any submission past the deadline will result 0 point.