We are going to practice using HTML, CSS and SVG to make a static webpage.

Activity:

Imagine you have no data visualization libraries. No javascript. All you have is html and svg.

I want you to create a visualization similar to this visualization from the New York Times below. But you will use just html and svg.

To simplify things:

- Instead of half-circles we will make full circles. (If you wanted to do half circles you would need to specify a path or do a clip, but that is not necessary for today).
- We will just make the first two lines (2017 and 2016).
- For each year, select a few of the disasters to visualize. Do enough to get the idea, not so much that it takes you a long time. I suggest 6 in each year.

To be clear: You wouldn't choose to make a visualization like this using SVG like this. But, here's what I want us to gain from this activity.

1. Can you make a basic, static webpage using HTML and SVG.

2. Can you access the developer tools, and see your elements in the DOM.

3. Practice the principle of mapping data elements to visual elements- 'encoding the data'.

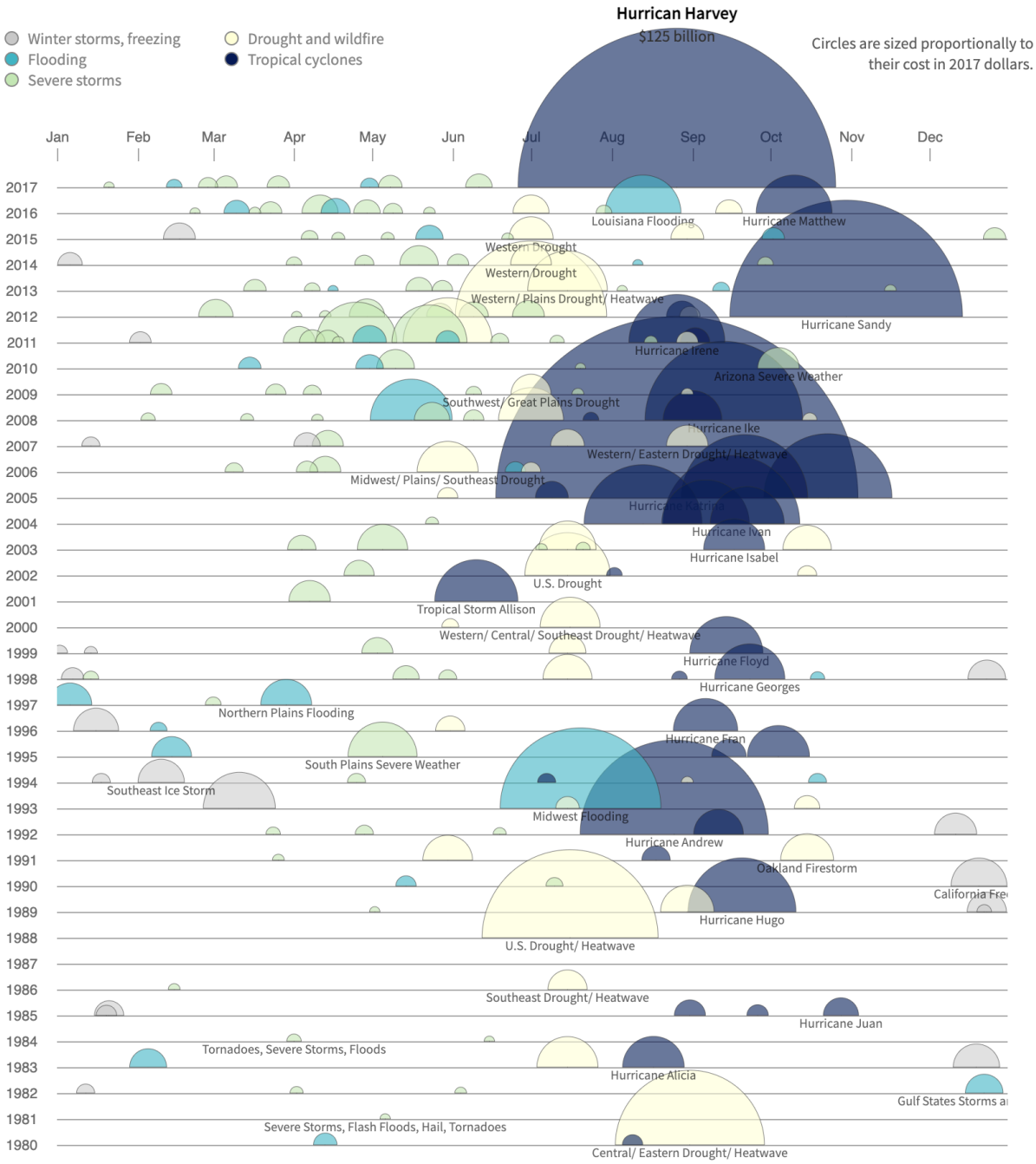
4. Work through the process of placing shapes, thinking about orientation of text, color, and parameters for elements

5. Develop an understanding of why a library for visualization like d3 may be preferable to doing everything yourself. D3 has a learning curve, and it is nice to know that it is 'worth it'.

Save what you are making and you will turn this in for in-class assignment credit.

We are going to create the first 2 lines from this timeline visualization below:

The Cost of Natural Disasters



This case study is a reproduction of the New York Times' visualization in [The Cost of Hurricane Harvey: Only One Recent Storm Comes Close](#) by Kevin Quealy.

Instructions:

1. Since we are developing this as a static page, you do not need a server. Just create a file called 'visualization1.html' and 'visualization1.css'. Open these files using your favorite text editor (I like Sublime text, but you can use whatever you prefer) and open the html file in using your favorite browser. I suggest Chrome, for developer tools.

2. Add boilerplate to your html, using the Tutorial 1 as a guide. Give your page a title in a header and add your name in a paragraph.

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="UTF-8"/>
    <title>Ceci n'est pas un document HTML</title>
  </head>
  <body>
  </body>
</html>
```

3. Look at the data at the bottom of this page. I've selected a subset of the points These are some of the natural disasters from the first two lines of the visualization shown above. It lists natural disasters, classified by type, with a date and a 'cost'.

4. Create an SVG on your html page, where you will draw your visualization. I suggest making it 600 tall by 1000 wide, but you can adapt this to fit your screen. Just keep this width and height in mind.

```
<svg width="1000" height="600">
</svg>
```

5. Draw a timeline in the svg using a 'line' element for 2017 and a line for 2016. They should be lined up so the start and end positions are the same, but spaced vertically in a stack. You decide how far apart to position them. See the tutorial for how to draw a line, or look at examples here: https://www.w3schools.com/graphics/svg_line.asp

6. Add some text labels using svg text elements. Label the year on the left hand side. Make sure the line starts far enough to the right to not cover the text. How can you align the text and position the text? https://www.w3schools.com/graphics/svg_text.asp

6. For each of the natural disasters in the dataset at the bottom, add a circle element to the svg for each event. Examples of circles in svg shown here: https://www.w3schools.com/graphics/svg_circle.asp

- Set the x position along the line you have drawn. The circle's x position on the line should be proportional how far in the year this date occurs, with an event on January 1 positioned at the start of the line, and an event on Dec 31 positioned at the end of the line. 2017 has 365 days and 2016 had 366 days (leap year). Remember your line doesn't begin at pixel x=0 and the line terminates before the end of your svg. **How do you decide where to position the circle along this x axis?**

- Set the y position based on the year, with the circles centered on the line.

- Size the circle's radius in a way that is proportional to the cost of the disaster. One question- do you want to set a minimum and maximum size for the circles, or should a cost of 1 be represented as a circle of size 1?

- Color the circle ('fill') based on the scheme below. Note how you can specify colors using a hex code, not just a word label! Make the circles transparent (opacity=".6"); this way, you can see events that overlap each other. Notice how the order in which you list the events determines who is 'on top'.

title	category	hex code
Winter storms, freezing	winter-storm-freeze	#ccc
Drought and wildfire	drought-wildfire	#ffffd9
Flooding	flooding	#41b6c4
Tropical cyclones	tropical-cyclone	#081d58
Severe storms	severe-storm	#c7e9b4

7. Near the top of your svg, indicate the months of the year, as they do in the NYT visualization. Hint- use the same approach to position the month markers- days from start of the year and your mapping equation below. How do you want to align the text?

How to position your circles along the x-axis?

You want to **map** from the domain (0-365 days) to a new range (startXOfLine - endXOfLine)

xPosition = daysFromStart / daysInAYear * (endOfLine - startOfLine) + startOfLine

Can you explain why this equation works?

To find days from start, you can use this:
https://www.timeanddate.com/date/durationresult.html

Data

Here's a subset of the data. **I have bolded the lines I suggest you implement.** Given more time, you could almost certainly do all the events...

type date cost name

```
tropical-cyclone 2017-08-27 125 Hurricane Harvey
severe-storm 2017-03-26 2.1 South/Southeast Severe Weather
flooding 2017-04-25 1.7 Missouri and Arkansas Flooding and Central Severe
severe-storm 2017-01-20 1.1 Southern Tornado Outbreak and Western Storms
flooding 2016-08-12 10.3 Louisiana Flooding
tropical-cyclone 2016-10-08 10.3 Hurricane Matthew
drought-wildfire 2016-06-01 2.5 Western/Southeast Wildfires
severe-storm 2016-03-23 2.1 North Texas Hail Storm
severe-storm 2016-05-21 1.2 Rockies/Central Tornadoes and Severe Weather
```