

# CS171 Design Sprint Process Book

Red Kinda Sus

Leader: Austin Hwang (austinhwang@college.harvard.edu)

Group Member 1: Sarah Hong (sarahhong@college.harvard.edu)

Group Member 2: Seth Billiau ([sethbilliau@college.harvard.edu](mailto:sethbilliau@college.harvard.edu))

**Dataset selection:** Mental Health in Tech: Getting Better or Worse

**Brief Description:**

In our project, we plan to examine mental health across professions in the tech industry. Our motivation for doing this project is that many of our peers (including ourselves) are considering going into a career in tech after graduation, and we think it would be meaningful to see the current state of mental health within the tech industry, and whether the trends have been positive over time.

**Related Work:**

- Our World in Data - Mental Health: <https://ourworldindata.org/mental-health>
- Inspiration on how to visualize survey data:  
<https://venngage.com/blog/survey-results/>
- Basic Python notebook on this dataset from Kaggle:  
<https://www.kaggle.com/xingobar/mental-health-in-tech-survey-data-visualization>
- Inspiration for D3 Visualizations:
  - <https://christopheviau.com/d3list/>
  - <https://money.usnews.com/money/personal-finance/family-finance/articles/economic-inequality-what-it-is-and-how-it-impacts-you>
- Report on mental health in the tech industry
  - <https://www.information-age.com/we-are-at-a-critical-point-for-mental-health-in-the-tech-sector-123489906/> (Harvey Nash Group Survey)
- Tableau visualization
  - <https://public.tableau.com/en-us/gallery/open-sourcing-mental-illness>
- Health related visualizations
  - <http://www.vizhealth.org/gallery/>

**Audience:** Our primary audience will be people working or interested in the tech industry.

**Goal:** How has perception/support of mental health in the tech industry changed over time?

**Questions:** What mental health disorders are most common among tech workers? Are there specific tech jobs that have more of a negative impact on mental health than others? Is there a relationship between age or gender and mental health in the tech industry? What is the tech industry's perception (positive/negative) on mental health? Is there a relationship between mental health and location, either by country or state? How open are tech workers to discussing mental health?

**Data:**

The main datasets we plan to use are from <https://osmihelp.org/research> -- every year this organization collects survey responses from professionals within the tech industry, and asks them a series of questions about their employers' attitude on mental health, their demographic information, and their current mental health state. One concern we have is that the number of observations decreases significantly from 2016 (1400 observations) to 2019 (350 observations). We'll have to find a creative solution for representing the data across time meaningfully.

**Data Cleanup:**

With respect to data clean up, we expect minimal data cleaning -- every year's dataset has a subset of common columns. We anticipate having to convert certain columns from strings to numbers, and we might rename columns, as some of the columns are a full sentence (the columns are labeled by question in the survey). We will also have to handle missing data entries -- for some rows, the participant only answered certain questions. Lastly, we will have to merge every year's data file together into one dataset, so that we can handle them easily in JS.

## Week 9 Deliverable - Team Agreement:

### Red Kinda Sus

#### Team Agreement

- Although code will be written by individuals, all team members should be involved with the technical aspects of the project. All code should be documented well.
- Final design decisions will be discussed among all members; fair compromises should be made when necessary.
- Work hours should be split as evenly as possible (actual task output may differ based on an individual's ability / previous experience). This ensures not only fairness but also learning opportunities for everyone. We will keep each other accountable so that one person does not work too much / too little.
- We will use a Git workflow to aid our progress as a team and help us split up the work of coding.
- Work will not necessarily be done together in person, but good communication via Discord is expected in a timely manner. Work may be done remotely as long as collaboration and communication are done well.
- How will we deal with non-performing members?
  - Communicate early
  - In case of emergency, reach out early and see how you can make up for it
- What are your team roles? (decider, GitHub czar...)
  - Austin = Team leader/GitHub czar
  - Seth = Team member
  - Sarah = Team Member

Signature:	Seth Billiau	Sarah Hong	Austin Hwang
Date	11/1/2020	11/1/2020	11/1/2020

## **Week 10 Deliverable**

### **Dataset link:**

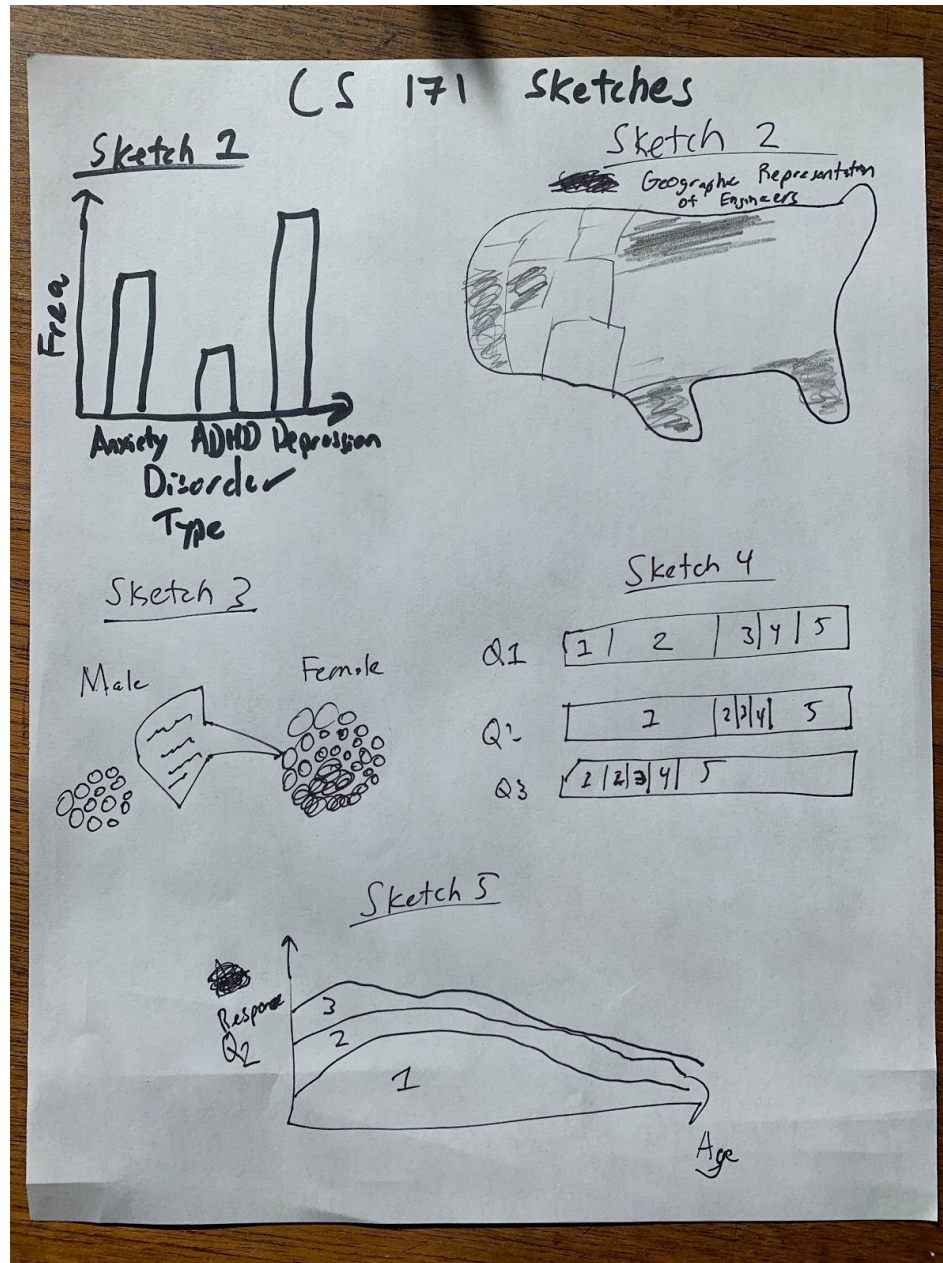
[https://docs.google.com/spreadsheets/d/1231P1IWUA8h23\\_\\_rLd-OTHW4WUnMvqW5MWEmlRuO4Zk/edit?usp=sharing](https://docs.google.com/spreadsheets/d/1231P1IWUA8h23__rLd-OTHW4WUnMvqW5MWEmlRuO4Zk/edit?usp=sharing)

### **Question IDs:**

1. How does our audiences' perception of mental health in the tech industry compare to the actual data?
2. How is the number of people diagnosed with mental health disorders split demographically?
3. Is there a relationship between age, mental health disorders, and behavior of employers and coworkers?
4. How are mental health issues in tech distributed throughout the country?
5. How are mental health issues distributed across time, as well as split demographically?
6. What proportion of people in each demographic selected have been diagnosed with a mental health disorder?
7. How has demand for tech jobs changed over time and what are some important events in the tech boom?
8. What are the differences between the expected and actual prevalence of mental disorders in the tech industry?
9. How does company size relate to how a company perceives mental health/disorders?
10. What are some common sentiments voiced about mental health among tech industry workers?
11. What is the distribution of disorders by type?
12. Are there specific tech jobs that have more of a negative impact on mental health than others?
13. What is the tech industry's perception (positive/negative) on mental health?
14. Is there a relationship between mental health and location, either by country or state?
15. How open are tech workers to discussing mental health?

Sketches:

Seth:



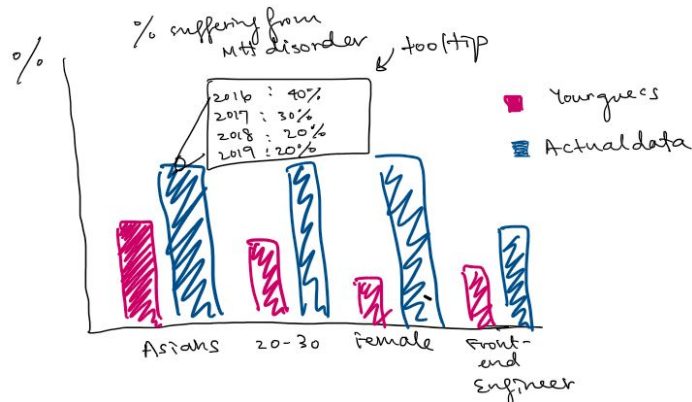
### Question IDs

1. What is the distribution of disorders by type? (Q11)
2. How are mental health issues in tech distributed throughout the country? (Q4)
3. How is the number of people diagnosed with mental health disorders split demographically? (Q2)

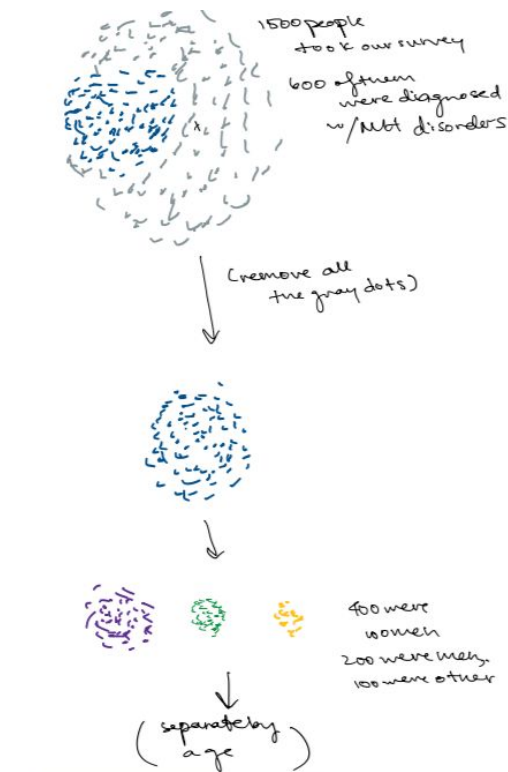
4. Is there a relationship between age, mental health disorders, and behavior of employers and coworkers? (Q3)
5. Is there a relationship between age, mental health disorders, and behavior of employers and coworkers? (Q3)

**Sarah:**

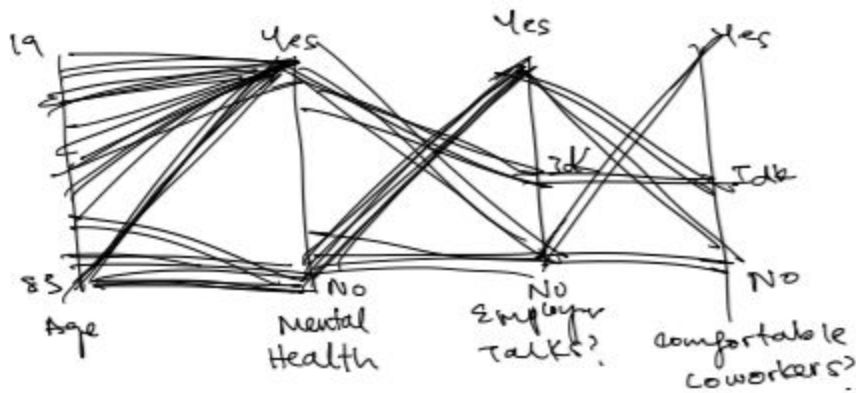
SH1: How does our audiences' perception of mental health in the tech industry compare to the actual data? (Q1)



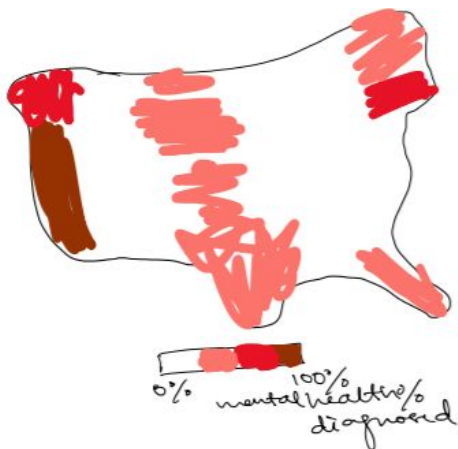
SH2: How is the number of people diagnosed with MH disorders split demographically? (Q2)



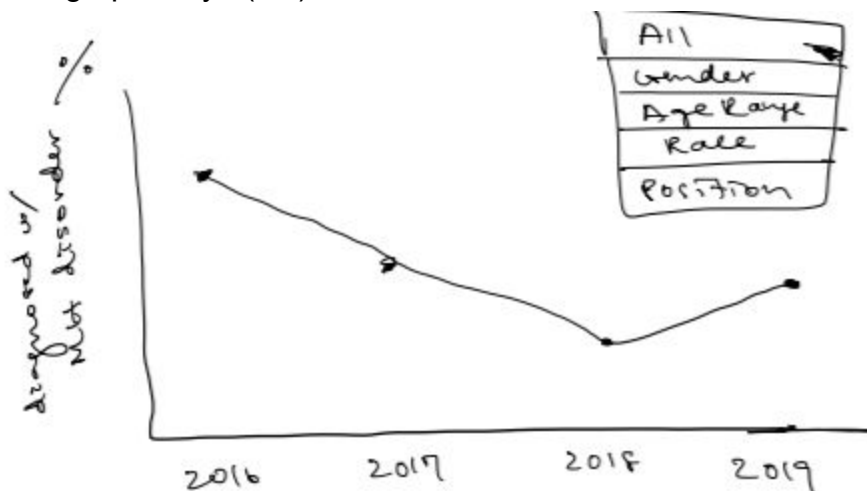
SH3: Is there a relationship between age, mental health disorders, and behavior of employers and coworkers? (Q3)



SH4: How are mental health issues in tech distributed throughout the country? (Q4)



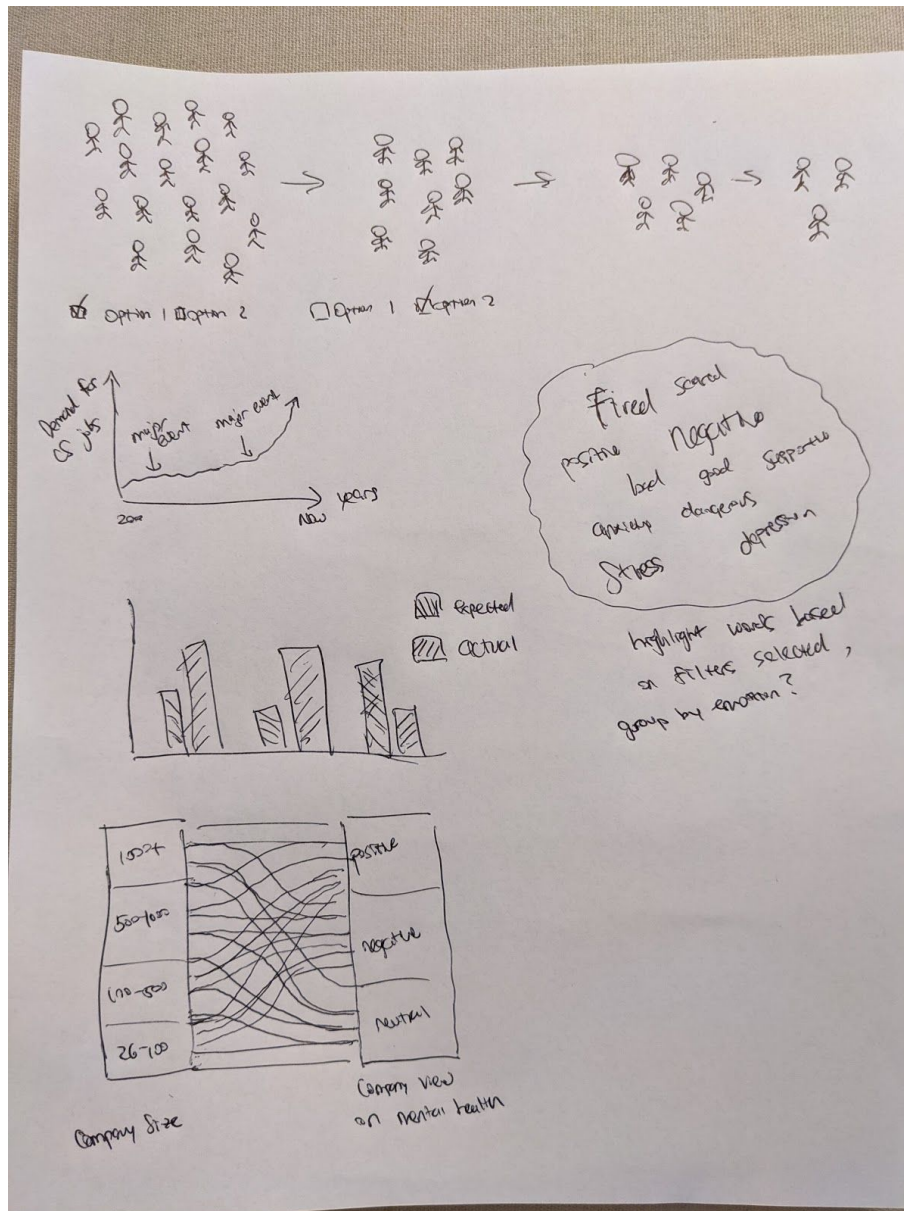
SH5: How are mental health issues distributed across time, as well as split demographically? (Q5)



Austin:



1. What proportion of people in each demographic selected have been diagnosed with a mental health disorder? (Q6)
2. How has demand for tech jobs changed over time and what are some important events in the tech boom? (Q7)
3. What are the differences between the expected and actual prevalence of mental disorders in the tech industry? (Q8)
4. How does company size relate to how a company perceives mental health/disorders? (Q9)
5. What are some common sentiments voiced about mental health among tech industry workers? (Q10)





## Design:

Sketch ID (desc.)	Question ID	Author	Votes
SB1 (bar)	Q11	SB	
SB2, SH4 (map)	Q4	SB, SH	SH, AH, SB
SB3, SH2, AH1 (dots)	Q2	SB, SH, AH	SH, SB, AH
SB4 (likert)	Q3	SB	
SB5 (likert & age)	Q3	SB	
SH1, AH3 (exp vs. actual)	Q1	SH, AH	SH, AH, SB
SH3 (brush)	Q3	SH	SH
SH5 (temporal line graph)	Q5	SH	
AH2 (timeline)	Q7	AH	AH, SB
AH4 ()	Q9	AH	
AH5 (word cloud)	Q10	AH	SH, AH, SB

## Paragraph explanation

The five sketches that we selected cover a wide range of questions that we feel are important including the geographic distribution of engineers with mental health disorders, how mental health disorders vary across demographic groups, and how the mental health landscape in tech has changed over time. We feel that SB2/SH4 is a good way to overview the geographic scope of the dataset while reminding the audience of where professionals are located. Also, SB3/SH2/AH1 is a great way to visualize the granularity of the individuals in the dataset while also displaying differences in demographic factors, distribution of disorders, etc. SH1/AH3 is a great way to engage the users in the visualization, allowing them to guess statistics to set up a surprise reveal. AH2 visualizes temporal changes in the mental health landscape and how they relate with real world events which gives our dataset and visualization important context. Finally, AH5 allows us to visualize survey form responses and get a general sense of the sentiment of those responses, whether it be positive or negative. All in all, we're looking forward to prototyping these and telling a compelling story.

## Storytelling:

## Data Storyboard:

**Message:** The state of mental health in the tech industry is not as good as it seems, and is getting better/(or worse) over time.

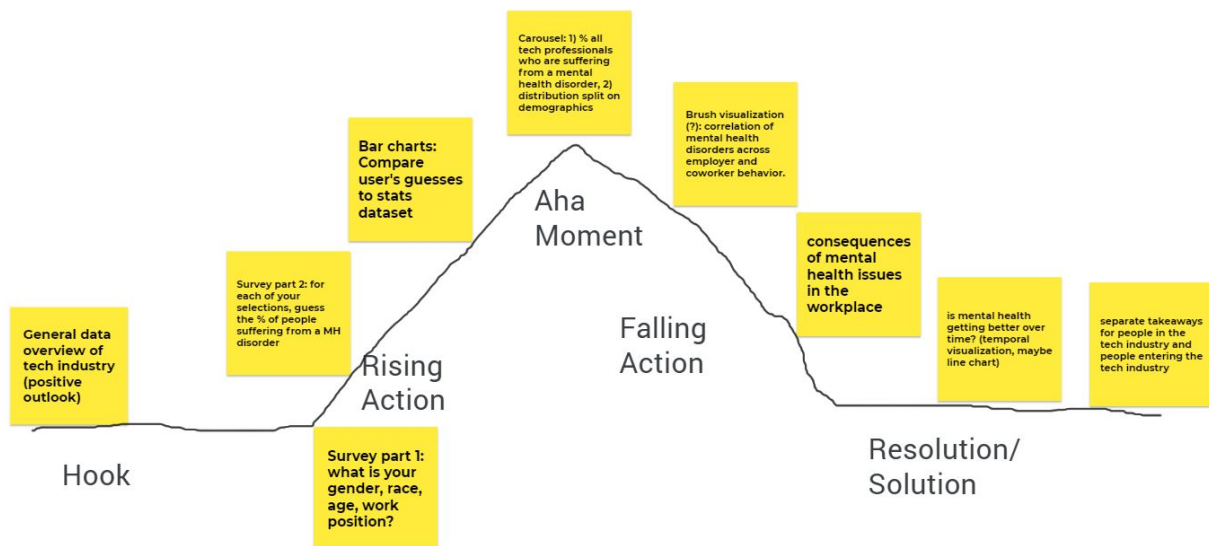
*(Note: After finishing our data analysis/cleaning we will determine whether it is getting better or worse)*

## **Justification:**

We chose this message because as we were doing EDA, we noticed that an overwhelming number of survey participants were struggling with mental health issues, and many of the other questions had explanatory elements (i.e., work environment, employer values, etc.). Thus, we wanted to communicate this discovery and explanatory journey to our audience through our message.

## **Jamboard Storyboard:**

[https://jamboard.google.com/d/14PiZp0sh3aV5rWJ8a4hEbc\\_\\_q1BhGfHsJzlpDseHBIY/edit?usp=sharing](https://jamboard.google.com/d/14PiZp0sh3aV5rWJ8a4hEbc__q1BhGfHsJzlpDseHBIY/edit?usp=sharing)



## **Overview**

In the hook, we start by providing some general statistics about the hot demand of tech jobs today and how attractive the job looks in terms of salary and other benefits. Then, in the rising action, we show the differences between the user's expectation vs. reality of various mental health related stats in the industry. For the aha moment, we highlight the actual proportion of tech professionals suffering from a mental health related issue filterable by demographic. In the falling action, we show the relationship between various variables like mental health disorders with employer and coworker behavior and the consequences they have in the workplace. Finally, in the resolution, we decide whether mental health seems to be getting worse or better and provide some key takeaways for people looking into entering the industry.

**Does your story convey meaningful insights and a powerful main message?**

Our story will be primarily about the insights about the perception of mental health in the tech industry, as well as the consequences of mental health issues in the workplace. The main message is conveying the difference in expectation vs. reality of the prevalence of mental health issues in the tech industry and whether it has gotten better or worse over time.

**Is your story unveiling some surprising insights for the audience?**

Our story is planning on asking the audience to provide their own assumptions first through a series of survey questions about what proportion of a certain demographic they believe to be suffering with a mental health disorder in the tech industry. Through their answers, we will reveal the surprising prevalence of these disorders and possibly the stigma of mental health.

**Did you come up with a call to action, or is your story more compelling without it?**

The call to action will be urging companies and tech industry workers to provide more support/resources for maintaining good mental health in the workplace and to work to reduce stigma surrounding mental health disorders. We will also provide some mental health resources at the end.

## Week 11 Deliverable

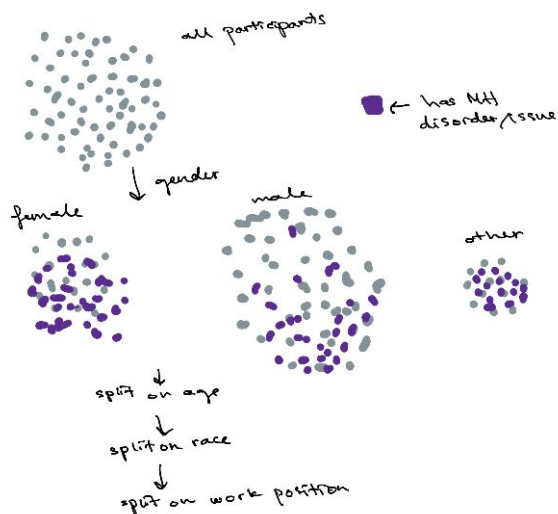
Here are the sketches we want to prototype, as well as who is implementing the v1 prototype of each sketch.

Sketch ID (desc.)	Question ID	Who is implementing?
SB2, SH4 (map)	Q4	Seth
SB3, SH2, AH1 (dots)	Q2	
SH1, AH3 (exp vs. actual)	Q1	Sarah
AH2 (timeline)	Q7	Austin
AH5 (word cloud)	Q10	Seth

### Innovative Vis Design:

Our innovative visualization will be a dot chart, similar to those found in <https://patsukhum.github.io/Marvel/> and <http://www.syria-visualized.com/>. Each dot represents 1 of our 3000 data entries. As the user clicks through the animation, the dots split into gender > age > race > work position. The dots will be color-coded by those who are struggling with a MH disorder vs. those who are NOT struggling with an MH disorder. This way we can visualize not only the distribution of survey participants but also the proportion of each group.

This visualization will also be **interactive** because the users at the end can choose for themselves how to split the data pool. A sketch of this visualization is shown below:



### Interactive Vis Design:

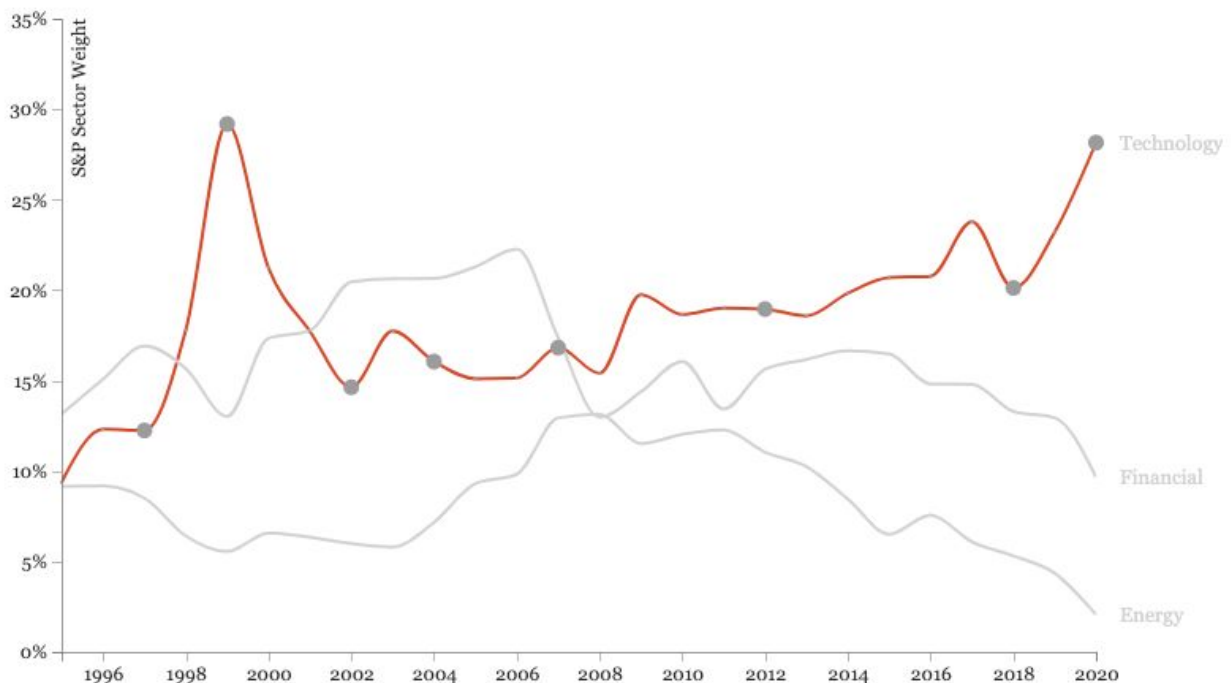
Our interactive visualizations (in addition to our interactive innovative vis design) are our timeline of the rise of the tech and our grouped barchart that compares our user's guesses to the actual statistics in our data.

The timeline of the rise of tech contains a brush, in which users can select a certain time range to filter on, and the timeline will zoom in on that time range's part of the timeline. The timeline will also have a tooltip, so that users can hover over a certain year and read more about what happened that year that was significant in tech.

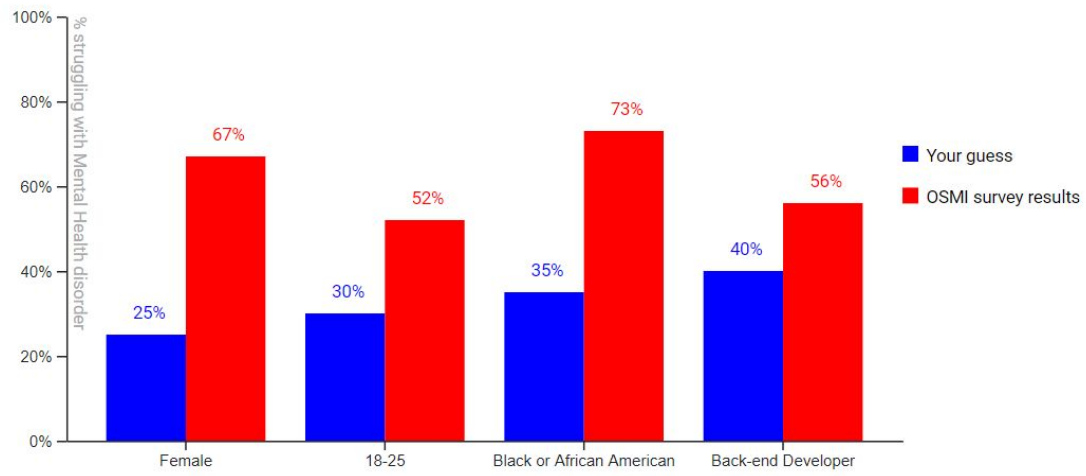
The grouped barchart comes after the user takes a brief survey, in which they disclose their gender, age, race, and work position. Then, for each of those categories, they guess what percentage of tech professionals in that demographic are struggling with a mental health disorder. Lastly, the grouped barchart right after the survey shows the comparison of the user's guesses and the actual data from our dataset.

We've already coded a first iteration of the timeline and grouped barchart, so we'll show that below:

#### *Timeline -*



#### *Grouped Barchart -*





## Week 12 Deliverable

We expect you to be 95% done with the implementation of your data story. It should be ready to be tested by a random person the following week.

Specific requirements:

- Please submit only code (and have an up to date process book)!
- All views must be complete and working by this point!
- We will evaluate the progress you made from Prototype V1 to Prototype V2
- You will have two weeks until the final submission. The last week is meant for fine-tuning, incorporating feedback, documenting, creating the screencast, etc.

If the dataset is too large to upload, please contact your project TF so that they can either copy your dataset directly or use dropbox, etc.

Finally, you will fill out this [self and peer evaluation form](#) to reflect on how well you and your teammates performed in the final project so far. **Every team member** needs to fill out this form. Only the teaching team will see your data. This form may affect the grades of team members who did not pull their weight. We will ask you to fill in the same form again at the end of the final project.

**This is a team assignment. Please submit only once!** The submission should be done by the assigned person in your team (usually the team leader) who is doing the submissions.

Please check [the final project overview](#) for more information about the final project.

Please submit your a **before 11:59 pm EDT on Sunday, November 22.**