CS171 Design Sprint Process Book

The Park Lovers

Leader: Gordon Wade (00738641, gow208@g.harvard.edu)
Group Member 1: Nate Mortensen (51391381, nmortensen2@gmail.com)
Group Member 2: Tashrif Billah (71426300, tbillah@bwh.harvard.edu)

Team Agreement

A. Code will be written by individuals and all team members should be involved with the technical aspects of the project. All code should be documented well.
B. Final design decisions will be discussed among all members; fair compromises should be made when necessary.
C. 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.
D. We shall use a Git workflow to aid our progress as a team and help us split up the work of coding. The code will be hosted at https://github.com/tashrifbillah/vis-final-project .
E. Work will not necessarily be done together in person, but good communication via an agreed upon platform is expected in a timely manner.
F. Work may be done remotely as long as collaboration and communication are done well.
G. Communicate clearly responsibilities and schedules ahead of time.

Signatures:

Gordon Wade
Date: 10/24/2020

Tashrif Billah
Date: 10/25/2020

Nate Mortensen
Date: 10/25/2020

Abstract

This project aims to provide users with interesting information about public lands (particularly, the National Parks system) and encourage them to utilize these great resources. This project was inspired by the current situation with COVID-19, which has resulted in a decreased ability to use shared indoor recreational spaces. Outdoor recreation provides a safer alternative, and this project aims to understand usage patterns as well as encourage people to take advantage of these great resources.

Interesting historical information and overview statistics have been compiled in a tabular format by Wikipedia (see: https://en.wikipedia.org/wiki/List_of_national_parks_of_the_United_States#National_parks). This data is sourced from various publications by the National Park Service and may be helpful in telling a story about the origins and uses of public lands.

The National Parks Service also provides summaries on visitor volume for each park (see: https://irma.nps.gov/STATS/Reports/Park). Data sets from this source may be useful in investigating trends of visitor volume to various parks over time. This could include seasonality as well as larger shifts, and may include differences attributable to the COVID-19 pandemic.

Lastly, the National Parks Service also exposes detailed park information directly via an API (see: https://www.nps.gov/subjects/developer/api-documentation.htm#/activities/parks), which can be used for real time queries regarding the parks, services, and activities available. This data will likely be useful for creating an interactive visualization to provide users with information that may help them to plan a trip.

The specifics of the project will evolve as we explore the available data, but with the resources listed above, we may be able to create interesting visualizations to tell the story of how (and when) National Parks were created, how usage patterns have changed over time (possibly including during the COVID-19 pandemic), and provide the user with an interactive tool to help them research and plan a trip to explore the parks.

Map

Background, Motivation and Related Work

During the ongoing COVID-19 pandemic, health care experts have encouraged outdoor activities for recreation. Parks can be the best place to do so. With many parks all over the country, citizens might have hard time navigating to the ones that best fit their interest. Making a good visualization tool available to them should ease up the effort for finding the most interesting parks. Hence, we believe we have addressed an important need for the public.

Based on our search so far, related work can be found in https://en.wikipedia.org/wiki/List_of_national_parks_of_the_United_States#National_parks and in https://irma.nps.gov/STATS/Reports/Park. However, to the best of our understanding, they are static information and do not present a visually appealing tool for non-technical citizens to explore. To fill that scope, we have taken up this project.

Audience and Questions

Audience

- People who are interested in outdoor activities
- People who are looking for safe recreational activities to engage in during the COVID-19 pandemic
- People who are interested in understanding (and using) public lands

Questions

- How can I find parks that are nearby me (or near somewhere I might travel to)?
- What types of activities are offered by the various parks?
    - Do these activities vary based on geographic region?
- How can I find parks that support activities that I am interested in?
- When were the various national parks created?
- Is there a trend of how frequently new parks were created over time?
- How many people visit each (or all of the) park in any given year?
    - Which parks are the most and least popular?
    - Which parks have the highest geographic density of visitors?
- Are there seasonal fluctuations for visitation numbers?
- Have these numbers changed during (possibly as a result of) the COVID-19 pandemic?

Data and Cleanup

We plan to collect data from three major sources:

I. National Parks Overview, compiled by Wikipedia
II. The National Parks STATS page
III. The National Parks API

They are described in detail below.

I.

National Parks Overview, compiled by Wikipedia:
https://en.wikipedia.org/wiki/List_of_national_parks_of_the_United_States#National_parks

- Name (Categorical)
- Image (Other)
- Location (Geographic Location)
- Date established as park (Ordinal)
- Area (Quantitative)
- Recreation visitors (2019) (Quantitative)
- Description (Other)

We plan to scrape the HTML content of Wikipedia to obtain the above fields and convert to JSON objects that could be used in JavaScript.

II.

The National Parks STATS page (https://irma.nps.gov/STATS/Reports/Park) gives access to visitor volume data in several different reports:

Annual Park Recreation Visits

- Park (Categorical)
- Year (Ordinal)
- Visitors (Quantitative)

Recreation Visits by Month

- Park (Categorical)
- Year (Ordinal)
- Month (Ordinal)
- Visitors (Quantitative)

Annual Park Ranking Report

- Park (Categorical)
- Rank (Ordinal)
- Recreation Visits (Quantitative)
- % of Total (Quantitative)

Current Year Monthly and Annual Summary Report

- Park (Categorical)
- Visitors in Month (Current Year) (Quantitative)
- Visitors in Month (Previous Year) (Quantitative)
- Visitors in Month Diff (Quantitative)
- Visitors in YTD (Current Year) (Quantitative)
- Visitors in YTD (Previous Year) (Quantitative)
- Visitors in YTD Diff (Quantitative)

The STATS page gives an option to save HTML content as csv files. If we are able to do so, no cleanup should be necessary.

III.

The National Parks API (https://www.nps.gov/subjects/developer/api-documentation.htm) includes endpoints that can return many different objects. Those most likely to be used in our analysis include:

"Campground" Object

- accessibility (Categorical)
- addresses (Geographic Location)
- amenities (Categorical)
- campsites (Categorical)
- contacts (Categorical)
- description (Other)
- directionsoverview (Other)
- directionsUrl (Other)
- fees (Categorical)
- id (Categorical)
- images (Other)
- latLong (Geographic Location)
- latitude (Geographic Location)
- longitude (Geographic Location)
- name (Categorical)
- operatingHours (Categorical)
- parkCode (Categorical)
- regulationsoverview (Categorical)
- regulationsurl (Other)
- reservationsdescription (Categorical)
- reservationssitesfirstcome (Quantitative)
- reservationssitesreservable (Quantitative)
- reservationsurl (Other)
- weatheroverview (Categorical)

"Park" Object

- activities (Categorical)
- addresses (Geographic Location)
- contacts (Categorical)
- description (Other)
- designation (Categorical)
- directionsInfo (Other)
- directionsUrl (Other)
- entranceFees (Quantitative)
- entrancePasses (Categorical)
- fullName (Categorical)

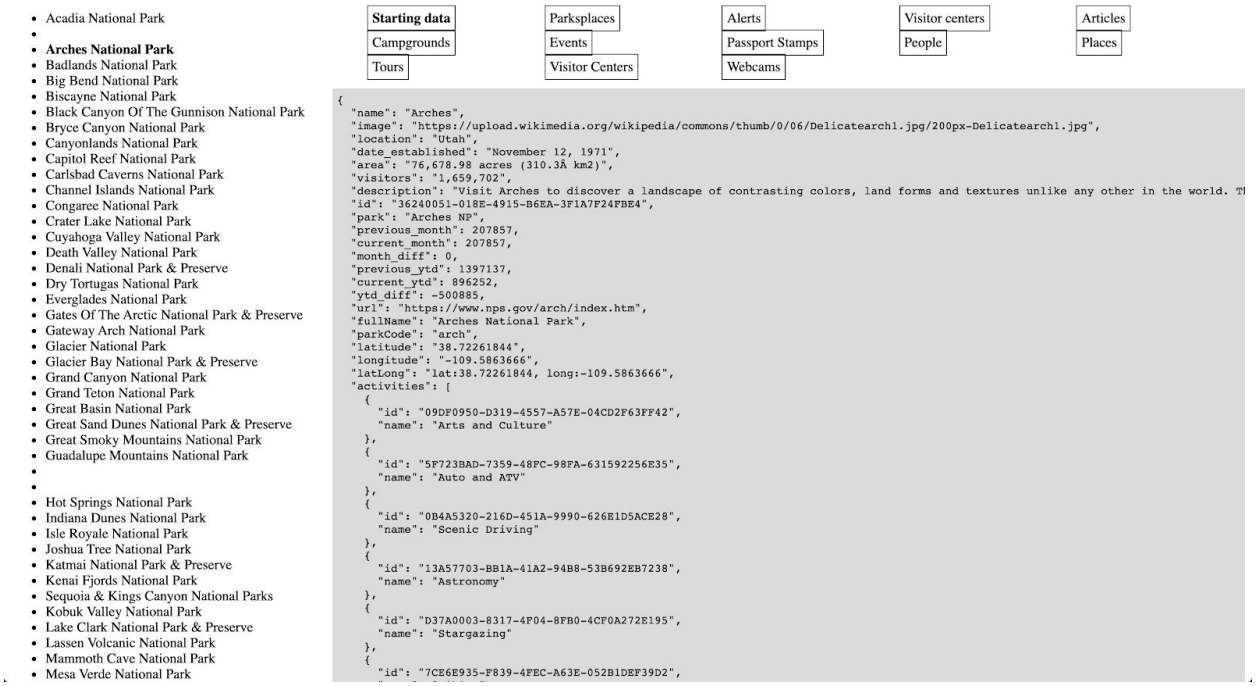
- id (Categorical)
- images (Other)
- latLong (Geographic Location)
- latitude (Geographic Location)
- longitude (Geographic Location)
- name (Categorical)
- operatingHours (Categorical)
- parkCode (Categorical)
- states (Geographic Location)
- topics (Categorical)
- url (Other)
- weatherInfo (Categorical)

As we delve in, we shall figure out in the coming weeks what kind of data curation would be required for the above source.

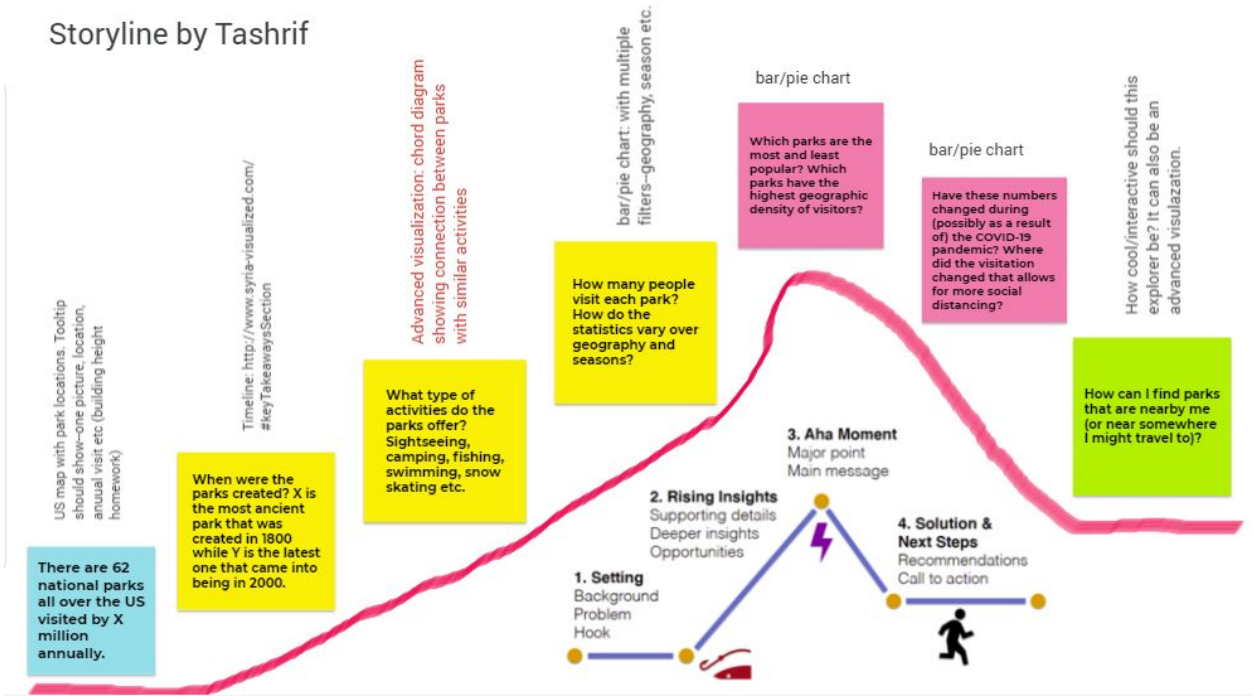
---------- TF feedback @ 11-02 ----------
Great job on outlining your topics, data source, audience and questions!
The data source you pointed towards seems sufficient to answer your questions. Your target audience as the public users is an appropriate selection for the topic. I like that you listed down the data metrics in dataset to help you brainstorm ideas.
For the data questions that you came up with, I would further think about high-level categories to group your ideas, such as temporal vs. geographic exploration, attributes of the parks, trend or anomalies, etc. That could help you categorize your questions better for the next steps in deciding data stories.

Data Cleanup/Exploration

This week, we did most of the work of scraping/cleaning/aggregating the data from all three sources into a single array. In addition, we built a data exploration utility to aid us in vetting the feasibility of our data stories with the actual available data (including API endpoints):

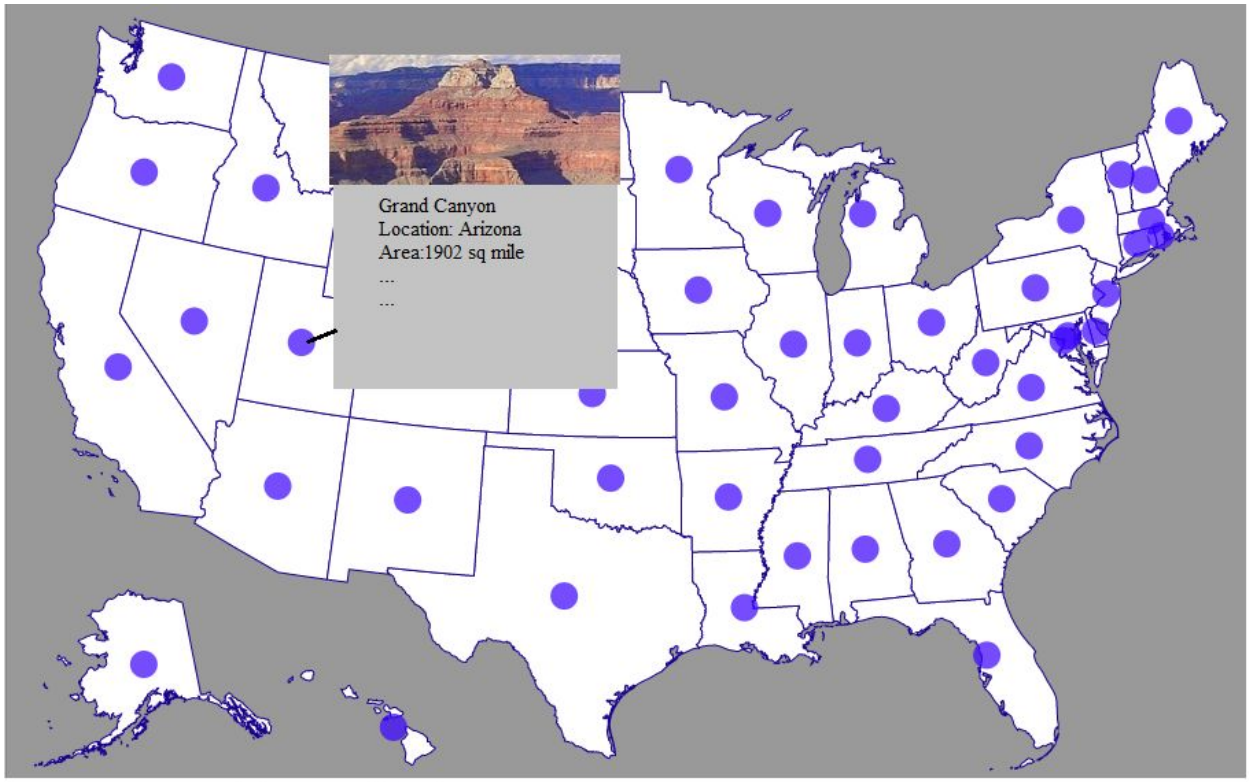


Storyline:
https://jamboard.google.com/d/1N4CvFz3TK429atMUynX2GOAKVVj_Z5IdMiTiRKgi9rQ



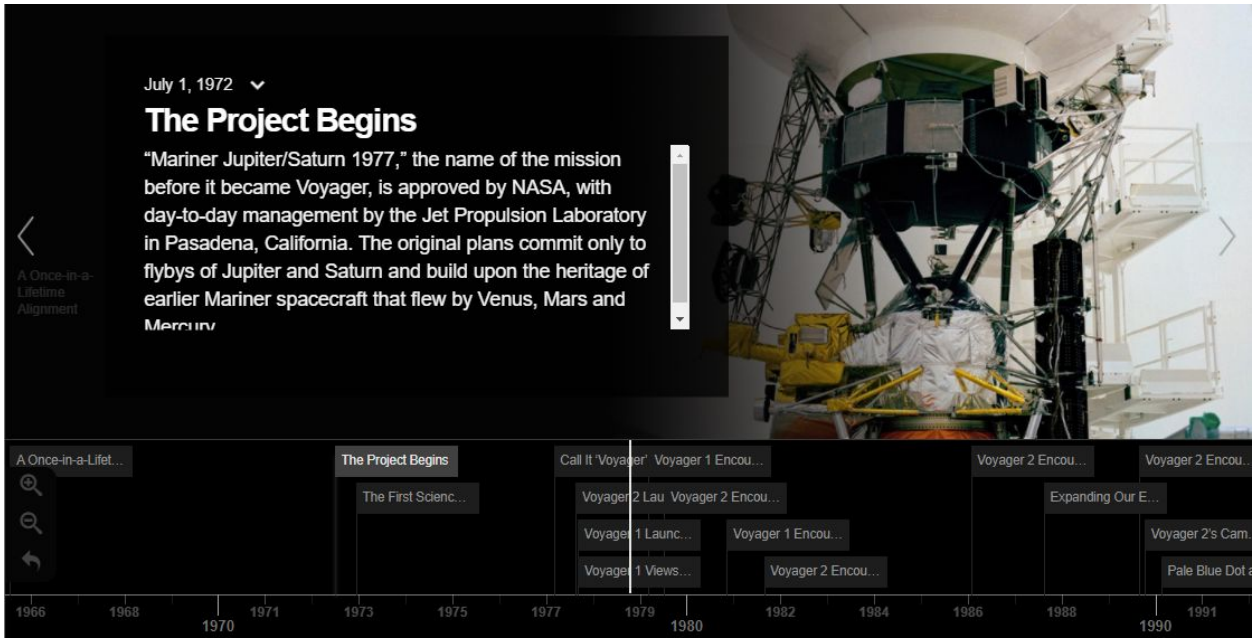
Tashrif's five sketches

Question 1: what is the summary of national parks in the US?



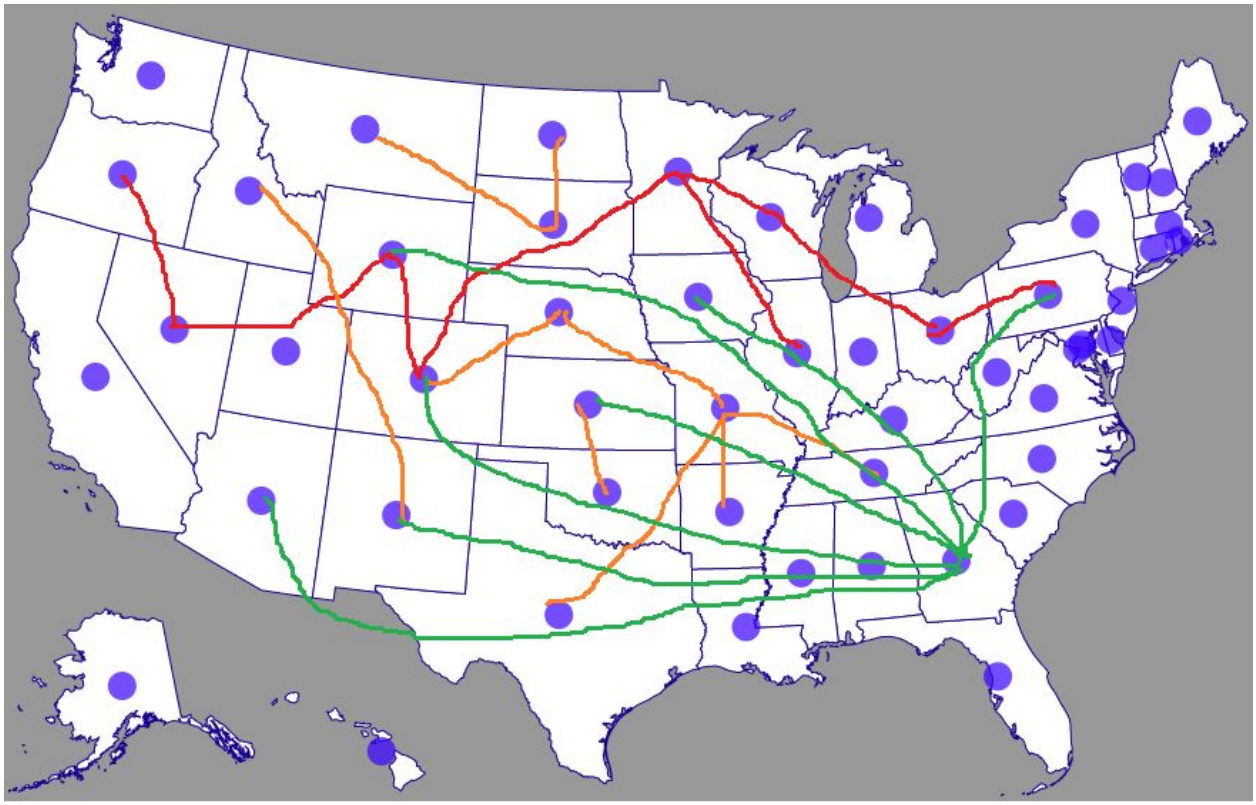
Circles are park locations
Hover of each circle shows a quick summary of that park

Question 2: What is the history of various national parks?



The bottom timeline can be browsed to see park histories. The timeline will be zoomable and draggable. In addition, there will be a brief history about the park in upper left column. The above timeline is taken from NASA Jet Propulsion Laboratory hosted Voyager history and serving as an example.

Question 3: What activities are available at each park?

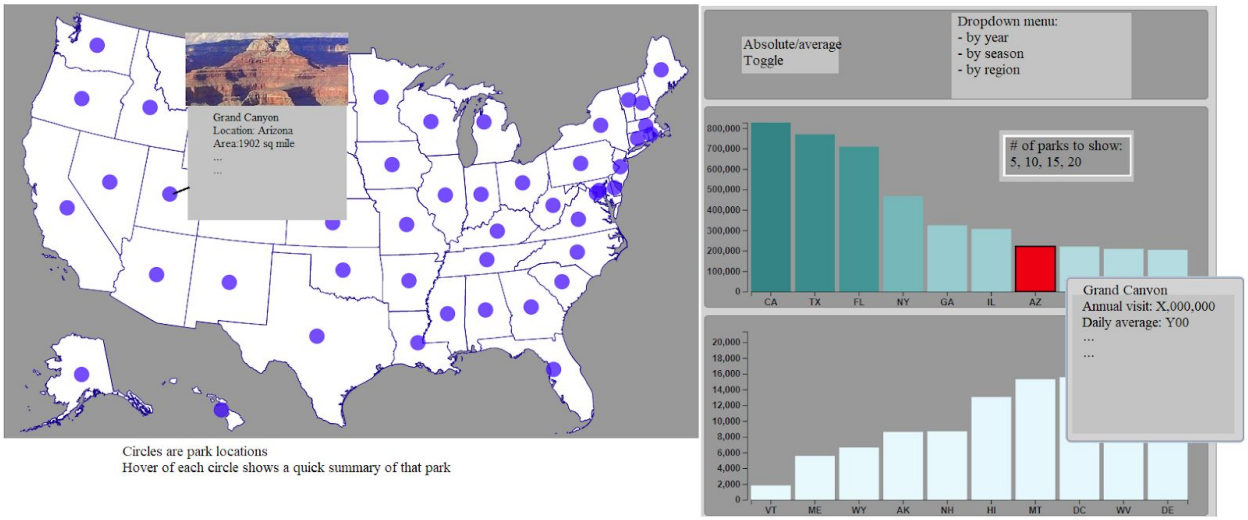


Swimming
Camping
Fishing

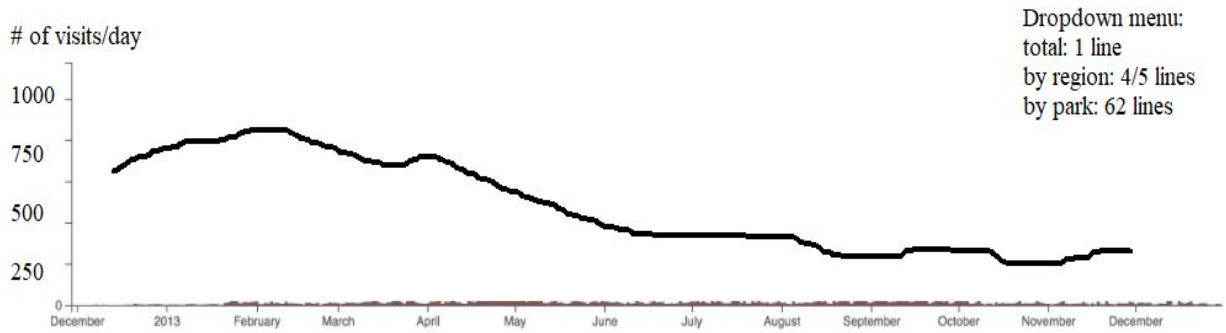
Advanced visualization: edge bundling

Upon mouse hover over any edge, parks supporting activity correspond to that edge will be visible and the rest of the parks+edges will be dimmed

Question 4: How many people visit each park? How do the statistics vary over geography and seasons?



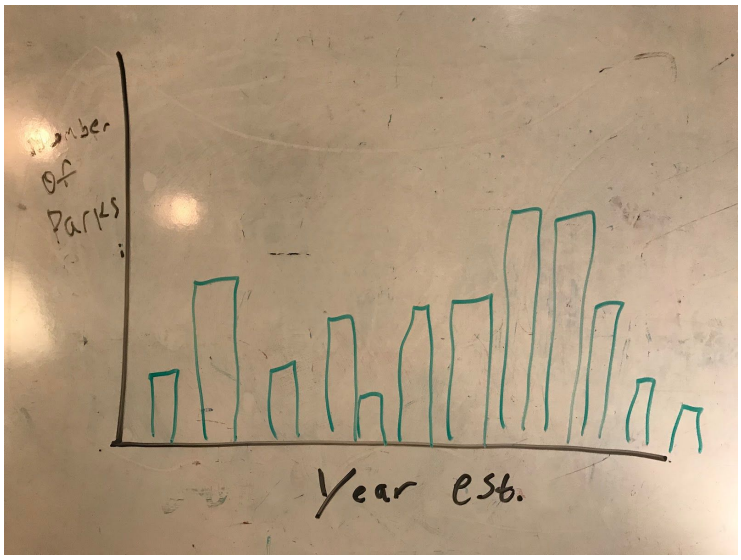
Question 5: Have these numbers changed during (possibly as a result of) the COVID-19 pandemic? Where did the visit change that allows for more social distancing?



Features:
- zoomable
- click and highlight only one line

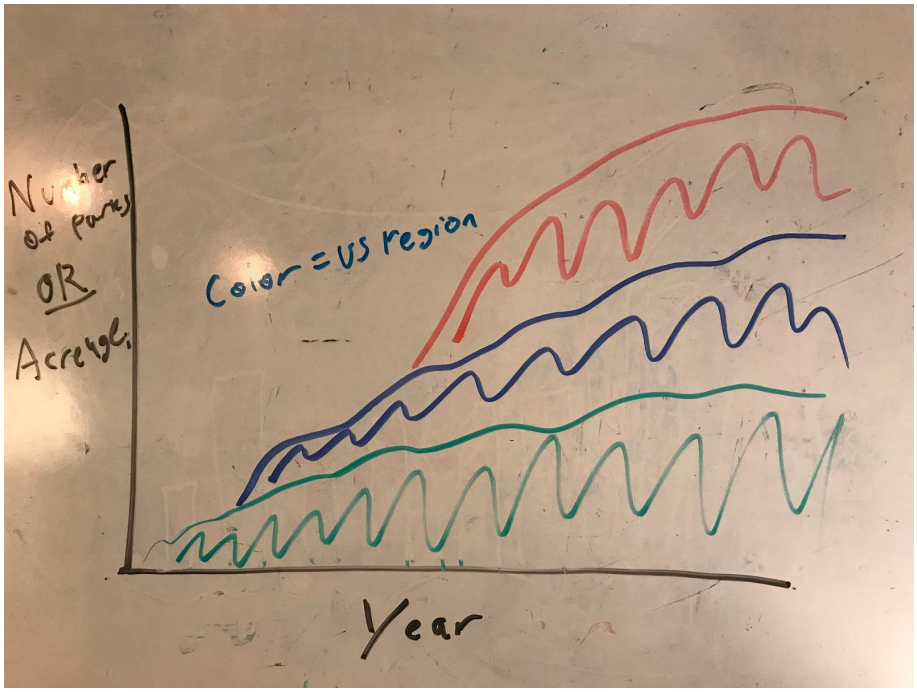
Gordon's Sketches

Question 1: When were the national parks created?



This straightforward visualization can help answer the question, and potentially detect trends regarding when the various national parks were created.

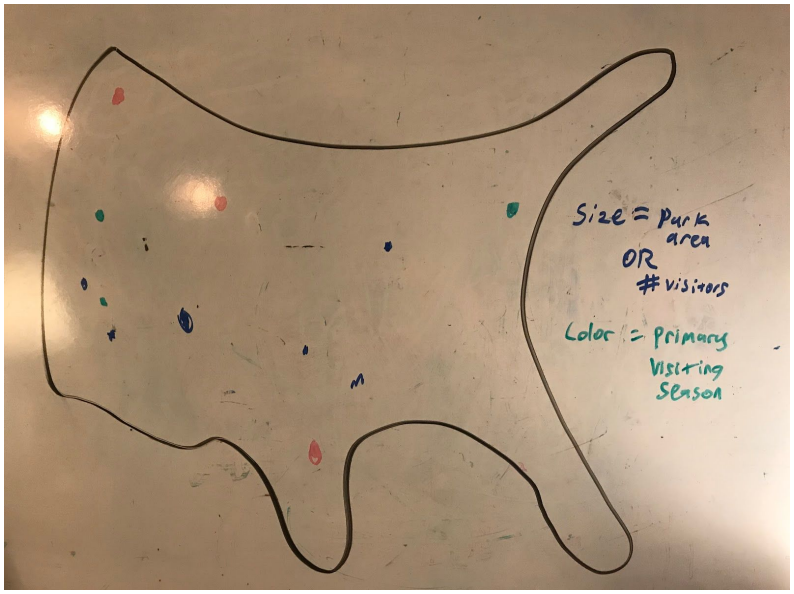
Question 2: When were the national parks created? Where are the different parks?



This mountain chart incorporates the color channel to map the region of the United States in which the park is located. This provides more context to understand not only when the parks

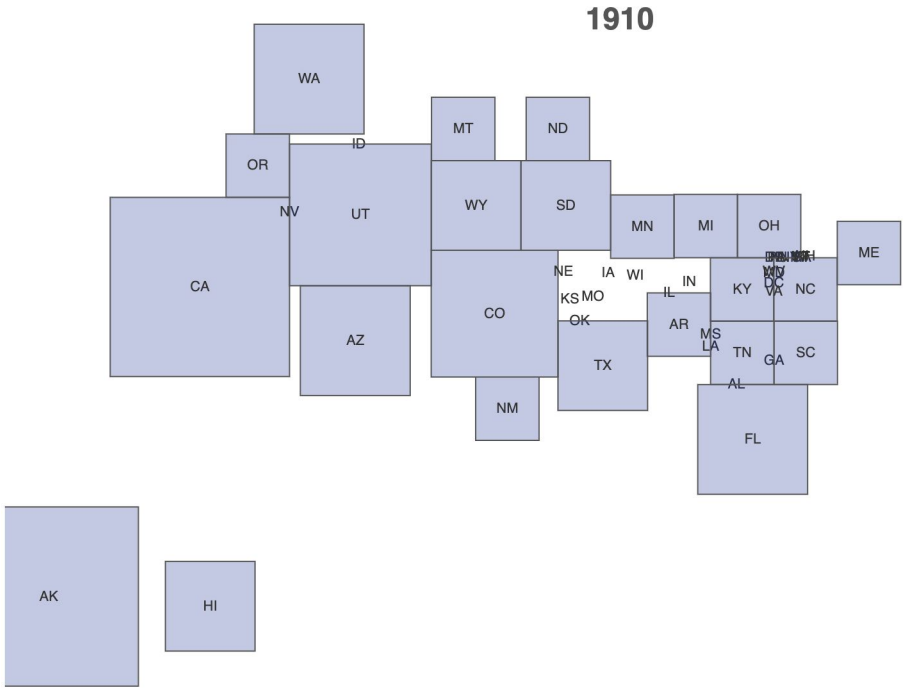
were created, but which areas have the most parks (or most park land) and whether certain areas are still developing additional parks.

Question 3 : Where are the parks? What is the seasonality of each park?



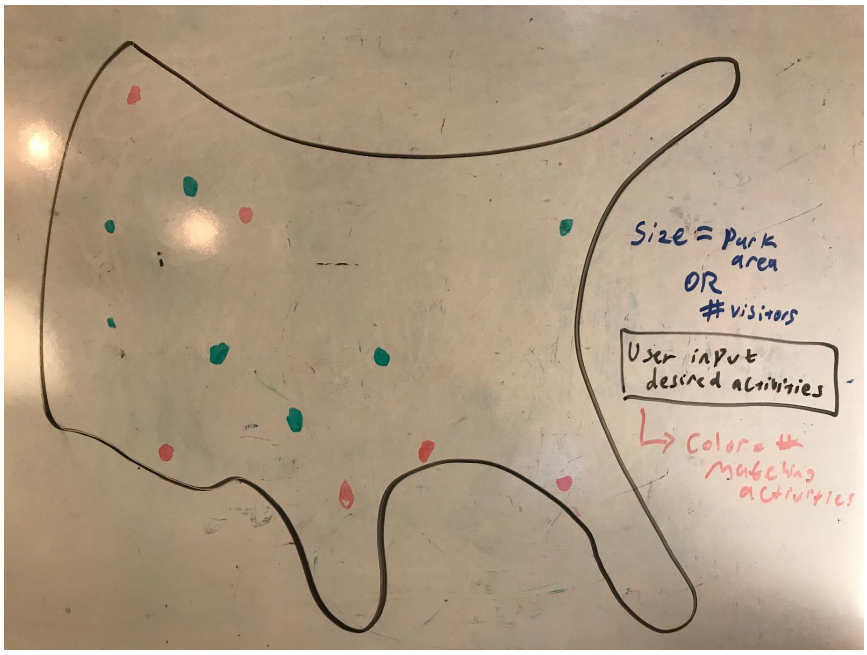
This visualization shows the geographic location of each park, as well as using the color channel to encode seasonality. This may be helpful in understanding the “popular” times to visit, and whether these vary by region.

Question 4: Where are the various parks located?



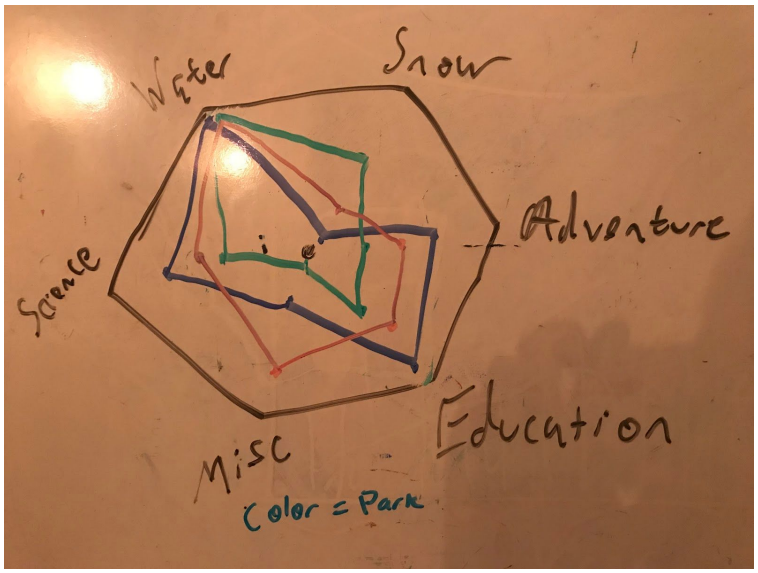
Somewhere between a force-directed graph and a cartogram, this visualization helps to give a sense of which areas of the country have the highest density of national parks. Unfortunately, this prototype does not elegantly handle the case of states with 0 national parks.

Question 5: Where are the various parks? How can I find parks that support activities that I am interested in?



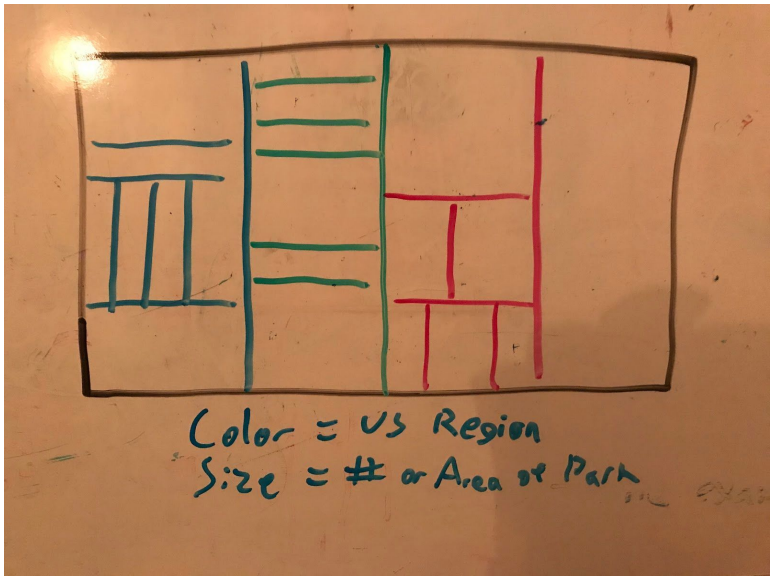
This map gives a good geographic sense of park locations, as well as allowing user input regarding the user's preferred activities. This input is then used to break the parks into "tiers," represented by the color channel to help determine the best matches.

Question 6: How can I find parks that support activities that I am interested in?



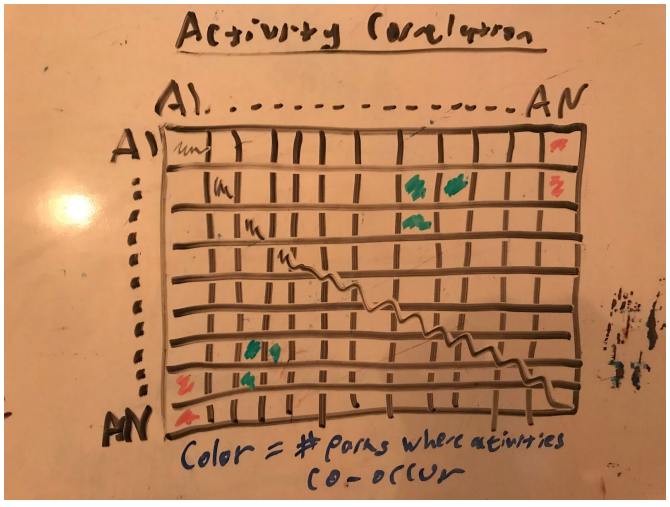
This overlayed radar map can help the user determine which parks are a close match for their interests. The “activities” can be grouped by overarching type (as in the sketch) or can be filtered by the user. The number of parks overlaid (or compared side by side) should be small to allow for direct comparison. To aid in this, we can filter by user interests and only display their top matches.

Question 7: Where are the various parks?



This treemap helps the user to visualize where the various parks are located. The first separation would be on the regional level (also represented in the color channel), and the subsequent divisions would be by state and then individual park. The area could be allocated by number of parks or by overall park area.

Question 8: What types of activities are offered by the various parks? Do these activities vary based on geographic region?

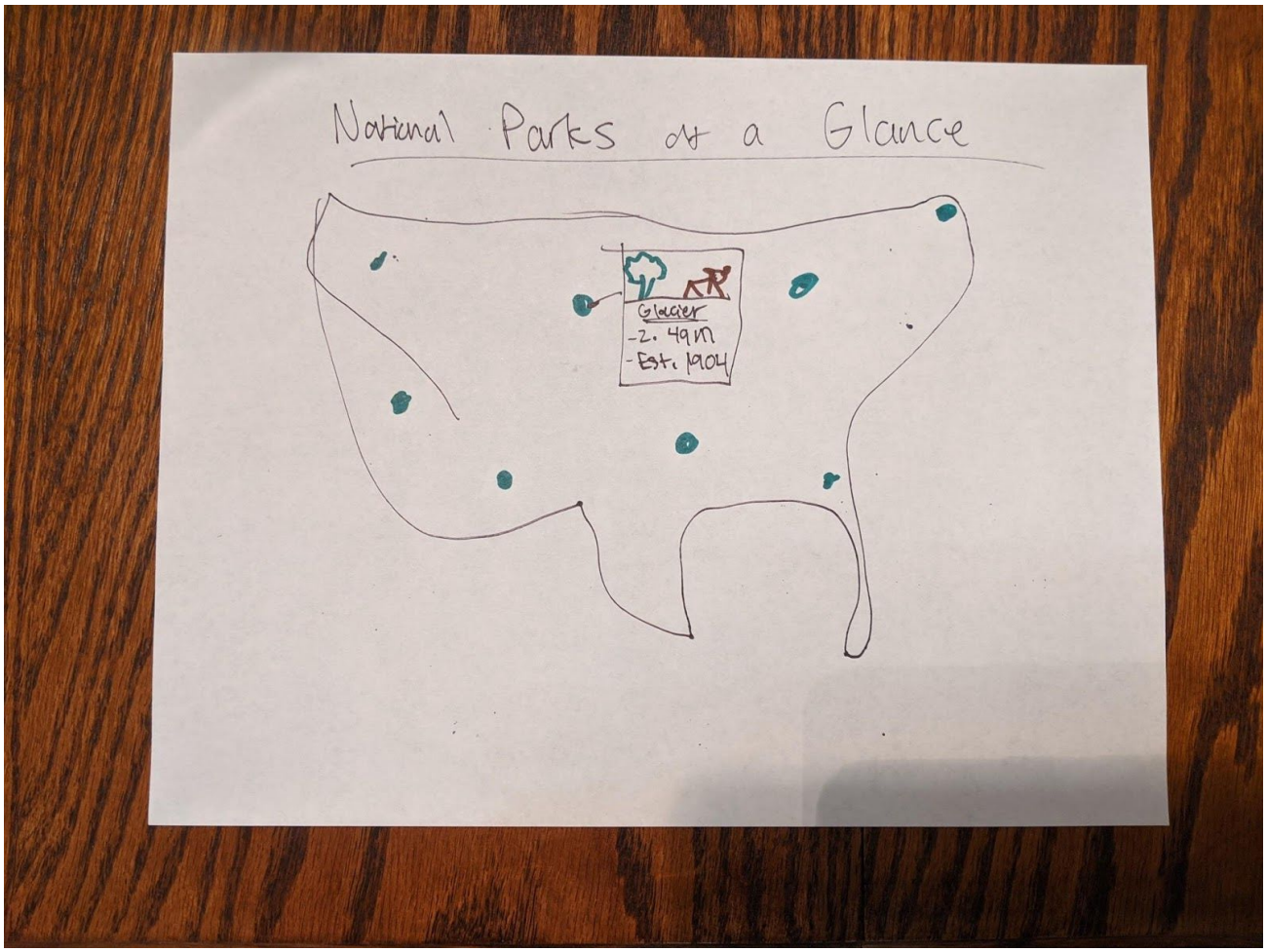


This correlation matrix can help the user to understand the co-occurrence of various activities. The color channel is used to represent the number of parks at which the two activities for each

square coincide. This should create interesting patterns of related activities, and may highlight regional differences as well.

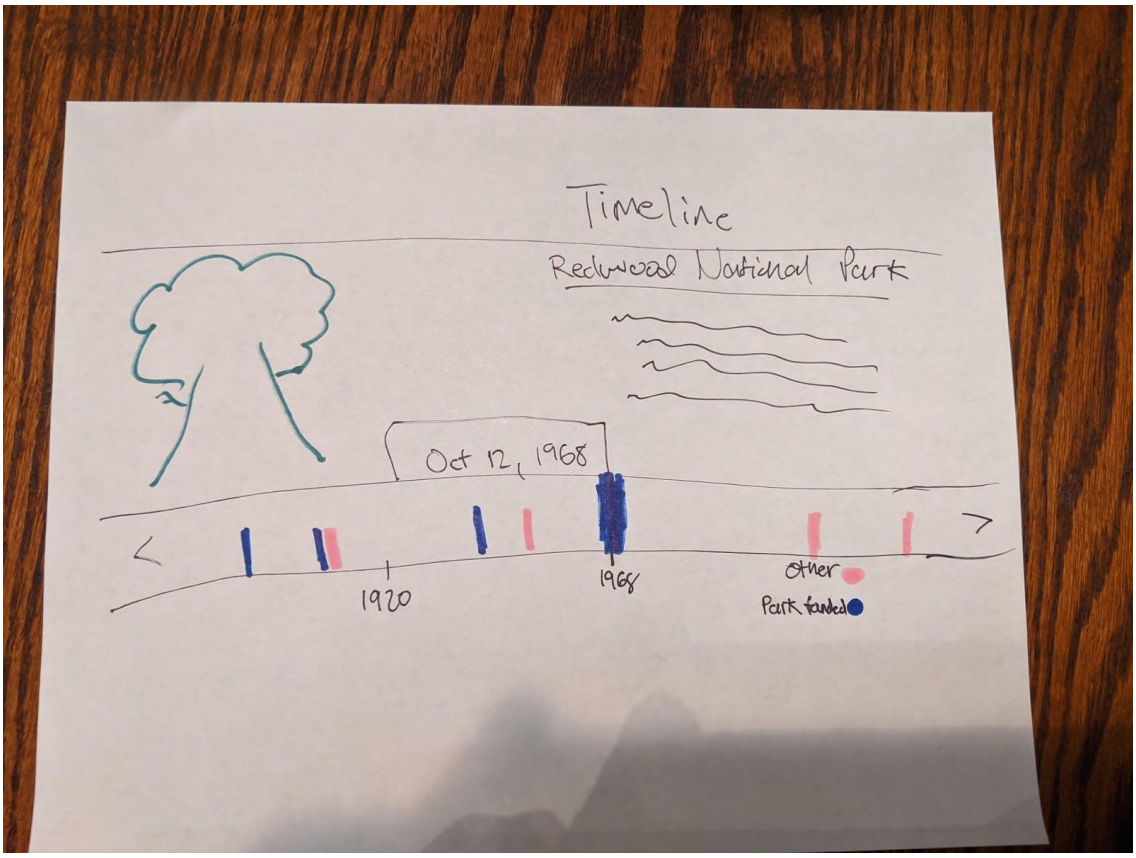
Nate's Sketches

Question 1: What is the summary of national parks in the US?



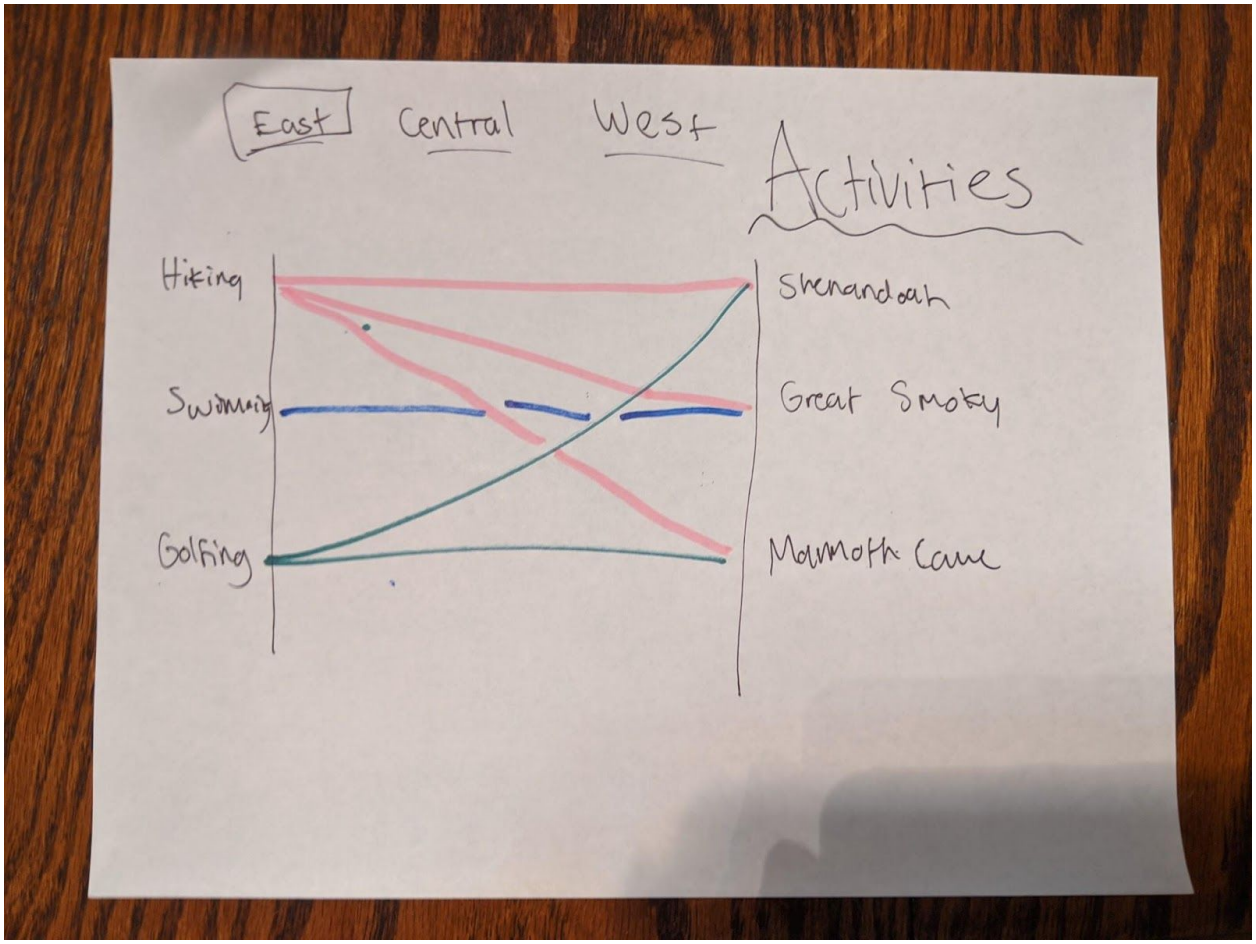
The goal if this graph is simply for the viewer to get acquainted with the approximate geographical distribution of the parks in our dataset. When hovering over a circle, a popover will appear with general information.

Question 2: What is the history of various national parks?



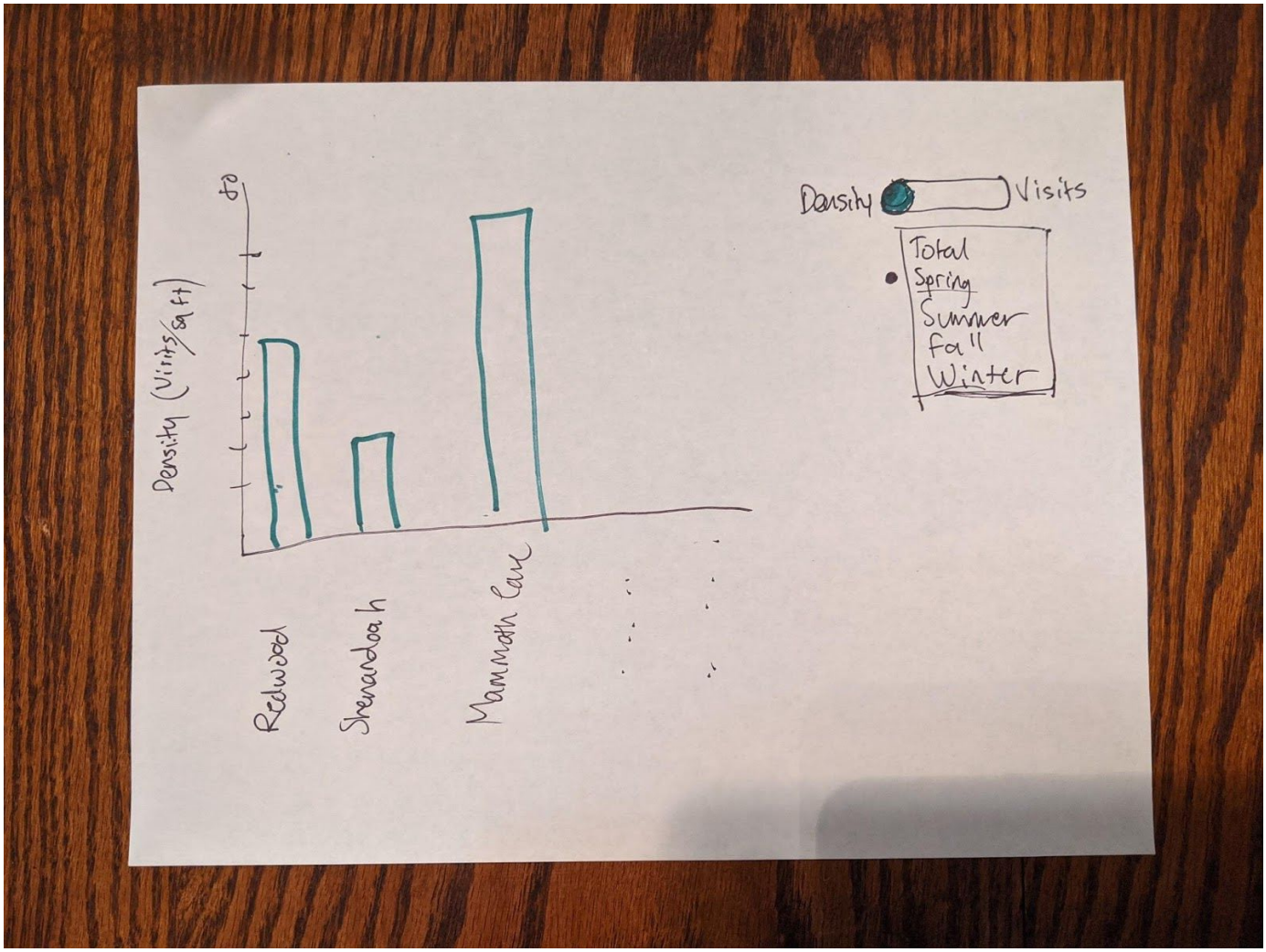
This will be a scrubbable timeline, combined with a slideshow that highlights various important developments in the history of National Parks. Significant founding dates and notable events (both in general and for specific parks) will be detailed.

Question 3: What activities are available at each park?



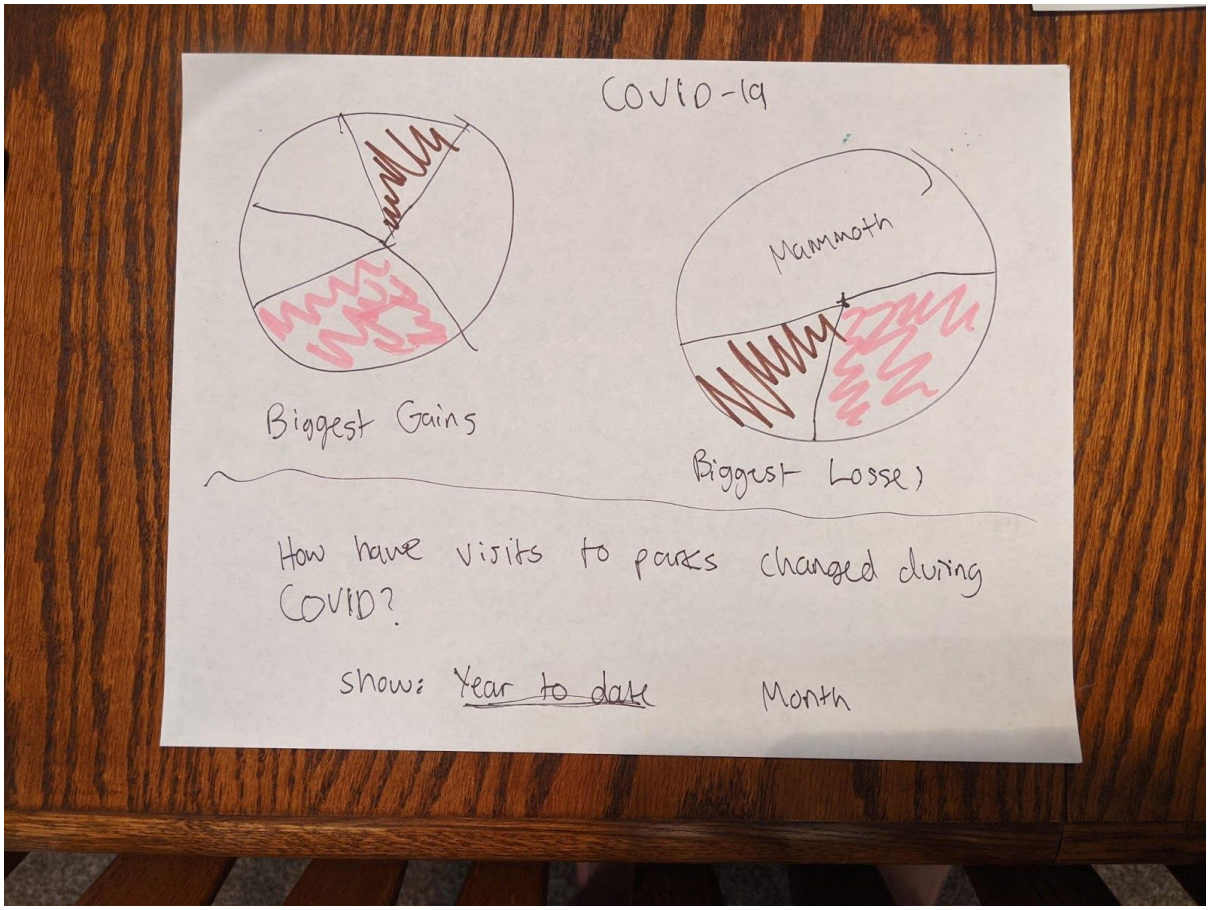
This graph will allow a more visual representation of which parks offer particular activities. It will, at a glance, show which activities are very common, and on the other end which parks offer the most activities. We believe this is an important dimension in a user deciding which park they may want to visit.

Question 4: Where are the parks? What is the seasonality of each park?



This will show which parks are very popular, both in absolute terms and relative to its size, by region. In particular, we may want to find a benchmark of a safe density that may help the user decide which season and which park will offer room for adequate social distancing.

Question 5: How has COVID affected national parks?



These pie graphs will provide a clear guide of which parks have seen the most change as a result of COVID. While it may not directly influence their decision to visit a particular park, there are arguments on both sides (gains/losses) that may convince someone to visit **any** national park.

Decide

Serial	Question	Sketch ID	Votes	Total votes
1	**What is the summary of national parks in the US?**	TB-1 GW-7 NM-1	TB+NM same—popup GW tree graph	TB
2	**What is the history of various national parks?**	TB-2 GW-1 NM-2	TB+NM same—timeline GW bar chart	NM
3	**What activities are available at each park?**	TB-3 GW-8 NM-3	TB bundling on map GW matrix NM bundling on parallel coord	TB/NM
4	**What is the seasonality of each park?**	TB-4 GW-3 NM-4	TB+NM same—bar chart GW—color coding on map	TB/NM Seasonal data?
5	**How has COVID affected national parks?**	TB-5 GW-None NM-5	TB line graph NM pie chart	Seasonal data?

6	**How can I find parks that support activities that I am interested in?**	GW-5 GW-6	Gordon only	Gordon

---------- TF feedback @ 11-12 ----------
Good job on the variety of sketches. Some are pretty well thought through based on the data you have, which are nice.
The overall storyline seems fine, but I think the hook element is not that strong as the message you want to convey is pretty simple and unsurprising.
I think the main issue here is you are framing your questions and design more like product functions than questions specific for data except for questions 4 and 5.
Some questions you have listed here can be asked in a slightly different way to enrich the data visualization you would design. For example, Q1 right now only prompts you to create a map with interactive points to hover over, but if you asked, Where are most National Parks located? You would come up with various data vis and enrich your answers. Q2, also can be asked like “Is there a moment when most National Parks are established?”, etc. These are just some possibilities; I just want to bring this up because the questions you ask will greatly impact your choice of data and depth of insights you gain.

Overall, I think the storyline is okay, but the data story needs to be enriched. I would encourage you to try to refine your questions in a more data-driven way. That will make your story more interesting and provides extra insights that people don’t already know the answers/or know where to easily find the answers. Feel free to reach out if you have questions.

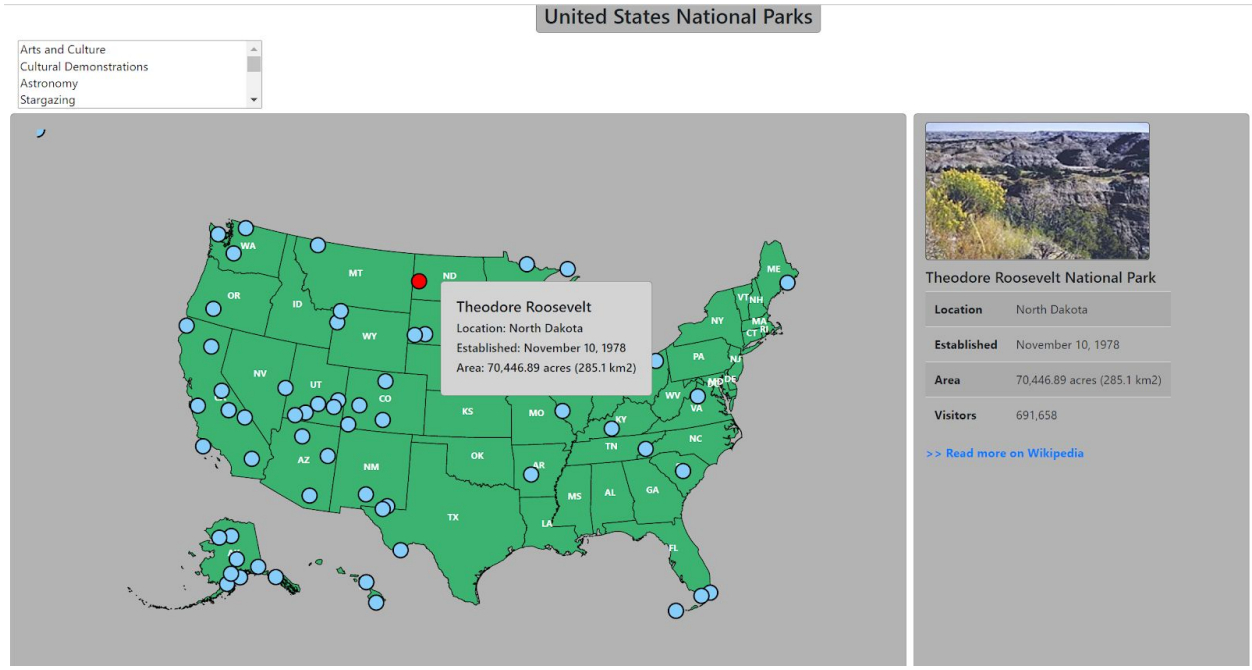
Response:

- but I think the hook element is not that strong as the message you want to convey is pretty simple and unsurprising.
  Our data is of exploratory type, not explanatory. Moreover, not all stories may have a climax where absentee ballots elect a trailing candidate the president days after election night. So it may not be unsurprising that some main messages are pretty simple and unsurprising.

- Some questions you have listed here can be asked in a slightly different way to enrich the data visualization you would design.
  All of the team members got full credit in the Tableau project. Based on the art of storytelling we learnt before, we believe we shall be able to embellish our stories in the coming days. As of now, our focus is to have the visualizations in place. Once we are done with that, we shall rephrase our stories to make the storyline an engaging one. For now, please consider the questions as placeholders that will be replaced by actual stories later.

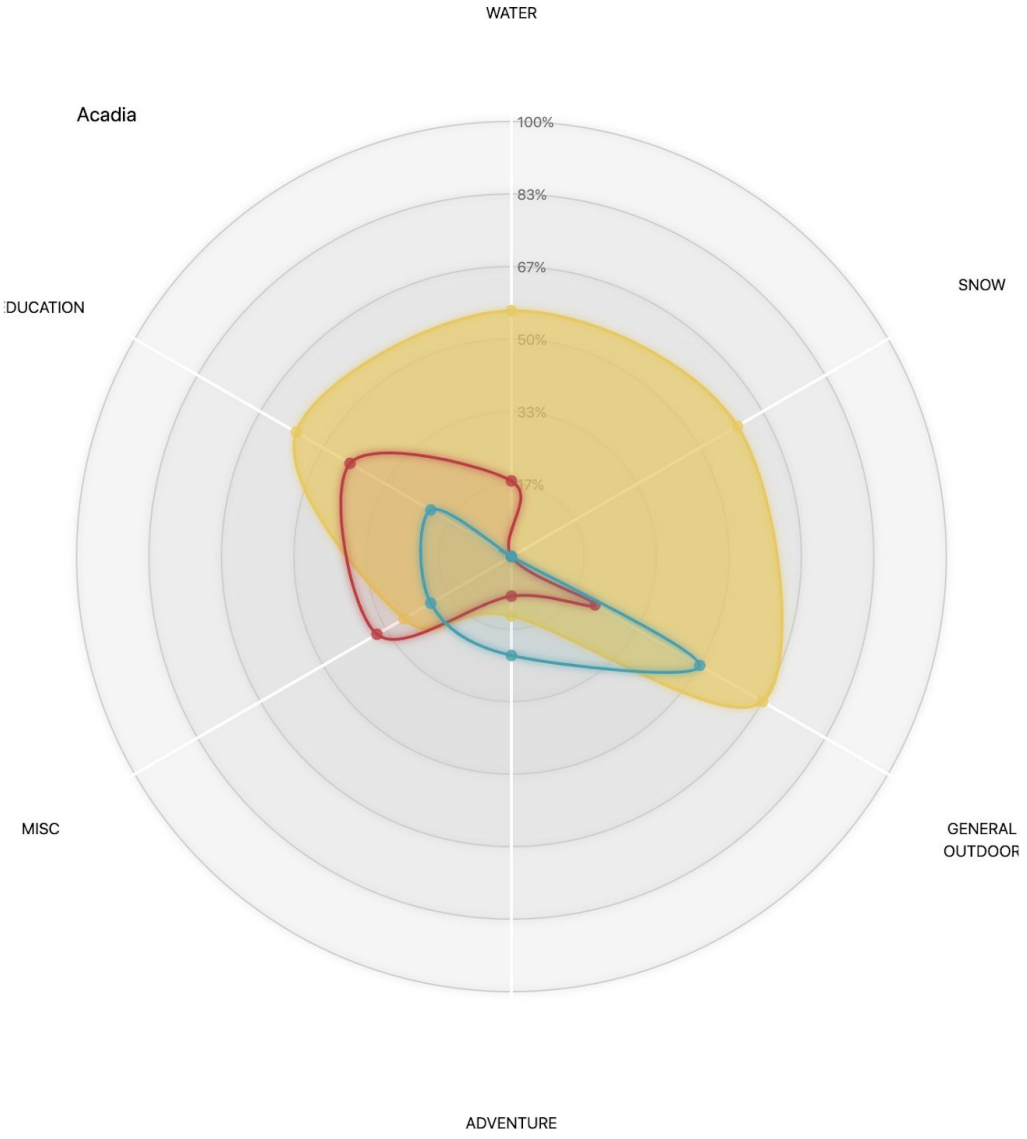
Tashrif's visualization of Q1

What is the summary of national parks in the US?



Gordon's visualization of Q6

How can I find parks that support activities that I am interested in?



This advanced visualization helps to characterize park profiles by the types of activities they offer. All possible activities are grouped into 6 categories. Then each park receives a score for each of these categories based on the number of potential activities it offers (i.e. a park that offers 6 of 10 possible activities in the "Adventure" category would receive a score of 60%).

Implementation of this visualization required addition of another data-cleaning script in order to create the json object that is used as a representation of activity categories. This script and data can be found in "data-cleaning/activities"

This visualization will eventually incorporate the activity filter to rank the top parks based on a user's preferences and display those parks. In addition to having an overlay view, we can provide smaller radar plots for each individual park:

Nate's Visualization of Q2

The timeline/carousel allows a viewer to familiarize themselves with the history of national parks. The cleaned data from the prior week was used to populate founding dates of each park, while new data was scraped from nps.gov to populate various legal events.

At this stage, the timeline below and carousel are interconnected so that an event fired on either component will reflect in the other. The timeline itself will likely be changed to add in titles/zoom/scrub functionality and encode legal vs park founding dates with designated colors.

Prototype V1 -> Prototype V2

- ✓ Add analysis of seasonality and/or COVID effect (Q4 / Q5) - Nate (data part)
- ✓ Update all visualizations to be filtered by central control
  - ✓ Map - Tashrif
  - ✓ Timeline - Nate
  - ✓ Radar - Gordon
- ✓ Determine whether to include new activity-filtered map for GW5 - Gordon
  - ✓ If not, maybe include GW4 (cartogram) instead
- ✓ Update storyline, ensure that questions are engaging
- ✓ Begin work on shared aesthetic & theme - Nate

---------- TF feedback @ 11-20 ----------

Good job on the first prototype!
I think your implementation of interaction and novel visualization work well and present the content in an easy to read layout. The basic structure of the webpage is implemented too. One suggestion is to add the questions you want to answer in the title of each section as placeholders even if you haven't finalized the details yet. This will help you walk through the storyline easier.
Another point to discuss is that I understand you want to create a more exploratory visualization for users. While that can also present interesting insights, please make sure you include some subjective messages to guide the users. We have checked within the TF group that the final project should contain storytelling elements even if you implement an exploratory tool. We can discuss more if you have questions on this.
Finally I think you are splitting your work pretty nicely. I just want to make this information available - a baseline for how many visualizations to contain in your final project is 1 vis / 1 person. It's good that you have more (and usually it needs to be more to support your story), but make sure there is one priority chart that's well designed and implemented.

Updated Story, Context, and Chart Titles

- ➢ Background
  - Title: United States National Parks
    - Description:
      The United States is home to some of the most unique and stunning natural geographical features in the world. Over the course of nearly 200 years, 62 of these sites have been designated as National Parks. Every year, these parks support as many as 90 million visitors.
- ➢ Learn about the history of National Parks.
  - Timeline
    - Title: How did National Parks come to be?
    - Description: Yellowstone was officially established as the first National Park in 1872. 34 years later, Theodore Roosevelt passed the Antiquities Act of 1906, creating presidential authority to designate national monuments from federal lands to protect significant natural, cultural, or scientific features. The national monument designation has served as a precursor to the National Park designation for many parks.
- ➢ Explore the various regions.
  - Description: Please select one to help guide your decision

- Map
  - Title: Where are the National Parks located?
  - Description:
    Filter the parks by activities available (top left), hover over the map to learn more about each park, and search the details of a park by typing in the name (right).
- Hex Map
  - Title: Not all regions are created equal. Which areas have the most access to National Parks, and how can this help guide your plans?
  - Description:
    This representation of the United States shows how each region is represented by using one hexagon for each National Park in that region. Depending on you location, this may be able to help inform your plans.

➢ Find the parks that will best support you in pursuing your favorite activities

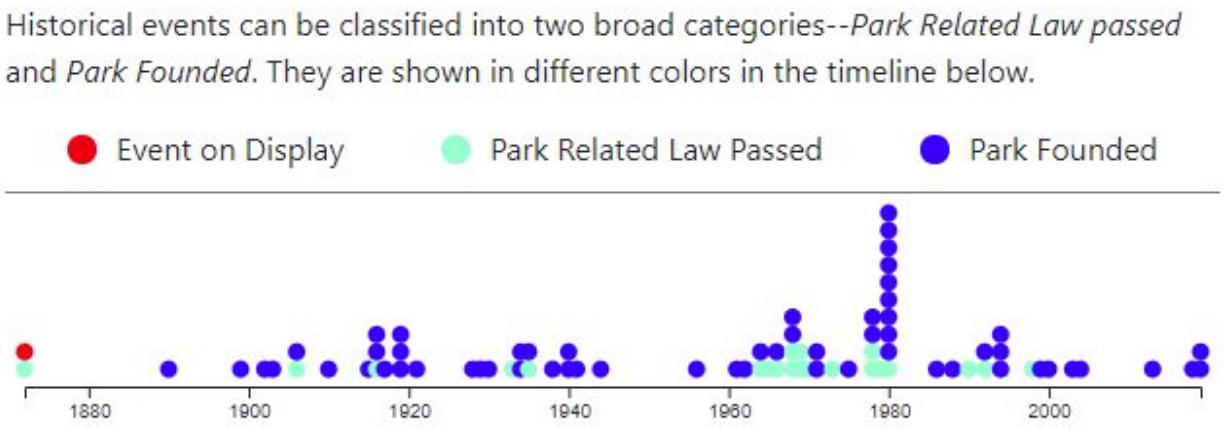
- Description: Let us know what types of activities you are most interested in. This information is used to find great parks for you to explore.
- Radar Map
  - Title: Different parks excel in different areas. Which parks are the best match for your interests?
  - Description:
    The National Parks offer over 100 different activities. Here, we can see the result of categorizing each activity and summarizing each park's unique personality by rating it on the number of activities available in each category. Your input is used to determine your top three matches. What are the personalities of your matches?

➢ Make a decision based on the popularity of each park and your comfort level with crowds

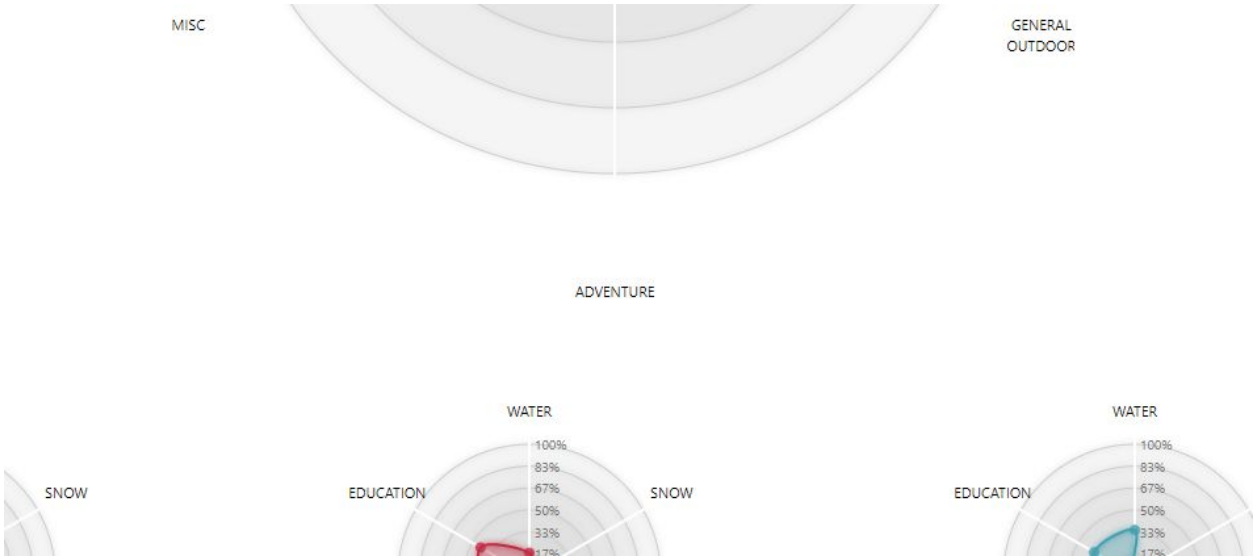
- Description: Which season will work best for your trip?
- Line Graph
  - Title: How has COVID-19 affected park utilization in 2020?
  - Description:
    Although outdoor activities are recommended as some of the safest recreational options, there has been a marked decline in visitors during 2020. This decline is most visible during March 2020, when many states first enacted precautionary legislation.
- Bar Chart
  - Title: Which of your matching parks are the most popular?
  - Description:
    Based on your tolerance for crowd size, it may be helpful to take park popularity into account when planning your trip. Visitation varies drastically between parks, and even between seasons within the same park. Some of the most beautiful and secluded experiences may be found during the "off-season".

Prototype V2: Suggestions For Later

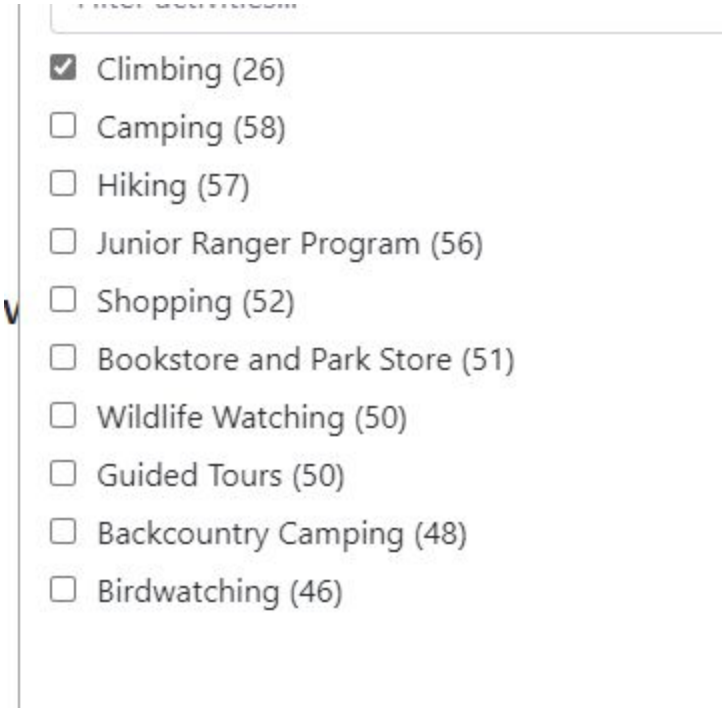
- ❏ Timeline
  - ✓ Timeline should not start scrolling until it appears in the user's view
  - ✓ Might be nice to add a tooltip to the "brush" section of timeline to display the event name
  - ✓ Should the legend be underneath the brush section?
- ❏ Maps
  - ✓ Should the state label font size scale with image/window size?
- ❏ Hex Map
  - ✓ Should be updated so the tooltip displays specific park names (or maybe more detailed information)
  - ✓ Some parks are shared across states. It would be helpful to represent this with a pattern or with a half-hexagon
- ❏ Radar Map
  - ✓ Tooltip activities list need spaces between items
  - ✓ It can be impossible to hover over small areas in the overlaid version. Not sure if this can be fixed…
  - ✓ Might be helpful to include the state for each park
  - ✓ Would be nice to be able to include smooth transitions instead of snap changes. Working on a branch to refactor the radar chart to allow for this.
- ❏ Line Chart
  - ✓ Should we default to the monthly view to make the "covid drop" more visible?
- ❏ Bar Chart
  - ✓ X-axis should be labeled
  - ✓ Can we make it more clear what we are displaying? I *think* we are showing the top 10 matches based on user input, ranked by number of visitors… is that correct?
  - ✓ Might be helpful to include the state for each park
- ❏ Evaluate Results
  - ✓ It might be useful to include the state name in the list. Or to show a mini-map with the top 10 parks on it.
- ❏ Sidebar filters
  - ✓ Is the ability to scroll within the "activity" section intuitive?
  - ✓ Can we ensure that the sidebar does not cover title text?
- ❏ Should we use one uniform style for tooltips? I'm using the "d3-tip" from one of our earlier assignments
- ❏ Ensure that all filters correctly control the visualizations
- More delineation about dots in the timeline:



- A one-liner telling the following three circles represent the above unified circle:

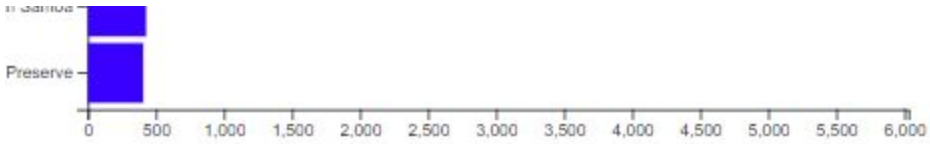


- When an activity is selected, it jumps to the top without the knowledge of the user:



- Activities list should be sorted
- The text “explore” sticks out while it should be hidden:

- Bar chart--limit number of ticks?



---------- TF feedback @ 11-29 ----------

The scrolling layout makes the storyline clear. The implementation is about 70% done.

My feedback on the current prototype-

(1) Give different color or background to distinct each section. Adding a park image to the first view to engage the users might be good.

(2) The timeline is catchy and presents a good amount of information. However, the timeline below the carousel is not within the view, and the red dot that indicates the event is not easy to understand. I suggest you enlarge the dot size and give a same color background to the timeline+carousel to indicate they are together. (Enclosure design principle)

(3) The animated highlight of dots on the map is distracting since there are many components on the map visualization. You don’t want to attract user attention all the time after they already know which park they are looking at. Maybe restrict the animation to present for once or use a static red dot to highlight instead.

(4) The “select a region” filter on the right seems to be presented across 2.3.4 section. I am not sure if it applies to all these visualizations or only in 3. It is blocking the main view and needs to have a collapse function.
(5) The hexagon map is novel and nicely presented! I suggest you consider using the similar color scheme for both maps.
(6) The radar charts look nice. I suppose it will act based on the filters on the right panel. Look forward to it.
(7) 5.6. are not implemented.

Overall the storyline is clear and the rich interaction that you intend to implement is fantastic. Important steps to take 1. Implement all the charts and functions correctly. 2. Pay attention to the overall visual consistency and clarity (components in a chart need to be grouped, the color should be consistent, ensure the use of CRAP principle).
-4: Not all views are implemented and the filter interactions are not fully functional.

CS 171 – Design Sprint

Host Name: Gordon Wade
Tester Name: Alex Wong
Tester Email: alexwong@g.harvard.edu

General Observations from the think-aloud study:

- Intro
  - Top blurb is cool - likes the premise of customized exploration
  - Why is there so much whitespace? (It's a bit confusing at first)
  - Should "or scientific" be "and/or scientific"?
- Timeline
  - Pictures on timeline are great
  - Reuse of stock images for legislative points is confusing. Duplicate image makes it seem like the carousel has reached end of loop
  - Alex didn't notice the "brush" area for the timeline until after clicking through for a while.
    - We could experiment with a "snap-on" to ensure that this gets into the user's window
    - There should be additional text clarifying that these two are integrated
    - Terminology "event on display" is confusing
- Section Transitions
  - The header sticky is cool!
  - But sometimes it shows the wrong number (seems to go 2 -> 4 -> 6)
- Map
  - Color scheme is a bit off-putting
  - Haleakala is malformed in the park selector dropdown
  - Region selector needs to be hooked up
- Hex Map
  - Text "your" location is cut off
  - Use of one hexagon for one park is intuitive
  - Gray color is also intuitive
  - Legend is too far down - it is not immediately visible and so the colors are confusing. Maybe it should be on the side?
- Selection Bar
  - Shouldn't cut off content
  - Unclear at first that it is intended to "stick"
  - Activity select: number of options is a bit high. Maybe they should be alphabetical so it's easy to find (doesn't notice search)
  - Confusing that selected elements jump to top
- Radar Chart
  - Very cool, but not as intuitive as the other visuals. More explanation would be helpful

    - What are the percentages, and why don't they add up to 100%?
    - The hover/tooltip text is great - maybe it should be more obvious
    - Park names should be more visible
- Line Chart
    - Option to choose metric is not immediately visible
- Bar Chart
    - Randomly breaks sometimes
    - What do the numbers mean? (We should label the axis)
    - Tooltips would be nice
    - Didn't notice season selector until moving onto next viz
- Park Info
    - Where are these parks located?

What does the tester like about your data story?
The tester found the premise of the story to be compelling. It was clear that the user was expected to engage by answering questions throughout the page in order to receive customized feedback. Very much liked the images and information pulled from the NPS API.

What improvements does the tester point out?
A lot of aesthetic improvements that would lead to more intuitiveness and usability. Particularly, several places could use more written explanation or some type of visual cues (snapping of elements into place, etc.)

Was the intended key message clear to the tester? Why or why not?
The key message was clear! No questions on that.

Did the tester get your next steps or call to action? Why or why not?
The tester enjoyed the idea that he could use this information to plan a trip, but wanted the final summary to include location (state) of each park so that he could more easily assess which would be the best options.

Hostname: Tashrif Billah
Tester: Fernando Medeiros
Tester email: fem433@g.harvard.edu

General Observations from the think-aloud study:

Timeline:

- Arrows are not visible
- Dots do not fit in the scope of view, user has now idea that there are dots below, he was stuck in the looping picture for a while until got bored
- Text description eclipsed the nice picture behind, should be moved to one side (left or right)
- Timeline axis does not span the full page width

Map with circles:

- Yellow color+grey background hard to read--AS, NP, GU

Hex map:

- The empty states need a legend
- Tooltip front+background color is not appealing
- Tolltip too small to read

Bar chart:

- Less bright fill color
- Text label denoting numbers on the right of each bar
- xAxis should be held fixed while bar widths vary from season to season to show change of visits
- Transition should be slower
- Options--Birdwatching + Winter has a bug

Radar plot:

- Surrounding texts are too small and thin to read
- The whole figure does not fit in the scope of view and so the user did not realize there are three separate plots below
- Meaning of each percentage/area is required

API:

- Need padding b/w contiguous tabs--Photos | Alert | Campgrounds | Place of Interest
- User should be made aware that the description spans further below i.e. user needs to scroll
- Fill spaces on left and right side of the view

What does the tester like about your data story?

- Storyline is coherent and in succession with each other
- A number of visualization with animation effect
- Map with blinking circle to point out the location
- API with suggestion

What improvements does the tester point out?

As noted in general observation

Was the intended key message clear to the tester? Why or why not?

The key message was clear! No questions on that.

Did the tester get your next steps or call to action? Why or why not?

Yes he did. The tester liked the idea that filters--regions, activities, and season will find him a suitable park.

Hostname: Nate Mortensen
Tester: Sarah Hong
Tester email: sarahhong@college.harvard.edu

General Observations from the think-aloud study:

- Make it clearer what the user is supposed to actually do. (Don't rely on someone to read the intro text and remember it throughout.
- Likes how the header sticks
- Carousel is aesthetically pleasing
    - Like how the carousel and timeline below are linked

What does the tester like about your data story?
She liked how all of our visualizations (except hex map) were interactive with user input rather than purely static. She liked the use of pictures as they were enticing, and lots of background information.

What improvements does the tester point out?

- Didn't understand the difference between the dots in the timeline
- Confused about clicking vs hovering
    - "Typing" in the select box, not actually typable
- Maybe zoom into the map as you select a region?
- Confused about why some hexagons have no national parks
- Confused about which parks are shown in the radar
    - Why only 3? Why those 3?
        - Make a better empty state
- Bar chart broke at some point

Was the intended key message clear to the tester? Why or why not?
The first thing she mentioned was that "this page is meant to help me find a park" which was exactly correct; however, she forgot about this message throughout the process of the visualization. She was also not totally clear about the parks at the end because there was little indication that they were scored.

When she got to the end, her question was: "Was I supposed to be stating preferences?"

Did the tester get your next steps or call to action? Why or why not?

Yes, she understood that the goal was to attend or at least research national parks nearby. She liked that we kept her on the page when selecting between parks before actually going to the website.

Polishing: Post-Test Updates

- ✓ Timeline
  - ✓ Timeline should not start scrolling until it appears in the user's view - Nate
  - ✓ Might be nice to add a tooltip to the "brush" section of timeline to display the event name - Nate
  - ✓ Should the legend be underneath the brush section? - Nate
  - ✓ **Add a max height to ensure that brush add timeline fit on screen - Nate**
  - ✓ Make sure stock photos are unique - Nate
- ✓ Maps
  - ✓ Should the state label font size scale with image/window size?
  - ✓ Ensure that map color scheme is cohesive - Tashrif
  - ✓ Region selector should be hooked up - Everyone update your own viz (see "eventhandler.js"
  - ✓ Haleakala encoding - Tashrif
  - ✓ Make map zoomable - Tashrif
    - ❑ ~~(Optional) make the regions auto-zoom~~
- ✓ Hex Map
  - ✓ Make sure that nothing is cut off - Gordon
  - ✓ Move legend up - Gordon
  - ✓ Add grey entry for legend - Gordon
  - ✓ Should be updated so the tooltip displays specific park names (or maybe more detailed information) - Gordon
  - ✓ Some parks are shared across states. It would be helpful to represent this with a pattern or with a half-hexagon - Gordon
  - ✓ Add highlighting on hover - Gordon
  - ✓ Make sure tooltips are legible - Gordon
  - ✓ Consider white vs tiled background?
- ✓ Radar Map
  - ✓ Update text styles to be more visible for labels - Gordon
  - ✓ Make sure explanation is clear - Gordon
  - ✓ Tooltip activities list needs spaces between items
  - ✓ ~~It can be impossible to hover over small areas in the overlaid version. Not sure if this can be fixed…~~
  - ✓ Might be helpful to include the state for each park
  - ✓ ~~Consider empty radar chart until selection made - Gordon~~
  - ✓ Update axis labels to be larger / bold
  - ✓ Update title to put "Top Three Parks" first
  - ✓ Would be nice to be able to include smooth transitions instead of snap changes. Working on a branch to refactor the radar chart to allow for this.

- ✓ Line Chart
  - ✓ Move the dropdown so it is more visible - Tashrif
  - ✓ Should we default to the monthly view to make the “covid drop” more visible? - Tashrif
  - ✓ Move this to #1
- ✓ Bar Chart
  - ✓ X-axis should be labeled - Tashrif
  - ✓ Make x-axis static (don’t update on season change) - Tashrif
  - ✓ Add bar labels - Tashrif
  - ✓ Add text explanation to explain which parks are being shown
  - ✓ Might be helpful to include the state for each park
- ✓ Evaluate Results
  - ✓ It might be useful to include the state name in the list - Nate
  - ✓ Span more width - Nate
  - ✓ Separation for tabs - Nate
  - ✓ Layout images in grid - Nate
  - ✓ Cut this to only 5 results
- ✓ Sidebar filters
  - ✓ Is the ability to scroll within the “activity” section intuitive?
  - ✓ Activity filter - add transition when moving activities up - Nate
  - ✓ Can we ensure that the sidebar does not cover title text? (low priority)
  - ✓ Reset buttons?
  - ✓ Text to explain reset / process more clearly to user?
  - ✓ Add a toggle for preference between “Minimize Crowds” or “Maximize Popularity”
- ✓ Should we use one uniform style for tooltips? I’m using the “d3-tip” from one of our earlier assignments
- ✓ Ensure that all filters correctly control the visualizations - all (update our own visualizations from eventHandler.js)
- ✓ Sticky Header Banner
  - ✓ Ensure that it adjusts at the appropriate location - Nate
  - ✓ Switch 6 to 5 for last step - Nate
- ✓ Top Ten Parks
  - ~~✓ Determine weighting for region filter vs activity filter - Nate~~
- ~~❑ (Optional) Add a NavBar~~
- ✓ Add footer- Tashrif

---------- TF feedback @ 12-03 ----------

Nice record of user testing. It seems you got quite a few useful insights to improve on the usability and intuitiveness of your current design. I like the list of to-dos you extract from user insights. To second your users’ feedback, I think your visualization implementation is very enriched and customized to users. It only requires some polish on visual and user experience detail to make it a lot better. Look forward to your final results!

Final Deliverables

Website: https://tashrifbillah.github.io/vis-final-project/

Screencast: https://youtu.be/oAY_QPBDq_0