Term Project Deliverables and Specifications

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Term Project Attempt #1 Draft

During Thanksgiving Break, work on developing a first draft of one of your term project ideas and upload the result to **http://digitalmedia.neu.edu/***YourUserName***/term/attempt1/draft — share this link in a new post in the Weeks 10-12 Term Project Development Discussion Board.**

The **draft** of this practice (due at the time of your Class #10 right after Thanksgiving Break) will be graded primarily on thought and effort. *Not everything needs to be working correctly by this class meeting, but we need to see that you tried!*

The **index.html** page that you upload to this location must include your best attempt(s) at a working visualization and your writing about this attempt.

It may also include an accurate sketch of what you intended your visualization to look like, if you did not get your code fully working. However, the sketch is not a substitute for some attempt at creating the visualization! If you include a sketch, please make it a reasonable size to fit with the rest of your web page.

If you create multiple visualization experiments this week, you may optionally use this page to link to each experiment or to other sketches that support your work. This is totally optional, though!

Assignment Details:

Based on the data structuring and visualization examples that we've provided and any research that you've done, attempt to create an original visualization based on your Sketch #2 or Sketch #3 or a new idea. Requirements:

- **Must not** be a simple scatterplot (not just your Sketch #1). Push yourself to do something more!
- **Must not** be any of the forbidden visualization types (simple bar chart, pie chart, word cloud, etc.)
- **Must** show the **relationships** between **at least 3 properties** of your data
- **Must** incorporate **all observations** from your data (you should have 20 or more recordings by now)

Your idea does not necessarily have to match any of the visualization sketches that you've submitted, if you've come up with new ideas since receiving your critiques. If working with a new idea, you should still *test your idea with real data in sketch form before going to the trouble of trying to build it.* You might even share your idea in your class section on Discord to get classmates and teaching team members to help ensure that your idea works!

While your visualization should at least partially function, **it only needs to be a "rough draft"**— your best effort, but if there are issues with overlapping data or fitting labels or getting the correct units to show (e.g., you haven't figured out how to get Numbers to format as dollar amounts or dates or times), that is ok!

Writing: First, put a title on the visualization, just as you've done for the scatterplots. Beneath this, provide a brief analysis of your work so far. At a minimum, tell us what hypothesis you're currently trying to prove (or what question you're currently trying to answer) and then explain to us how your current visualization supports that hypothesis (or answers that question)— or, if you feel that your current visualization does not support your hypothesis (or question answer), tell us what you will change for your next visualization so that it might better support your work.

Then, on this page, write about your research, design, and development process. What resources did you use to decide on this visualization form (cite sources and explain how you used them)? What is your rationale for using this visualization form— i.e., why do you feel it's the best fit for your data and your hypothesis (or question)?

The one **critical** thing to write is **citations for your sources**. Be sure to explain to us what resources you used to develop your visualization idea and what resources you used to adapt a visualization idea. Please remember that "citing sources" means explaining how each source was used, not just listing a bunch of things that you read.

REMINDER: The final version of attempt1 will be due as your Lab #10 assignment

Term Project Attempt #2 Draft

By Class #11, upload a draft of a **different attempt** at a term project visualization (following as many of the specifications in this document as you have time for) to **http://digitalmedia.neu.edu/***YourUserName***/term/attempt2/draft**

Then make a posting to the **Weeks 10-12 Term Project Development** Discussion Board that includes:

- A clickable link to your **attempt2 draft** upload
- A summary of your project so far, <u>providing all of the below-listed information.</u>

For this draft, we encourage you to experiment.

If your attempt1 project ended up being close to a complete term project (following the guidelines in this packet and based on feedback received from your lab instructor), then **consider trying a different visualization idea for this attempt**.

This may sound like taking a step backwards, but your second idea might inspire improvements to your first idea, or your second idea might be even better! For this attempt, you may create **any kind of visualization that you want** as long as it **shows the relationship between at least 3 properties of your data**. In other words, you still can't do a pie chart or simple bar chart (which each only show 2 data properties at most), but you can do a scatterplot, if you want. However, **if you do a scatterplot for this attempt**, make sure that it shows your improvement as a programmer – i.e., give us something more complex than what you did for your scatterplot explorations!

If your attempt1 project still has a lot of room for improvement (again, based on feedback from your lab instructor), then **push yourself to improve the visualization as much as possible.** Some possible improvements: Can you make the data fit better into the allowed space (1600 x 1000 pixels) by consolidating it? Or can you add an interactive element that lets us choose to see some or all of your data? Or can you visualize other aspects of your data in ways that add meaning to your sketch?

In all cases, if you try something and it does not work out, take a **screen capture** of the failed attempt, **save a copy** of that code (in case you want to revisit it later!) and **write about what you tried and what went wrong** (as far as what the visualization failed to do, not just "I got errors") as part of this week's posting!

Information for your Weeks 10-12 Term Project Discussion Board posting for attempt2/draft

1. REQUIRED: Provide a <u>clickable link</u> to your visualization attempt as it exists in **attempt2/draft**

2. Briefly explain to us the question or hypothesis that you decided to explore through your visualization and <u>why you chose this particular visualization format and these particular data items to explore this question.</u>

3. Briefly explain to us how your visualization attempts to explore this question or hypothesis, what initial conclusions you have drawn from your visualization, and <u>what other observations you have made in looking at your data.</u>

4. If you created **different** visualizations for **attempt1** and **attempt2:** Which one do you feel works better at this point? How does it better explore your hypothesis or answer your question?

5. If you **continued development** of your **attempt1** visualization for this draft of **attempt2:** What specific improvements did you make in this draft? What else do you think needs to be improved for your final?

*NOTE: Some of this may be information that you've also included on your **index.html** page, but the version in your Discussion Board posting should be expanded to include the underlined additional thoughts listed here. This will give you a good start on figuring out what you will say when presenting to the class.*

Term Project Attempt #2 Final

By Lab #11, upload a **revision** of **one of your two attempts** at your term project visualization to
http://digitalmedia.neu.edu/*YourUserName***/term/attempt2/final**

NOTE: Although this is due at lab, it will be graded as part of your Term Project Process grade – i.e., the grade for all of the various parts of the project that lead up to your term project final submission!

Then make a posting to the to the **Weeks 10-12 Term Project Development** Discussion Board that includes:

- A clickable link to your **attempt2/final** upload
- A summary of your project so far, <u>providing as much of the below-listed information as you can</u>. This will give you good practice for what to say in your final presentation and a head-start on your final paper.

For the final version of this attempt, we encourage you to get something fully working and close to finalized. This can be a significant revision of your **attempt1/final** or a revision of your **attempt2/draft** or even a completely reworked idea based on feedback you've received and insights you've gained from these other attempts!

As before, **if you try something and it does not work out,** take a **screen capture** of the failed attempt, **save a copy** of that code (in case you want to revisit it later!) and **write about what you tried and what went wrong** (as far as what the visualization failed to do, not just "I got errors") as part of this week's posting!

Information for your Weeks 10-12 Term Project Discussion Board posting for attempt2/final

1. REQUIRED: Provide a <u>clickable link</u> to your visualization attempt as it exists in **attempt2/final**

2. Briefly tell us about **all** <u>of the data that you collected</u> (not just the data on your final page). You may give us a link to an example of your bigger dataset if you have it uploaded as well. Alternatively, you can provide us with a *small* table in your Discussion Board posting that just shows an example of your data -- meaning all properties of your data that you collected this quarter, even if you ended up adding, deleting, or changing some during the course of the project.

3. Briefly explain to us how your visualization attempts to explore this question or hypothesis, what initial conclusions you have drawn from your visualization, and <u>what other observations you have made in looking at your data.</u>

4. Briefly explain to us how your visualization attempts to answer this question, what initial conclusions about your question you have drawn from your visualization, and <u>what other observations you have made in looking at your data.</u>

5. In addition, explain any changes that you have made to your idea since your sketches and the attempt1. Also include any further questions or issues that you are encountering. Again, be sure to cite sources for code that you have adapted from other source and/or places from which you've learned techniques.

6. OPTIONAL: As part of your final presentation, you will be asked questions about your code and how it works. If you want to practice explaining your code in this Discussion Board posting, feel free to pick a section of <u>original code</u> **(code that you wrote yourself and did not just copy from an example)** and explain here.

*NOTE: Some of this may be information that you've also included on your **index.html** page, but the version in your Discussion Board posting should be expanded to include the underlined additional thoughts listed here. This will give you a good start on figuring out what you will say when presenting to the class.*

Term Project Draft for Class Presentation

In the days leading up to the Class #12 (final) meeting, based on feedback from your project attempts and help you've received from the instructional team and classmates, develop a near-completed version final visualization that includes <u>as much of the required information for the final project as detailed on the next few pages.</u>

Upload this nearly finalized project to: **http://digitalmedia.neu.edu/***YourUserName***/term/draft/**

By "nearly finalized", we mean that we expect you to <u>at least:</u>

- **fully develop your final web page**
    - ensure your visualization fits the size requirement
    - ensure that your key and labels completely explain your visualization
    - explain your project in the HTML as detailed below
    - provide a title that indicates what your project is about in only a few words
    - format the text so the margins are reasonable (should not span all the way across page, which is hard to read!)
    - provide some visual hierarchy to your text so that it's easy to read -- use paragraphs, bold, italics, lists, and other HTML formatting that you've learned

- **ensure you fully understand all JavaScript included in your project**
    - REMINDER: You must convert all arrow functions to use the function keyword unless you have received explicit permission to use them in your project!
    - EXCEPTION: You don't have to explain the code in d3.js, collect.js, or other <u>libraries</u> (not sure if you're using a library? you can only use approved ones, so be sure to ask!)

- **format your JavaScript neatly**
    - First, **use VSCode auto-formatting**, of course!
    - Then, ensure your code is broken up into logical sections **with a single blank line between each**

- **write good <u>original</u> code comments** that:
    - use the **formatting** you learned in class and specified for this project
    - document all **named** functions
    - explain any **complex code** (loops, arrow functions, multi-part conditional logic, etc.)
    - include citations of **<u>all sources</u>** directly used in coding your project (videos/books/websites you learned from, and specific code that you adapted into your project, if any)

REPLY to your own posting in the **Weeks 10-12 Term Project Development** Discussion Board to share the clickable link.

NOTE: Because this is the version that you will present in the final class meeting, it is OPTIONAL to write an explanatory posting to accompany this link; you may want to do this so that you have some updated notes to refer to, but it will <u>not</u> be part of your grade. ***Your grade on this version will depend on your in-class presentation*** *(see next page)!*

FINAL PRESENTATION

During the Week 12 class meeting, each student will take 5-10 minutes to share their final project. All students will be responsible for critiquing and questioning their classmates' work, with the instructional team members guiding the conversation.

The presentation is **fairly informal**, but it is **required** and is part of your final grade. At a minimum, you must be prepared to show your uploaded visualization on a classroom computer and to explain your visualization clearly and succinctly, guiding us through what to look at, your question/hypothesis, and your conclusion(s).

After you present, the students and the instructional team members will ask questions about your project and offering suggestions for ways to it before the final submission deadline.

Finally, the instructional team member will ask you questions about your code. Your classmates may also ask you questions if they are curious about how you coded a certain part of your project.

This is a great opportunity to share what you have learned, but most importantly, ==you must be able to explain how all of your code works!== "I got this function from a web site" is not an acceptable answer!

The best way to prepare for this is to write thorough code comments for all functions, loops, and conditional logic. This will ensure that you can quickly find the answers to our questions!

You also should spend some time making sure that you can **quickly locate the correct file and line numbers for anything in your code that you are asked about**. For example, if you are asked "How did you create the star shapes in your project?" you should not have to spend more than a few seconds finding the relevant code to show us. **If you don't know your project incredibly well at this point, that is an indicator that you did not write your own code and/or that you did not spend time analyzing the code that you adapted from other sources.**

*TIP: You can use **View Page Source** in Chrome to get to the source for your **index.html** and then you can click on the linked file names in the HTML to get to your code. You can then use Chrome's **Find** to quickly locate something in your code (For example, if we asked you about the star shapes in your project and you know you wrote the code in **main.js** and used a variable called **star**, you could navigate to **main.js** from your index page and then find the first use of the variable in the code.*

Clarification: You do not need to submit a draft final report PDF for the drafts of the final project. However, if you would like feedback on your final report so that you have guidance on revising it before the final deadline, include a copy named **report.pdf** within your **draft** or directory and let us know in your class Discord channel that you posted it. This way, any member of the instructional team (or possibly a classmate) can give you suggestions!

Final Submission

By NOON (midday) Boston Time on Friday, December 16th, you must upload a final version of your project **including your final report PDF.** Because grades are due on Monday, we must grade these projects over the weekend, so <u>we cannot give people extensions for any reason whatsoever.</u>*

Check your final project submissions to ensure everything is in place and nothing has been overwritten! You should have the following files in your web space (accessible as described in every assignment -- i.e., **digitalmedia.neu.edu/***YourUserName***/** followed by the directory paths given below).

term/final	Your final web page and visualization must appear when we go to this directory
term/final/report.pdf	Your final report must be downloadable from this location
term/attempt1/draft	Your practice visualization due at Class #10 must appear when we go to this directory
term/attempt1/final	Your practice visualization due at Lab #10 must appear when we go to this directory
term/attempt2/draft	Your practice visualization due at Class #11 must appear when we go to this directory
term/attempt2/final	Your practice visualization due at Lab #11 must appear when we go to this directory
term/draft	Your nearly complete draft visualization that you presented in class must appear when we go to this directory
term/sketches/draft	Your web page that describes your initial three sketch ideas and that links to your three (or more) draft sketch PDFs
term/sketches/final	Your web page that describes your revised three sketch ideas and that links to your three (or more) final sketch PDFs.

==PLEASE check that all of your uploads are in the right place!==
This is as easy as going to **digitalmedia.neu.edu/***YourUserName***/** and then pasting on the above-listed file locations (e.g., **digitalmedia.neu.edu/***YourUserName***/term/final** for the first one). If you do not see what has been described above at that location (<u>not</u> in a folder or file that you then have to click on, but the described content <u>appearing in your browser</u> when at that URL) then be sure to re-upload to the correct location! Failure to do this may result in a 0 on part or all of the term project *(if we can't find it, it does not get graded)*, so **be very very careful!**

As part of being careful, **REMEMBER: We must be able to see your progress throughout the project.** If your earlier milestones look identical to your final version, **this will <u>not</u> demonstrate that you improved your work** over the course of the project, and **you will receive an overall <u>lower</u> grade as a result!** Even if one of your early drafts was perfect, we still expect to see improvements in code formatting, commenting, variable naming, efficiency, etc. You should also try to experiment and challenge yourself with more advanced coding in your later drafts, if your earlier drafts already do everything you want them to.

In other words, **be careful <u>not</u> to overwrite earlier uploaded projects**. Better yet, **have a backup** that you can re-upload in the worst case! You can always download your projects using FileZilla, same as you upload! Check the Week #1 Lab slides for more information about this!

*A reminder on Incompletes: **Don't plan on getting one!** Per University policy, an "Incomplete" grade can only be awarded to a student who has (1) completed all but the final project and (2) provided satisfactory documentation of a medical, family, or other crisis that results in their needing more time to complete the final project. <u>We cannot give an "Incomplete" to a student who has not completed at least 75% of the coursework, nor to a student who simply "needs more time".</u> **This is not a class policy; it is a University policy that we are required to follow!**

Final Deliverables (due at end of Week 12)

For your **final** deliverable, upload your **final visualization** and your **final report PDF**. IMPORTANT: Be sure to upload to the correct directories. We will check each attempt, draft, and final directory for different versions of your work so we can credit you for improvements made between each version!

FINAL DATA VISUALIZATION: The **index.html** file in the project directory must load up your visualization and must include neatly formatted and styled text (HTML & CSS) that explains your visualization. **In order to be complete**, this page should include:

- A single visualization of the relationship between at least three different properties of your data *(NOTE: You may provide alternative visualizations linked from your main one, but you must choose one visualization that you'll primarily write about and that we'll primarily use as the basis for your grade!)*

- Representation of data for at least the last 6 weeks (**up to and including Week 12**, so you must add in data **through Wednesday of Week 12** to your final deliverable)! *(NOTE: If your project does not have 6 weeks of data including through December 14th, please be sure to explain why in the information about your project written beneath your visualization. Valid reasons include changing the data you collected after Week 6 or not doing the activities that you track during the last week of class. "I forgot" is not a valid reason.)*

- A title for your visualization that briefly summarizes its contents. Generally, a title for a visualization explains what you are comparing in just a few words. Focus on making the title a clear and brief explanation in simple terms. Nothing fancy needed here! Good examples: "Relationship Between Music Genres and Daily Moods", "Writing Down Ideas Increases Their Actionability", "Checking Instagram: tracking my habits and moods" *(NOTE: The title should be on your page as a large heading above your visualization or your visualization analysis)*

- A key to your visualization that explains data represented by variations in scale, shape, color, or anything else that isn't clearly a part of your axis labels *(TIP: While it is generally better if your key is actually a part of the SVG generated for your visualization, if you have a particularly complicated key that's easier to produce as HTML or as a static graphic (such as a PNG), that is OK! You just need to make sure that the key is laid out next to the visualization in a way that ensures we will see both the key and the visualization on a reasonably size screen without scrolling in any direction!)*

- Neatly and clearly labeled axes that include well-formatted text and numbers and any units of measurement. *(TIP: Units of measurement can be described in text below the axis, if that is more suitable. For example, rather than having long numbers $0 through $100,000 on your axis, you might label your axis in increments of 10 from 0 through 100 with text beneath it saying "Annual Income in thousands of dollars")*

- All of the above elements must fit into a reasonably sized Chrome for MacOS web browser window **without us needing to scroll.** A good guideline for "reasonably sized web browser" is 1600 pixels wide by 1000 pixels tall. If your visualization plus key needs to be much larger than this, please check with your instructor. *(TIP: You must not make your page "responsive" (your visualization's SVG should not resize when the browser resizes!), but you might want to use Chrome's "device toolbar" feature that lets you test pages in a variety of sizes just to test your page formatting.)*

- The remaining elements below should appear beneath your visualization. **NOTE: It is OK if we have to scroll down the page to see these items**, so they do not need to fit within the 1600 x 1000 pixel recommended space.

  o The question (e.g., "Does my mood affect my shopping habits?") or hypothesis (e.g., "People are friendlier in residential neighborhoods") that you're exploring through this data visualization.

  o An overview of the data that you collected for this project. You must explain what data you collected and why you collected it. You must also tell us how often you collected data (once per day? more? less?) for this project and explain whether you think this provided you enough data to do your visualization and come to any conclusions. You might also include an example of what your dataset looked like before you cleaned it up for your visualization (this can be as a separate HTML page or a JSON file or a PDF, but not an Excel file or other format that is not native to the web). Be sure to explain what each piece of data represents as clearly as possible -- i.e., include units of measurement, possible values, etc. If the data is based on a scale that you made up, then explain the scale and provide example values (e.g., instead of just "0 = sad", explain what a typical "0" rating for your mood actually involves)

- A one-paragraph <u>conclusion</u> based on your observations about your data. Based on your visualization, what's the likely answer to your question? Or, if you're still working from a hypothesis, does it seem to prove or disprove your hypothesis? If the patterns in the data seem to disprove your hypothesis, what alternative hypotheses are suggested by patterns in the visualization? If you don't see any patterns in your visualization, suggest other data that you could collect and visualize in the future that might provide an answer to your question or support an alternative hypothesis (and what might that alternative hypothesis be?)

FINAL REPORT

Must be submitted **as a PDF** *(no other file format will be accepted!)* called **report.pdf** in the same directory as your **final** version of the term project (in other words, we must be able to see your report at **digitalmedia.neu.edu/***YourUserName***/term/final/report.pdf**)

There is no specific length requirement for the report, but anything less than 5 pages of single-spaced 12-point type with 1 space between paragraphs and 1-inch margins **(not including illustrations or raw data)** <u>may</u> be a sign that you need to do a bit more thinking and writing. Once you add illustrations and raw data, the report will likely be 10 or more pages.

Tell the complete "story" of your project in this report. Just as in some classes you might present to guest critics who are unfamiliar with your project or your work, you should treat this report as a thorough paper <u>that can be understood by someone who does not know what you worked on for this entire quarter.</u> *NOTE: The more professionally and thoroughly and <u>clearly</u> you communicate about your project, the better your grade on the report will be!*

Remember: **<u>you can't assume that we know what you are thinking</u>**, even though we have been looking at your project all term. Pretend that this report will be read by a guest critic who is totally unfamiliar with your work! To do this, you need to be <u>very explicit</u> about how you collected your data, what units of measure you used, what range of values you used, and how you translated your raw data into the final project. The more we understand about your thought process— *even on parts of the project where you tried something that did not work and you had to re-think!*— the better your final paper will be! *TIP: A lot of this information may already be found in the analysis you've written on your various draft and final attempt pages and in your Discussion Board postings, but you will want to expand upon this information here!* ***DO NOT*** *just copy-paste from old Discussion Board postings. Make this a cohesive report with clearly defined sections!*

Beyond these general guidelines, **in order to be complete, this report must include:**

- <u>All</u> of the data that you recorded for the project, <u>including</u> the date on which you recorded each piece of data (if you recorded the <u>time</u> of each data recording as well, you should also include that, but it is OK if you did not record the time if it was not relevant to your data)
  - **The data <u>does not</u> all have to be in JSON format, but it must be neatly formatted and searchable text.** You could provide your data as an export from an Excel spreadsheet or whatever you used to record information. However, please <u>do not</u> include your data as just an image. It must be text so that we can search it, and it must be included in your PDF! (Presumably your data is already in digital form at this point, even if you originally noted it on paper, since it's part of your final project!) *TIP: You can use Adobe Acrobat (which everyone should have access to via the school's licenses) to combine multiple PDFs into a single file, if you currently have your data in one file and your report in another.*
  - Even if you changed your project partway through, you should still include evidence of <u>all</u> of the data that you collected, **including data that you collected before you changed your project's data collection** (so, earlier data may be in a separate table from later data).
  - If you changed what data you were recording or made major changes to the format of the data partway through the quarter, please explain what you changed, when you changed it, and why you changed it.
- A <u>rationale</u> for the form of your final visualization. Why was this visualization format the most suitable for representing your data? What other visualization types did you consider? Why did you ultimately choose the format that you did over your other options? *(TIP: This combines nicely with the next topic, which is showing alternative ideas that you explored)*

- Provide us supporting evidence for your decision **from readings that you've done and/or other visualizations that you've looked at online**

- Make reference to your sketches (and optionally screen captures/links to your alternative implementations) as part of this discussion.

- If you ended up receiving permission to break any final project rules (such as making your visualization bigger than the allowed size, or using a form of visualization normally forbidden), be sure to write about your efforts to NOT break these rules and what led you to conclude that the best solution required a deviation from the rules. *(REMINDER: If you need to break a final project rule, you need to ask for and receive permission in advance! Your instructor will then advise you on what to say about breaking this rule in your final paper)*

- One good place to start your rationale is the decision tree and articles at https://www.data-to-viz.com/ and the chapters from the online books that we assigned in order to help with this! You also may find that you can build your rationale from your discussion of your other visualization ideas -- i.e., the item right before this one!

- **Sketches or a screen capture** of **at least one other** **visualization of your data** that you considered for your final project and an **analysis of the benefits and drawbacks of this alternative idea**. This alternative could be based something from your **sketches** directory or one of your **attempt** directories, or could be an idea that you sketched or attempted but did not submit. **Just make sure that the sketch or screen capture includes all elements expected in a visualization!** This includes (but is not limited to): axis labels, values, keys, a title, and a hypothesis.

  - **This sketch must not be the same as your final visualization.** This sketch must be one of the ideas that DID work, conceptually, but that you DID NOT use as part of your final! If you received feedback that an idea <u>did not</u> work or needed revisions, then you can't use it as an alternative idea sketch (or screen capture) unless you revise it so that it works as a possible final project idea first!

  - **Contrast this alternative idea with the visualization that you ultimately chose to implement.** What does this idea do better than your final visualization? What does it focus on that your final does not? What does it do less well, or what data did it fail to communicate? Why did you choose not to use this idea? *(IMPORTANT: "I decided not to use this idea because of feedback I got" is <u>not</u> what we are looking for. We want you to explain <u>in your own words</u> why this idea was a <u>good</u> idea for visualizing your data but ultimately not the <u>best</u> idea.)*

  - **Optional:** You can <u>additionally</u> include <u>other</u> visualizations that you <u>implemented</u> as part of your final project experimentation if <u>these other visualizations help us to understand why you decided to select the one that ended up in your final project.</u> For example, if you ended up creating a simpler final visualization because it more clearly communicates your data, but you also created a more complex visualization that you decided not to use, you should explain to us why you decided the simpler visualization was better. In addition to a screen capture of this alternative visualization, be sure to include a link to a <u>working version</u> of the more complex visualization so that we can look more closely at what you attempted. A screen capture is great for talking about your ideas, but to actually prove to us that you wrote code, we need to see it!

- <u>Analysis</u> of your work, including responses to the following (in essay form!):

  - What <u>questions or hypotheses</u> you considered exploring in your final visualization. What did you think you might learn from your data? What did you ultimately decide to explore?

  - What <u>conclusions</u> have you come to, based on your data? You have a fairly small amount of data, so consider what your final visualization <u>suggests</u> about your question, even if you don't yet have a <u>conclusive</u> answer. Look at the other data that you collected but didn't visualize and see if there are any other conclusions that you can draw (i.e., does your other data support other questions or hypotheses that you might have explored)

  - Did the conclusions surprise you or tell you anything new about yourself or about the world around you? If so, what? How has this project changed (if at all) how you think about yourself? The world? How you observe the world? How you think about data?

  - Now that you have completed this project, what ideas do you have for other data that you could collect <u>on this same topic</u> that might give you more insight into whatever you were studying? For example, even if you think that your data supported your hypothesis, you could propose collecting other data that might provide other causes-and-effects related to what you were exploring.

- o Before being assigned this project, did you regularly collect data about yourself (tracking workouts, food, mood, habits, etc)? If so, what data did you already collect? Did that in any way prepare you for this project?

    - o Does this project inspire you to continue to collect other data about yourself or the world? If so, what data would you like to collect, and what would you use it for in the future?

- A "Works Cited" page **that includes <u>specific citations</u> for all resources used in designing and writing about your data visualizations and in writing this final paper.** Please the MLA format (https://www.bibme.org/mla) to make sure that you include all necessary information.

    - o For the <u>paper's</u> <u>citations</u>, you only need to include citations for works that informed your <u>thinking</u> on your final project deliverables (your sketches and your visualization) and for works that you quoted (with proper attribution, of course!) in the paper to support your rationale and conclusions.

    - o <u>Cited works</u> means works that you have actually quoted or from which you have taken specific facts (which means you should have credited them in the body of your paper as well, using in-line notes, footnotes, or endnotes). Anything that just "inspired" your work can go on the separate "Bibliography" page detailed below.

    - o In addition to providing a "Works Cited" page at the end of the paper, be sure to provide attribution for <u>ideas</u> that came from elsewhere. You can do this with in-text and/or parenthetical citations, as described at https://www.bibme.org/mla

    - o ***ACADEMIC INTEGRITY REMINDER:*** *Please review the University's standards for quoting work. If you quote someone else's work without providing your own insights and context, you do not get any credit for those thoughts. If you simply rewrite someone else's sentences <u>without</u> crediting them for the ideas, then you are committing plagiarism.* ***We take plagiarism very seriously, and you will fail the final project if we find any evidence of it in any part of your project.***

- If you read articles or web pages that informed your visualization design or that generally taught you coding techniques that you applied to your project, you <u>may</u> want to include them on a separate "Bibliography" or "Additional Resources" page in your final paper.

    - o ***If you do this, please <u>only</u> include pages that directly contributed to your final project***. **A "padded" bibliography will not impress us.** For example, we will not take your bibliography seriously if your final visualization is a scatterplot, but you cite a bunch of articles about bar charts.

    - o For this page, feel free to add a note beneath any credited resource that may require explanation. For example, if you did in fact use a technique from an article about bar charts in your final scatterplot, write a sentence explaining to us how this article helped you!

- You will additionally cite sources for any code that you adapted <u>in your JavaScript</u>, as detailed on the next two pages.

Term Project JavaScript Requirements

Your code will be graded based on **originality** (did you clearly write some of your own code and not just copy and slightly modify examples or other people's work?), **use of techniques from this course** (how well did you apply what you learned in class? how well did you adhere to class coding standards?), and **your demonstrated comprehension of these techniques** (did you clearly and thoroughly comment your code in your own words?).

Here is a list of some of the items that we will check in your code. **Use this list as a starting point to ensure that your project complies with our standards, but additionally ensure that all of your code follows the three key guidelines stated in the above paragraph.**

- Original code comments explaining all functions and logical structures (e.g., loops and multi-part conditionals) that you've written in your program.

  - For d3 "helper functions" and for short logical structures (**if**, **for**, etc.) that are only 1-2 lines long, you can write a short end-of-line style comment (one using **//**) to explain.

  - For longer multi-line structures in your program, write a multi-line comment (using /* */) **above** each structure.

  - For any function declarations longer than a "helper function" (i.e., the major functions of your program, such as the one that will actually draw your visualization), you must write full function documentation as practiced in class -- i.e., summary, requirements, parameters, returns.

- Citations for any code that you adapted from other sources (as a code comment). Provide the specific source (examples: a web page's title and URL, a lecture's title or date and slide numbers, or a book's title and page numbers) for any code from other sources that you incorporated into your project, even if you modified the code to make it your own.

  - We should be able to find the code quickly based on the information that you give. We should not have to search a web site or a book chapter for it, so be specific.

  - You do not need to use MLA format for these citations but be sure to include enough information to credit the original creator— the author's name(s), if possible, or the organization behind the cited code, if a specific name is not available.

  - For code adapted from class or lab examples, please cite Jay Taylor-Laird as the author.

- Removal of all code comments **not** written by you. THIS IS **VERY IMPORTANT.** Leading us to believe that others' words are your own— even unintentionally! — is plagiarism! Be sure that every code comment in your project— including in the **index.html** file! — is in **your own** words!

- Variable names all appropriate for your project. You may use one-letter variable names for **iterators** (e.g., **i** for loops, or **d, i** for data and indices in d3 evaluation functions), but you must name all other variables, objects, and properties that you've created so that their purpose is clear, relevant to your project, and accurate. For example, a variable to count the number of movies that you watched could accurately be called **moviesWatched** or **movieCount**, but if it was called **calorieCount** or **numberOfDays**, that would be inaccurate.

- **Consistent** variable naming. For example, you can use **d,i** or **value, index** or any other combination for iterating through data in D3, but you should always use the same variable naming scheme in your project. As a bad example, if you use **d,i** in one part of your project and **value, index** in another place, that will suggest that you're at worst copying code and at best not thinking enough about what the variables mean (and every variable that you use should be meaningful to you at this point!)

- Function names all appropriate for your project. Except for anonymous functions (such as those used as parameters to many d3 methods), any functions or methods that you create must be named so that their purpose is clear, relevant to your project, and accurately describe what the function does. For example, a function that counts the movies you watched could accurately be called **countMovies**, but if it is called **countDays** or **addOneToExercises**, we will suspect that you did not write it.

- All variables declared using **let**. If you <u>need</u> to use **const** or **var**, you must provide a comment <u>for every single usage</u> that explains <u>why</u> you used that declaration format instead (TIP: "the code wouldn't work with **let**" is not a good enough reason)

- Functions declared using the **function** keyword and fully explained with a code comment (NOTE: may be used in combination with **let** if you're using a function-generating method such as the **d3.scale** family of methods). You must convert any "arrow functions" to regular functions <u>unless</u> you have your instructor's explicit permission to use arrow functions. *REMINDER: If explaining an anonymous function, you can use an end-of-line (//) comment instead of writing full function documentation, but you must write full function documentation or all others.*

- All JavaScript code written in properly named external files. You must not have <u>any</u> JavaScript in your **index.html** file, only **<script>** tags that reference your **.js** files! If your project is interactive, <mark>this includes not having any onclick="" or other event-handler tags in your HTML</mark>; you must instead add any event listeners in JavaScript via **addEventListener()** or **on()** as covered in this course! If you are unsure how to do this, then this is something that you need to review before the final! If you still have difficulty after attempting to do this correctly, please ask an instructional team member for help and <u>make sure you understand what they show you so that you can explain it in code comments!</u>

- Data loaded from an external **.json** file. You will learn to load in data from a JSON file using **d3.json** and to get full credit, you should do this instead of assigning your data directly to variable **dataset.** Your data must be in JSON or JavaScript object format, regardless of how you load it in. Using CSV is <u>strictly</u> not allowed, since that is not a data format that we used in this class. Generally when people try to use CSV for their final, it's because they have copied an online example instead of breaking it apart and taking only the pieces they need. It's easy to convert CSV to JSON, so do a little research and you won't end up with this problem!

- Use of a local copy of **d3.min.js** version 7.6.1 (the version that we provided you) rather than a version provided by a remote server! <u>You must use the **most recent**</u> version that we provided in class (some projects may have used version 5.x, so be sure to check this). Other versions of d3.js will not be accepted for any reason!

- No d3.js extensions unless you have received permission from your class instructor to use them! Everything that you need for this project is included in the version of **d3.min.js** that we provided! If you use any D3 extensions, you must provide a local copy of the extension in the project. If you're not sure about how to do this, please ask!

- No additional code libraries unless it is one that we said could be used or that you received specific permission to use. If you use any libraries, please provide a <u>local copy</u> of the library in the project. If you're not sure how to do this, please ask!

- Code organized in accordance with a class project template (**preferably** the term project starter). You can add files as needed, but we should be able to understand <u>why</u> you added these files. For example, if you decide to break up your code so that one file contains your main visualization and another contains your utility functions, that is great; we love readability! On the other hand, if your project consists of a file structure that looks nothing like anything we've done this quarter, we will question the source of your work!

REMEMBER: **We would rather see a not-very-impressive project that fulfills the requirements rather than an impressive one that contains code that you clearly do not understand!** **A big part of the final project is your analysis of your work, so** even if you end up creating a simple scatterplot in the end, if you can explain what you tried to accomplish, what your code does, and what you learned, you can still earn a decent grade! If you can further demonstrate to us that, **through experimentation with other visualization formats**, you concluded that the scatterplot was the <u>best</u> way to show your data, then you can still earn an excellent grade!

Term Project Sample Rubric

Element	Unscaled Points
Page: Submitted in correct place	10
Visualization: Shows 6+ Weeks of Consistently Recorded Data	10
Visualization: Fixed size (does not resize) and fits in reasonable window size	5
Visualization: Clear key for all visual elements	10
Visualization: Good use of color/scale/shape/position	10
Visualization: Appropriate visualization type chosen for question/hypothesis	10
Visualization: Appropriate axis ranges/ labels/ choices	10
Visualization: Readability of visualization	10
HTML: Clear hypothesis/question	10
HTML: Overview of data collected	10
HTML: Conclusion based on data	5
JavaScript: Comments on complex structures and all named functions	10
JavaScript: Variable & function naming	10
JavaScript: Citations for borrowed code	10
JavaScript: Accurate function documentation	10
JavaScript: Originality & level of challenge	20
JavaScript: Indentation and spacing	10
JavaScript: Follows class standards (no var, => converted or explained)	10
Data: Collected and visualized until December 14, 2022	10
Data: All (even unused and changed properties) in report PDF	10
Report: Submitted in correct place	10
Report: Final visualization rationale	15
Report: Data collection rationale and process	15
Report: Conclusions based on data	10
Report: Alternate idea sketch(es) & comparison(s)	15
Report: Cites supporting evidence / research	10
Report: Past/future data collection thoughts	5
Report: Overall clarity & completeness	20

NOTE: "Unscaled points" show you the ratio of each component of the project contributing to the final. For example, the page being submitted in the correct place is 10/300 points, or 3.3% of your term project grade.

Your raw score on the final project will be scaled to the points allocated for the final project on the dynamic grading scale -- generally around 120 points within a total class grade scale of around 450 points.

This rubric is subject to change without notice; it is provided as an **approximation** of how each project will be graded. Additional bonuses or penalties may be assessed based on each instructors' priorities and on each students' work.