

CS 171 – Final Project



At-A-Glance

What: A major part of this course is a group project in which you will work in small teams of three on a web-based interactive visual data story that allows your audience to gain insights and the main message about some topic of your own choosing. You will use the design sprint process and map your project, get the data, sketch your visualizations, come up with your data story, implement it using D3, and evaluate the results. You will host your final project as a public website using GitHub pages or any other web hosting service of your choice (we strongly encourage you to use GitHub).

When: Here is the weekly schedule with deliverables:

Week	Main Tasks	Submissions (Sundays)
Week 7 (Oct 10 - Oct 16)	Find a team and a topic	Process Book & Project Proposal
Week 8 (Oct 17 - Oct 23)	Team Agreement and Detailed Project Plan, Data	Team Agreement & Detailed Project Plan
Week 9 (Oct 24 - Oct 30)	Data, Map	Map (Audience, Questions), Data Description
Week 10 (Oct 31 - Nov 6)	Sketch, Decide, Start Prototyping	Sketch, Decide
Week 11 (Nov 7 - Nov 13)	Prototype	Prototype V1
Week 12 (Nov 14 - Nov 20)	Prototype	Prototype V2
Week 13 (Nov 21 - Nov 27)	Prototype and Test	Think Aloud Study Results
Week 14 (Nov 28 - Dec 4)	Prototype & Wrap Up	Final Submission
Week 15 (Dec 5 - Dec 11)	Project Video Watch Party & Best Project Awards!	Self and Group Peer Assessment

Teams: You will pick your own team of 3 students to work with. In general, we do not anticipate that the grades for each team member will be different. However, we reserve the right to assign different grades based on peer assessments.

Mentor: We will assign a TF mentor to each team in week 8.. Your mentor will leave feedback in your process book. Your mentor is also going to meet your group in weeks 9 or 10 and 12.

Topic: You will pick your own topic and dataset.

Design & Implementation: You will follow the design sprint process and use HTML, CSS, Javascript, and D3 for your implementation.

Remote Collaboration Tool: You can use [Miro](#), e.g., to create a storyboard.

What to do

Here is an overview of the deliverables for each week. Please go to the Modules on Canvas and look for more detailed instructions. The tasks and deliverables may change from this document, so always follow the weekly descriptions in Canvas.

<https://canvas.harvard.edu/courses/108108/modules>

Week 7: Process Book & Project Proposal

You will choose a team leader and set up your process book. Make sure all your group members can edit it. You also need to add a project proposal to your process book. In your project proposal, you will let us know what topic you are interested in exploring, including a project title and abstract. The team leader also needs to submit the project proposal as well as the team members' information through the [project proposal form](#).

Week 8: Team Agreement & Detailed Project Plan

In your process book, you will add your team agreement and create a detailed project plan, which should address the following points of your Map step:

- **Basic Info.** The project title, your names, e-mail addresses, and your team name.
- **Background and Motivation.** Discuss your motivations and reasons for choosing this project, especially any background or research interests that may have influenced your decision.
- **Related Work.** Anything that inspired you, such as a paper, a website, visualizations we discussed in class, etc.
- **Audience and Questions.** Provide a description of your audience and the primary questions you are trying to answer with your data story. Do you have any overarching goals and objectives that you want to accomplish?
- **Data.** From where and how are you collecting your data? If appropriate, provide a link to your data sources.
- **Data Cleanup.** Do you expect to do substantial data cleanup? What quantities do you plan to derive from your data? How will data processing be implemented? Try to minimize the amount of cleanup you have to do by finding cleaned and ready-to-go data sources whenever possible.

You will also be contacted by your TF mentor. Make sure your TF mentor can access your process book. They will leave weekly feedback on your progress.

Week 9: Data, Map You will submit your dataset(s) that you are planning to use for your project. In this week, you will examine your data (we encourage you to use Tableau for initial data exploration). Next, you should clean your data, and be able to load it into your D3 project. As a team, you will work on the Map step and decide who the audience of your project will be, and what questions you want to answer in your visualizations.

Week 10: Sketches, Decide & Storyboard

Each team member will create individual sketches of visualizations using a pen and paper that might answer your questions. In addition, you can create a few exploratory visualizations in Tableau. As a team, you will then decide which of these visualizations and insights you plan to pursue in your project. Finally, you will create an initial storyboard of the data story that you plan to tell. Please note, we expect you to have at least one **novel** visualization in your final implementation. Check the “Technical Requirements” in the rubric for details. You should also get started on prototyping in this week.

Week 11: Prototype V1

You will create a first working visualization prototype. You do not have to have all your visualizations up and running, and it does not need to be completely interactive, but the overall structure and the content should be clear. We will ask you to hand in your code in its current state.

Week 12: Prototype V2

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

Week 13: Test

You will conduct a think-aloud study with a random person from another team that we will assign to you. You will document the results of the study and use them to make changes to your prototype.

Week 14: Wrap Up & Submission

You will finalize your web-based data story and submit your final project at the end of the week. You will host your final project as a public website using GitHub pages or any other web hosting service of your choice (we strongly encourage you to use GitHub). You need to make sure your public website is up and running and include the link of your website in your process book.

In addition to the process book, data, and code of your project you will also create a **two-minute screen-cast with narration** showing a walkthrough of your data story. You can use any screencast tool of your choice. Please make sure that the sound quality of your video is good - it may be worthwhile to invest in an external USB microphone. Please use a standard video file format with a standard video codec.

Week 15: Watch Party, Best Project Prizes & Peer Assessment

On Wednesday, Dec 9, we will host a final project video watch party during regular class times. At the end of it, we will announce the winners of the coveted CS171 Best Final Project prizes that will be determined by a vote among the TFs. Winners will be immortalized (sort of) on our external course website at cs171.org. Finally, you will fill in the self and group peer assessment form.

What to Submit

At the end of the final project, your team will submit the following items in a single .zip file:

- **Process book:** a PDF file, generated from your Google doc, that documents every step and design decision of your final project.
- **Tableau Packaged Workbook (.twbx) file (optional):** A package of files that includes your data source file, the Tableau workbook (.twb), and any other files used to produce the workbook (including images). Make sure you select **.twbx** when you save your file since we will not be able to grade .twb files.
- **Data:** Submit all the cleaned data that you used in your project. If the data is too large to upload, store it on a cloud storage provider such as Dropbox.
- **Code:** All web site files and libraries assuming they are not too big to include.
- **Final Project Video:** A max. 2-minute screencast with narration that shows how your audience would go through your data story.
- **README** - The README file must give an overview of what you are handing in: which parts are your code, which parts are libraries, and so on. The README must contain URLs to your project websites and screencast videos. The README must also explain any non-obvious features of your interface.

Grading Rubric

When grading the final projects, we will ask your TF mentor and a second TF who was not directly involved with your team to evaluate the following properties:

- **Completeness**
 - Completed project proposal form submitted
 - Submission of all of the required files, including self and group peer assessment from each team member
 - TFs can read the process book and view the final project video
- **Map**
 - Team agreement form signed by all team members
 - Detailed project plan in the process book
 - A clear description of the target audience
 - A list of at least 10 interesting initial questions
 - A clear description of your data, including any necessary cleanup procedures
- **Sketch**
 - Complete and cleaned data submitted in time
 - At least 3 sketches per team member of visualizations that answer the questions
 - Possibly Tableau visualizations and dashboards used for exploratory data analysis (optional)
 - Good storyboard sketch for your data story, including main message, hook, and audience takeaways
- **Decide**
 - Sketches are sensibly clustered and named
 - The result of the group voting is documented
 - Your main message has been refined, justified, and finalized

- Prototype
 - Complete code and data for Prototype V1, V2, and final submission
 - Complete screenshots of your visualizations and data story before and after Test
 - Discussion of features and issues that you will address after test
- Data Story
 - Data story has a clear title, subtitles, captions
 - Visualizations answer your main questions and insights appropriately for the audience
 - Visualizations and data story are well designed and effective
 - The data story has a clear hook, main message, and audience takeaways
 - Data story is well designed (e.g., whitespace, C.R.A.P., Gestalt principles)
 - Data sources and authors of the data story are clearly identified
- Test
 - Complete think-aloud study notes by your team, including the name and email of your test subject
 - The main findings and comments of your think-aloud study are well documented
 - List of ideas on how to improve your data story and visualizations to address the comments
 - Comments have been addressed in your re-design and final submission
- Process Book
 - The process book is complete and clearly documents the progress throughout the design sprint
- Final Project Video
 - The video can be viewed by the TFs and the maximum length is 2 minutes
 - The video has a spoken narration that presents your data story and interactive visualizations
 - The video and narration are appropriate for a general audience
- Effectiveness of Visualization and Interaction Designs
 - Proper use of colors
 - Effective charts and visual encodings
 - Engaging and useful interactions for the visualizations
 - Follows the design guidelines and principles you learned in this course
- **Technical Requirements**
 - Implemented multiple coordinated (linked) views
 - Implemented at least one innovative visualization that is either
 - a) an extension of an existing visualization type, or
 - b) a novel visualization type
 - The goal of an innovative visualization is to go beyond typical bar charts or line charts, be creative! Come up with custom visualizations that only work for your type of data!
 - Your final website should be robust, reliable, and polished