Basic Info
Nutrition Explorer
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https://github.com/jlund24/nutritiondatavis

Background and Motivation
Discuss your motivations and reasons for choosing this project, especially any background or research interests that may have influenced your decision.
We chose to focus our work on nutrition because it's a topic relevant to everyone. Everyone eats, and most people feel some need to make conscious choices about the nutritional value of the food they purchase and consume. None of us have much background or research interests in nutrition, but we do find it interesting and a topic of value.

Project Objectives
Provide the primary questions you are trying to answer with your visualization. What would you like to learn and accomplish? List the benefits.
We want to provide an easy and understandable way for people to understand what they are eating or plan to eat by showing them to what degree their chosen foods fulfill their nutrition needs. It will also be a fun way to play with different options and see how that affects their diet outcome. Showing price will make it even more interesting, allowing users to discover relationships between nutritional value and cost.

The primary question we're trying to answer is **how do the nutrient qualities and prices of common foods compare to each other?**

We'd like to learn in particular about how less well-known (but still important) nutrient qualities like folate or vitamin A vary among different foods and what the best sources of each are. We'd also like to gain some experience building visualizations that allow the user more control over what is displayed. The meal view in particular will allow users to choose the subject of the visualization.

We hope the visualization will allow users to see the merits of various foods and make informed decisions about which foods are most effective at delivering needed amounts of nutrients within a reasonable caloric range.

Data
From where and how are you collecting your data? If appropriate, provide a link to your data sources.
We will be using 3 main sources of data:
1) FoodData Central Data from the USDA: https://fdc.nal.usda.gov/download-datasets.html
2) USDA guidelines for food group portions for different demographics.

(example for vegetables) https://www.choosemyplate.gov/eathealthy/vegetables
3) (optional) USDA ERS - Fruit and Vegetable Prices
https://www.ers.usda.gov/data-products/fruit-and-vegetable-prices/

**Data Processing**
Do you expect to do substantial data cleanup? What quantities do you plan to derive from your data? How will data processing be implemented?
Yes, we expect to do substantial data cleanup. Our goal is to have one table with detailed nutritional information and the average price for a small (~100) set of foods so we can visualize different nutritional relationships with iconographic scatterplots, and one table with corresponding nutritional guidelines for different demographic groups. We plan to use a combination of R and Python to do join different sources together to create these datasets.

Visualization Design
How will you display your data? Provide some general ideas that you have for the visualization design. Develop three alternative prototype designs for your visualization. Create one final design that incorporates the best of your three designs. Describe your designs and justify your choices of visual encodings. We recommend you use the Five Design Sheet Methodology.
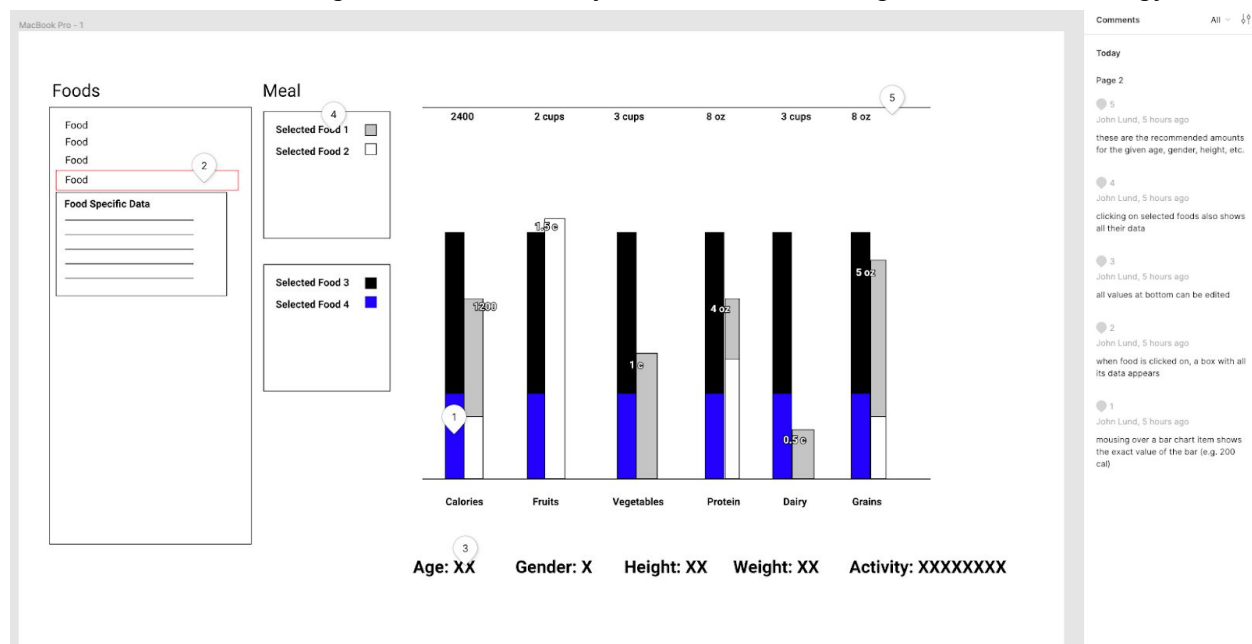
Prototype 1
The idea behind this prototype was comparing how much foods contribute to the daily recommended amount of each food group across foods and across combinations of foods. Stacked bar charts were used for individual meal to allow users to see both the total daily contribution and how much individual foods were contributing. The bar chart groups help users compare how each meal (or group of foods) contributes to the daily recommended amounts of calories and food groups. More specific data about individual foods can be observed on demand

by hovering over the name in the list on the left. The scale of the chart also changes based on the demographics of the user (age, gender, weight, etc.) such that the y max is the daily recommended amount. The overall goal is to make comparison between foods and meals easy with regard to daily recommended amounts of different food groups and calories.

ARE YOU EATING ENOUGH
PRODUCE?!

search for a produce item

veg	price	deets
eggplant	$5	• winter
		✓ recipes

. in team

you're selected....

×2
$5

×2
$5

×1
$2

Total
$12

dark
wraps
whatever

Prototype 2

Daily Nutrition Plan

Age [25 ↕] Sex [🚹 🚺] [Customize] (reveals goal boxes)

Goal = [ ]

[Save]

counts as
2 cups of
vegetables

Milk (category) (yellow)

Vegetables	Fruits	Grains	Meats	Calories
2/4.5	0.5/5	4/4	5/4	
(green)	(blue)	(brown)	(red)	

New Plan

[Raw Broccoli ▼] [1 2] cups ⓘ

[Steak ▼] [8] oz. ⓘ

[SAVE PLAN]

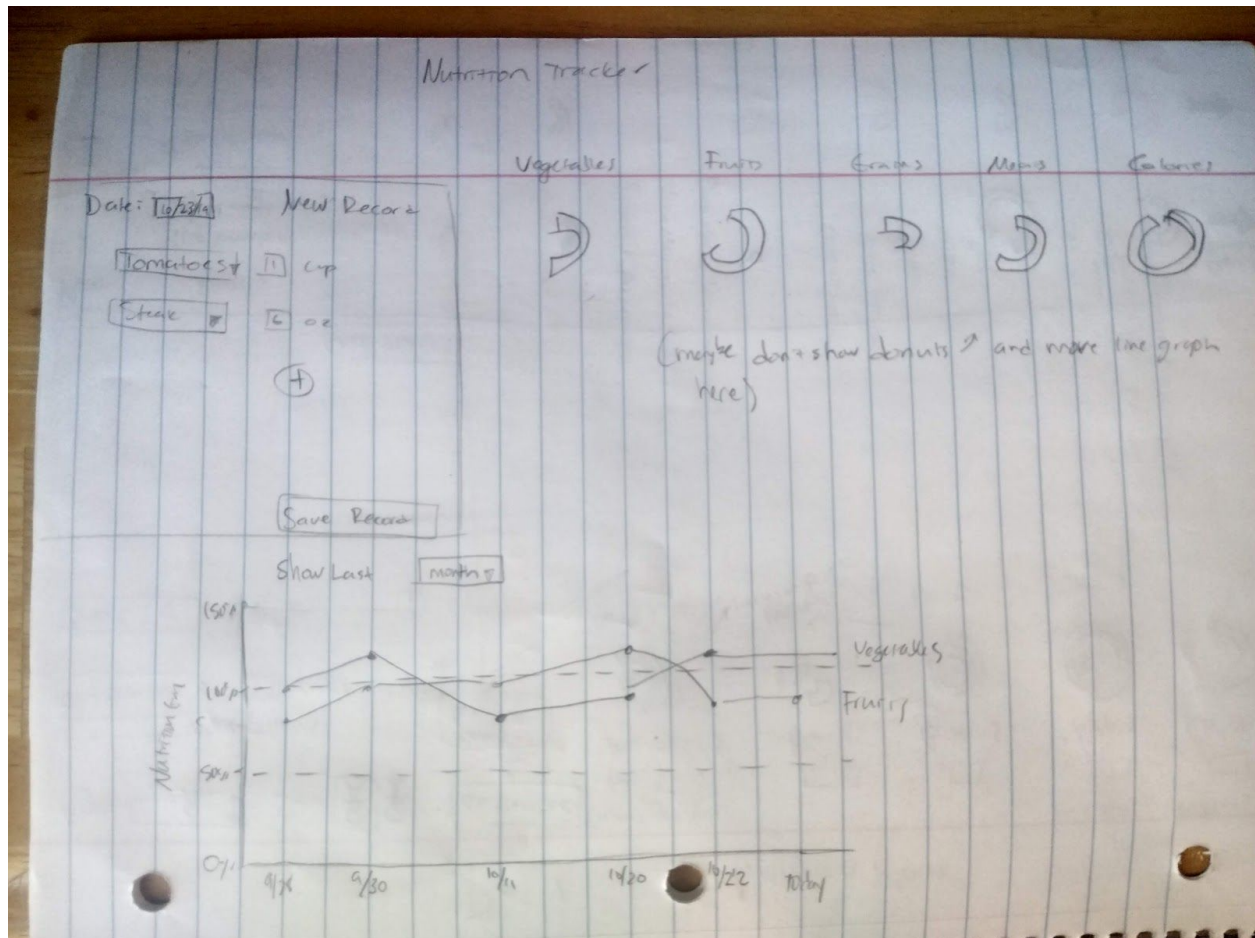| Plan	Foods							Copy to Tracker
1	1 cup tomatoes, 3 Hot dogs	✏	⟩	▫	◠	◯	⟩	➡
2	4 Slices of bread, 2 cups squash, 1 hamburger	✏	⟩	◿	⟩	⟩	⟳	➡

Prototype 3 (above 2 images)

The idea behind this was to allow the user to input information about themselves, which we would use to determine their nutrition needs. Users would select different foods to create a "meal plan," and we would display how those foods combine to meet their needs for the different food groups by showing donut plots. We liked the idea of donut plots because they show progress towards a goal, or part of a whole. This was based off of our initial dataset, which gave us information about food groups, but not nutrition data like protein and carbs.

The second view would be more of a tracker, where the user would input what they actually ate, similar donut plots would show to what degree their nutrition needs were met that day, and a line plot would show their data over time so they can see if they are consistently lacking in any areas.
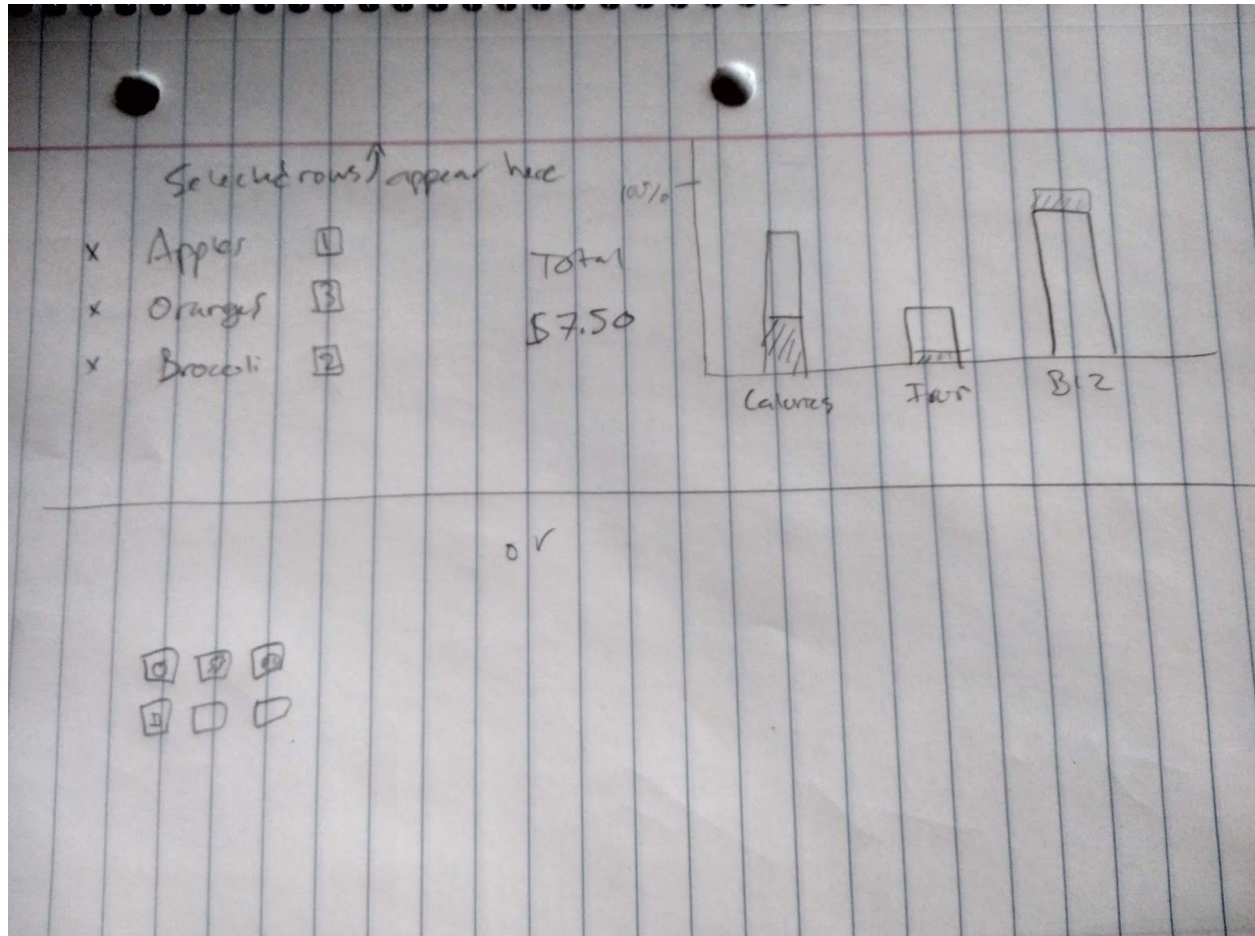
	Sortable Column		Column		
	Servgsize	Fats	(Iron) mg	Price	
Bopple	1 cup	0		$3.00	

x-axis [Calories]

y-axis [Iron]
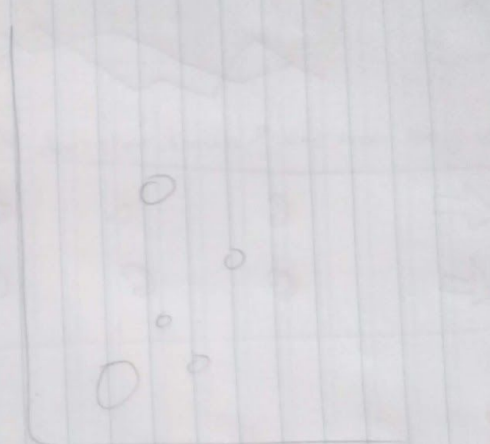
Size [Price]

Final Prototype (above 2 images)

We found a dataset that we felt better met our goals, because it provides nutrition information rather than just food groups. We thought we could show all of the data in a table, with each food item we choose to include in the rows (optionally with icons by the food name), and columns will show the serving size and the nutrition facts we perceive as most relevant/interesting. Each cell will show a donut plot showing how much of their nutrition needs would be met by a serving of that food. Finally, as an optional feature if we can obtain the data, we would display the price. This table will take up the left side of the page. We think a table will be a good way for someone to view all of the information quickly without having to select each food item one by one, and the columns allow for some comparison.

On the right side, we will have a scatterplot. The user will be able to select what feature to use for the x-axis, y-axis, and circle size. We may optionally include icons of the foods on top of the circles. Circles will be color-coded based on their food group (vegetables will be green, etc.). That same color scheme will be used for the table labels.

Below the scatterplot we will have a feature allowing the user to select a group of foods and quantities to see how a "meal plan" will fulfill their nutrition needs. A stacked bar graph will display how close to 100% they are for each nutrient, with the layers of the bars being color-coded to match a food item so they can see how much each food is contributing to the

nutrient. If our number of foods is small enough, we may have a grid of icons they can toggle on/off instead of using drop-downs to select foods. If we obtain price data, we will display the total price of the selected foods next to the bar graph.

The views will be interactive. Rows in the table will be selectable/hoverable and will highlight the corresponding circles in the scatterplot, and vice versa. Tooltips will be used to provide additional information on hover. We may allow users to add foods to their "meal plan" by selecting rows in the table.

Must-Have Features

List the features without which you would consider your project to be a failure.

- Table
    - Shows key nutrient data for all foods
    - Sortable by each feature
    - Each cell is a visualization (bar/donut chart)
    - Click to select food item in scatter plot
- Scatterplot
    - Compares foods by selected columns in table
    - Hover for food name and metadata
    - Click to select food item in table
- Meal view
    - Allow users to select foods and number of servings
    - Show bar chart with combined nutrient amounts

Optional Features

List the features which you consider to be nice to have, but not critical.

- Table
    - Drag to reorder columns
    - Brush over several rows to highlight them in scatterplot
- Scatterplot
    - Brush over several points to highlight them in table
- Meal view
    - Select foods by clicking rows in table
    - Show bar charts in "stacked" form
- General
    - Incorporate price into all visualizations
    - Food icons

Project Schedule

Make sure that you plan your work so that you can avoid a big rush right before the final project deadline, and delegate different modules and responsibilities among your team members. Write this in terms of weekly deadlines.

Deadline	Bond	Lizzie	John	All
Oct 30				Detailed design finalized. Git collaboration process defined.
November 1	Code initialized with divs and classes set up so views can be worked on independently	Start data wrangling process	Code initialized with divs and classes set up so views can be worked on independently	
November 8	Scatterplot done. Axes and size are user-selectable. Tooltip displays circle info on hover	Have a complete (at least in terms of columns) dataset	Data all appears in cells in some form, might still be a little rough	Table and scatterplot independently finished
November 15	Meal planner - can select foods, quantities, shows bar graphs and prices	50% of graphics done	Polish and finalize table cell visualizations. Add sorting.	Meal Planner view finished
November 22	Work with John to create interactivity between views	100% of graphics done	Work with bond on interactivity	View interactivity finished. Code done.
November 26	Finalize process book	Make recording	Add hover effects and dragging. Host website	Project completed, including process book, screen recording, and

				website

Final deadline: November 27