U Hungry

Process Book

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Overview and Motivation: Provide an overview of the project goals and the motivation for it. Consider that this will be read by people who did not see your project proposal.

Cooking has always been one of the many challenges that students face. Being a student is a full-time job, especially during exams you have little time to cook. The goal of U Hungry, a website for finding on-campus restaurants, is to help students at the University of Utah find the best place for their meals. There are different applications to locate some restaurants across or close to the campus. Still, none of them can give you a solid recommendation based on factors such as distance from your department, price, quality, etc. Also, there needs to be more information about some available on-campus restaurants, some of which are cheaper and more delicious. U Hungry will help students find what places to eat on campus are best for them based on their priorities. Using U Hungry can allow students to make full use of available resources on campus and better manage their time and budget while eating good quality food. In addition to all these points, students prefer to eat off campus when they cannot find affordable places on campus. With this website, we can introduce campus restaurants to students, especially those less known. As a result, instead of students eating outside the campus, by looking at this website, they can find exciting locations on campus and support local businesses, which will generate more income for the University of Utah.

Related Work: Anything that inspired you, such as a paper, a website, visualizations we discussed in class, etc.

The inspiration for this project was being an international student on campus, meaning you traveled to a completely unknown place. It would be best if you explored it to find different resources on campus and fully use your opportunities as a member of the University of Utah. During the first days, the only source of information for international students is the data being shared online or the talks with friends that you are finding slowly, and if you are an introvert, you will have a hard time with this option. Moreover, caring about your budget is a factor that affects your decisions upon your arrival. Expenses at the beginning of the journey need to be managed. In other words, the cost of the food is a significant portion of your payments at this time. Therefore, finding affordable on-campus foods would be an excellent opportunity to save money. With all these in mind, our inspiration to build a website is to list all available on-campus restaurants and help students decide better where to eat delicious food at the University of Utah.

Questions: What questions are you trying to answer? How did these questions evolve over the course of the project? What new questions did you consider in the course of your analysis?

As it was mentioned in the project objective section of our project proposal, we are trying to answer the questions that might come to our brains when deciding where to eat. These questions are listed below:

1. Which restaurant is closest to the departments of students on campus?
   A big deal is that the time we have for each meal is limited. So it's important to find the closest place to save time while we can eat in peace and without hurry.
2. Which restaurant is better matched with our budget?
   There are different options on campus with varying ranges of price. We can filter available options based on our budget to manage our expenses.
3. Are the available restaurants open?
   Our eating time might differ from the working hours of the on-campus restaurants. Some of them have limited hours of work. Knowing the status of the restaurant can be a piece of good information.
4. Is this restaurant popular?
   We have different restaurants on campus, but most do not have public websites. So people from off-campus do not know whether these places exist, and only students in those buildings are the customers. As a result, there needs to be more information and reviews about them online. Collecting the ratings from different websites can help students decide where to eat better.
5. What types of restaurants are available?
   Some people prefer to eat in the cafe and some like restaurants. Knowing the type of restaurant can be a filter for the decision of the students.
6. What is the address of the restaurant?
   Having the location of the restaurant can provide the students with the opportunity to locate the places quickly.
7. What is the contact information?
   For more information, the students might want to contact the restaurant. Gathering the contact information of the restaurants can be helpful.

Data and Exploratory Data Analysis: Source, scraping method, cleanup, etc. What visualizations did you use to initially look at your data? What insights did you gain? How did these insights inform your design?

As it was mentioned in our project proposal, there is no single source to find all the information necessary to answer our questions. Therefore, we decided to collect our data traditionally. In what follows, the steps we took to gather all the data together are well elaborated.

As was mentioned in our project proposal, there is no single source to find all the information necessary to answer our questions. Therefore, we decided to collect our data traditionally. In what follows, we have listed the steps we took to gather all the data together.

To answer the questions mentioned above, we needed two data sets. One data set is necessary to list the origins, which are the departments that users are located in and want to search for available places. The other data set is the one for the destinations, all restaurants to eat on campus and their information.

Departments

First, we need to define the origin points where the user is located. In this case, the origin is the departments on campus. To find the list of departments on campus, we used the list of academic departments, which is available on the "Colleges, Departments & Programs" section of the website of the University of Utah. Then we used google maps to find the latitude and longitude of each department to completely define the origin as a reference point for distance calculation and filtering available options. The CSV file of the "Departments" is in the folder of data of our project.

Restaurants

To find all available on-campus restaurants, we had to collect data from different websites. So first, we decided what information we needed to collect to answer the questions we wanted. The information that could help us better analyze the available restaurants is listed in what follows.

- Name of the restaurant
- Name of the building the restaurant is located
- Type of the restaurant
- Address
- Latitude and longitude
- Google map link
- Phone number
- Working hour
- Dine-in, take-out, and delivery status
- Rating
- Reviews
- Menu photo (menu list, price, food ingredients)
- Website of the restaurant
- The number of dollar signs which is a general reference for the price without specifying a specific amount.

After listing the factors, we searched different sources to complete our data set. The following sources helped us to achieve our goal.

1. Google maps was our primary reference to find the restaurants and the necessary information listed above. (University of Utah restaurants)
2. Then, we worked with the online University of Utah map to be able to locate the restaurants, their website, and working hours. Unfortunately, this website is not updated, and some of the restaurants on this website are permanently closed. (Campus map)
3. Boost, a campus food ordering app that few students use, does not seem popular on-campus. Few options are listed in this application. Their focus for designing this application was the main campus, not other locations. (Boost)
4. The "Dining - Housing & Residential Education" website of the University of Utah. The list on this website shows the dining locations across campus where students can use their meal taps, transfer meals, and flex dollars. This list covers the locations from Heritage commons to the lower campus.
5. The "Dining Services" website of the University of Utah has the working hours and menu of some restaurants on campus.

6. The website of the restaurant
7. In some cases, the restaurants have up-to-date Instagram accounts. So we used this information to make our data set stronger.
8. Other applications also helped us to collect data of campus restaurants, such as Tripadvisor, DoorDash, etc.

The weakness of most of these applications is that they don't have enough information about a series of university restaurants that are perfect places to eat. On the other hand, a series of restaurants have more reviews because they are located in a good university area, which makes the students pay more for their meals. However, they can go to other restaurants and eat more affordable food. Therefore, we checked the restaurants in person to complete the data set and help the students to decide based on stronger data.

Storing data

After collecting the information, our challenge was storing the data. For some parameters, we only needed to store one single data, such as the restaurant's name, phone number, etc. However, we had to store different vectors for the menu list, items, ingredients, and price. The following steps show the process of reaching the final version of the CSV file ready to use in JavaScript.

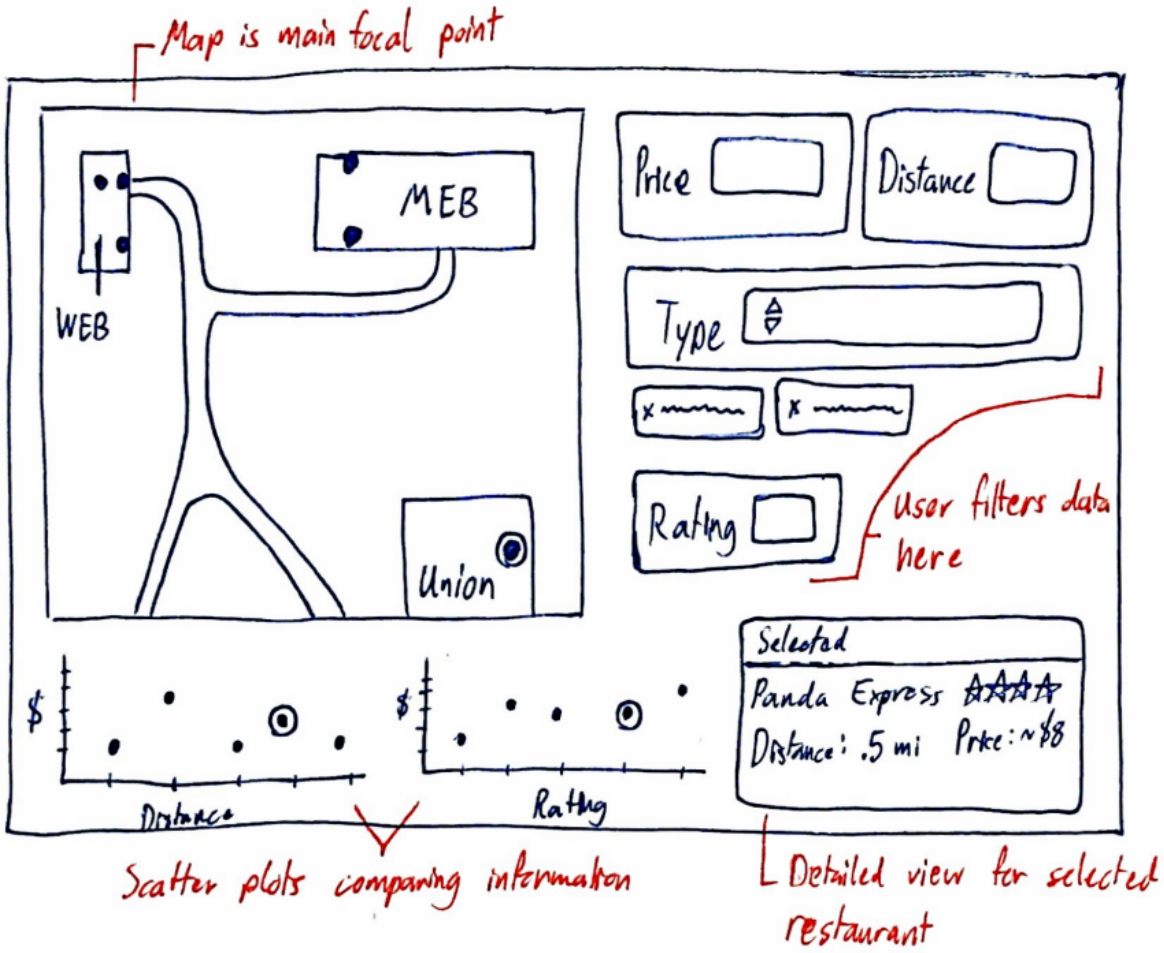
1. *Storing data in one single sheet*
   We could not list data in one sheet in which each row contained information related to one restaurant. The reason was the vectors of data for the menu. We needed more cells to store the data.
2. *Storing menu data in one cell*
   We stored the information from the menus in one cell as a series of arrays to assign one row to each restaurant. We could use an online converter to convert the CSV file to JSON. Given that the menu data was not completely visible to the viewer of the CSV file, this method was not acceptable.
3. *Separate sheets*
   Then we tried to store the data of each restaurant in one separate sheet to store the menu data in different cells. Given that the data length was different, we could not read all the data in JavaScript properly.
4. *One single sheet with a visible menu*
   In the final step, we gathered all the separate sheets together. To be able to read the data with the d3.csv(), we decided to consider the same length for all the data of the restaurant based on the length of the menu data. Then, by repeating the single arrays to the menu length, we completed our data cells. In the end, we used the repeated data as a guide for our if-else clauses to move forward and downward of the CSV file and transfer all the data to our code.

   Finally, the “uHungryRestaurants” can be seen in the data folder of the project.

Design Evolution: What are the different visualizations you considered? Justify the design decisions you made using the perceptual and design principles you learned in the course. Did you deviate from your proposal?

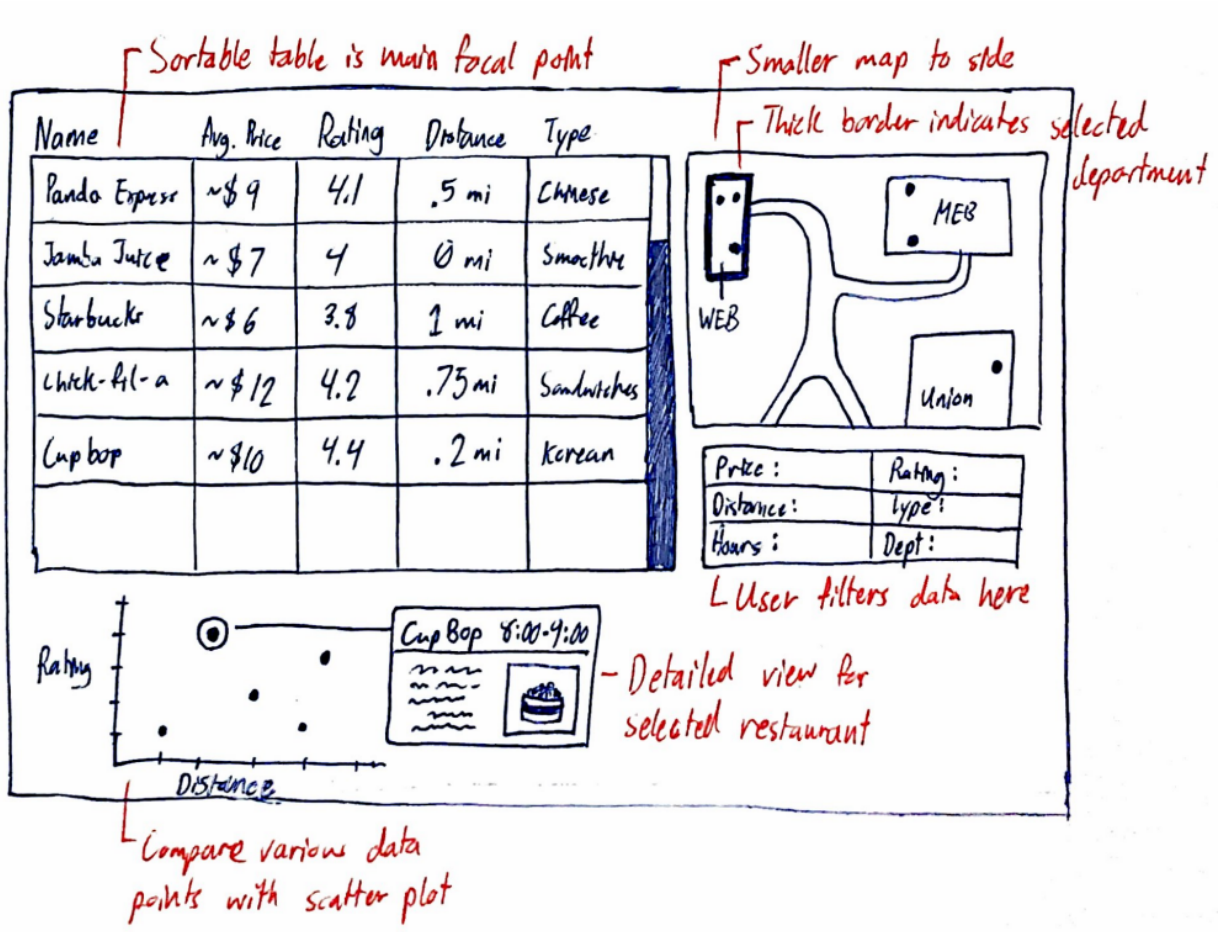
Our design evolution did not deviate from our project proposal, and we followed the proposed designs to achieve our final sketch. Sketch 1 to 4 are reported below from the proposal for review, and the final drawing is added to them to complete our brainstorming process.

Sketch 1:



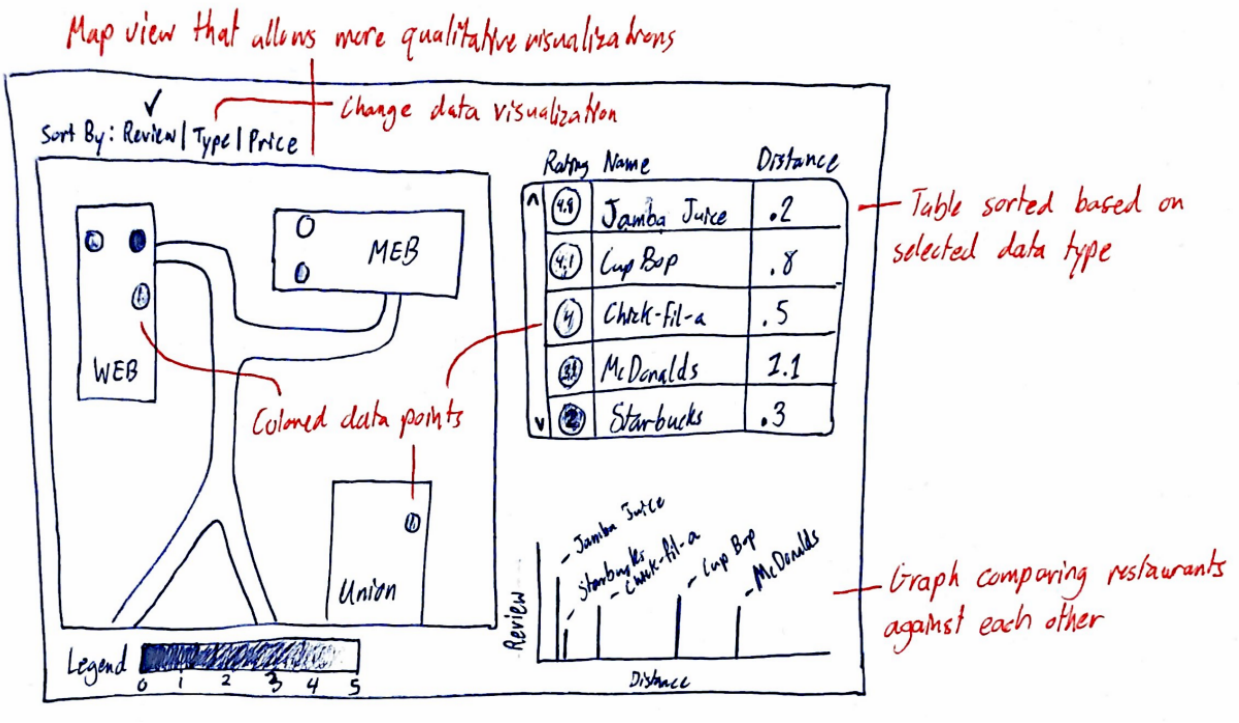
This first has the map as the main focal point and takes up most of the space. The optional filters the user can define are located boldly on the right of the map. These features are most prominent. The goal is to have locations be the most visual aspect of the site. Beneath the map is space for scatter plots or other kinds of charts that will compare different data points related to the filtered restaurants. Finally, at the bottom right is a space for displaying more detailed information about a specific restaurant. This can be chosen by selecting a datapoint on the map or from one of the charts. This layout lacks an easy way for the user to see all of the available filtered restaurants. With this layout, this can only be accomplished by expanding the map far enough out to display all the data points which may hinder readability.

Sketch 2:



This second sketch has a data table as the main focal point. This can display all (if not most) of the critical data points associated with each restaurant. The map has been shrunk and moved to the right of the table. Users will be able to filter the data displayed on the table and on the map using the section below the map. Charts comparing individual data types are displayed in the lower portion of the site. A details section highlighting extra information about a single restaurant is located to the right of the chart section. This restaurant, similar to the first sketch, can be selected by clicking a point on the chart, map or data table. This site allows for more quantitative data to be displayed.

Sketch 3:

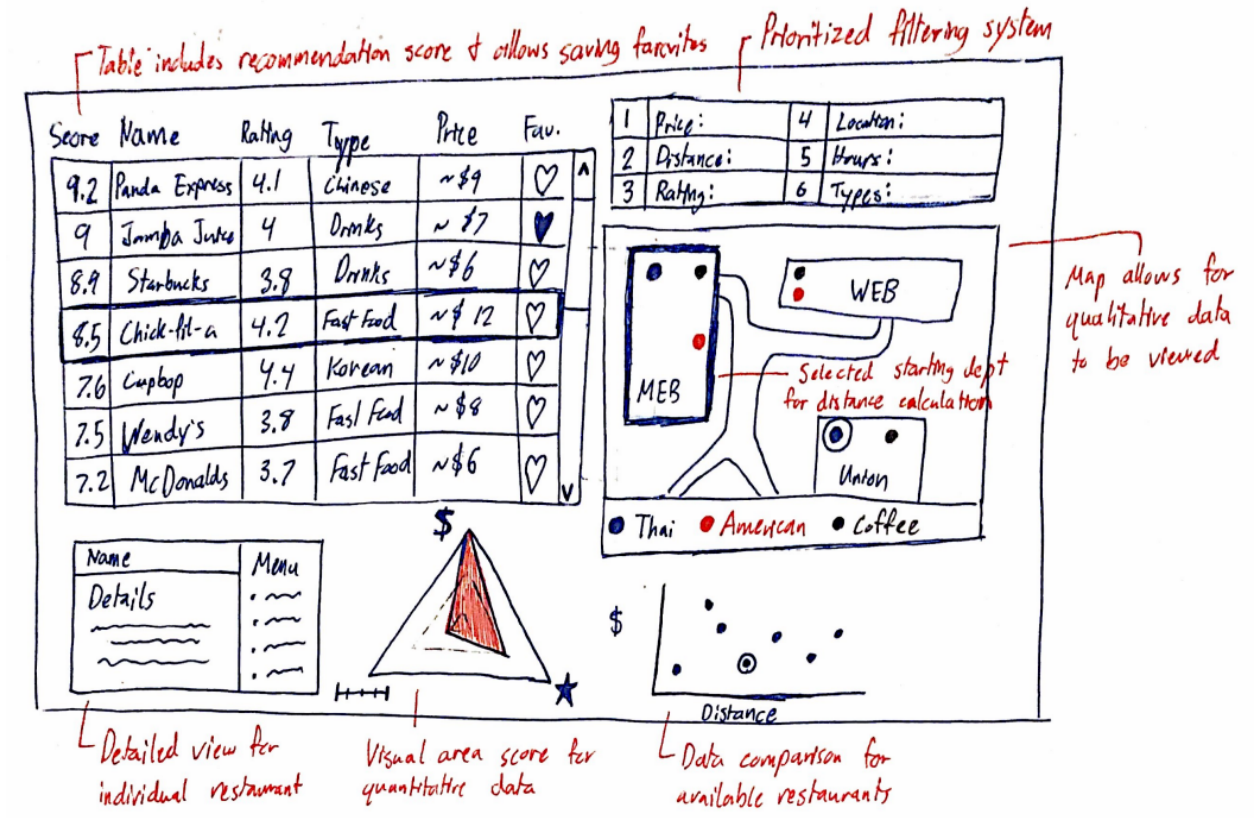


This third sketch has a map once again as the largest aspect of the site. This time, more qualitative data about each point on the map can be displayed with each dot being a different color based on the data type chosen by the user. A map legend is placed beneath the map to help better define what these colors mean. This selection is made above the map. To the right of the map is a smaller data table that sorts itself based on the chosen data type from the user. Certain visual aspects from the map can be displayed here as well. In the lower right portion of the site is an area for a chart to be displayed. This can feature more quantitative data to be compared. This layout doesn't have much space for detailed information for specific restaurants, but this could be added in a lower section accessible by scrolling down.

Sketch 4:

This sketch (shown below) maintains most design aspects from sketch #2. The table and map stay in the same relative place. The table now includes a score that will be calculated by a simple algorithm based on what the user will like the most as defined by their filters. Additionally, the filters now have a priority system that will factor into this calculated score. The map, similar to figure #3, will also be able to display qualitative data defined by the user. The detailed view will remain in the same location and will also display menu options if we have time and resources to implement this feature. To the right of this is an area chart that will show how well the selected restaurant (chosen from either the table, map or scatter plot) fulfills the requirements based on their preferences. At the far lower right is the scatter plot where the user can define what data points will be compared to one another based on remaining filtered

restaurants. This layout will prioritize the table as the most important visual with other charts and graphs functioning as supplementary information.



Final Sketch:

In the final step of our design process, we chose a table as the primary reference for showing the restaurants' data and then listing all the visualizations on the right side of the table. We have a map as a visualization for the location of the restaurants. We are adding a Pie chart to show the types of restaurants. Having a scatter plot to find the correlation between the rating and the average price will help decide based on this correlation. We are then adding the working hours information with the help of a bar chart to our website. At the top of the table, we want to have a filtering bar. By filtering, the visualizations will all change because they are linked together.

Implementation: Describe the intent and functionality of the interactive visualizations you implemented. Provide clear and well-referenced images showing the key design and interaction elements.

We started building our elements with the table and the map. Then we worked on other visualizations, all listed in order as shown in what follows.

Table

The step-by-step implementation of the table is well elaborated in what follows.

Step 1

In our project milestone, our focus was being able to read the data correctly and build the elements such as the table based on that data. The following figure shows the table in step 1.

Name	Building	Type	Rating	Avg. Price	Favorite
Panda Express	Union	Chinese	3.6	$21	
Jamba Juice	Union	Drinks	3.8	$21	
Cup Bop	Union	Korean	4.1	$21	

In this version of the table, the user could see the name, building, type, rating and average price of the 3 restaurants from our data sets.

Step 2

In this step, we showed all the data we had at that time in the table. The name, building, and rating characteristics were listed in the table, and we were working on calculating the distance.

Name	Building	Distance	Rating
Bistro at England Hub	College of Pharmacy		3
City Edge Caf&#65533;	Kahlert Village		N/A
Counsel	LAW		4
Crimson View	Union		4
Cross Roads Bistro	Union		N/A
Einstein Bros. Bagels	Union		2
Jamba Juice	Union		3
Kahlert - 500 Degrees	Peterson Heritage Center		N/A
Madsen	Spencer Fox Eccles Business		4
Market	Marriot Library		2
Panda Express	Union		3
Peterson Heritage center Food Hall	Peterson Heritage Center		3
Rooted	Carolyn and Kem Gardner Commons		N/A
Saffron Valley	Carolyn and Kem Gardner Commons		N/A
Sono	Union		N/A
Taqueria	Kahlert Village		N/A
The Game	Kahlert Village		N/A
The Point Restaurant	Department of Dermatology		4
Two Creek Coffee House CSC	Crocker Science Center		4
Two Creek Coffee House	William Browning		4
Urban Pioneer Caf&#65533;	Sorenson Molecular Biotechnology		5

Step 3

In this step, we have added the bars for the distance characteristic and also decided to have the type of the restaurants to better help the user decide if they are interested in that type of restaurant.

Name	Building	Distance	Rating	Type
Bistro at England Hub	College of Pharmacy		3	Bistro
City Edge Caf	Kahlert Village		N/A	Caf
Counsel	LAW		4	Caf
Crimson View	Union		4	Chinese
Cross Roads Bistro	Union		N/A	Bistro
Einstein Bros. Bagels	Union		2	Bagel shop
Jamba Juice	Union		3	Juice shop
Kahlert - 500 Degrees	Peterson Heritage Center		N/A	Food Court
Madsen	Spencer Fox Eccles Business		4	Caf
Market	Marriot Library		2	Caf
Panda Express	Union		3	Chinese
Peterson Heritage center Food Hall	Peterson Heritage Center		3	Food Court
Rooted	Carolyn and Kem Gardner Commons		N/A	Food court
Saffron Valley	Carolyn and Kem Gardner Commons		N/A	No type
Sono	Union		N/A	No type
Taqueria	Kahlert Village		N/A	Caf
The Game	Kahlert Village		N/A	No Type
The Point Restaurant	Department of Dermatology		4	Grill
Two Creek Coffee House CSC	Crocker Science Center		4	Caf
Two Creek Coffee House	William Browning		4	Caf
Urban Pioneer Caf	Sorenson Molecular Biotechnology		5	American Restaurant

The overview of the table shows general information about the restaurants. To make the table more interactive, by selecting each row, detailed information will be shown for the user: menu name, menu list, and food price. The following is an example of this by selecting the Bistro at England Hub.

Name	Building	Distance	Rating	Type
Bistro at England Hub	College of Pharmacy		3	Bistro
Potstickers	6 Pork Veggie	6.49		
Potstickers	6 Pork Sweet Corn	6.49		
Potstickers	6 Beef	6.49		
Potstickers	6 Vegan	6.49		
Potstickers	12 Pork Veggie	10.49		
Potstickers	12 Pork Sweet Corn	10.49		
Potstickers	12 Beef	10.49		
Potstickers	12 Vegan	10.49		
Side Dishes	Kimchee	2.59		
Side Dishes	Edamame	2.59		
Side Dishes	Glass Noodles	3.99		
Side Dishes	Fried Rice	3.99		
Side Dishes	BBQ Pork	3.99		
Side Dishes	Wontons w/Spicy Sauce	7.99		
Side Dishes	Wonton Soup	8.99		
Side Dishes	Weekly Special	3.59		
Side Dishes	Steamed Rice	1.99		
Side Dishes	Spring Rolls	4.95		
Pho	Beef Noodle	8.89		
Boba Tea	Thai Tea	3.99		
Boba Tea	Fruit Tea	3.99		
Desserts	Tiramisu	3.95		
Desserts	Classic Cheesecake	2.95		
Desserts	Chocolate Mousse Cake	3.95		
City Edge Caf&#65533;	Kahlert Village		N/A	Caf&#65533;
Counsel	LAW		4	Caf&#65533;
Crimson View	Union		4	Chinese

In this step, we were working on the color of the table. Given that all the websites related to the University of Utah are red, we chose red as our primary color. Moreover, when you hover over the rows and the table headers, the color will be different. This method helps the user to navigate the website better.

Step 4

In this step, we added the headers "Menu Name", "Item Name", and "Price" to help the user find what they are seeing. Also, a dollar sign was added to the price column for better clarification.

Another feature added to the table in this step was the sorting option. When the user is selecting on the headers of each column, that column will be the reference for sorting ascending or descending. The sorting would be alphabetical for name, building, and type, and for the distance and rating, it would be numerical. For example, the following figures show two sorting options for the first couple of rows of the table. The first figure shows the table when the ascending order of the bars for the distance is the reference for sorting. Starting from here

the figures would be only the first ten rows of the table just to focus on interactions and what features we added to it.

Name	Building	Distance	Rating	Type
Madsen	Spencer Fox Eccles Business		4	Caf🏻
Museum Caf🏻	Museum of Fine Arts		N/A	Caf🏻
Market	Marriot Library		2	Caf🏻
Rooted	Carolyn and Kem Gardner Commons		N/A	Food court
Saffron Valley	Carolyn and Kem Gardner Commons		N/A	No type
U Hungry Caf🏻	Turpin University Services		5	Caf🏻
Jamba Juice	Union		3	Juice shop
Cross Roads Bistro	Union		N/A	Bistro
Sono	Union		N/A	No type
Einstein Bros. Bagels	Union		2	Bagel shop

And the following figure shows the table when the descending order the distance is the reference for sorting.

Name	Building	Distance	Rating	Type
The Point Restaurant	Department of Dermatology		4	Grill
Bistro at England Hub	College of Pharmacy		3	Bistro
Peterson Heritage center Food Hall	Peterson Heritage Center		3	Food Court
Urban Pioneer Caf🏻	Sorenson Molecular Biotechnology		5	American Restaurant
Two Creek Coffee House CSC	Crocker Science Center		4	Caf🏻
Counsel	LAW		4	Caf🏻
Two Creek Coffee House	William Browning		4	Caf🏻
The Game	Kahlert Village		N/A	No Type
Kahlert - 500 Degrees	Peterson Heritage Center		N/A	Food Court
City Edge Cafe	Kahlert Village		N/A	Caf🏻

Step 5

In step 5, we decided to use stars to visualize the rating characteristic of the restaurants better. The sorting is still working for the star column of the table. Moreover, we have added a column with dollar signs, which is a general reference for the price without specifying a specific amount, to the table. This option can help the user have a better idea about the prices at first glance before seeing the menu, which will be a detailed view and provide more information when the user is interested in that restaurant and select the row for further data.

Name	Building	Distance	Rating	Type	Price
Bistro at England Hub	College of Pharmacy		3.5	Bistro	$
City Edge	Kahlert Village		4.5	Cafe	$
Counsel	Law		4.5	Cafe	$
Crimson View	Union		4	Chinese	$
Cross Roads	Union		3.5	Bistro	$
Einstein Bros.	Union		2.5	Bagel shop	$
Jamba Juice	Union		3.5	Juice shop	$
500 Degrees	Peterson Heritage Center		3.5	Food Court	$
Madsen	Spencer Fox Eccles Business		4.5	Cafe	$
Market	Marriot Library		2.5	Cafe	$

Given that the menu list is too long for some restaurants and it might be hard to look at and scroll, we changed the color of the rows to make it easier to look at the data of each row.

Name	Building	Distance	Rating	Type	Price
Bistro at England Hub	College of Pharmacy		3.5	Bistro	$
City Edge	Kahlert Village		4.5	Cafe	$
Menu Name	**Item Name**	**Price**			
500 Degrees	Pepperoni Pizza	$$ $			
501 Degrees	Cheese Pizza	$$ $			
502 Degrees	Vegan Pizza	$$ $			
The Game	Knockout Nuggets (6 Pcs)	$$ $			
The Game	Black Bean Burger	$$ $			
The Game	Chicken Caesar Wrap	$$ $			
The Game	French Fries	$$ $			
The Game	Side Salad	$$ $			
Taqueria	Tacos Plate	$$ $			
Taqueria	Quesadilla	$$ $			
Taqueria	Burritos	$$ $			
Deli	Caprese Pesto	$$ $			
Deli	Concert Parking Lot Grilled Cheese	$$ $			

Step 6

In the final version of the table, we modified the "Menu Name" column. In the previous steps, the menu name was repeated for all the items it was included, and in this version, it is only written once for each set of items. Moreover, we have added the "Inside" column to show the ingredients of the foods, which can be helpful for users, especially those with dietary restrictions.

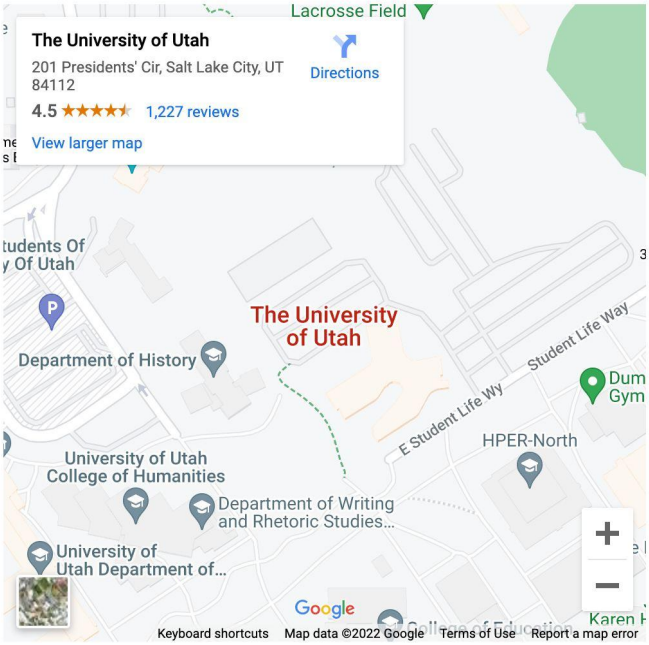
Name	Building	Distance	Rating	Type	Price
Bistro at England Hub	College of Pharmacy			Bistro	$$
City Edge	Kahlert Village			Cafe	$$
Counsel	Law			Cafe	$$
Crimson View	Union			Chinese	$$$
Cross Roads	Union			Bistro	$$
Einstein Bros.	Union			Bagel shop	$$
Jamba Juice	Union			Juice shop	$$
Menu Name	**Item Name**	**Price**	**Inside**		
Classic Smoothies	Aloha Pineapple	4.94 $	Pineapple juice, pineapple sherbet, strawberry, banana, nonfat Greek yogurt		
	Caribbean Passion	4.94 $	passion fruit mango juice blend, orange sherbet, strawberries, peaches		
	Mango-A-Go-Go	4.94 $	passion fruit mango juice blend, mangos, pineapple sherbet		
	Matcha Green Tea Blast	5.74 $	soymilk, fat free vanilla frozen yogurt, matcha green tea,		
	Orange Dream Machine	5.74 $	orange juice, orange sherbet, soymilk, fat free vanilla frozen yogurt		
	Peanut Butter Moo'd	5.74 $	fat free vanilla frozen yogurt, chocolate moo'd dairy base, soymilk, bananas, peanut butter		
	Razzmatazz	4.94 $	mixed berry juice blend, orange sherbet, strawberries, bananas		
	Strawberries Wild	5.74 $	apple strawberry juice blend, fat free vanilla frozen yogurt, strawberries, bananas		
	Strawberry Surf Rider	4.94 $	lemonade, lime sherbet, strawberries, peaches		
	White Gummi	5.74 $	peach juice blend, pineapple sherbet, soymilk, lime sherbet, orange sherbet, mangos, raspberry sherbet		

Map

Step 1

The original plan to show the location of each restaurant on campus was to incorporate a Google map overhead view. Finding an example of how to embed a map view into the site was easy enough. The unforeseen difficulty with this method was actually using the API, the process of which was far more complicated than we

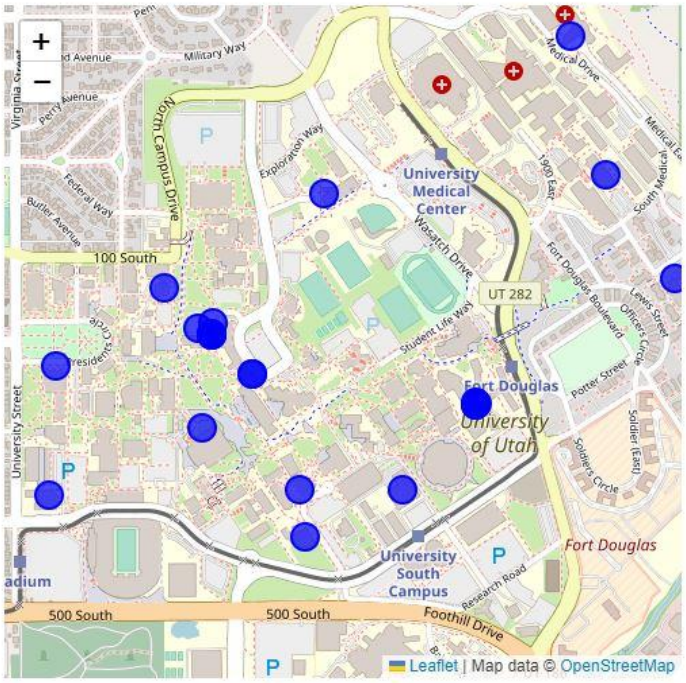
had hoped. In the end, the decision was made to go with a different library entirely to show restaurant locations.



Step 2

The 2nd attempt, and the chosen method to display location data, incorporated using the leaflet library. This method was chosen after seeing some other student examples utilizing the same method. This library's implementation proved to be far easier than Google's, and communicated seamlessly with the d3 library.

Each circle on the map indicated a different restaurant. The user can hover the mouse over each of these locations to get more information about that certain restaurant. When the user clicks on one of these locations, the color of the circle will change confirming the selection. The associated restaurant's row on the table will also be highlighted, as well as the associated point on the Rating/Price scatter plot.



Filtering

Step 1

The original plan for filtering the data involved the variables displayed in the image below. We quickly realized that the "hours" criteria would be difficult to account for, as certain individual restaurants had different open and close times for different days of the week. We decided to scrap this criteria altogether. Additionally, because of other implementation designs, the distance criteria was also discarded.

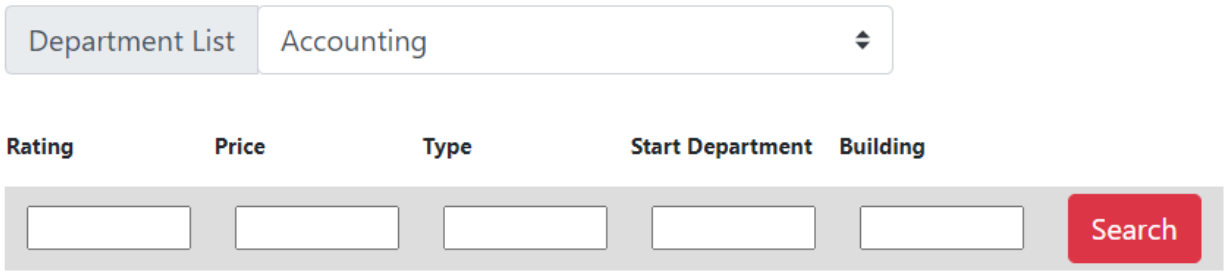
Rating	Price	Types	Distance	Hours	Location

Step 2

The previous Distance variable was replaced with a "Starting Department" variable instead. This would allow the user to determine their starting location based on the different department locations on campus. This change also allows for more chart variability, as the bars in the table will change length based on how far each restaurant is from the starting department location. The UI was also changed to have a more aesthetically pleasing look and keep more in line with the U of U red theme. Additionally, we added a department list pulldown menu above the criteria entries to show all of the possible starting locations available on campus. The user still has to manually type their desired starting location into the text field.

The table beneath this is filtered based on the criteria entered. For example, if the user is only interested in seeing restaurants with an average rating of 4.5 or higher, they type 4.5 into the rating field. They could also

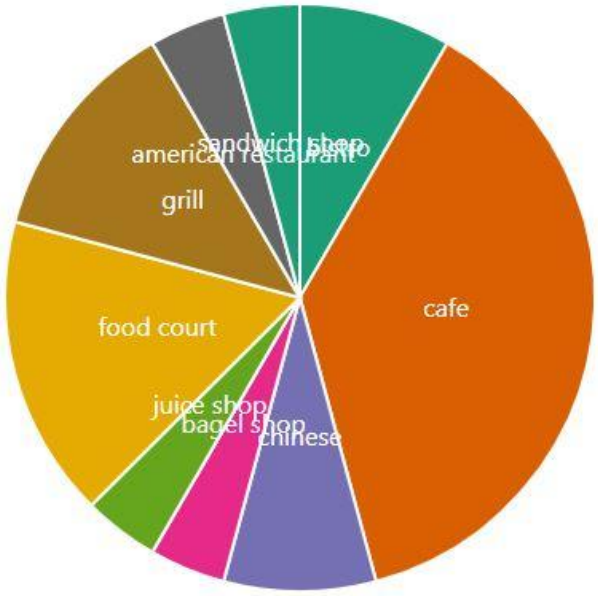
choose to only see restaurants in a specific building. The price field only narrows the table by inputting 1-3 '$' symbols which indicate the budget of the user.



Pie Chart

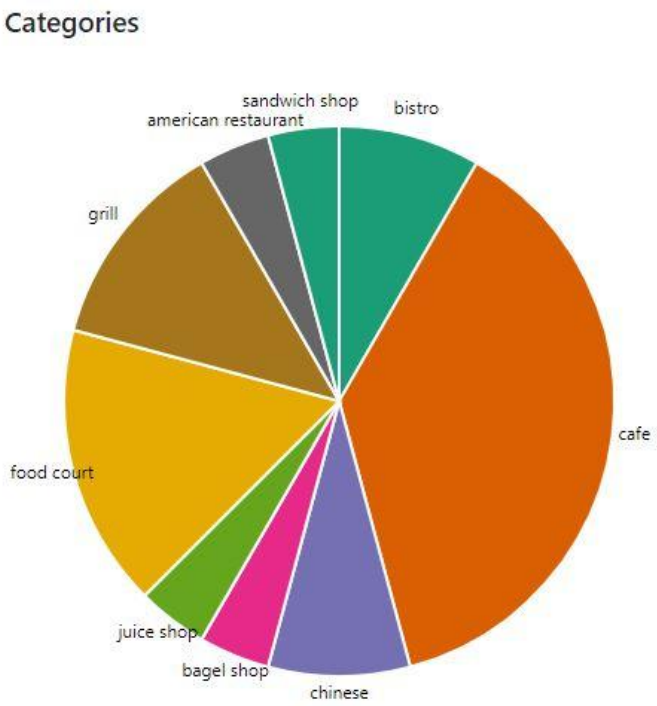
Step 1

Given that we wanted to use visualization to help the user better understand the data, we decided to add a pie chart to our website. This pie chart is linked to our filtering system. Whenever the user changes the filtering, the type of the filtered restaurants will be shown as a pie chart to see what type of restaurants are available with their criteria. Also, the pie chart was improved in the following steps.



Step 2

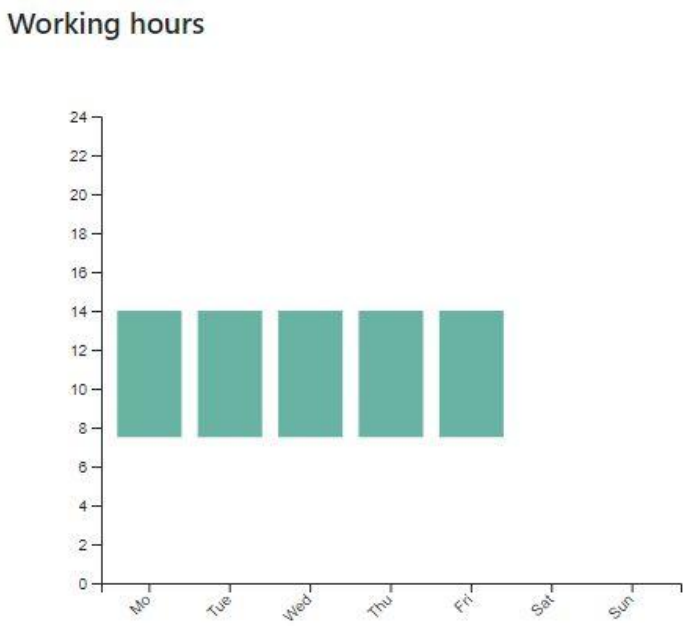
In step 2 of the pie chart, we added a title to this visualization to clarify which information is being shown. This title will help the user to interact better with the data. Also, we have demonstrated the types of restaurants around the pie chart because it would be easier to read them.



Bar chart

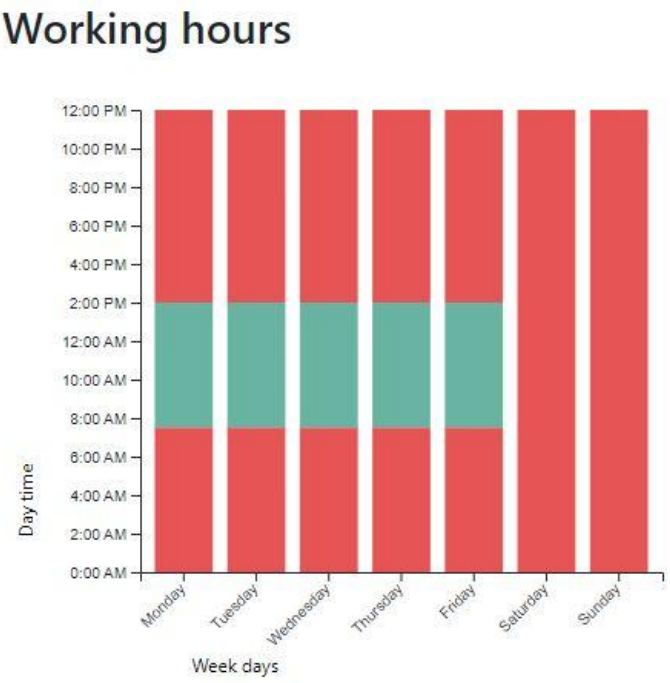
Step 1

One piece that needed to be added to the website was working hours. We added a bar chart to show the time the restaurants are open. The user needs to select the restaurants from the filtered data to see the working hours as a bar chart. This chart will make the visualization more interactive and let the user explore the data without providing a large amount of data at the beginning.



Step 2

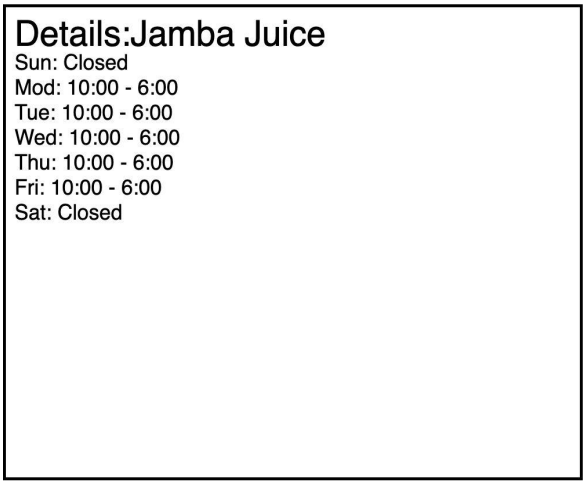
For step 2 of the bar chart, we decided to show when the restaurants are closed. Also, we added the axis labels to make it more straightforward. With this, it would be clearer to read each restaurant's working hours data.



Details

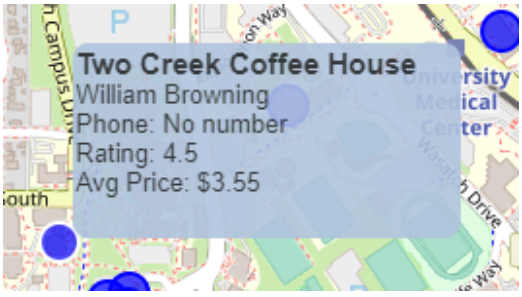
Step 1

Our original design had a details section beneath the main table. The purpose of this was to show more detailed data about a specific restaurant. As the coding process went on, we realized that the original intended menu data was simply far too detailed and numerous to show here. But with menu information gone, which was the bulk of the details, little more information was available to be displayed here. This felt like a waste of space. So different details like hours of operation, phone number, etc. were moved to other data visualizations.

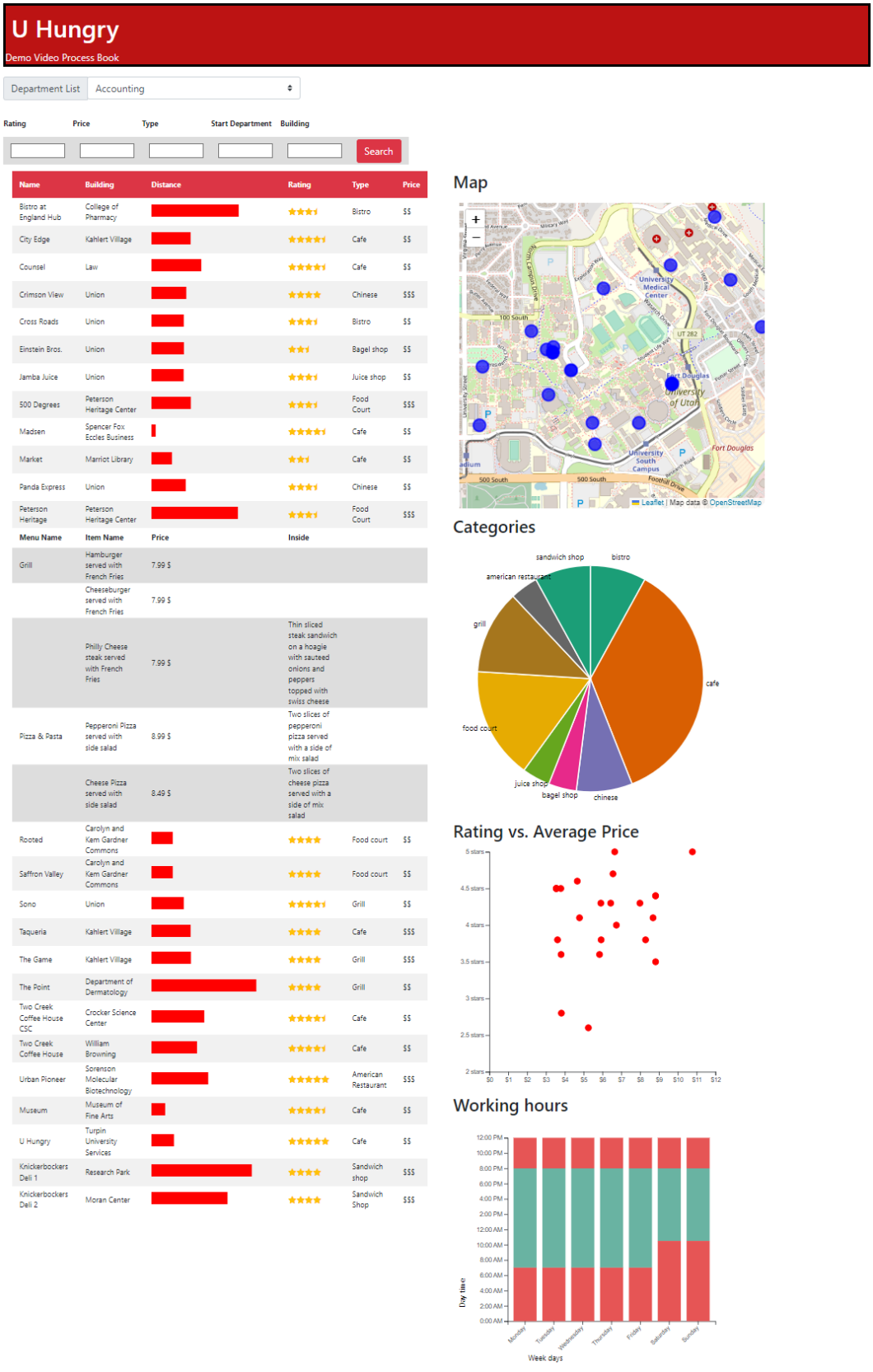


Step 2

Some of the details were converted into a tooltip popup accessible by the map visualization and the Rating/Price scatter plot. The detailed information here includes the phone number if available, the average rating and average price of the menu items. We felt that the hours of operation data was robust enough to constitute having its own data chart. These tooltips can be accessed from the map and the scatter plot.



Final Website Design:



Evaluation: What did you learn about the data by using your visualizations? How did you answer your questions? How well does your visualization work, and how could you further improve it?

While interacting with the data we had collected, we were able to compare different aspects of different restaurants with ease. The most obvious of these was how far certain restaurants were from different departments. This feature would be especially helpful to students who have a tight college schedule and don't have much time to travel to restaurant locations. Another interesting discovery was a loose trend between average restaurant reviews and average restaurant pricing. The scatter plot indicated that if certain places had higher quality food, they tended to be more expensive. We also discovered that a surprising number of restaurants didn't have an associated phone number, which would make contacting those locations more challenging.

One of the more difficult aspects of this project was getting the criteria aspect to work properly. This was especially challenging since almost every data visualization relied on this part of the site working properly. This involved researching optimal data structures to hold the information, as well as finding ways to send this data to the methods that needed it. Another challenging aspect was ensuring that the site was responsive and easy to use. We incorporated several mouse-over events to indicate to the user which parts were interactable, and changed the visualizations of the site based on their selections.

Since we were designing this site with the University of Utah in mind, we wanted to design the site thematically around it. Thus, the primary color we chose to use for the site was red. The other main use of color was used in the categories chart. Since there wasn't any data involving gradients or scalable data, we didn't have to use any color scales in our site. Our table involved a lot of text-based data originally. To increase the number of visualizations on the site, we replaced numbers representing distance, average rating and average price with bars, stars and dollar-symbols respectively. This reduced the amount of needless reading the user has to do while still providing the required data to the user in a more visual fashion.

In future iterations of the project, streamlining the criteria entry process would be the primary focus. Just having text fields as an input method isn't as intuitive as having sliders or list selections. It also allows for increased user error as they may input something into the field incorrectly. Overall, we think our display of information is easy to ingest and draw conclusions. A site like this could be expanded to include restaurants near university campus to expand options available to potential users.