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Forage

1) Team

The design research effort for our low fidelity prototype was collaborative for the most part, since we tried to meet in-person to create and revise the paper version of our app. Usability testing was spread out amongst members, but once Jessica Ambrosio and Viola Mocz found a significant flaw in our app design, they became more involved in creating and revising our low fidelity prototype. Afterward, Jessica, Viola, and Brandon Canfield went on to polish the high fidelity prototype, and Alice Wu wrote up the majority of the documentation from sections 1 through 6.

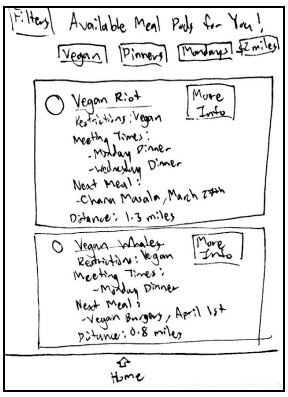
2) Problem & Solution

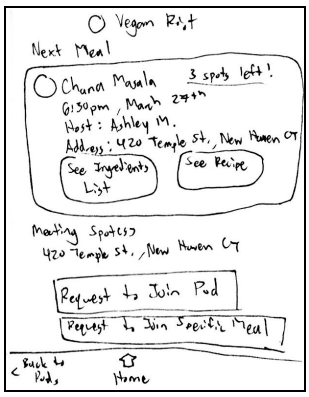
We propose to help reduce the problem of food waste at the community level by building a mobile application that would help users connect with other people living nearby to meet up for meals, or gatherings. Since most ingredients come in bulk, users often end up wasting food items by not consuming them in time. The application promotes the sharing of ingredients and supports meal planning when users attempt to organize recipes and times with other users. We renamed the app from "Meal Pod" to "Forage" as it better captures the spirit of the app where people cooperatively bring ingredients to meals, similar to hunter-gatherers.

3) Initial Paper Prototype

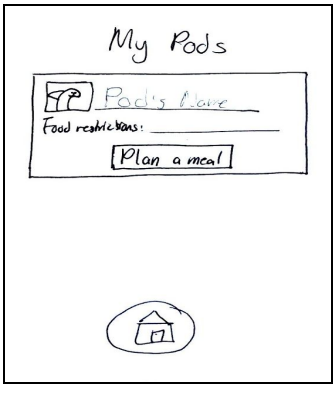
The original paper prototype was based on the concept of meal pods, where people formed long-term groups, or pods, to consistently share meals with. The two primary tasks we tested for were: 1) users joining a meal pod to share ingredients and 2) creating a pod/planning a meal.

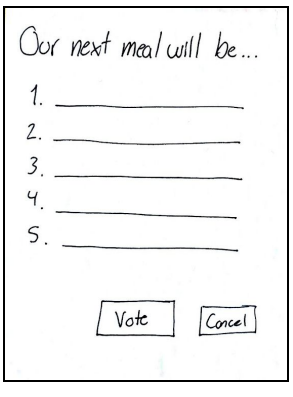
Sample of Joining Meal Pod Process





Sample of Creating Pod/Planning Meal





4) Testing Process

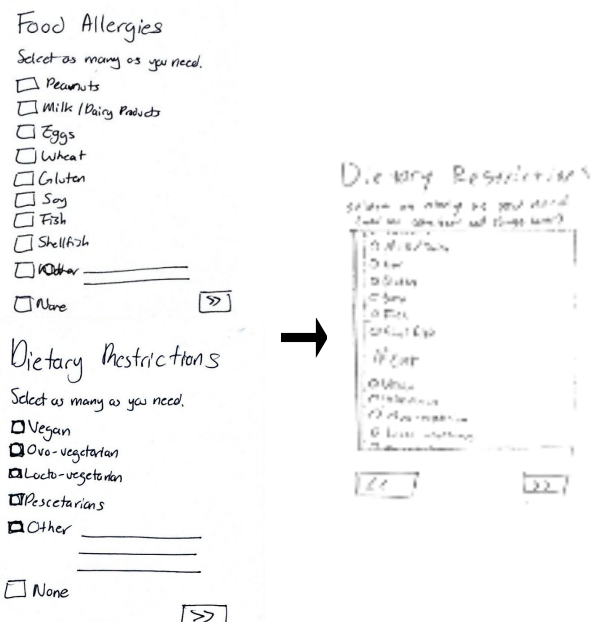
We first performed two heuristic evaluations with other students in our HCI class to spot the most egregious errors in our app, such as not being able to recover from errors the user makes. We then fixed our prototype based on the results of the heuristic evaluation and then performed three usability tests, in between each we also improved upon our design. For our usability tests, we focused on three young adults who were familiar with typical user interfaces for mobile applications, since they were our target audience. We asked them to perform two tasks with our prototype: joining a meal and planning a meal. The restrictions were that the user had to pretend that they were vegan. The user would go through a sign up process, join a pod nearby, and then join a meal organized by the pod. After joining a pod, the user would be able to set up a time and location for a meal, choose the final meal with other users, and then select the ingredients that would be needed for the meal.

After our first usability test, we realized that the pod feature was confusing and limited flexibility in meal planning, so we decided to remove it from the app and instead allow users join any meals nearby, rather than groups that intended to form meals. Furthermore, we believed that the paper prototypes weren't as clear as we needed them to be. The user was often sidetracked by messy handwriting or lopsided toolboxes, rather than our app's functionalities. Thus, we converted our paper prototype to a basic digital mockup using Powerpoint. Afterward, our second and third tests focused on testing the intuitiveness of the user interface and observing the workflow of the user as they interacted with the app. We wanted to ensure that the purpose of the app was clear once again, and that the tasks could be done without any confusion.

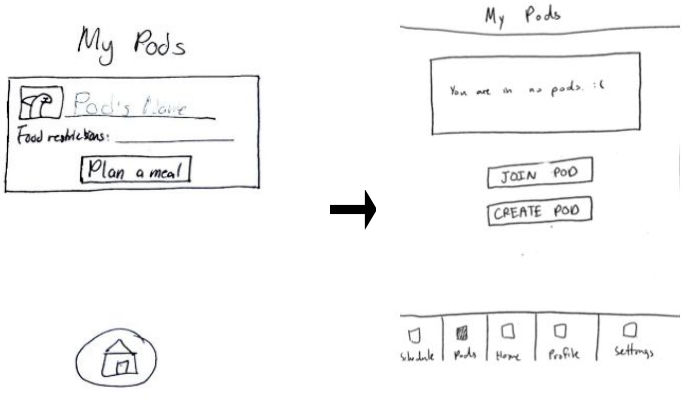
5) Testing Results

After the heuristic evaluation, we realized that our registration process was cumbersome and didn't allow users to go back to change any mistakes they made. Moreover, our lack of a final toolbar made it difficult for users to figure out how to navigate around the app. The usability testing we conducted revealed more severe flaws in our app design.

Registration Process Change

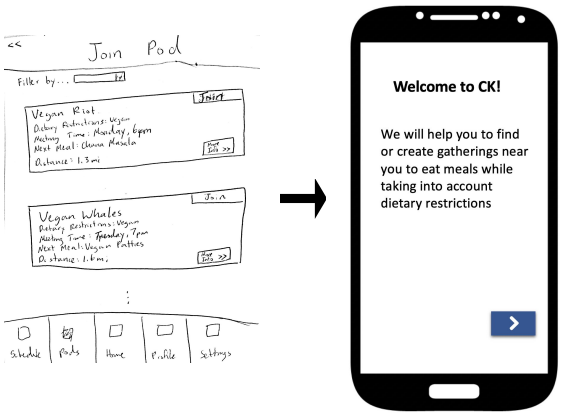


New Toolbar

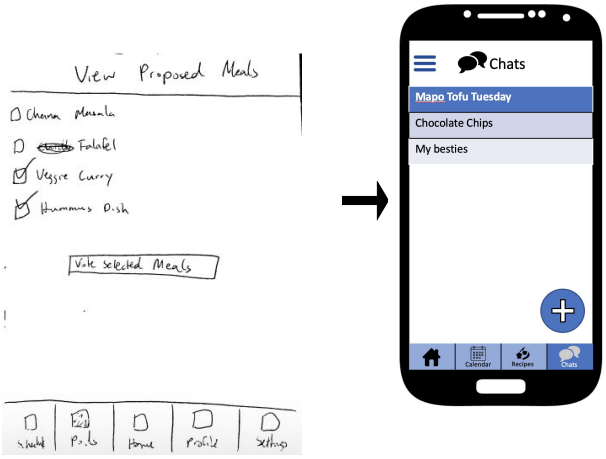


The first usability test revealed many of our user issues, from the most superficial (confusing nomenclature, difficulty in finding pods) to the most critical (dramatically reduced flexibility in meal planning) were the consequence of grouping users into pods. As a result, we decided to remove pods from our second iteration of the design, thus increasing the flexibility of meal planning beyond weekly meetings with a fixed group of people. The second most significant change from this test was the replacement of the voting system for deciding meals with a chat feature which would give more flexibility to groups in meal planning.

Pod to Gathering Change

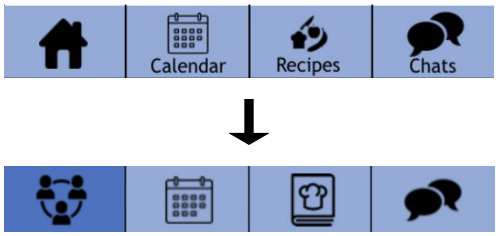


Chat Feature Addition



The second usability test revealed minor design options we could have improved upon to make the app's functionalities more clear. This included changing our toolbar icons to more revealing images instead of vague icons, and darkening icons on the current page the user was on. In addition, we ensured that extraneous details in our app design was eliminated, so that users weren't overwhelmed by too much information.

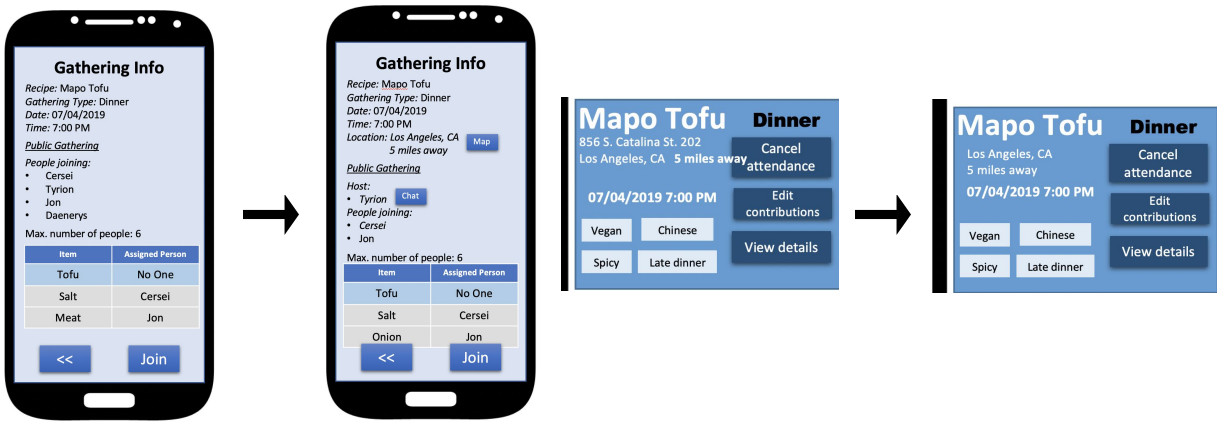
Toolbar Change



Ingredient Table Clarified

The third usability test further honed in on clarifying confusing points in the app, as well as giving the user more freedom. For example, there was no option to chat with the host of a gathering individually before joining. Users may want to talk with a host to ask pertinent questions before joining. Another change was the decision to hide addresses until the day of the gathering. Not hiding the user address would have been a major privacy concern, and would likely drive away a large portion of our potential user base.

Chat Option Added *Address Privacy Change*

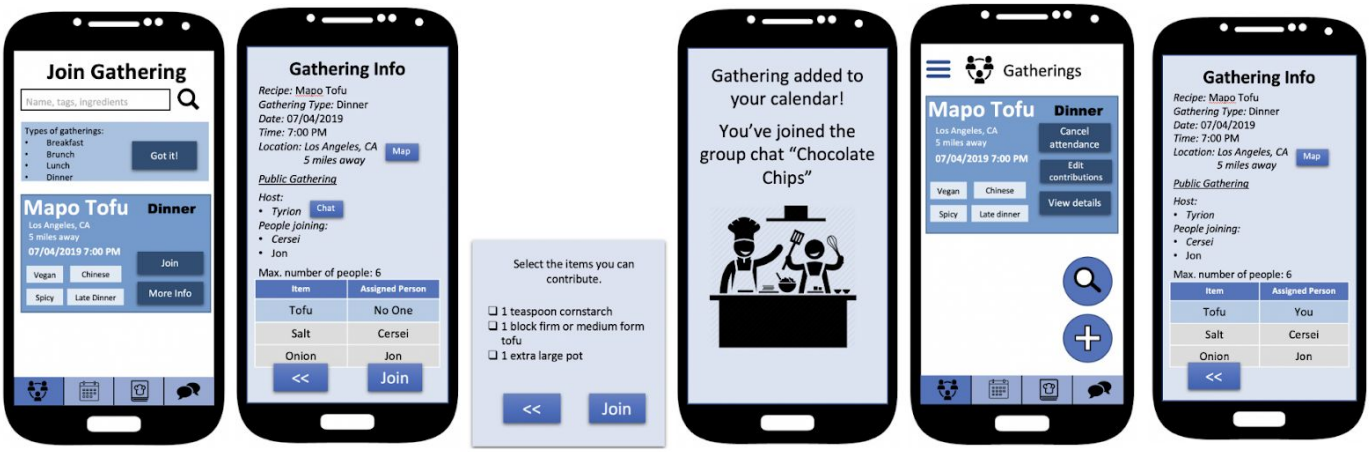


6) Final "Paper" Prototype

The final version of the low fidelity prototype is based around the concept of gatherings, where users can join nearby meals and bring their fair share of ingredients in order to partake in the meal. Users have the ability to create gatherings as well, allowing them to host meals in the comforts of wherever location they may choose, as well as inviting friends to host private meals.

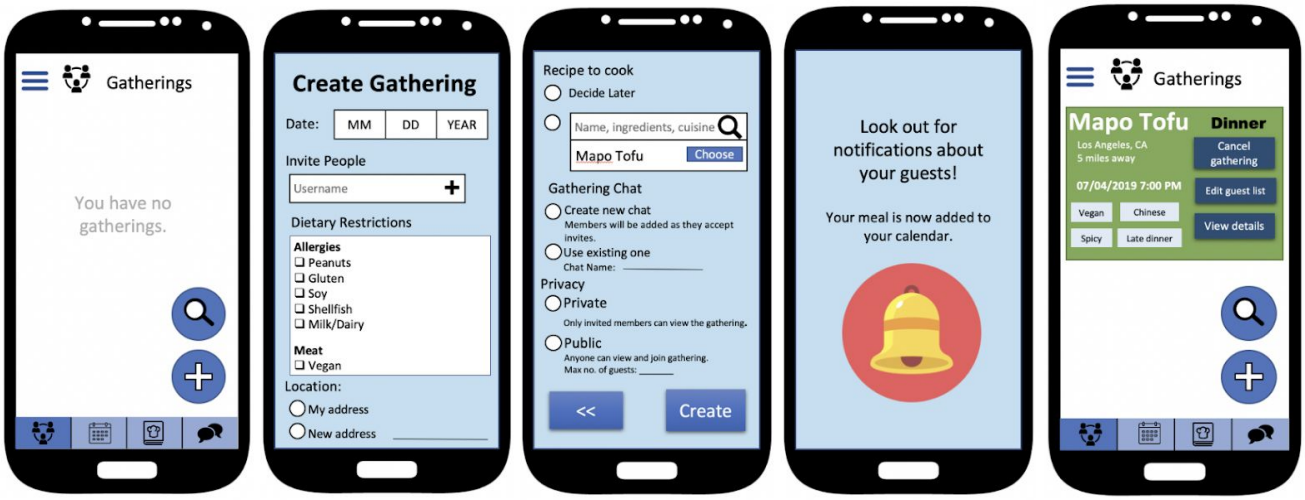
The app also supports an exportable calendar that connects meal times to the user's pre-existing schedule and allows them to visualize their availabilities. In addition, there is a recipe page where users can add any of their recent or favorite recipes for future use. Lastly, users can form chat groups with their gatherings in order to better coordinate logistics, get to know the other members better, as well as facilitate a smooth, reliable mode of communication between members and their host.

Joining a Meal



Users can search for gatherings using keywords that pertain to their meal preferences. Once the user finds an appropriate gathering, they may view further information about the gathering, such as its current members and ingredient list. If the user want to join, they must select the ingredients they can contribute first. Afterward, the gathering will pop up in the user's gathering homepage, and they can go on to edit their ingredient contributions, view the gathering's detailed information again, or cancel their attendance.

Creating a Meal



Users can create a meal by clicking on the "plus" icon in the gatherings homepage. Once clicked, they will be redirected to a creation screen which handles the logistical details that users needs to provide, such as the date/time of the gathering and any dietary restrictions. Afterward, the gathering that the user created is displayed in the gatherings homepage. The gathering is color coded by a different color, because the user is a host, rather than member.

7) Design Mockup

The most significant change in moving our prototype from low fidelity to high fidelity was the switch from paper/low fidelity digital prototypes to using high fidelity prototyping software (Adobe Xd). We also were selective with specific placement, font sizes, colors, and other high-fidelity design points. Some of the more major changes since the low fidelity prototype include:

- Application name
    - Because we do not have pods anymore we changed the name of the app from Meal Pod to Forage, reminiscent of how hunter-gatherers cooperated for meals.
- Registration
    - Removed username field (replaced with email)
    - Consolidated information about app from three pages to one

    - Added “I already have an account” in case user mistakenly clicks Sign Up
    - Changed “add photo” interface to standard for mobile apps
    - Replaced First Name/Last Name fields with Full Name (less jumping between text boxes)
    - Streamlined time availability entry
    - Combined dietary restrictions/food preferences into one page
- Gatherings page
    - Removed the blue/green box background for each gathering and rearranged the info and buttons so the screen looks less crowded
    - We moved the search gatherings button and create gatherings button to the top because if we keep these buttons at the bottom right, then they would cover up the information for the gatherings
- Searching for gatherings
    - Added a pop-up for items the user can contribute when they press the join button
- Creating gatherings
    - Added tags of dietary restrictions and foods the user might not like that they can assign to the gathering. These tags would be automatically added from the user’s profile and from the profiles of people they invite, but the user would still be able to make changes if needed.
    - Added more details for searching up recipes when creating a gathering. If the user looks at the details of a recipe, then the app recommends other recipes that utilize a lot of the same ingredients.
- Details of gathering page
    - Made it more clear what ingredient the user was expected to bring
    - Directly showed the address (when a user joined the meal) and added a “Directions” button to help navigate
    - Added a large recipe image at the top

With our high-fidelity mockup, we keep the same main functionalities of searching for gatherings, creating gatherings, having a recipes page, viewing a calendar, and chatting with groups and individuals. We want users to cooperatively contribute to each gathering by bringing ingredients or cooking supplies.

Task 1: *Joining a meal gathering*

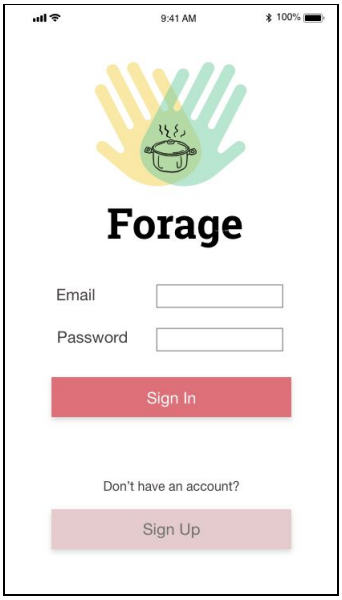
Our first task is joining a meal gathering. First, our user creates an account (Fig. 1) and inputs their name, a picture, location, times they are available, and foods they do not like. This information helps us select the most relevant gatherings to present to the user. These can always be changed later in the user’s profile. After registration, the user is automatically presented with

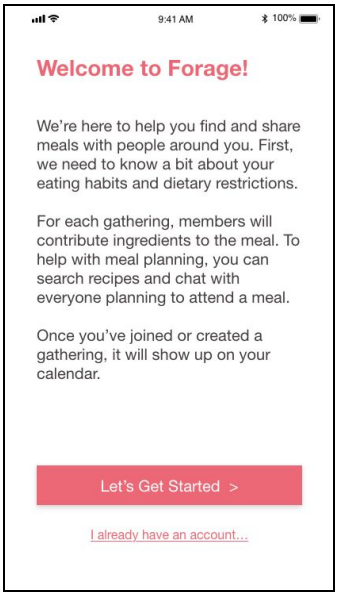
a page of search results (Fig. 2) filled with meal gatherings they may wish to join. The user can then view the details of the gathering and determine if they wish to join. The details include the recipe, general location, time, the person hosting, the people joining, the max number of people, and a list of ingredients. From there, users choose what ingredients they can contribute and the gathering is added to their calendar. Users who already have created an account need not register; instead, they can perform another search from the "Gatherings" page by pressing the "Search" button and their preferences/availability will automatically be factored in.

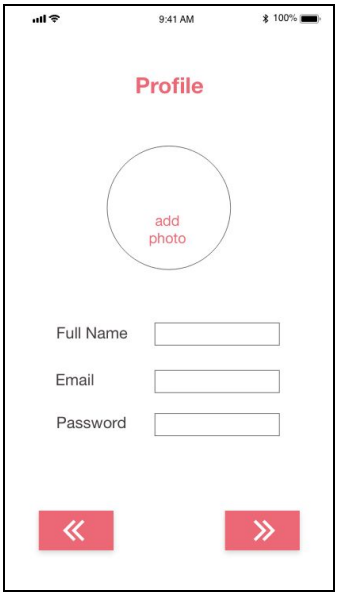
Task 2: *Creating a meal gathering*

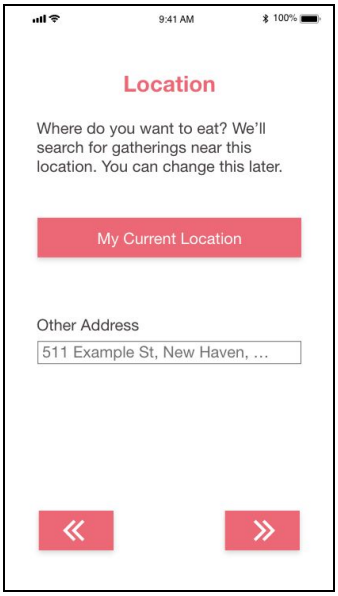
Our second task is creating a meal gathering. We start from a "Gatherings" screen where the user has no upcoming gatherings. To create a meal, the user needs to press the "Create" button in the "Gatherings" section. They'll fill out the date, invite people (which will automatically fill in the dietary restrictions section below), edit dietary restrictions, say the location, suggest a recipe, have a group chat associated with the gathering, and establish whether the gathering is public or private (Fig. 3). The searching of recipes is more fleshed out so they can search by ingredients, name, cuisine, etc. and if the user clicks on more details of a recipe, then they can see other recipes that utilize a lot of the same ingredients (Fig. 4). Once created, the gathering will appear in the "Gatherings" section, but it will appear with green buttons instead of blue buttons so the user can distinguish between which gatherings they are hosting and which they are the guests of (Fig. 4). The host should get notifications as people accept invites, cancel their attendance, and fill in their contribution.

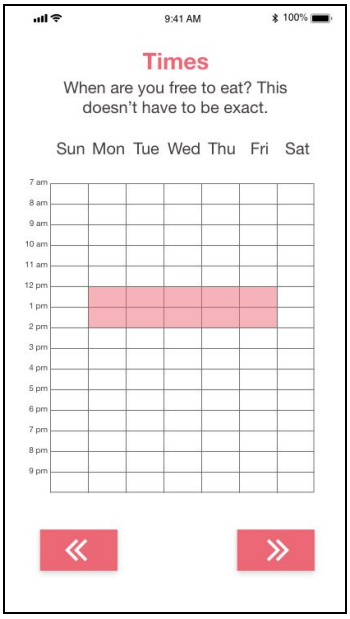
Figure 1: Registering as a new user. The user inputs their profile info, location, times they are available, food restrictions, and foods they do not like.











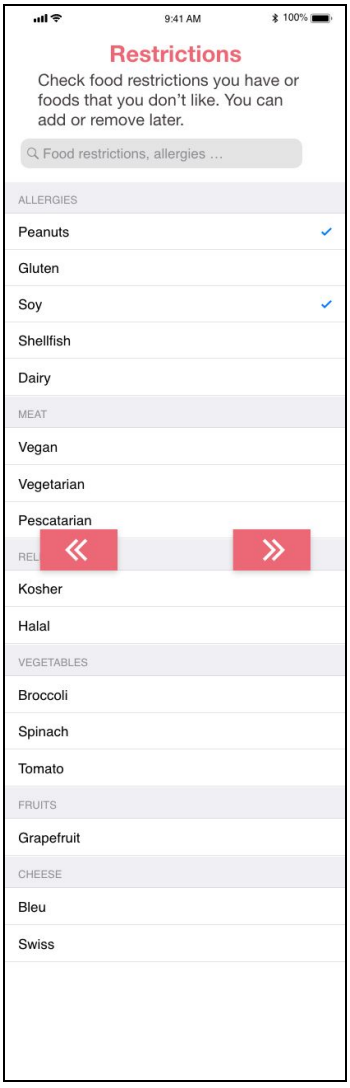
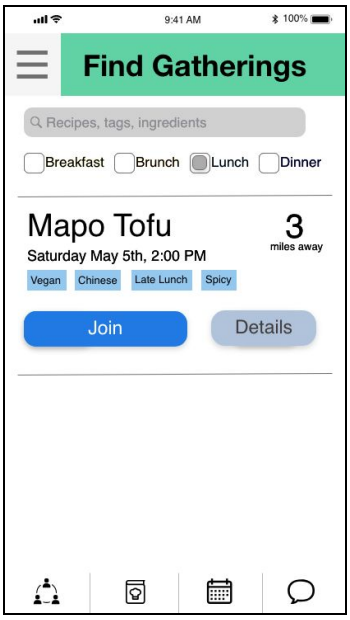
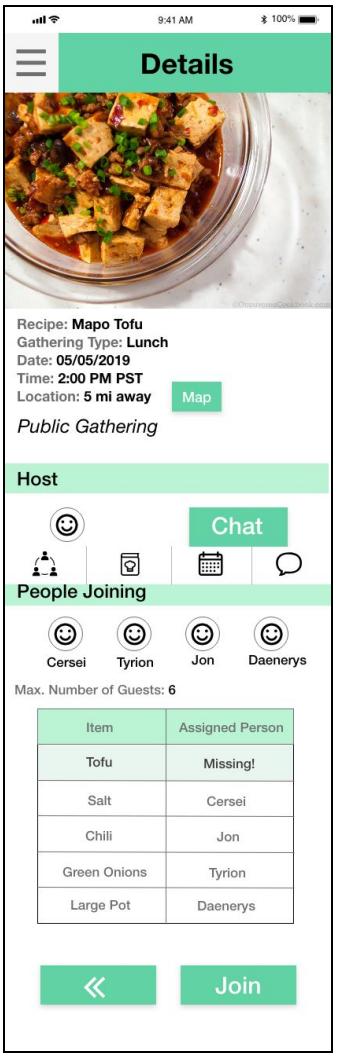
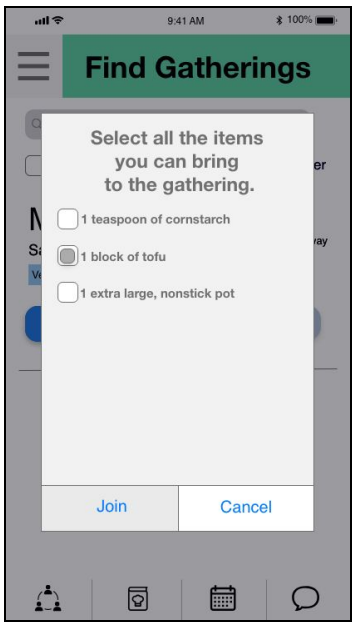
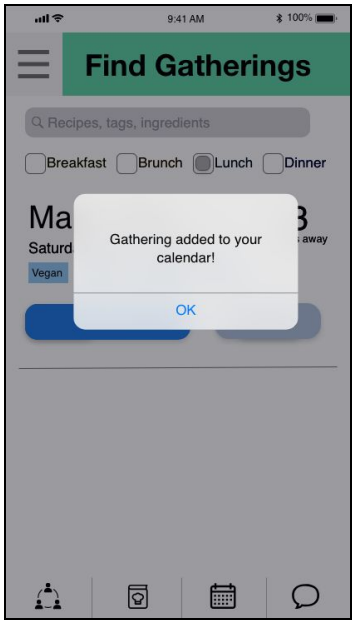


Figure 2: Searching for nearby gatherings and joining Mapo Tofu. The user elects to bring tofu to the gathering.









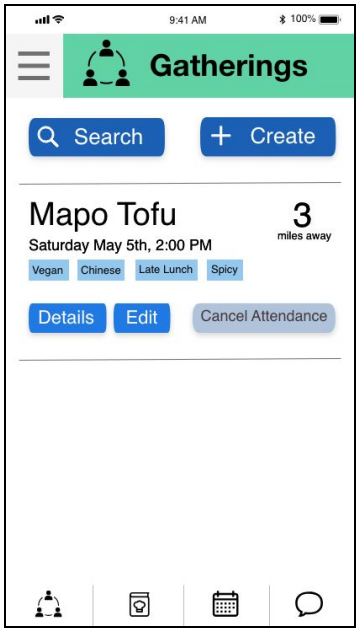


Figure 3: The user presses the create button, which pulls up a form where they fill in info about the gathering, such as the date, people to invite (which will automatically fill in the dietary restrictions section below), location, recipes to cook, chat group, and the privacy of the group. When the user presses the "Add recipe" button, they can search up a recipe to add.

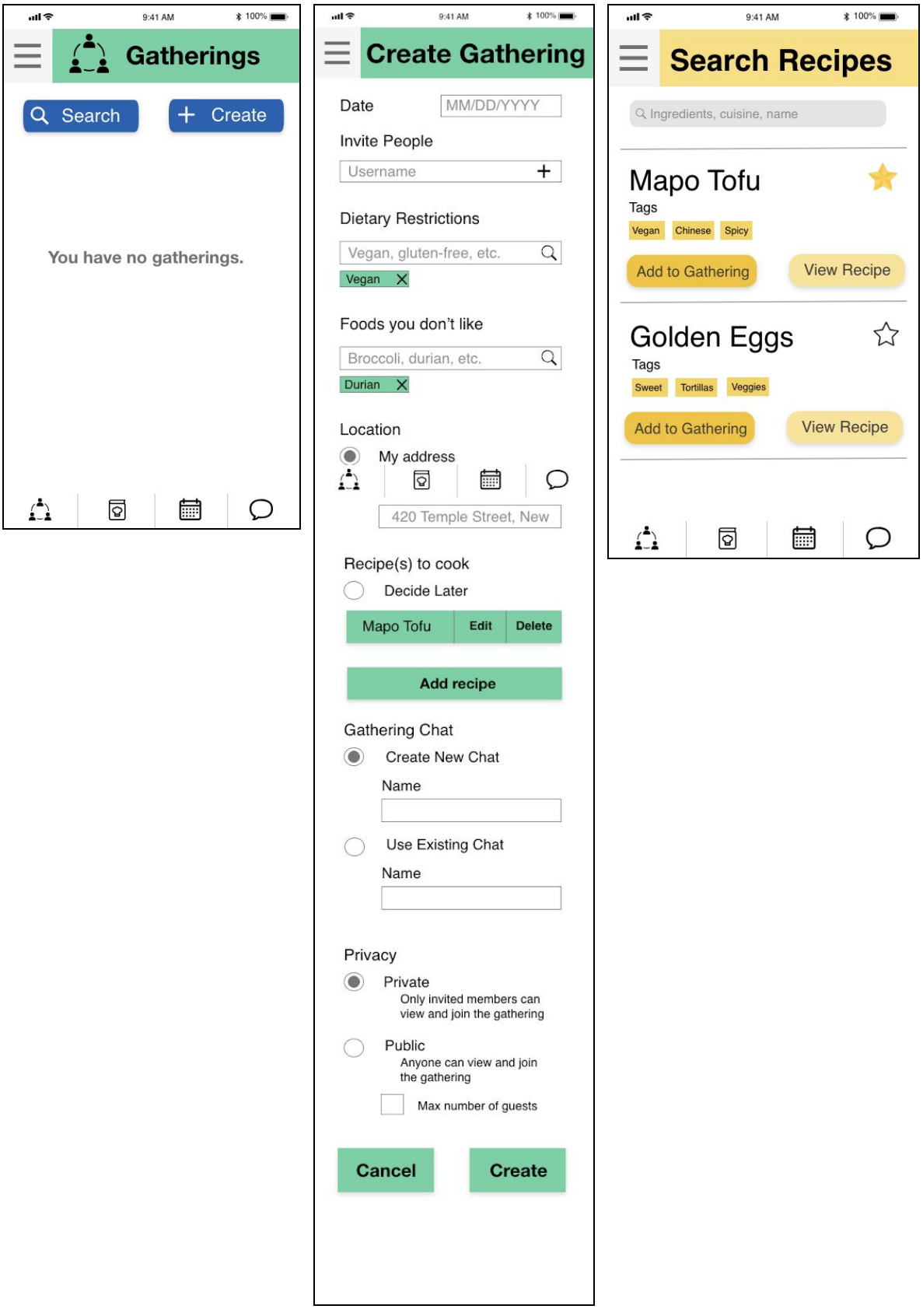
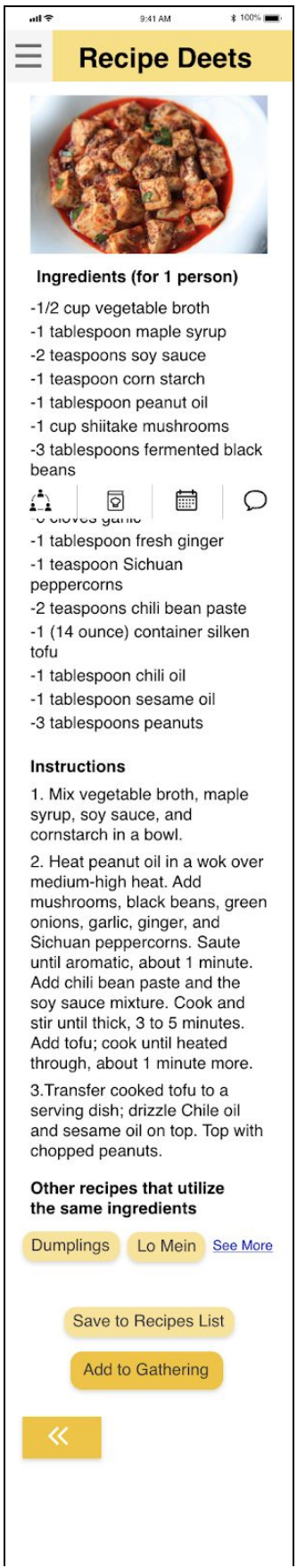
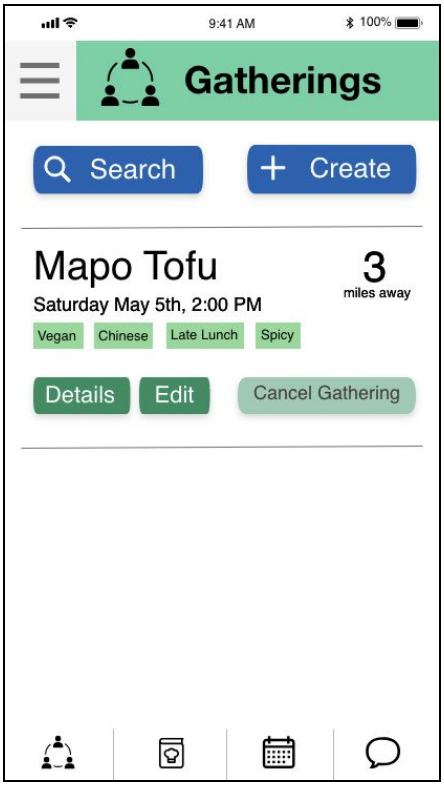


Figure 4: If they click on the "View Recipe" button for Mapo Tofu, they can see the ingredients, instructions, and recipes that use similar ingredients. Once the gathering is created, it appears in the "Gatherings" page. The colors of the buttons are green to signify the user is the creator.





8) Discussion

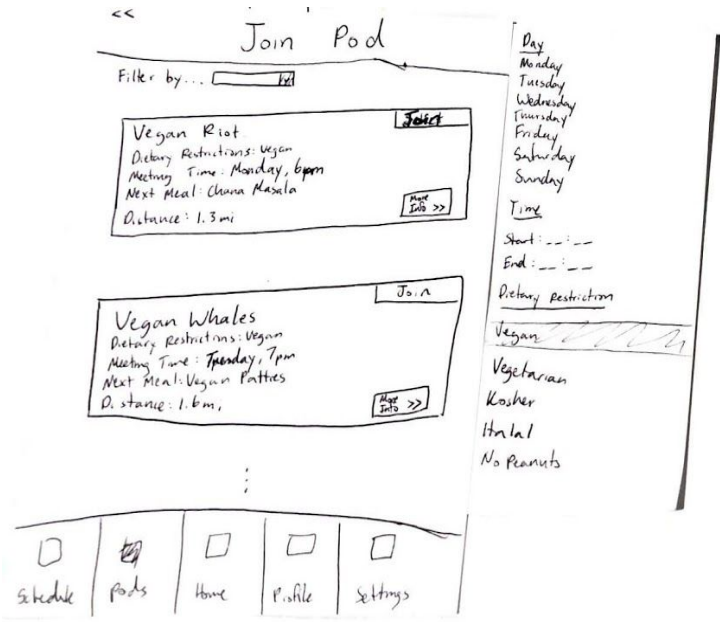
The iterative design process was more helpful than we imagined. We anticipated making only minor changes to our user interface but ultimately ended up reworking the entire paradigm that our solution was based on (moving from pods to only single shared meals). The process of testing with users helped us achieve a design that was less confusing and more consistent than we would have been able to come up with on our own.

The two tasks we focused on changed from sharing raw ingredients and meal planning to joining a gathering and creating a gathering as a result of our tests. Ultimately, we found that the concept of pods caused a lot of user confusion, and by moving from pods to individual gatherings, we reduced user confusion and possibly decreased barrier to user entry.

More iterations would definitely help to refine the design and we might spot more features that may be useful through more usability tests, but at the moment it is a solid minimum viable product that could start being coded up.

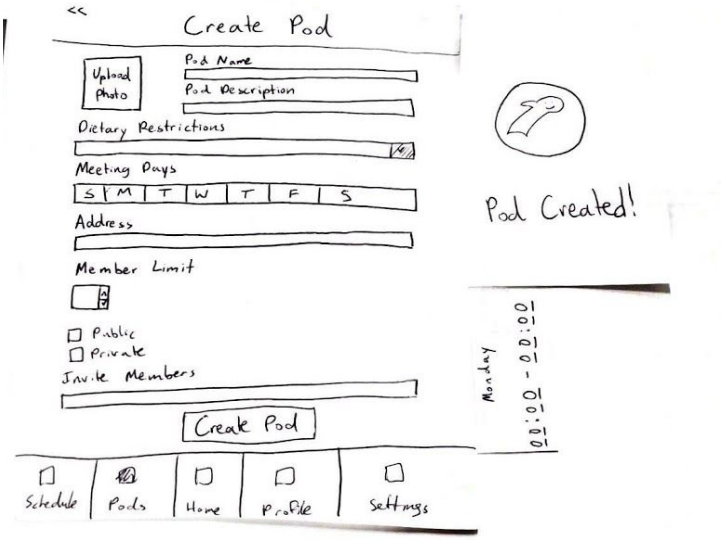
9) Appendix

The following images were part of our second paper prototype and represent many of the ideas that we originally had for our app. Each of them, as it can be easily seen, is very crowded. Therefore, most of the content of each of these screens was either broken down into multiple ones, or completely scrapped in order to provide a better user experience. Each of the images includes a brief description on the lessons learned from the users that had to interact with this early version of our prototype.

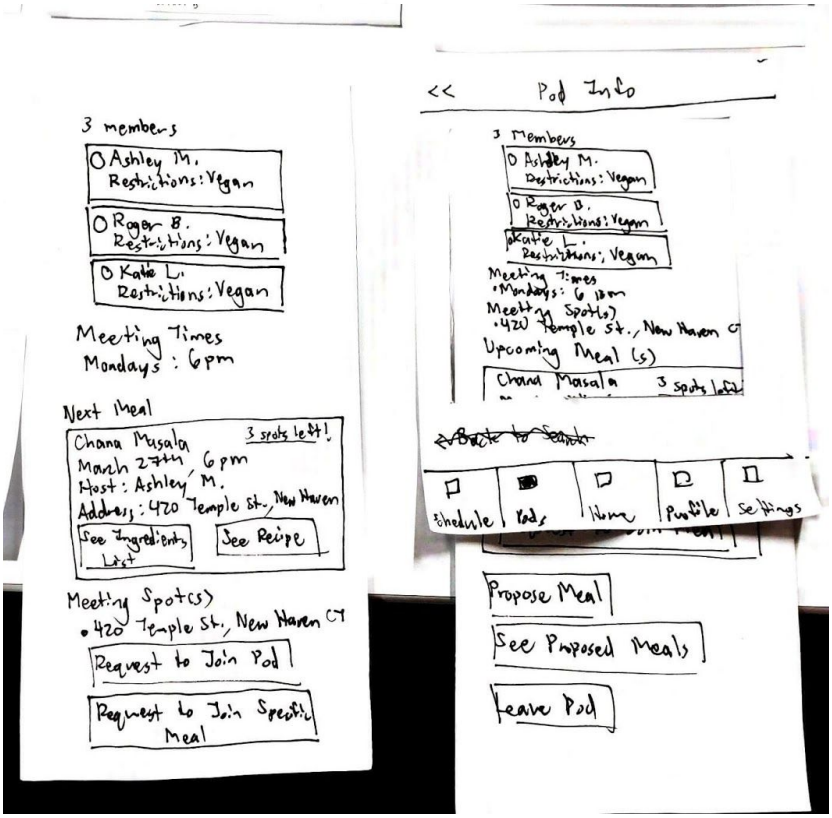


Back in our second prototype we had the concept of a “meal pod,” a group of individuals that would gather together at predetermined, consistent times in order to cook and share a meal. When our first users in class were presented with this screen along with the instruction of “Joining a meal”, they were incredibly confused with what a pod was and what the difference was between a pod and a meal. We at first thought that this problem could be solved by providing an explanation of the terminology in the

beginning of the sign up page, but after our first user testing outside of class, our user questioned the existence of Pods and their efficacy to actually reduce food waste. “What if I can’t make it to the meeting and my food goes bad?”, “What if I can’t find a pod that needs my food?” These and other questions made us realize that our concept of pods needed to go. Although the page is quite crowded, it was incredibly helpful to have all this information thrown to our users because it made them question the concept of pods and the complexities that they could bring with them.



The second task that we instructed our users to perform was to “Organize a meal.” The process that we had in mind was **Create a pod -> Create a meal.** However, as with our first task, there was confusion as to why there was a need to create a pod before organizing a meal. This was another big hint that pod creation was a barrier for the user to actually finish the task presented.



Up to our last assignment, the **Pod Info** page has been problematic. Although this page has now been renamed as **Details** and it focuses exclusively on the details of a gathering, it contains similar information. In particular, it contains the people that will join the gathering, the gathering time and place, the ingredients list and the number of people that can attend the gathering. The content on this page, was very crowded because we wanted to convey as much information as possible, and wanted to give users as much flexibility to join a pod and/or a meal. After conducting our usability tests, we

discovered that users were confused when presented multiple choices, and for the most part, did not look at details that were not relevant to them. For our latest prototype, we simplified this page as much as possible to present as early as possible information that would be crucial to the user to join a gathering, in particular, the location, time, and ingredients missing. The rest of the details were either eliminated, or deleted along with the pods concept.