Design Alternatives, Low-Fidelity Prototype & Initial Evaluation Report

A Report Focused on Understanding the Real Problems of Fridge Habits that Lead to Wasted Food

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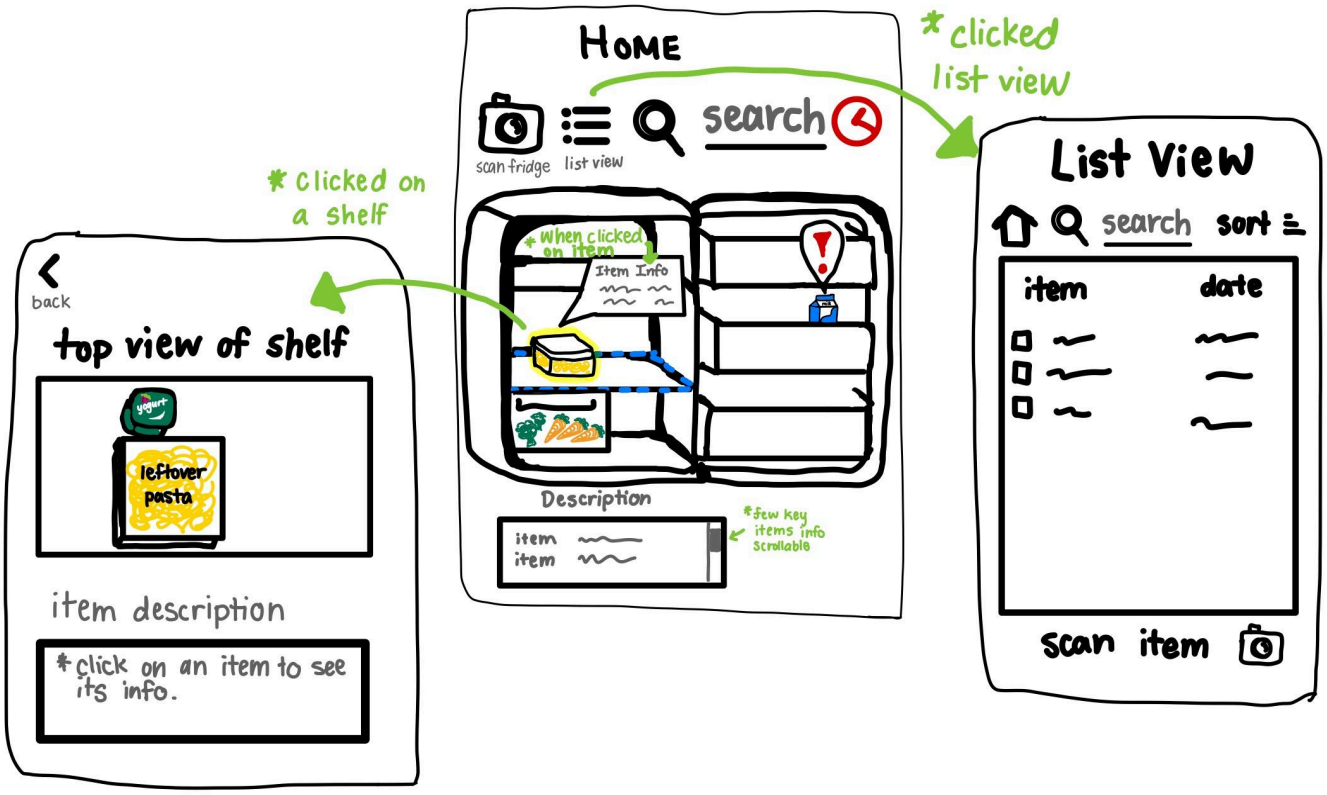
Design Alternatives

Concept 1



The app notifies when an item will go bad soon and shows an alert above the item. The user can scan the fridge/specific items or manually input items to track in the app. They can drag and drop items to rearrange locations as needed. The user can click on items to view details about the item and click on shelves to get a top view of the section. Another feature is searching if items are in the fridge, then the section and item will be highlighted. The app has an alternative list view of the items which can be sorted by different filters.

Pros:

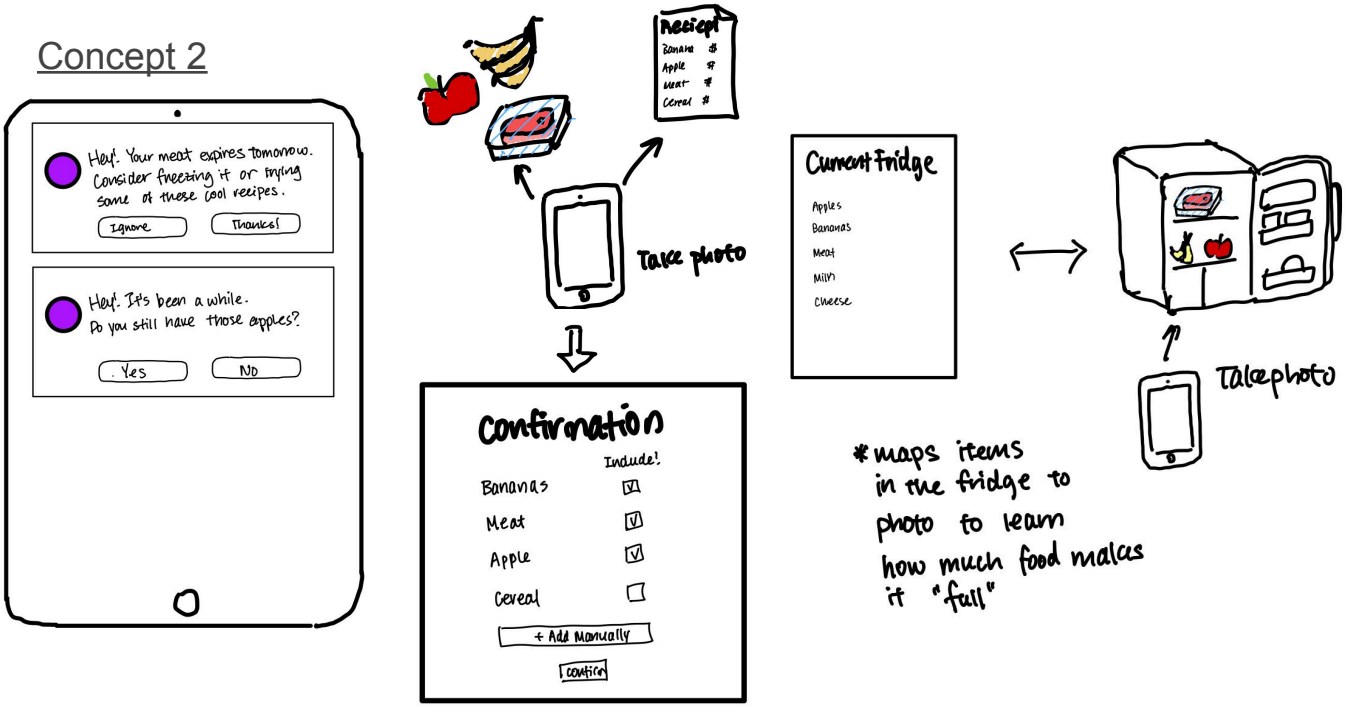
- Alerts the user of expiring food, helps reduce food waste
- Allows users to see the view of their fridge even when they're not home which can prevent overbuying

- Provides freedom to update fridge inventory easily through scanning or manual input

Cons:

- It can be hard to scan food items that are in the back of the fridge
- Full fridge view, the inside view which includes what is on the shelves, as well as the side door can be hard to see on some devices (i.e phones)
- Users will often have to scan the fridge if they live with others, or if food items move around frequently

Concept 2



This solution is an app that allows the user to scan their receipt or take photos of the food they put into the fridge, keeps track of approximate expiry & amount of items and sends reminders and simple recipes that use that food and whether it is edible. The app also asks the user if they still have this food and the user can scan it to update the fridge which makes the system learn how much food makes the fridge full.

Pros:

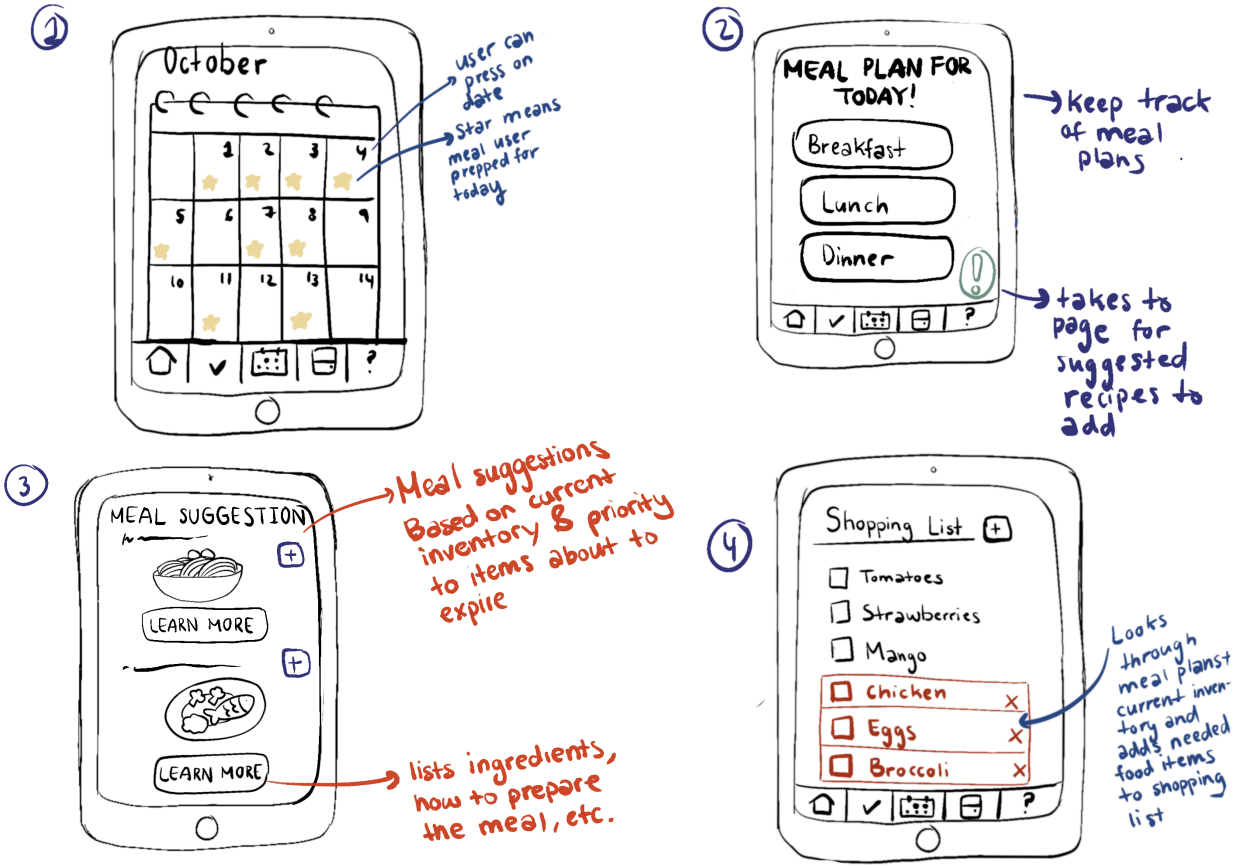
- All functions require minimal effort and engagement from the user
- Helps users remember food that is about to expire

- Helps users remember what is in their fridge even if they are away

Cons:

- Not the most accurate tracker - expiry date & amount is estimated
- Solution's effectiveness is dependent on optional user input
- Solution's effectiveness is dependent on the amount of data

Concept 3



Mobile app that helps users plan meals based on fridge inventory. Users input their available items, and the app generates meal ideas to help use up items before they spoil. Some features include: Recipe suggestions page based on current inventory, meal planning calendar and grocery list generator based on planned meals.

Pros:

- Efficient meal preparation and shopping, helping to reduce impulse purchases

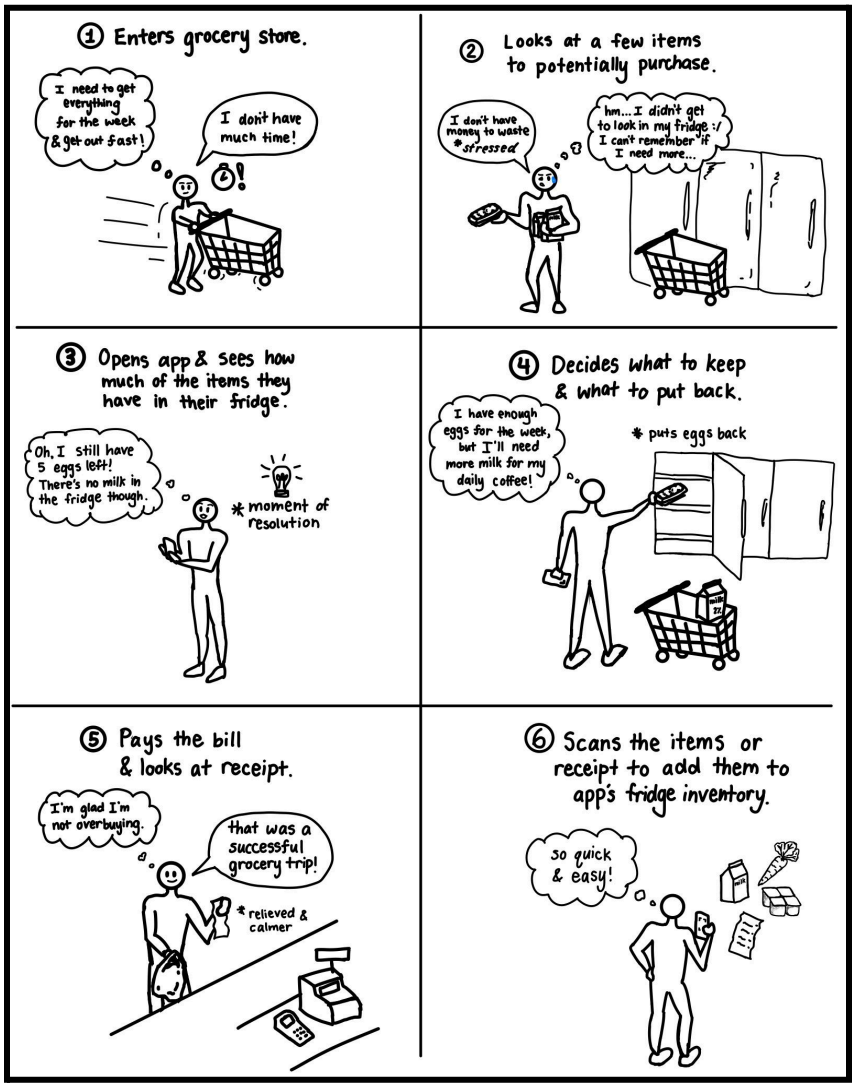
- Helps users utilize available ingredients, minimizing waste
- Convenient for users when planning their shopping trips

Cons:

- Time consuming setup while inputting items
- Solution's effectiveness is dependant on user input
- May not account for sudden meal plan changes or unexpected leftovers.

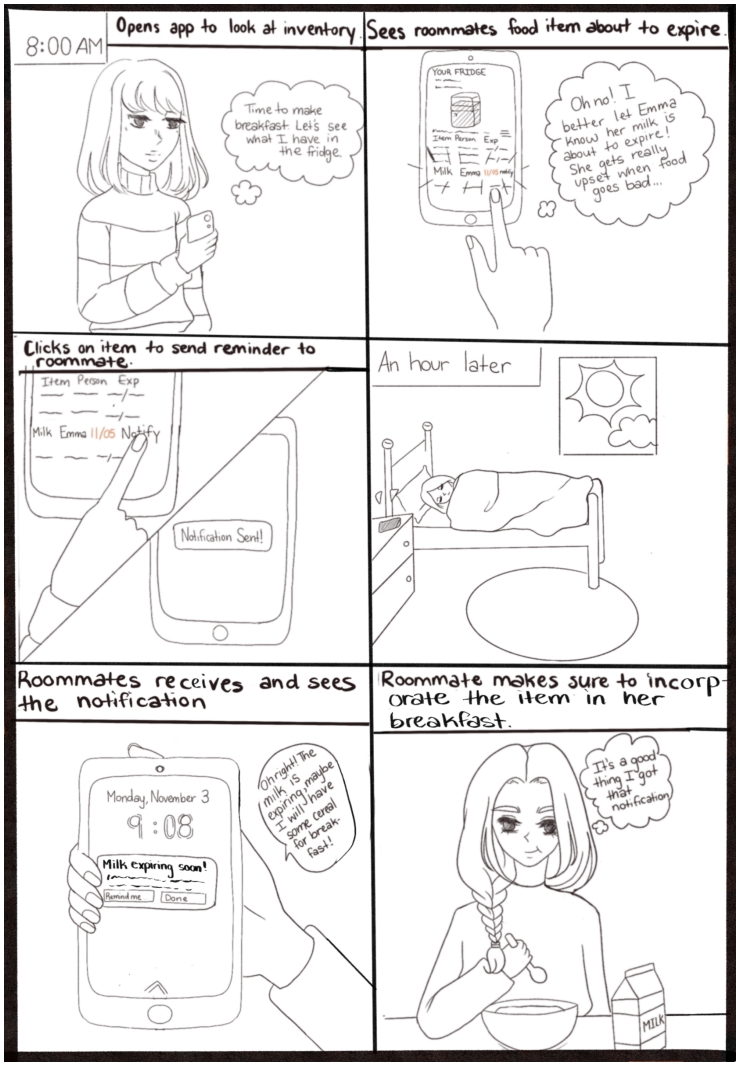
Storyboards

High-Level Storyboard 1



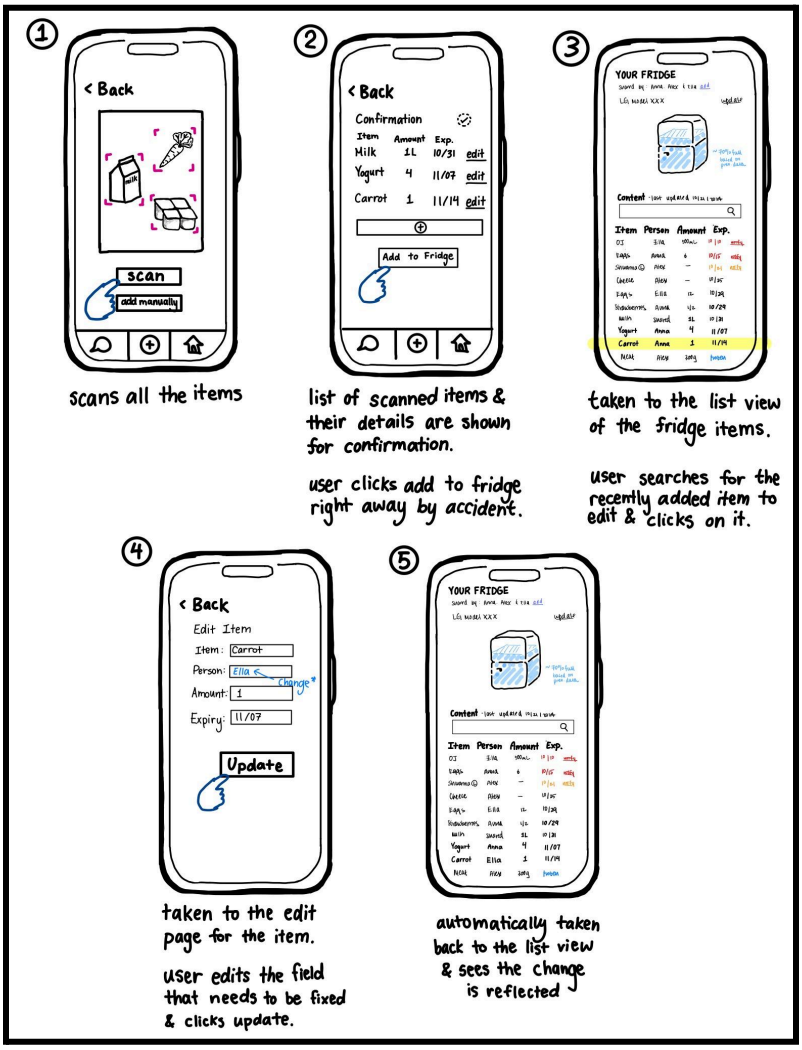
Explanation: The purpose of this storyboard is to show how a user may interact with the application when doing groceries, to buy the right amount of groceries they need and not overbuy. The trigger event of the user is not knowing whether they should buy something because they can't remember what they still have in the fridge and how much is left. In the process of grocery shopping, a user can virtually view the contents of their fridge on the app and details about each food item, including its amount, to alleviate the stress and effort of making decisions about purchasing an item or not. Users can also view an approximation of how much space is left in the fridge for new groceries, which can also make purchasing decisions easier. When a user wants to add new items to the fridge and update the contents of the fridge, they can use the camera to scan all their items or scan the receipt with the list of items. This satisfies the design requirements of tracking what users have in their fridges and how much space is left in the fridge.

High-Level Storyboard 2



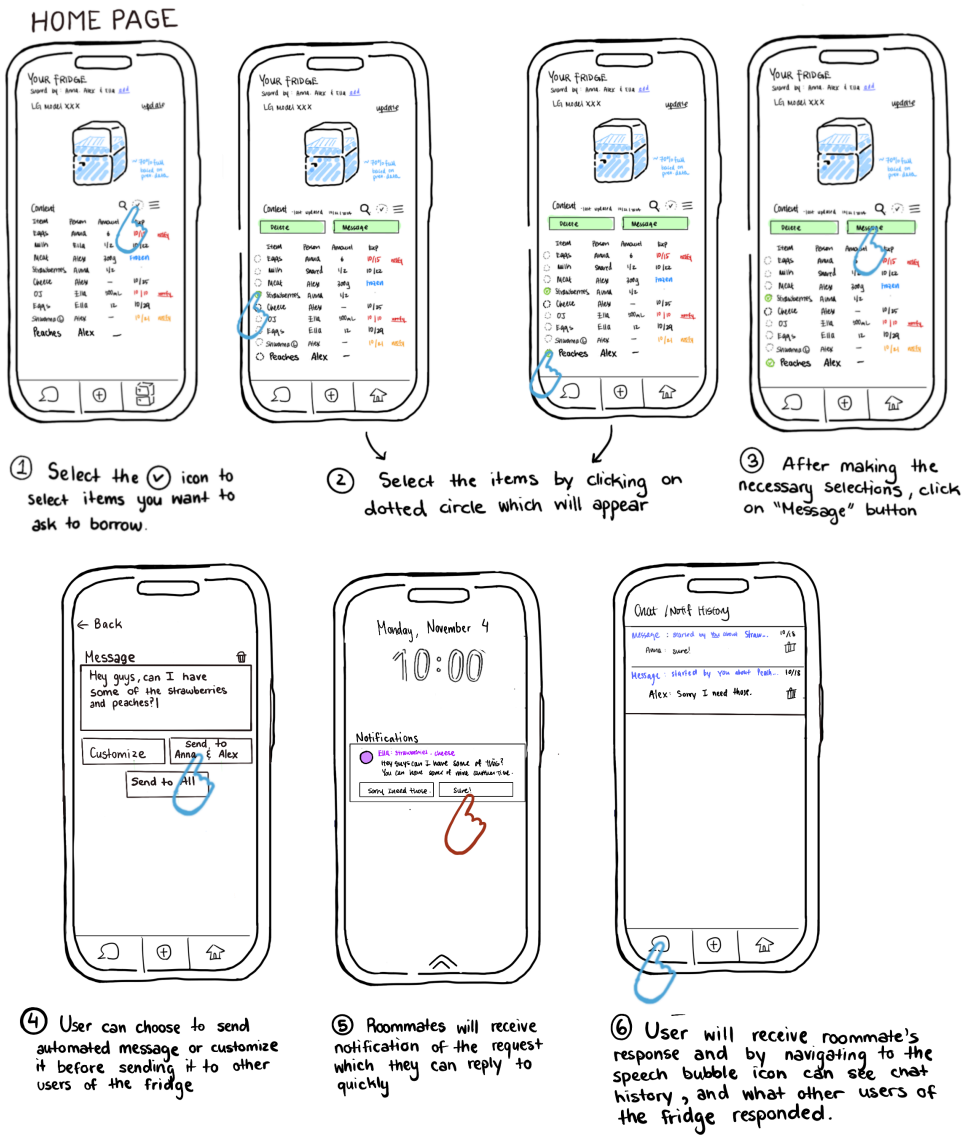
Explanation: The purpose of this storyboard is to show how the app can be used to manage fridge space when living with others. The goal is to notify other fridge users about which of their food items are about to expire. The trigger event is seeing that a roommate's food is approaching its expiry date as you look through the list of food recorded on the application. As users can see information about their and their roommates' food items, they can easily see the expiry date of those items. When they see that items are about to expire, they can press the notify button to easily alert their roommate about the item about to expire, helping their roommates stay accountable for their food items. This satisfies the design requirement of 'which food is going to expire/go bad soon' and 'tracking what food is in the fridge' (because we are identifying items that are about to expire and should have priority for use).

Screen-Level Storyboard 1



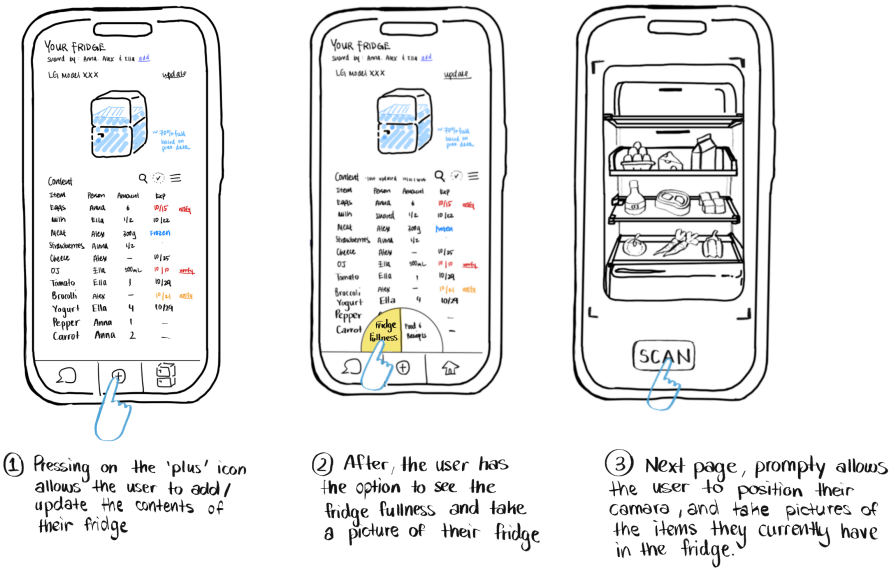
Explanation: The purpose of this storyboard is to highlight the flexibility users have when editing food items they add to the app. In this scenario, a user scanned their items and in a rush, they accidentally confirmed the list of items to add to the fridge before they finished checking over the details for each item. The user was panicked, but they were able to easily find the items they just added, click on the item to open its editing page, and update the information they needed. Scanning the items satisfies the requirement of tracking what users have in their fridges, and it automatically sets suggested expiry dates, which can be manually edited if necessary.

Screen-Level Storyboard 2



Explanation: This storyboard aims to highlight how multiple users of the same fridge can interact with the app and how sharing and organization can be optimized. In this scenario, a user forgets that they run out of certain items and they currently cannot go to the grocery store, but they notice their roommates have the items they need. Although their roommates are not home, they realize they can send a message on the app. They go to the fridge app and see who those items belong to. They click on the items they want permission to use and can send a quick message to their roommates, and the roommate gets the notification right away. This feature satisfies the design requirement of 'communicating to users who share the fridge about what food they can eat' because the labelling system allows users to identify who each item belongs to and communicate to the person if they want to use their item.

Screen-Level Storyboard 3



① Pressing on the 'plus' icon allows the user to add/update the contents of their fridge

② After, the user has the option to see the fridge fullness and take a picture of their fridge

③ Next page, promply allows the user to position their camara, and take pictures of the items they currently have in the fridge.

④ Updates the content of the fridge basen on what is in the scan.

⑤ User sees changes made to the list of items on the home screen.

Explanation: This storyboard aims to highlight other ways of fridge organization, such as the ability to detect fridge fullness and contents by scanning the fridge. In this scenario, a user forgets to update the contents of their fridge (they used up some items but forgot to remove them from the list). They go onto the app and choose to scan their fridge, which would tell the user the fridge's fullness but also update the contents based on the image and current food item log. This way, the users can ensure that only items they currently have in the fridge are displayed, removing those that are no longer there from the list, contributing to efficient fridge management and organization. This feature adheres to two of the design requirements, ‘track what users have in their fridge’ and ‘track how much space users have in their fridge’, which are useful for both space and food item management.

Paper Prototype

Description & Rationale

We decided to integrate elements from two design concepts to make our paper prototype. The main functions included in the prototype are as follows.

1. Tracking fridge content (Figure 1, Figure 2)

Tracking the user’s food items/content was one of the most important design requirements derived from our formative studies. To make this piece of information as accessible as possible, we implemented two different views of this data, a visual icon view as well as a filterable, sortable list view (Figure 1). Additionally, to lighten the user’s workload in keeping the data updated within the app, we designed the prototype so that the user had the option to add new items via three methods: manual input, taking a photo of the food items to be added, and taking a photo of a receipt (Figure 2). Further, to fill in the essential information regarding the food

items being recorded (item name, owner, expiry date, amount), the app estimates any values not explicitly provided and allows the user to edit any of these approximations as necessary.

2. Communicating with housemates about fridge content (Figure 3, Figure 4)

During the SP2 presentations, we received feedback from our TA that it would be interesting to focus on the social aspect of sharing a fridge with multiple people as it would give rise to different use cases for the app for the various real-life conflicts people encounter in this context. Based on this feedback, we decided to include a messaging function in the app.

We generalized the potential use cases of this function into two categories of needs; one, to notify a housemate of an item expiring and two, to communicate with housemates about certain food items in the fridge. We designed the communication function according to these use cases and created an easily accessible “notify” button next to expiring or about-to-expire foods (Figure 3) as well as an option to message the user’s housemates about existing items (Figure 4).

3. Tracking how full the fridge is at any given time (Figure 5)

In our formative studies, a key discovery was that the most frustrating failure our primary users experienced in terms of managing their fridges was accidentally running out of space. Thus we included “track how much space users have left in their fridge” as a design requirement.

The actual implementation method we chose for this function is a learning model that approximates how full the user’s fridge is given the current, recorded items in the fridge. More specifically, every now and then the user can take a photo of their fridge and submit that data along with an up-to-date list of food items so that the system can map how much of what kind of items make this particular fridge full. We selected this implementation over the realistic 3D modeling of the user’s fridge considering the technological limitations of accurately modeling different fridge models and food items.

Note 1: We created our illustrations for the paper prototype on a shared file on the Goodnotes app to allow for collaboration. The final designs were printed out on paper to conduct evaluations.

Note 2: Some screens of the paper prototype are grayed out for readability in the following Figures. Although the same screens were used in the printed-out paper prototype, the gray masks were not included.

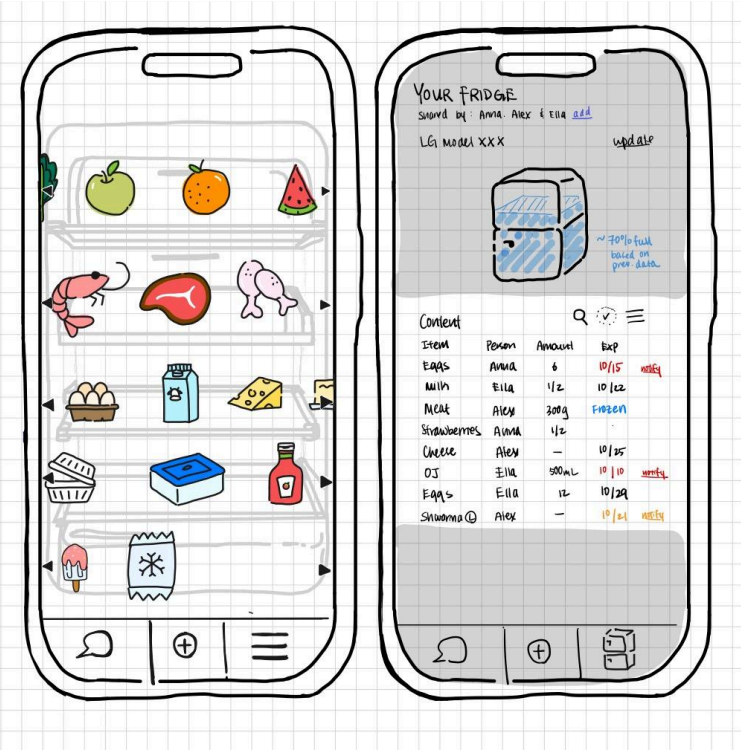


Figure 1. Displays of what the user currently has in their fridge: icon view (left) and list view (right)

Both views display the same information. Clicking on the food icon or food name on either screen triggers the “edit item” page (not shown in this figure) where the user can edit the data corresponding to that item such as item name, owner, expiry date, and amount.

Figure 2. Process of adding new items into the tracker

The user can scan items or a receipt to add new items to update the list of food items in the app. The screen on the left is the scanning feature and the screen on the right shows the confirmation page that appears after the items are scanned.

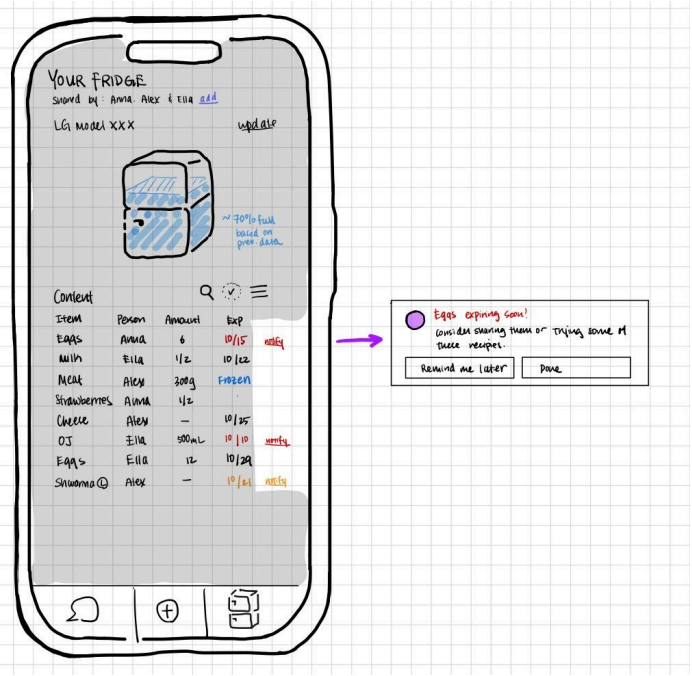


Figure 3. Notification feature to notify housemates of expired or soon-to-expire food items

A user can click the “Notify” button (left) to send a reminder notification (right) to the owner of the food item.

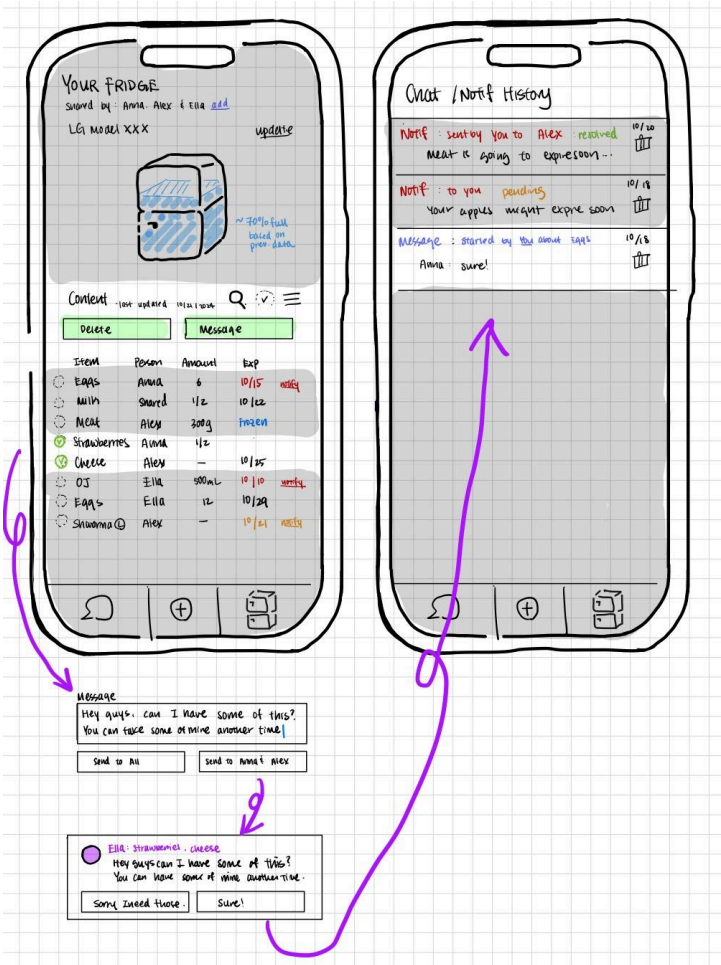


Figure 4. User flow to send messages to housemates about specific food items

When a user wants to communicate with their housemates about certain food items, they can select the items on the list view (screen on the left) and click “Message” which will trigger a text box. Once the user sends the message, their housemates will receive it in the form of a notification and their response and any further communication will be accessible in the Chat / Notification History page (screen on the right) accessible from the bottom right chat icon.

Figure 5. Mapping images of fridge content with list of items to approximate "fridge fullness"

Users can take a photo of their fridge and the app will map the image to the current list of food items recorded on the app (left). Every time the user updates the system with this action, the app will learn how full the user's fridge will get, given a list of food items. This approximation is visually displayed to the user as an icon on the home page (right).

Advantages and Disadvantages

Advantages

- Most of the core functions have been implemented in a way such that the user's world load is minimized. For example, food items that have reached their expiry date will automatically have "notify" buttons displayed next to them so that the user can easily contact their housemates about it without writing a message themself. Additionally, users

can take a quick picture of new additions to their fridge and the system will estimate expiry dates so that the user only has to edit incorrect information rather than adding every item manually.

- This prototype is designed to allow users to collaboratively manage their fridge with their housemates, which is a context relevant to the majority of our primary users, based on our formative studies. However, this prototype is still functional for those without housemates or those who have housemates but are using the app alone.

Disadvantages

- The function to track how full the user's fridge is heavily depends on how frequently the user takes photos of their fridge, thus if the user neglects to do this the approximation may be inaccurate and not reliable.
- This prototype has limited focus on the design requirement "suggest how to deal with expired/expiring food in their fridge" we listed in our formative studies. Although some expiration notifications will give suggestions such as freezing the item, it will not go as far as to provide item specific, detailed solutions.

Think-Aloud

Study protocol

We carried out the think-aloud on four participants and made two scenarios for each think-aloud. We first allowed each participant to explore the interface freely, without interference, and then we gave them two tasks. The two scenarios provided necessary context for the participants to explore as many of the available features as possible.

The following are the scripts we used:

Scenario 1: Update Fridge after Groceries

Imagine you've just finished grocery shopping, and now you're sorting the items you bought into the fridge. You have the receipt and the groceries in front of you, and your goal is to organize and manage the fridge. Now, I'd like you to show me how you would use the app after a grocery trip. Feel free to explore the interface as you wish and check out the different features available.

Scenario 2: Update Fridge after making Scrambled Eggs

Next, imagine you're planning to make a meal using the existing items in your fridge. You'll be using the app to assist with this process. Some items are labelled with your name or your roommate's, while others are unlabeled. Each item also has an expiry date. Now, I'd like you to show me how you would use the app to help prepare scrambled eggs. Feel free to explore the interface and try out the various features as you go.

Each session consisted of a Wizard, Observer and Facilitator. The observations were taken down through digital notes, tracking each action the participant took on the paper prototype and writing down the thoughts and questions they verbalized.

The four participants we recruited were Ahana, Ethan, Lea and Jaemin. We gave the participants some basic instructions such as: "Pretend the paper phones are interfaces on a real phone. You can freely interact with the buttons on each screen as if they are real features on your phone. You are given these food items and this receipt. Pretend they are real items you got from the store."

Discussion of key findings

1. Adding and Updating Items

Ahana expressed initial confusion when trying to add new grocery items to the home page fridge view. She attempted to click on pre-existing icons but found that adding items manually was not intuitive, especially when the needed icon (e.g., for yogurt) was missing. This suggests that a more accessible and prominent scan button is necessary to simplify the item-adding process.

Ethan had a similar experience, noting that he initially tapped on the meat icon and manually inputted items without realizing that the scan button could be used for adding groceries. This indicates that the function of the scan button needs to be communicated more clearly.

Lea encountered challenges when trying to update the fridge after adding new groceries. She preferred a system that could aggregate the same items on a single editing page to streamline the process.

2. Messaging and Notification Functionality

The messaging feature emerged as a point of confusion for several users. Ahana mentioned that the notify button beside items was not intuitive and suggested that a direct messaging feature would be more practical, especially when users want to communicate about expired or potentially moldy food that needs immediate action. Ethan found the notification options unclear, as the “send to all” and specific recipient buttons were not straightforward.

Lea clicked on the message icon expecting to start a new conversation, only to find that the current setup was more like a history page. She and Jaemin both highlighted that it was not intuitive how to start a new message, recommending either an add-message option or clearer instructions for initiating a chat. Jaemin suggested that the chat icon should resemble a traditional history icon if it is only for viewing past conversations.

Ahana also noted that selecting an item and then messaging someone about it was a tedious process. The need for a more intuitive way to message people or notify them about shared items was echoed by other participants.

3. Fridge Fullness Feature

The term “fridge fullness” was flagged by multiple users as confusing and unclear. Ahana and Ethan both commented that they did not understand the purpose of the “fridge fullness” feature, whether it was for updating the contents or just checking them. Jaemin mentioned that the blurb appearing after a scan was not helpful and needed clarification.

Lea added that the “update content” button linked to the fridge fullness feature was not intuitive. Our testing did not sufficiently explore scenarios where users would use the fridge fullness feature while shopping. This indicates that better explanations and walkthroughs are needed to convey the function of this feature.

4. Navigational Challenges

Several participants experienced difficulties navigating through the app. Ahana suggested that differentiating between items owned by different users would be beneficial. For instance, she was unsure if the visual egg icon represented her eggs or those shared with roommates. She proposed a feature that notifies users if shared items are used by someone else.

Ethan pointed out that switching between the home page fridge view and the list view was not seamless. He wanted the list view to be more interactive, allowing him to click on items and update them easily. Jaemin emphasized the lack of a “go back” button when filtering items, which added to the confusion and made navigation cumbersome.

5. Deleting and Editing Items

Lea noted that there was no option to delete items directly from the edit item page. She also mentioned that deleting items visually from the illustrated fridge page would be useful, suggesting a feature where users could long-press an item, select it, and then delete it.

Jaemin pointed out that updating items manually felt tedious without a convenient +/- button. He believed that adding this option would make the item update process quicker and more user-friendly.

6. Scanning Functionality

Ahana and Lea both initially assumed that items had to be scanned one at a time, not realizing that the app could handle multiple items in one scan. Jaemin also mentioned that there was no clear explanation for how to scan the fridge or what to do when adding new items. Lea suggested that barcode scanning could make the process more accurate, citing other apps that successfully use this feature.

7. Additional Recommendations and Observations

Jaemin proposed adding a recipe-sharing feature when a user receives notifications like “try some of these recipes,” suggesting a link to an online search or recipe database. He also mentioned the idea of integrating a shopping list function that could automatically add items when something is deleted (e.g., eggs if the user always wants to keep them in stock). This would provide an added layer of user control and efficiency.

In hindsight, the testing scenarios could have included a more detailed walkthrough involving the fridge fullness function, particularly in a shopping context.

Expert Evaluation

Study protocol

We gathered evaluation data from six experts during tutorial time. Whenever a design concern was raised by the expert, we asked them to rank each issue they identified in terms of severity, assign each issue to a Jakob Nielsen heuristic, and asked them to provide a recommendation (if any).

We gave each expert the same basic instruction as the Think-Aloud and gave them the freedom to explore all features. We conducted this using a Wizard, a Facilitator and two Observers.

Discussion of key findings

Most Common Issues

1. **Confusing Icons**: Many experts noted that various icons (eg. “list view”, “select” icon to select multiple items in the list, “message”, and taskbar icons) were unclear or inconsistent, leading to usability problems in recognizing functions. Evaluators attributed “confusing icons” as one of the main reasons for difficulty figuring out how to select multiple items in the list, how to get to the editing page for a specific item, and how to navigate across the screens to the correct page on their own, without help clarifying.

2. **Lack of Clarity in Scanning Functions**: Issues like the "fridge fullness" meaning and the lack of a tutorial/walkthrough to understand the app's purpose were recurrent. It wasn’t clear what was being updated for fridge fullness. It was also unclear that users were able to scan multiple food items at once, with many initially trying to scan one item at a time.

3. **Inconsistent Taskbar**: Several experts pointed out the inconsistency of the taskbar, which made it confusing for users to navigate to the desired page from any screen and to find specific options. Users found it hard to interpret or navigate through to access functionalities without additional guidance.

4. **Chat History vs Messaging Feature Confusion**: The difference between the chat history tab on the taskbar and the actual messaging feature was often unclear, with the majority of users mistakenly clicking the chat history feature when asked to send a notification to a shared fridge user. Many were unable to locate the chat feature without guidance as the feature was not obvious and hidden.

Most Common Heuristic Numbers

- **Visibility of System Status (Heuristic 1)**: Issues like fridge status and fullness update confusions, ambiguity of food amounts measurements, and chat history inconsistencies were often linked to this heuristic, emphasizing the need for signaling real-time updates or feedback on last updates to users.

- **Recognition Rather Than Recall (Heuristic 7)**: The confusion with unconventional icons aligns with this heuristic, as users require clearer visual cues rather than relying on intuition or memory to figure out the functions within a new interface.

- **Help and Documentation (Heuristic 10)**: The absence of a walkthrough or tutorial was frequently associated with this heuristic, indicating a need for initial guidance. Evaluators also noted that certain text labels for features still caused confusion and were unclear. A walkthrough function was noted as a high-priority addition, particularly for new users who need guidance on the app's purpose and core functions.

Key Findings

- **High Severity Issues**: The lack of a walkthrough function and the unclear purpose of features like "fridge fullness" had high severity ratings, indicating they should be prioritized for improvement.

- **Ease of Fixing**: Some cosmetic issues, like icon clarity, were rated as easier to fix, suggesting that visual adjustments could improve the overall user experience without major overhauls.

- **Specific Recommendations**:
    - Add options for viewing different units to accommodate various recipe requirements.
    - Implement a consistent taskbar across displays for easier navigation.
    - Include error prevention measures, like prompts when users try to save items without necessary details.
    - Introduce a notification-based system rather than direct messaging for expiration alerts, allowing users to get relevant information without unnecessary chat features. Multiple experts stated messaging on the application might be redundant in shared spaces, and described the chat feature as surprising or unexpected on a fridge focused app.

Lesson Learned

One of the most significant issues identified during the evaluations was the confusion caused by unclear or inconsistent icons. Evaluators frequently mentioned that icons like the list view, delete button, and taskbar were difficult to understand or misinterpreted as other functions. For example, the garbage button was often mistaken for a shopping cart, and the list view icon was perceived as a settings option. This highlighted the importance of clear and distinct visual cues to improve recognition and minimize reliance on memory, aligning with Heuristic 7 (Recognition Rather Than Recall).

Another key finding was the lack of clarity in certain features, particularly the "fridge fullness" function. Users were still determining whether this feature was meant for checking or updating the fridge contents, creating confusion about its purpose. This underscored the need for more informative feature descriptions and real-time feedback, aligning with Heuristic 1 (Visibility of System Status). Additionally, the absence of an onboarding tutorial or walkthrough was a recurring pain point. New users struggled to understand the app’s full range of capabilities, highlighting the importance of better help and documentation (Heuristic 10). A guided tutorial would provide essential initial support, making it easier for users to navigate and understand complex features like multi-item scanning.

Navigation inconsistencies, particularly with the taskbar, were also noted by multiple evaluators. A standardized layout across all pages would promote seamless navigation and reduce user confusion. Users expressed that a fixed taskbar design, which includes the main functions like home, list view, and notifications, would be beneficial. The evaluations also revealed that the current chat history feature was often mistaken as a direct messaging feature, and one even misinterpreted it as an AI chatbox or help feature. This caused confusion, as users did not realize it was intended to display the chat history of the shared items or expiring

food. Evaluators preferred a streamlined notification system for alerting users to expiring items, emphasizing that a simple notification approach would be more efficient than the current chat feature.

The feedback also pointed out that users were unaware they could scan multiple items simultaneously, leading to a more tedious, one-by-one scanning process. This finding indicated the importance of providing tooltips or pop-ups that explain how users can take advantage of the app's more efficient features. This aligns with the need for more thorough help and documentation (Heuristic 10).

Proposed Design Changes

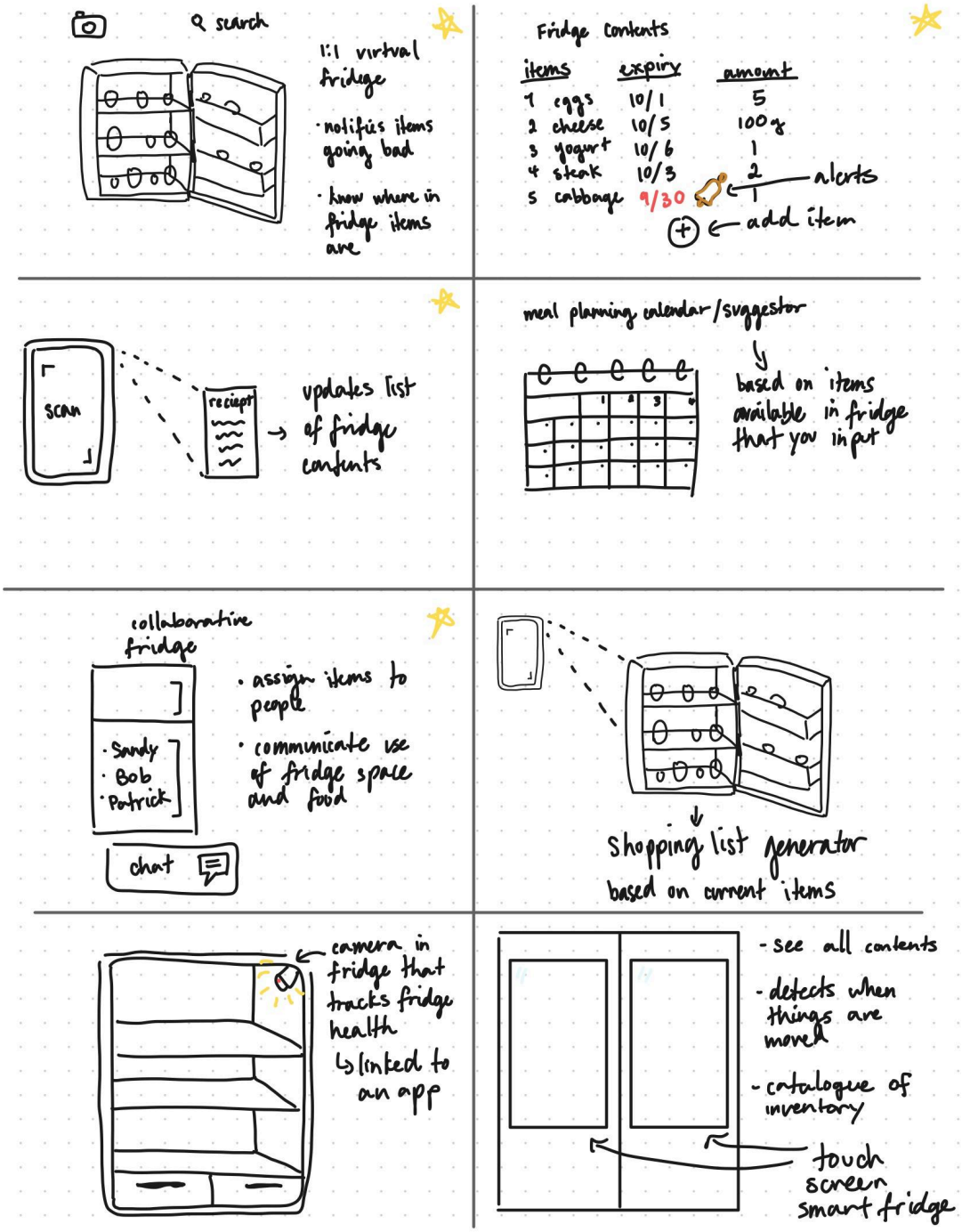
1. **Redesign Icons and Add Labels:**
    - Create more intuitive and visually distinct icons to avoid confusion.
        - Standardize the "Select", "Edit", "Delete", and "Add" items icons for manual user input options, and ensure familiar usability and controls for these features, that are common in other applications.
    - Include concise text labels under each icon to improve user recognition and navigation.
2. **Implement an Onboarding Tutorial:**
    - Develop a guided tutorial for new users to introduce the app's main features, such as multi-item scanning and the "fridge fullness" function.
    - Include interactive tooltips that appear during the first few uses to provide additional guidance.
3. **Standardize Taskbar Layout:**
    - Ensure that the taskbar layout remains consistent across all pages.
    - Maintain key navigation buttons (e.g., home, list view, notifications) in the same order on every page for a predictable user experience.

4. **Transition to a Notification System:**
    - Replace the current messaging interface with a streamlined notification system.
    - Notifications should inform users when their items or shared items are nearing expiration.
    - Allow users to customize their notification preferences, such as when and how alerts are received.
5. **Clarify Feature Descriptions and Add Prompts:**
    - Enhance feature descriptions with clear, descriptive prompts and pop-ups to reduce confusion around features like "fridge fullness."
    - Add confirmation prompts to reinforce user actions and reassure users that their tasks have been completed as intended for system status visibility.
6. **Add Multi-Item Scanning Tooltip:**
    - Introduce an informational tooltip that appears when users access the scanning feature.
    - Clarify that multiple items or receipts can be scanned simultaneously to improve user efficiency and align with the app's user-friendly goals.

These changes aim to make the app more intuitive, accessible, and efficient, ultimately enhancing the user experience.

Appendices

Ideation process



Link to ideation process documents:
https://drive.google.com/drive/folders/1eUjHK4ugXAoPUQ3kllNAlkP4qHcCE8pl?usp=drive_link

Think-aloud protocol and instruments

Link to protocol:
https://docs.google.com/document/d/1vbjagPXvAhAvYmmzE19PQSodmNAH8ayuTz6tUFlrPGE/edit?usp=sharing

Consent forms

Links to consent forms:
https://drive.google.com/drive/folders/1S4KL2pOR1BhH_LR3pd0ano4wHd6ldD7b?usp=drive_link

Talk-Aloud Protocol:

1. **Project Title**: "**Talk-Aloud Evaluation of Fridge App Paper Prototype**"

2. **Investigators**: Names and email addresses of all members of the team.

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3. **Purpose**: Our research aims to understand frequent fridge users to help us derive requirements for the design of novel interactive computational media that are intended to be useful to people who regularly use a fridge. A brief description of our design problem is: that people can struggle to keep track and manage what food is in their fridge, which can lead to financial loss and food waste.

4. **Process to be followed**: We will brief the participants about the purpose of the study, explain the consent form to them, and ensure that they sign the consent form. **We will then engage the participants in a 15-30 minute, talk-aloud evaluation. We will also, with their permission, make observations as follows: observe the participant's interaction and thought process while performing required tasks with the paper prototype of the application.**

5. **Participant selection:** Participants will be chosen from students, and busy professionals (those who work and are frequent users of their fridge). They will be identified via reaching out to friends, family and acquaintances and selected according to their degree of fridge usage, in terms of their level of contribution to the organization and management of their fridge and food disposal. In general, they will be characterized by their living environment (students living alone/roommates/families, busy professionals living alone/with partners, etc) .

6. **Relationships**: Our relationship to the participants may be described as follows: friends, relatives (parents, siblings, close family, distant family), classmates,

7. **Risk and benefit:** There will be minimal risk to the participants, for example that they feel that they have wasted their time. The only benefit will be to contribute to the education of the investigators. Participants are free to withdraw before or at any time during the study without the need to give any explanation.

8. **Consent details**: We will brief the participants about the purpose of the study, and explain the **attached consent form** to them, and ensure that they consent to participate and sign the consent form.

9. **Compensation**: Participants will receive no compensation.

10. **Information sought:** The information to be sought is described in the attached protocol for asking questions in a semi-structured interview.

11. **Confidentiality**: Information will be kept confidential by the investigators. Names or other identifying or identified information will not be kept with the data. The only other use will be to include excerpts or copies in the assignment submitted, but names and other identifying or identified information will not be submitted.

Consent Form Template:

Consent Form: Fridge Management Project

I hereby consent to participate in a research study conducted by Yuxi Zhang, Wendy Wan, Izumi Ando for an assignment in University of Toronto Computer Science 318, *Design of Interactive Computational Media*.

I agree to participate in this study, the purpose of which is to test the paper prototype of a fridge management app, and verbalize all actions you are taking while interacting with the prototype.

I understand that

- The procedures to be used are interacting with paper cut-outs of a phone screen while each action and verbalization is noted down by a note-taker
- I will receive no compensation for my participation.
- I am free to withdraw before or any time during the study without the need to give any explanation.
- All materials and results will be kept confidential, and, in particular, that my name and any identifying or identified information will not be associated with the data.

PARTICIPANT

Name (please print)_____

Signature_____

Date_____

INVESTIGATOR(s)

Name_____Signature_____

_____

Link to videos

*Due to the fact that we conducted the talk-alouds in public spaces like libraries for the convenience of our participants, we decided to not conduct the study using video recordings. This ensured that we were not disruptive of others' privacies and of shared spaces. Furthermore, some of our participants did not give consent to video recordings but gave consent to notes being typed down. *

Expert evaluation instruments

Link to Expert Evaluation heuristic table:
https://docs.google.com/document/d/1MAXjYLDnIIphNS7g3oKB7a3niu046TExsYzMnmUBYOE/edit?usp=sharing

List of experts and helpfulness

Expert Name	**Ranking of Usefulness (0,1,2)**
David Nagy	2
Natalia Tabja	2
Muhammed Hamza	2
Mashal Nihal	2
Yuvraj Khanna	2
Alaya Le	2

List of other groups and preparedness

Group Name	**Ranking of Preparedness (0,1,2)**
Penguins of Madagascar	2
Error 404 Study Spaces Not Found	2
Shavak	2
The Paige Turners	2

Documentation of data analysis process

Link to Talk Aloud observations:
https://docs.google.com/document/d/1rEFDL71k5wqBiVYLWPxnTf2OiTPHJSA7ldpbSmMQYMg/edit?usp=sharing

Link to Expert Evaluation observations:
https://docs.google.com/document/d/104C4BvOeQ1iqBkJT8SjOcluc1vKkWIC7QLEqy46tfAo/edit?usp=sharing

Group meeting notes

Link to meeting notes:
https://drive.google.com/drive/folders/1HkElakxl5m4ytDMVnk9TkC2LKj-r-nXv?usp=sharing

https://docs.google.com/document/d/1bfwzqjTL_iqlanKbyZdmzkuV_2e60C_EPdtpwgDNDfw/edit?usp=sharing