

1. Title: A Modern Way to Coordinate Your Shopping Trip

2. Team Member Name and Role:

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Antonio Diaz: User Testing Lead

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3. Problem and Solution Overview

We are tackling the issue of grocery shopping in communal households, specifically how to make the grocery shopping as easy and efficient as possible without any conflict happening between household roommates. A problem situation could look like this: You check your apartment's refrigerator and see that you are out of eggs. Seeing this, you buy eggs later that day, but return and see that one of your roommates did the exact same thing. In addition to this, you and your roommates have agreed to pay for eggs as a group and you now need to determine how much money is owed to you and get money from your roommates for buying the eggs. This situation gets very complicated as you add in more groceries. The proposed solution is to have a shared grocery lists in a mobile app, where every roommate has access and can add things to the apartment list. When a roommate goes to the grocery store to buy groceries, he/she will then access the the communal list on their phone and see what left to be purchased. This will ensure no duplicate items are purchased. Once the groceries have been paid for by the grocery go-er, the app facilitates the reimbursement process by notifying each roommate with the appropriate amount owed and providing options to pay that amount.

4. Contextual Inquiry Target, Stakeholders, and Participants

We performed 4 contextual inquiries on 4 different groups:

- a. Young Professional: George is our first participant. He is a software developer working at a local company in downtown Bellevue. George graduated from UW a few years ago. In college, George lived with 4 other roommates and had had experiences with communal shopping. George got a job offer right after school. He is currently living with his fiancé in an apartment nearby where he works. We talked with George because he had experiences living in communal housing and as a couple with his fiancé. We hope to get insight from him about how communal shopping works and how we can make shopping coordination easier.
- b. College Students: Our second group of participants are 4 college students living in a small apartment west of University of Washington. Neither of them have a car and often walk or take a bus to get groceries. We selected these students to interview because they represent a demographic group whose majority live in college dorms and shared housing. We think our design can potentially benefit these students by improving their shopping experiences.
- c. Small Budget-Constrained Family: Our third participants are a family of 3 who regularly shop at QFC in Beacon Hill. The husband is a day laborer who does not receive

paycheck consistently due to the seasonal nature of his work. The wife has a consistent job and therefore her paycheck is used mostly to pay utilities bill. The husband's paycheck is used to cover food. When time gets tough, they substitute away from buying groceries to getting food at local food bank. We selected this family to interview because we started broad and initially think they might represent an interesting and potential demographic group that we can serve. Another interesting thing that we learned from this interview is the budget constraint and how it affects the shopping process.

- d. Late-40s middle class man: Our last study participant is Jim. Jim is an IT consultant at a local firm. Jim has a partner whom he is currently sharing a condo with in Beacon Hill. Jim and his partner have been together for 5 years. They both have stable jobs and steady streams of income. We selected Jim to interview because we initially think he represents a different group of customer that we might go after: more than one young urban professional mid-to-high income. There are a few things that Jim and his partner are concerned about before and during shopping that other participants might not have indicated in their contextual inquiry. The contextual inquiry helps us get a bit more insight and to decide whether to make the app specific for a specific group or general to accommodate everyone.

5. Contextual Inquiry Results and Themes:

Despite having very different settings for our contextual inquiry, there were some common themes, problems, and practices that emerged. One common theme we found is reimbursement after grocery shopping is considered a non-trivial burden. The more people in the household, the more difficult it is to track everyone down to receive reimbursement. It is especially annoying to single out every personal item on the receipt in order to get exact dollar amounts. This suggests there should be functionalities designed to make reimbursement easy and fast. This practice of distributing reimbursement notices gave us a good idea for functional requirements for our app. In our design process, we decided to focus on this theme. In particular, we will apply this functionality to college roommates and young professionals sharing a living space.

Another theme that emerges is transportation coordination is often a problem because most people need a car to transport groceries back to their house. The majority of our target customers do not have a car. We also found that college students are often price conscious while shopping for themselves, but not too much when they shop for others. This suggests budget planning functionality would be useful for shoppers. Most of the people from our contextual inquiries also had preferred brands and took this into account more than finding the best deal or using coupons.

From our contextual inquiries, making a list was also a crucial part of the grocery trip experience. One of our CIs would take a mental note of what is needed in the kitchen and then go to the grocery store. However, some things would be forgotten and then required a second trip to the grocery store. A different CI valued their shopping list so much in fact, that even if he were near a grocery store he would return home to get the list. Another CI also mentioned that a list helps keep them from impulsively buying unnecessary items. This theme of the importance

of having a list pushed us to design communal list functionality for our app. Having a tool that saves this list is also crucial so you can have the list readily available.

6. Answers to Task Analysis Questions

A) Who is going to use the design?

- a) Target Groups
 - College students
 - Young urban professionals
- b) Background
 - Different ethnic and financial backgrounds
 - Living in an urban or suburban setting
 - Living with roommates of usually the same age group
 - Accustomed to mobile technologies (i.e. smartphones)
- c) Skills
 - Varies on profession and education
 - Young people tend to be better at navigating new technology than older people
 - Most people have a grocery shopping process that works in the sense that they can get their groceries and not have issues getting food.
- d) Habits
 - They go grocery shopping at the same stores
 - Share certain groceries with roommates

B) What tasks do they now perform?

- a) Before Shopping
 - Make a grocery list, determine who will pay for each item on an item-by-item basis
 - Set a budget, may edit the list to fit budget
 - Decide where they will shop and how they will get to the store
- b) During Shopping
 - Navigate store looking for items on the list
 - Pull items off the shelves and into their cart/basket
 - Head to the check-out line and pay for groceries
- c) After Shopping
 - Go back to house/apartment
 - Put groceries away
 - Square away grocery debts, roommates reimburse whoever paid for groceries at the store

C) What tasks are desired?

- a) Thorough list creation
 - Every roommate gets input on shopping list.
- b) Price awareness
 - Some shoppers are not aware of appropriate prices for certain items and may wish to be informed of a better deal if there is one.

- c) Painless reimbursement platform
 - The buyer of groceries at the store has to pursue roommates for debts, possibly creating tension and awkward conversation.
 - Some households choose alternative forms of compensation

D) How are the tasks learned?

- a) Grocery shopping is a common practice and most people learn grocery shopping habits over time.
- b) Depending on the living situation, roommates may choose to specify a system for grocery shopping (e.g. 1 person does all the shopping on a scheduled date; everyone then pays the shopper) or rely on spontaneous processes that don't have glaring downsides (e.g. 1 person is going shopping that day; she asks her roommate if she needs anything)

E) Where are the tasks performed?

- a) At home (house/apartment/dorm)
- b) At the grocery store.
 - Usually a preference to one grocery store due to selection, location, ease of access

F) What is the relationship between the person and data?

- a) Shoppers add grocery items to the grocery list, may specify who added the item
- b) Shoppers get receipts after each trip to the store
- c) Used in combination, roommates can calculate how much money is owed to the buyer

G) What other tools does the person have?

- a) Grocery lists, electronic or paper
- b) Cell phones and smartphones for communication between roommates

H) How do people communicate with each other?

- a) Cell-phones (SMS or MMS)
- b) Facebook messages

I) How often are the tasks performed?

- a) Depends on the living situation
 - factors include: proximity to store, financial situation, grocery needs
- b) For shopping, usually around once per week or twice per month
- c) For list creating, gradual throughout time in between shopping trips
- d) Reimbursement happens after every shopping trip.

J) What are the time constraints on the tasks?

- a) No strictly definable time constraints
- b) Prefer to be fast and easy as students and professionals are busy people.

K) What happens when things go wrong?

- a) Buyers don't get paid on time, creating relationship tension between roommates
- b) Wrong items are bought, producing food waste.
- c) Difficult to find an item, resulting in lost time searching
- d) Lists aren't kept updated, roommates don't get the groceries they need

7. Proposed Design Sketches - "3x4"

Design 1

The theme of this design is helping the shopper chronologically progress through the steps of the shopping trip. This is motivated by the fact that planning for a trip is fragmented and requires using more tools in more places than just a shopping list. The tasks handled include creating the list, going to the store, paying for groceries, and reimbursement. The design includes visibility of household lists, including tags and history to eliminate confusion in creating the communal shopping list. Intermediate steps such as getting to the store and reimbursement steps at the end of the trip are organized and guided by the application. The data flow is tracked to fill in knowledge gaps at each stage, such as populating reimbursement items with items from the shopping list creation. Other notable features include price awareness and promotions that give shoppers incentive to go plan a trip.

Figure 1-A: Sale Notification and List Creation

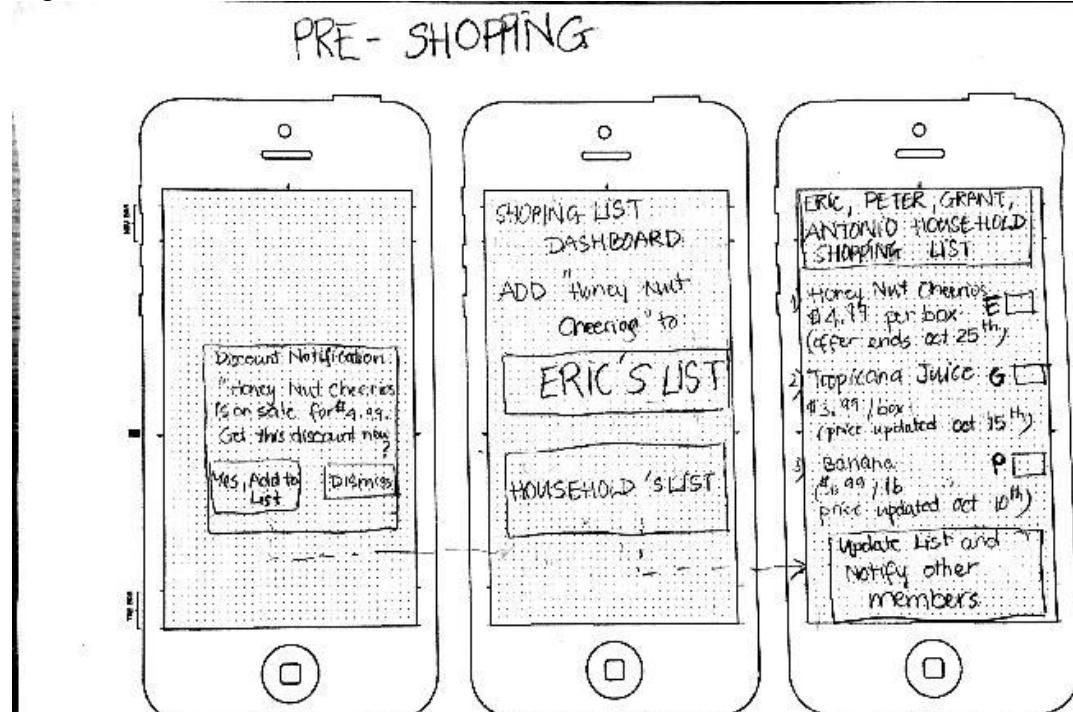


Figure 1-B: Choosing a Transportation Method

GO TO GROCERY STORE

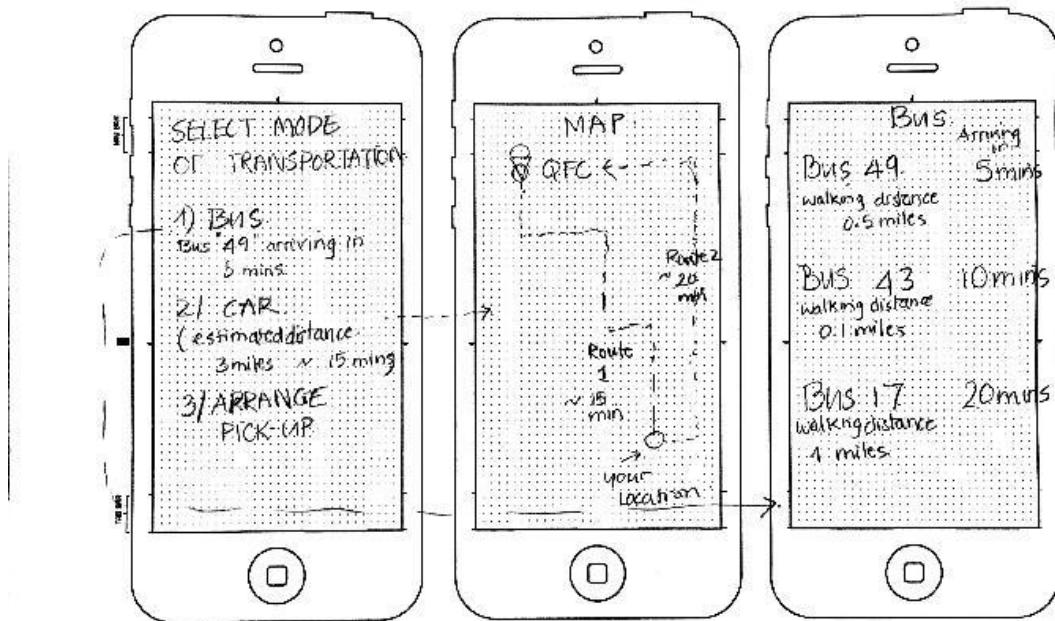


Figure 1-C: Payment

PAYING FOR GROCERY

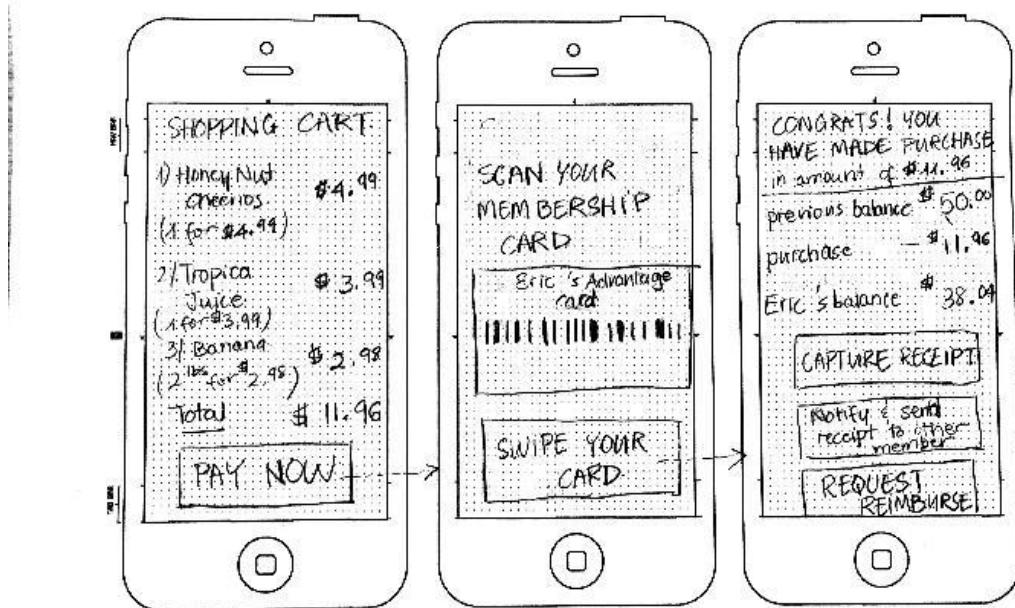
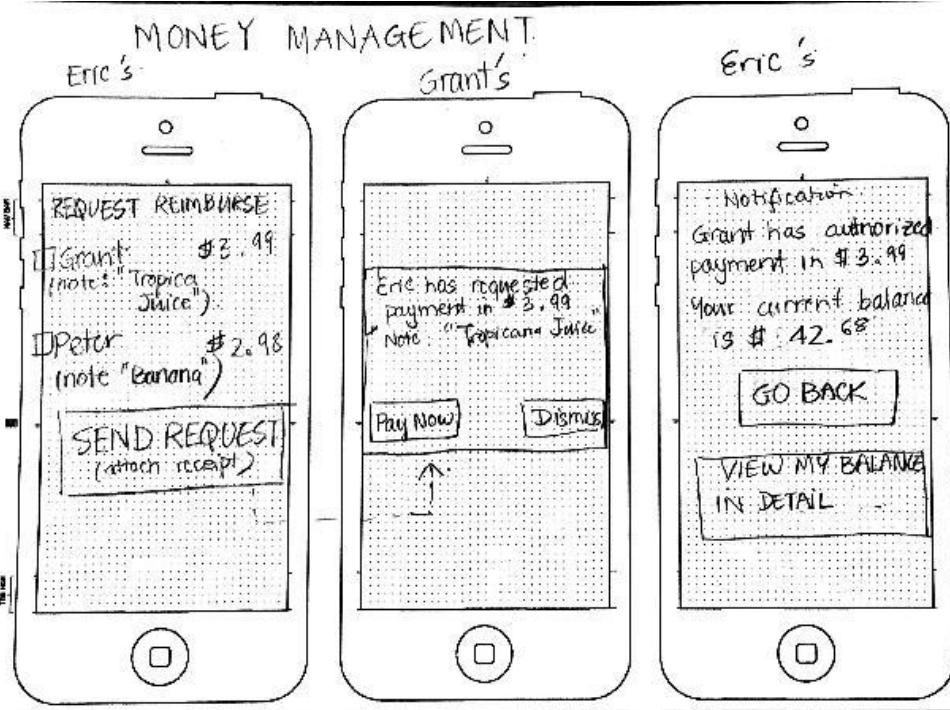


Figure 1-D: Money Management



Design 2

The theme of this design is improving household communication to reduce shopping confusion. This is motivated by the fact that two household shoppers can purchase the same item on the way home because they do not communicate when they are at the store. The tasks handled include noticing what's running out, shopping at the store, storing items, and reimbursement. In noticing what's running out, the design allows a person to communicate with the house to check for items running low and add to the group shopping list before he or she goes out to shop. In shopping at the grocery store, the design allows communication to household members to ask for any suggested items to prevent a future unnecessary shopping trip. In reimbursement, the design allows for objective communication for reimbursement payments in the house to reduce conflicts in the house over money. Other notable features include labels for storing and helping housemates locate purchased groceries.

Figure 2-A: Figuring out what's needed

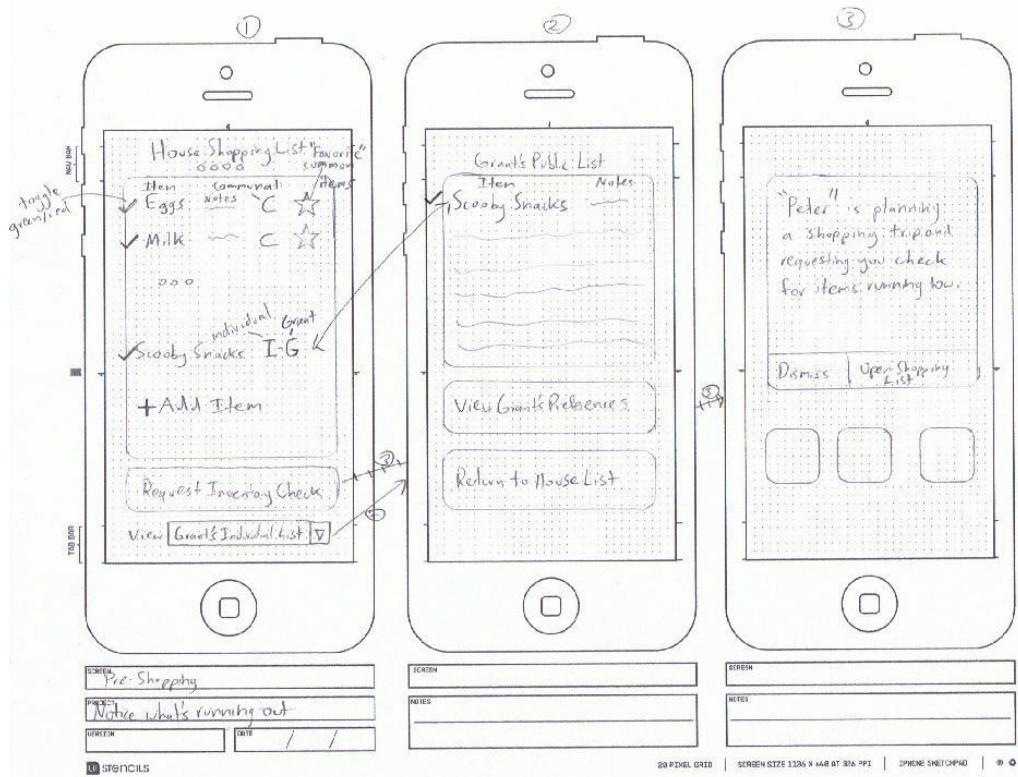


Figure 2-B: Shopping At The Grocery Store

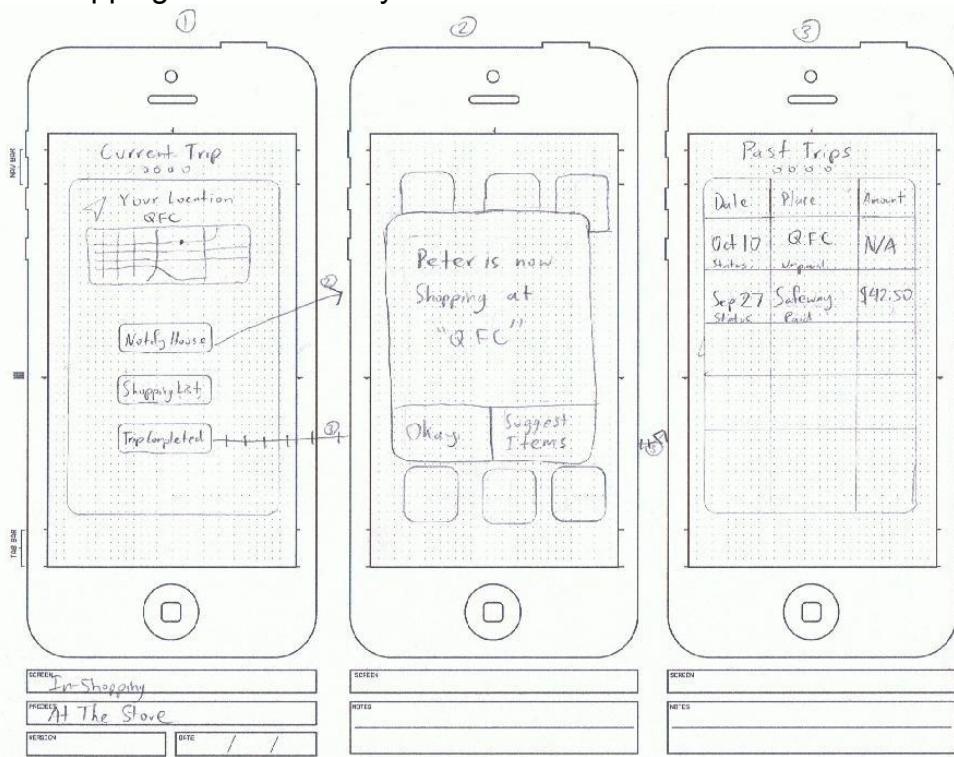


Figure 2-C: Storing Groceries

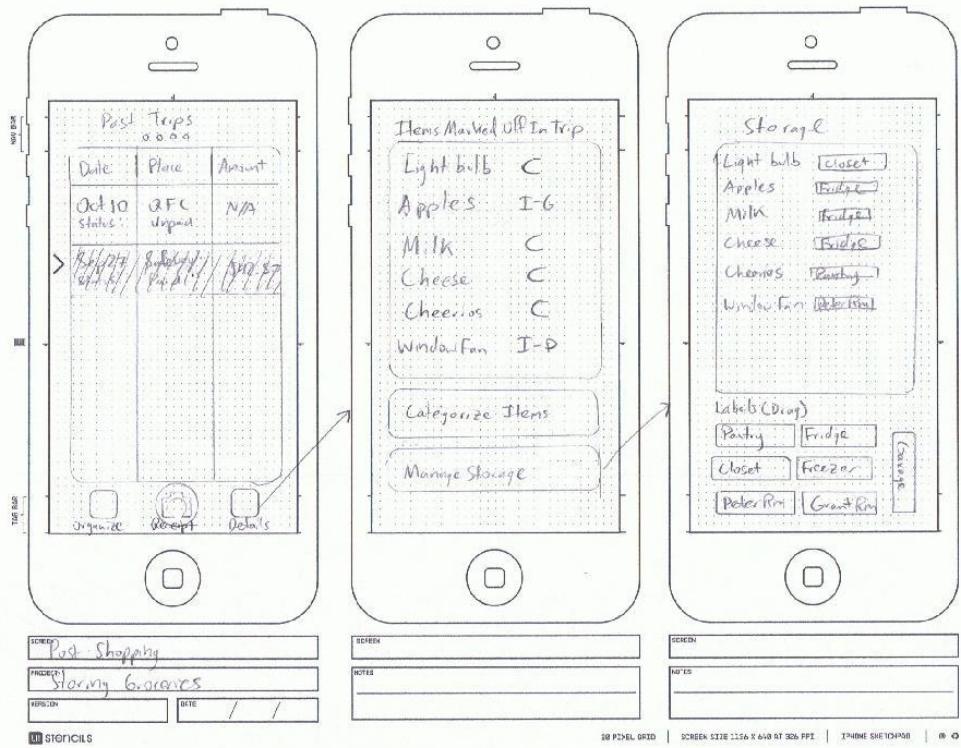
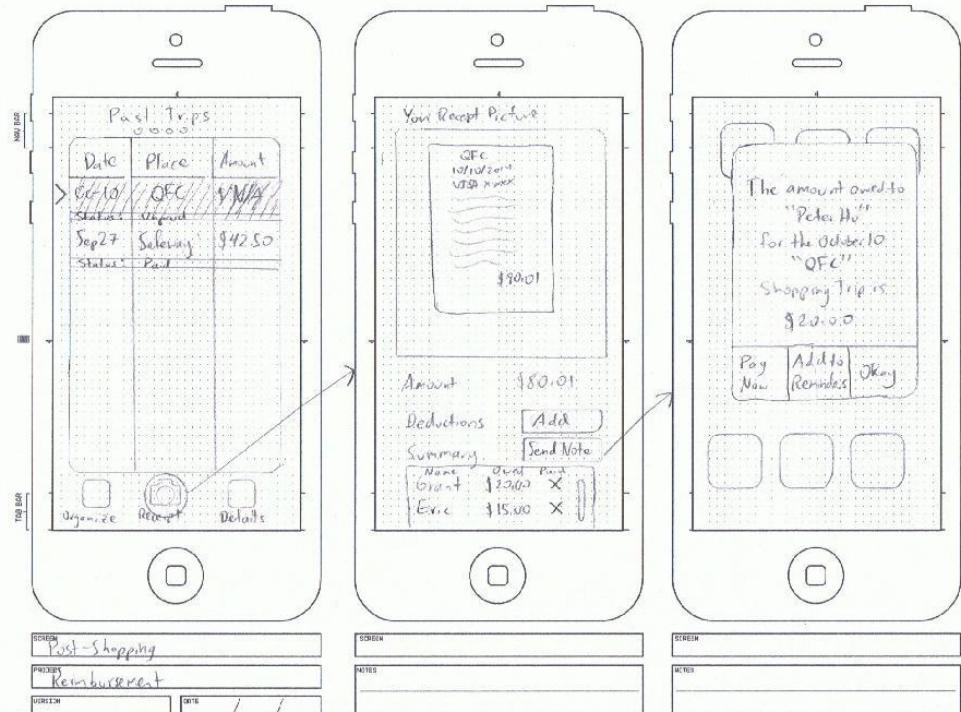


Figure 2-D: Managing Money/Reimbursement



Design 3

The theme of this design is using active hardware tracking of household inventory to automate discovery of missing groceries. This is motivated by the fact that shoppers make unnecessary trips to the grocery store because they identify items that are running low on a sequential and circumstantial basis. The tasks handled include detecting needed items, creating the list, grocery assignment, and storing groceries. Having active tracking of what's running out tells shoppers what they can safely include in the shopping list and buy in one batch. Especially for households where certain people assume the shopping burden, reducing the burden is a point of emphasis. Other notable features include an ambiguous shopping list with items that can be claimed for purchase on a first come first serve basis and storage assistance utilizing the hardware implemented for inventory detection.

Figure 3-A: Sensors and Listing

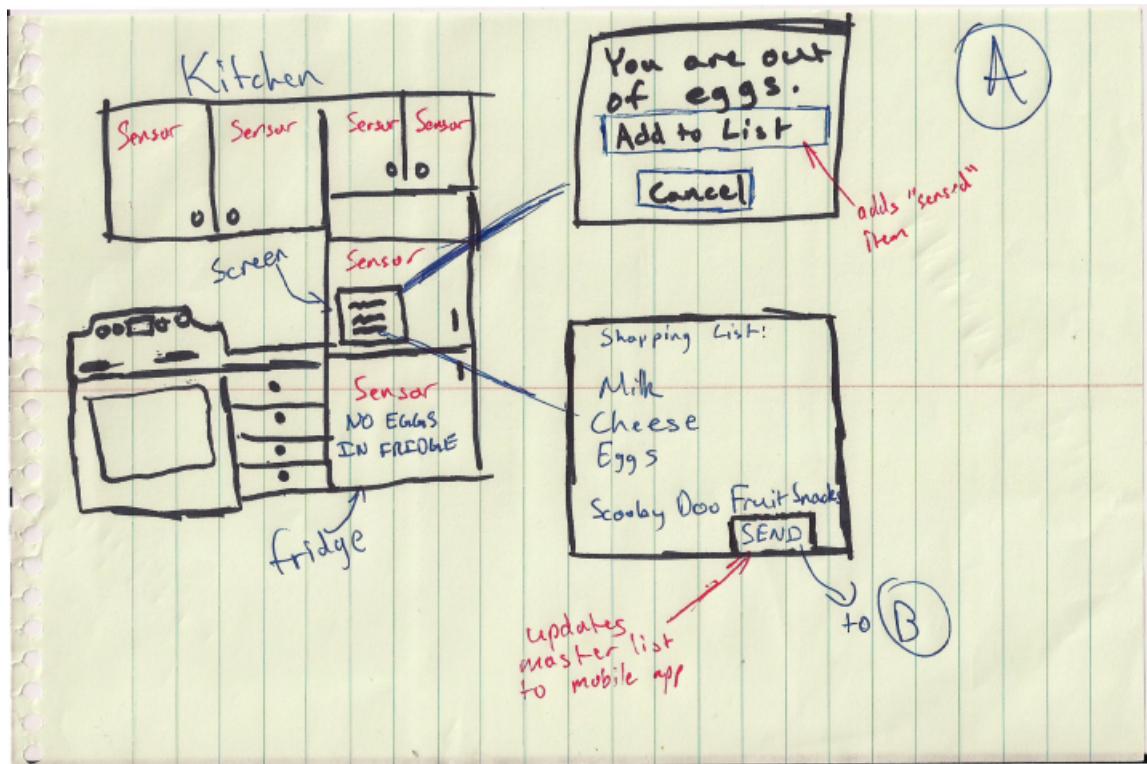


Figure 3-B: Task Assignment

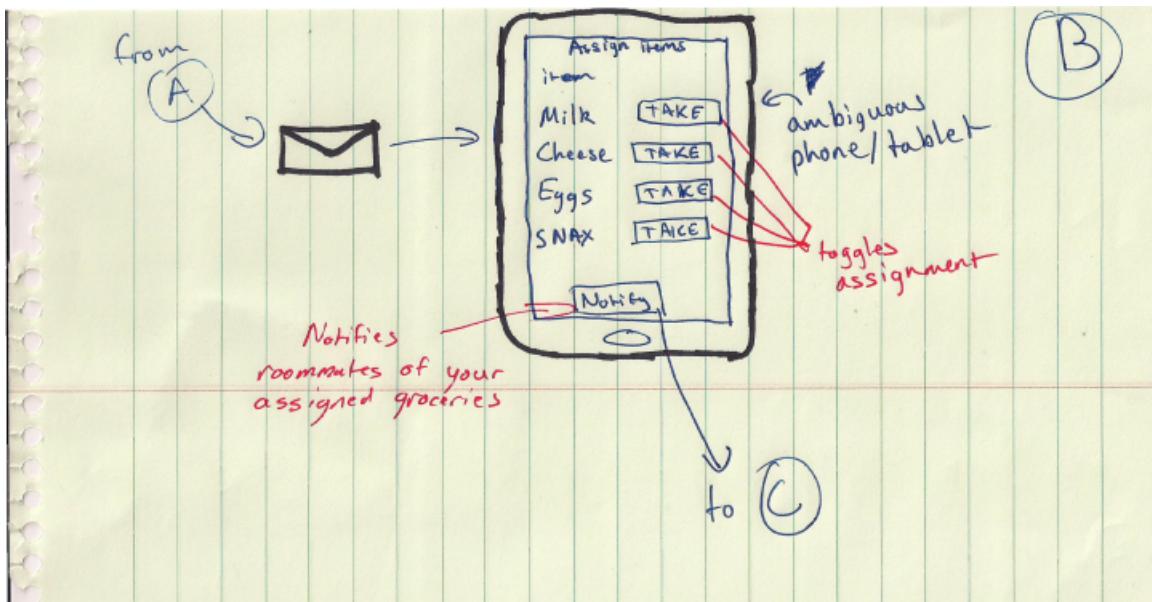
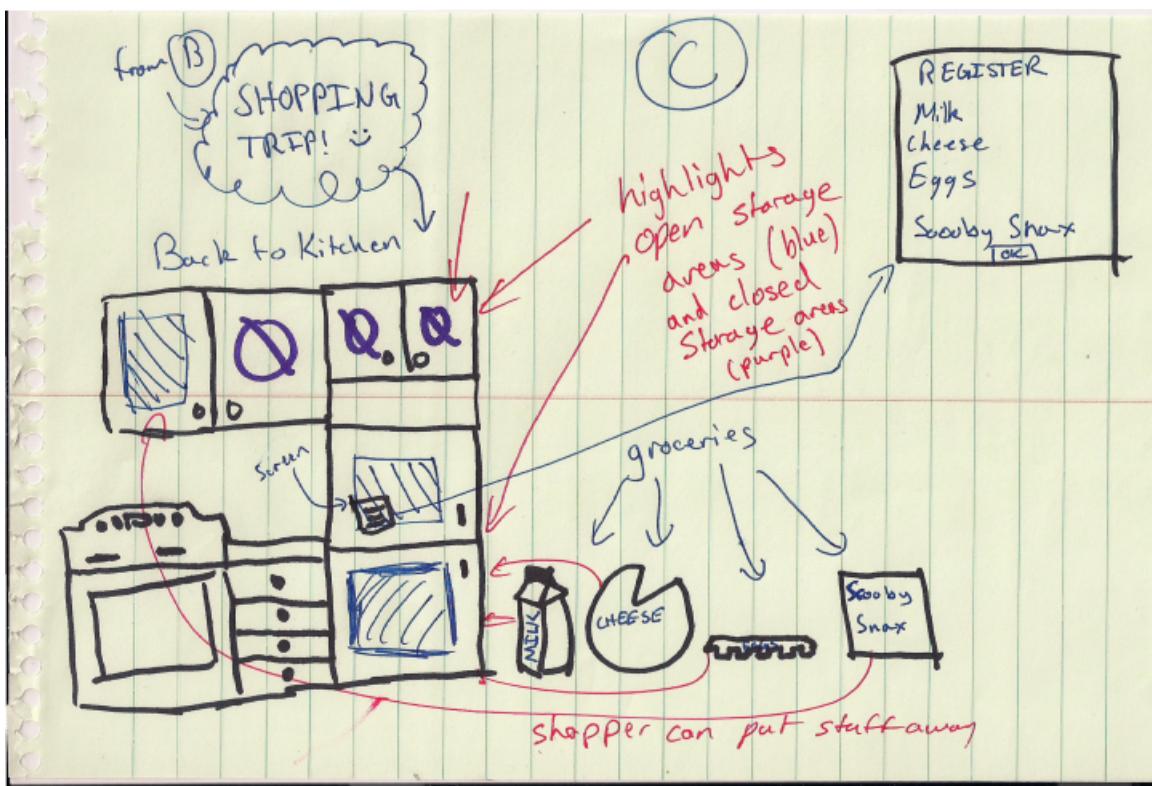


Figure 3-C: Storage



The two tasks our selected design covers are building the list and accounting for the list. According to our contextual inquiries, intermediate tasks such as going to the store and shopping at the store are not what shoppers are struggling with. In contrast, our contextual inquiries with college roommates revealed difficulty in the creation of the shopping list as well as in the reimbursement stage. The theme of our design is making reimbursements easier by utilizing the recent activity related to the house-shopping list. This design evolved from a combination of features of our three initial designs. People know what they are paying for because they posted their own items to the list in the planning stage. Accounting for item pricing is simple because items are associated with receipt information. This design is well suited for college students and young professionals. The ease of use of our design does not decrease with a large number of house members, a characteristic of young people households. Compared with other potential groups such as families, young housemates experience more awkwardness and tensions reimbursing each other for groceries. Our design aims to reduce conflicts in household interactions by providing a conflict-free and efficient accounting system. Our design gives us a platform to handle future tasks such as making internal payments, bartering for reimbursement, integrating other household bills with shopping reimbursement, and scheduling shopping duty rotations. These tasks have been highlighted by our contextual inquiry candidates as potential tasks that we could pursue in the future.

8. Written Scenario “1x2”

Four students live together in an apartment near their university. They have all downloaded the application that implements our design and connected to each other in the application. Throughout the week, their various food stores start to run out due to normal consumption. When a roommate feels that more of a certain grocery needs to be bought, he posts that item in the app to a grocery list of his choosing (Story Board A1). Grocery lists vary based on who will be paying for the items on the list. In this situation, the roommate puts the item on the “master list”, the list where everyone is financially responsible for the items on it (Story Board A2 & A3). Another roommate has noticed that he is out of a grocery that only he uses. In response to this, he uses the app to put that item on his personal list, the list containing items only he is responsible for.

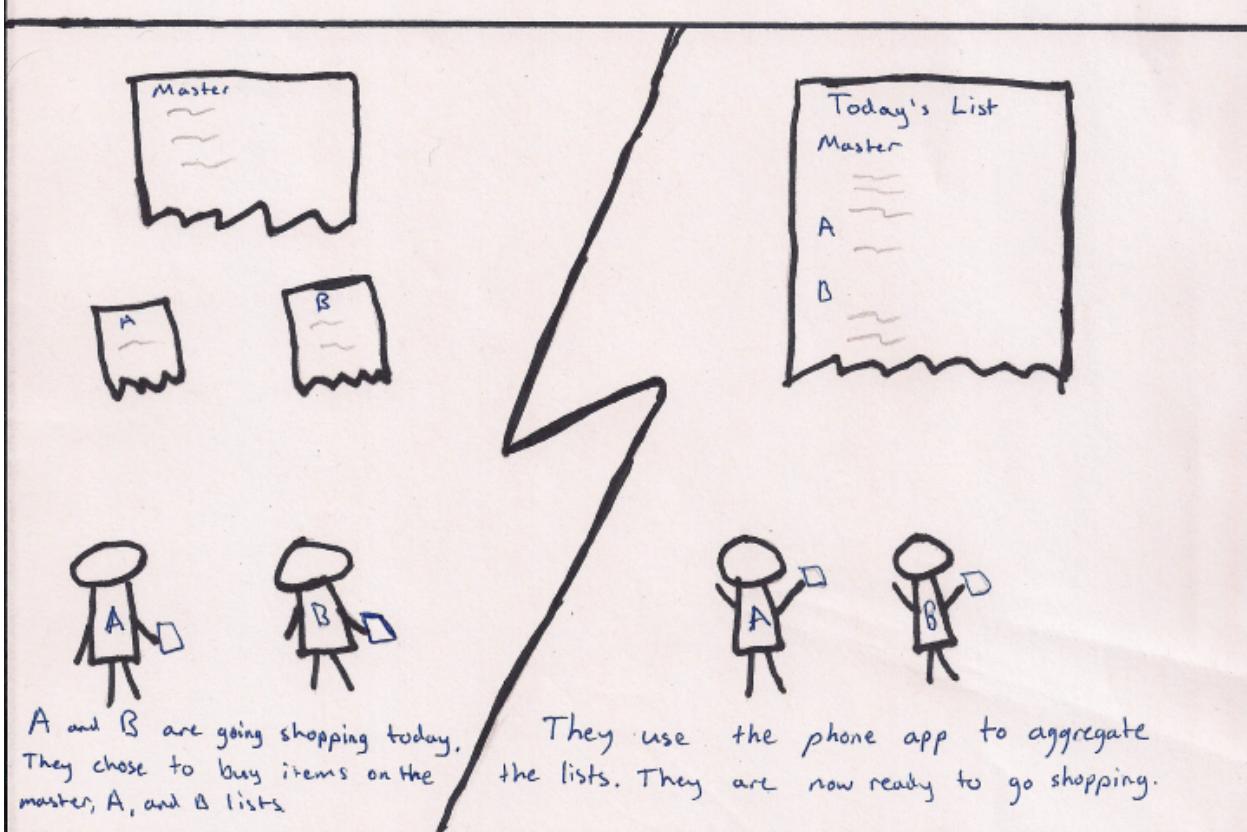
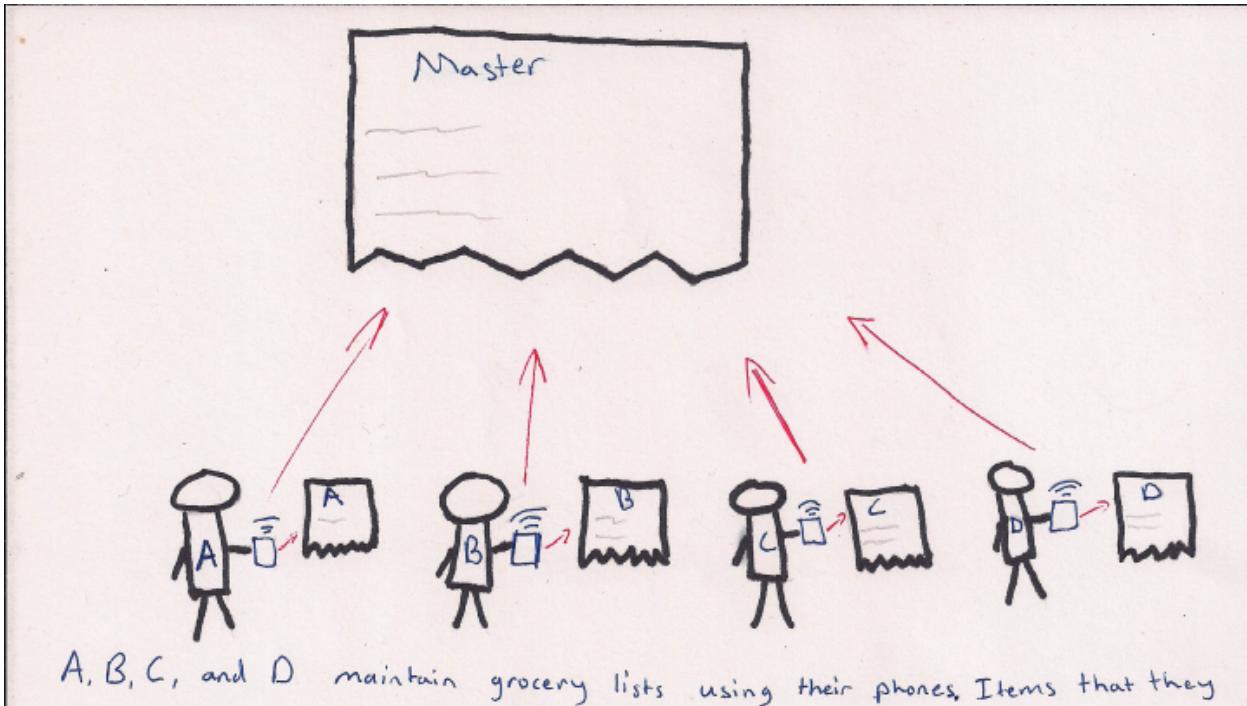
Later on in the week, two of the four roommates decide to go grocery shopping. They use our app to select which lists they will purchase at the store that day. In this scenario, they pick the “master list” and their personal lists. The app will then combine the separate lists into one list that the two roommates can use at the grocery store.

After the grocery shopping is completed and the groceries are paid for at the store, the roommates need to square all the debts associated with that shopping instance(Story Board B1) . One roommate took on all the cash burden of paying for the groceries at the store and his roommates must pay him back for it. The app has methods of inputting the grocery receipt data. This data can now be used in conjunction with the list data from the beginning to calculate the amount that each roommate owes the buyer. In this scenario, everyone owes the buyer something as he purchased items from the “master list” that everyone has agreed to pay for.

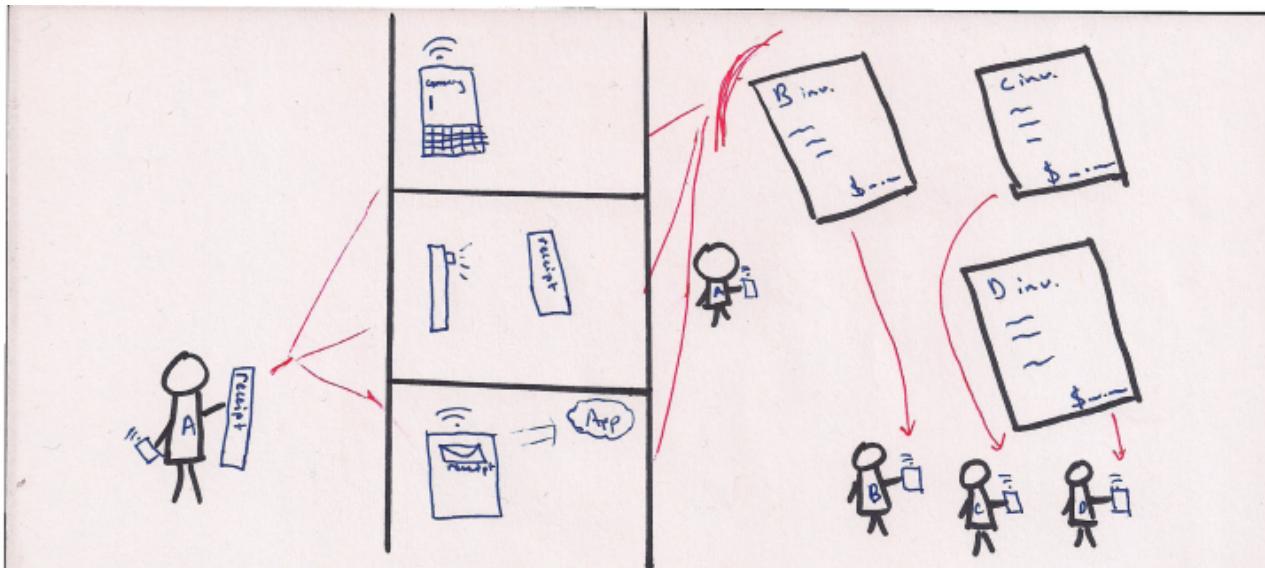
The app will then notify the roommates of their debts and provide them with options for reimbursement. (Story Board B2). As different roommates have different financial situations, direct reimbursement when the buyer requests it may not be possible. The app allows roommates to construct a reimbursement plan that works for them, reducing some of the tension and awkwardness involved (Story Board B3). Options may include, a direct payment at debtors choosing, choosing a date that the lender can safely collect a payment, bartering other goods and services to square away grocery debt (e.g. “we’re going out to eat tomorrow, I’ll buy your dinner”), or setting a debt level that can automatically be paid. Other payment options may arise further along as we develop the product as more opportunities for reducing tension reveal themselves. Going back to our example, each of the roommates decide on a plan to pay back the buyer and the buyer approves the plans or uses the app to work out a plan that works for him and his roommate.

9. Storyboards of the design

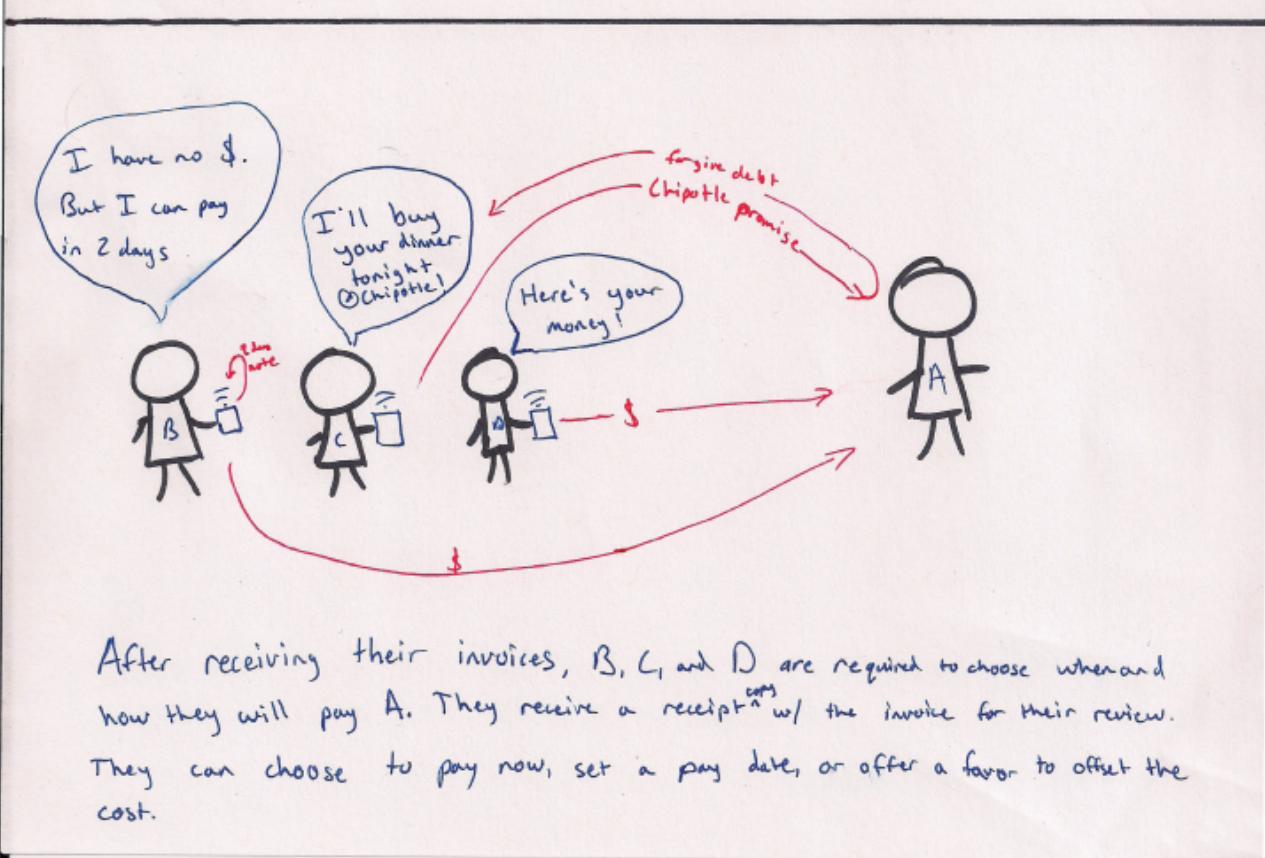
Story Board A



Story Board B



A pays for the groceries. She inputs the receipt into the app, either manually, by camera, or if available, by e-mail. The app uses the receipt and the list data to create invoices for his/her roommates.



After receiving their invoices, B, C, and D are required to choose when and how they will pay A. They receive a receipt^{copy} w/ the invoice for their review. They can choose to pay now, set a pay date, or offer a favor to offset the cost.