

SnapCart: The Accessible Shopping Experience

Team

John Feltrup - Research, Sketching, Writing, Ideas

Lior Levy - Research, Sketching, Writing, Ideas

Jed Chen - Research, Sketching, Writing, Ideas

Problem and Solution Overview

There are 1.6 million wheelchair users living in the USA, meaning approximately 1 in every 200 people require the use of a wheelchair. One of the difficulties that this community faces is grocery shopping. For wheelchair users, regular shopping trips are an inconvenience and time consuming. That being said, there are still users who want to be able to enjoy the experience of shopping at a physical store. That is why we propose the use of our app SnapCart. Our app will allow users to keep track of items they want to buy in a virtual shopping cart as they move through the store. They can add items to their cart by taking a picture of the item or by searching that item on the app. When finished shopping, the user can then pay and checkout through the app. At the exit, an employee will be waiting for the shopper with their items. Primarily, the app allows wheelchair users to shop in a physical store independently.

Design Research Goals, Stakeholders, and Participants

Our main goal for the design research was to understand what the experience of shopping is like as a wheelchair user. Our primary stakeholders, and the people we are designing for, are wheelchair users. These are users who have the ability to go shopping, and want to go to physical stores. Additional stakeholders include people shopping in the store as well as the employees within the store, as solutions provided to wheelchair users will also affect the shopping experience of the regular shopper and potentially the role of the employees in the store.

Our research to explore this problem had two primary parts. The first part was observing shoppers in stores, and compiling observations. We went to several large grocery stores in the area at different times of day. We wanted to map the behavior of how people normally shop, and identify particular areas that would be troublesome for the wheelchair user. We needed to understand the environment we would be designing in. This was important research to conduct, because initially none of us knew any wheelchair users, so we needed a place to start our research while we worked on finding participants.

The second part of our research was learning about the shopping experience from participants who were wheelchair users. The best way to understand where problems exist for our stakeholders is by asking them directly. We had two wheelchair participants who lived around the area. Both of them have been wheelchair users for some time. For our first participant, we interviewed her and heard her thoughts and pain points about the shopping experience. For our second participant, we followed her shopping and learned about the issues that get in the way of her shopping experience. This feedback was vital, as seeing the difficulties that this participant faced gave us a good idea of the tasks we could tackle and try to find solutions for.

Design Research Results and Themes

Carrying items

One of the biggest issues that seem to make shopping difficult for wheelchair users is the difficulty in carrying items, both light and heavy. From two of our participants, we heard that they carry baskets in their laps, which limits the amount of space they have for items. Their space is even more limited if they have personal items like a purse that they also place in the basket. Using a cart is not very realistic, as it is hard to maneuver both the cart and wheelchair without bumping into things within the grocery store. This is definitely a design space that we could explore more.

Grabbing items from shelves

Being a wheelchair user limits the ability to reach things that are high up. In the case of a wheelchair user shopping alone, they are forced to ask someone nearby for help. While most people are helpful, this could be troublesome if no one else is around. Another place that this could be problematic we noticed from our observations is in the freezer section. Grabbing items there require holding the door open, and in a wheelchair where mobility is difficult it is impossible to reach some items. In other times, wheelchair users might also need to grab heavier items, which is harder to do with limited movement.

Navigating the store

Moving through the aisles of a grocery store can be a non-trivial task in a wheelchair. Based on our observations of stores, a single cart left in a aisle would make moving through that aisle very difficult. Leaving shopping carts behind, if only for a little bit, is something that most shoppers do. This reduces the accessibility of the store for wheelchair users, and makes them have to wait or find another, longer way around.

Task Analysis

1. *Who is going to use the design?*

Our design is focused on wheelchair users that go grocery shopping. Though we found that there are some wheelchair users that avoid shopping, we hope that our design will help them feel more comfortable when doing so. Furthermore, we hope that our design will improve the shopping experience for all the customers inside the store.

2. *What tasks do they now perform?*

From our research, we found a few main tasks that needed to be done for grocery shopping: navigation through the store, grabbing items, and carrying items. In terms of navigation, many wheelchair users have trouble moving around the aisles. To make it easier, they do not use shopping carts but rather carry items in a basket on their lap. Grabbing items on high shelves is impossible for many wheelchair users, so they either shop with friends or ask a nearby shopper for assistance. Carrying items has also proven to be troublesome, and many wheelchair users have to account for the weight of the items and restrict the amount that they shop due to the limited space on their lap.

3. *What tasks are desired?*

To remove any concerns about grocery shopping, we wish to make these tasks more accessible for wheelchair users. We would like for wheelchair users to have an easier time finding the items that they need as well as a simple way to retrieve the said items to buy them.

4. *How are the tasks learned?*

Most of the tasks and workarounds are learned through experience. By going to the grocery store and encountering difficulties, wheelchair users find solutions to these problems by doing things such as not using shopping carts and asking others for help.

5. *Where are the tasks performed?*

The tasks will be performed within grocery stores, as this is the environment that we are focusing on.

6. *What is the relationship between person and data?*

Data about the user would likely not be stored in our design. However, data about the grocery store such as the layout and location of items would be shared among all users.

7. *What other tools does the person have?*

Currently, some wheelchair users shop with other people to make things easier. If they were to shop by themselves, using a shopping list helps shopping go faster. For difficult-to-reach items, asking other shoppers for assistance. Also, one of our participants brought their own bin to put items in. A alternative solution to grocery shopping that wheelchair users consider is doing it online.

8. *How do people communicate with each other?*

Communication is vital for wheelchair users shopping by themselves; they rely on other shoppers to help them retrieve items off high shelves. When shopping with others, setting up a time to go shopping and the entire shopping process becomes social.

9. *What are the time constraints on the tasks?*

Though there is no set time constraint on the tasks (given that they have nothing planned afterwards), it is preferable that the tasks be done in as short of a time as possible, since that is part of the purpose of our design.

10. *What happens when things go wrong?*

When things go wrong with our design (e.g. misuse or malfunction), a loss in time would probably be the largest consequence. Afterwards, people may be less inclined to use our design in the future.

Proposed Design Sketches "3x4"

Virtual cart app

An app that would allow users to keep track of items they would like to buy in a virtual shopping cart (Figure 1). They can add items to their cart by scanning the item, or looking it up in the app. They can pay and checkout through the app. An employee would be the one fetching these items and giving them to the user at the end. This allows wheelchair users to shop in a physical store easily.

Virtual cart app

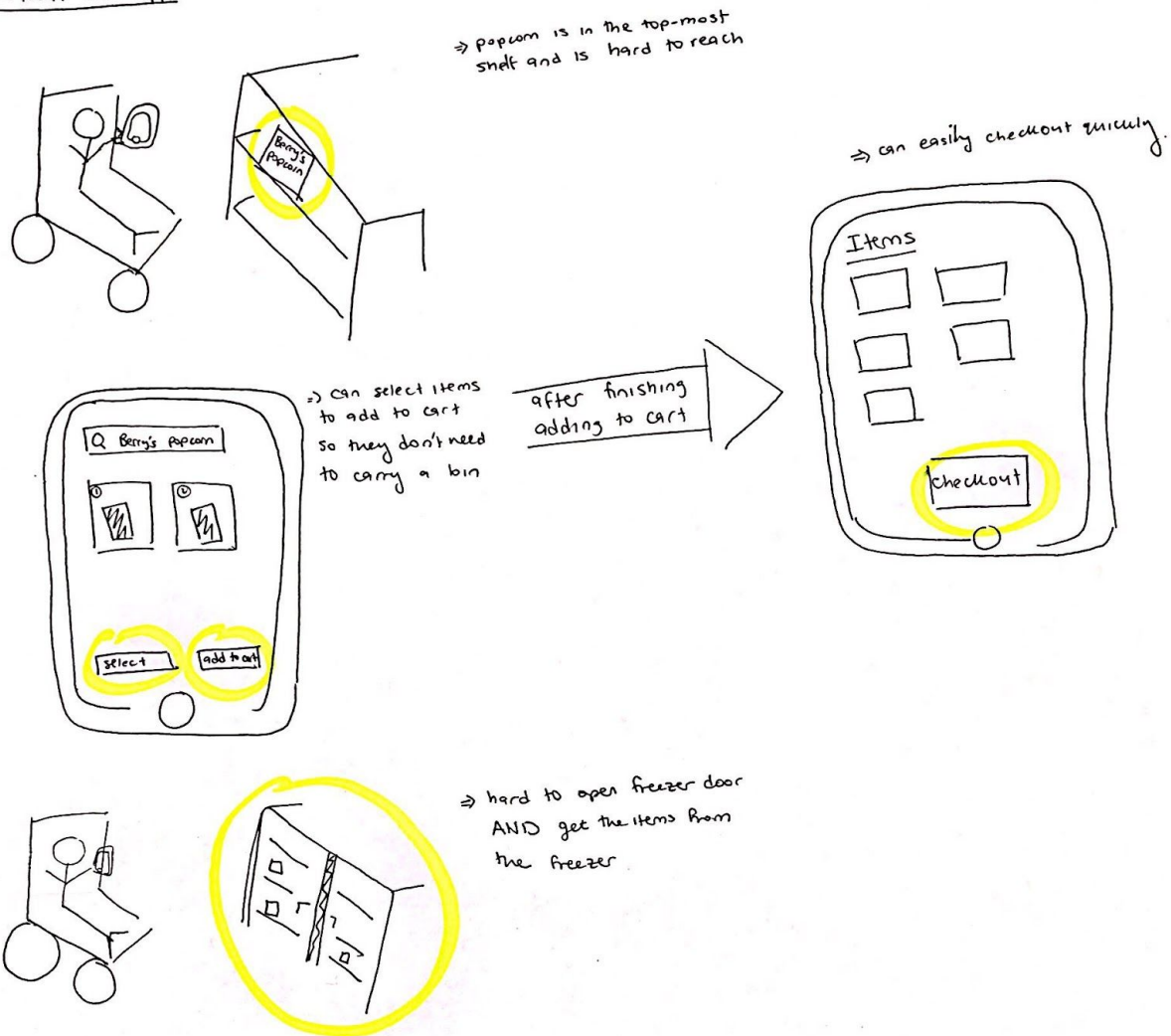


Figure 1: Virtual Cart App Sketch

Robotic carts

Robotic carts would follow shoppers around, and be a place to store a lot of groceries (Figure 2). The users do not need to push the cart since they move automatically, so they do not need to worry about the weight or volume of the items they buy. The carts can tell how close they are to each other and have a layout of the store. The carts scan reposition themselves so that they are not blocking any pathways, and not in anyone's way.

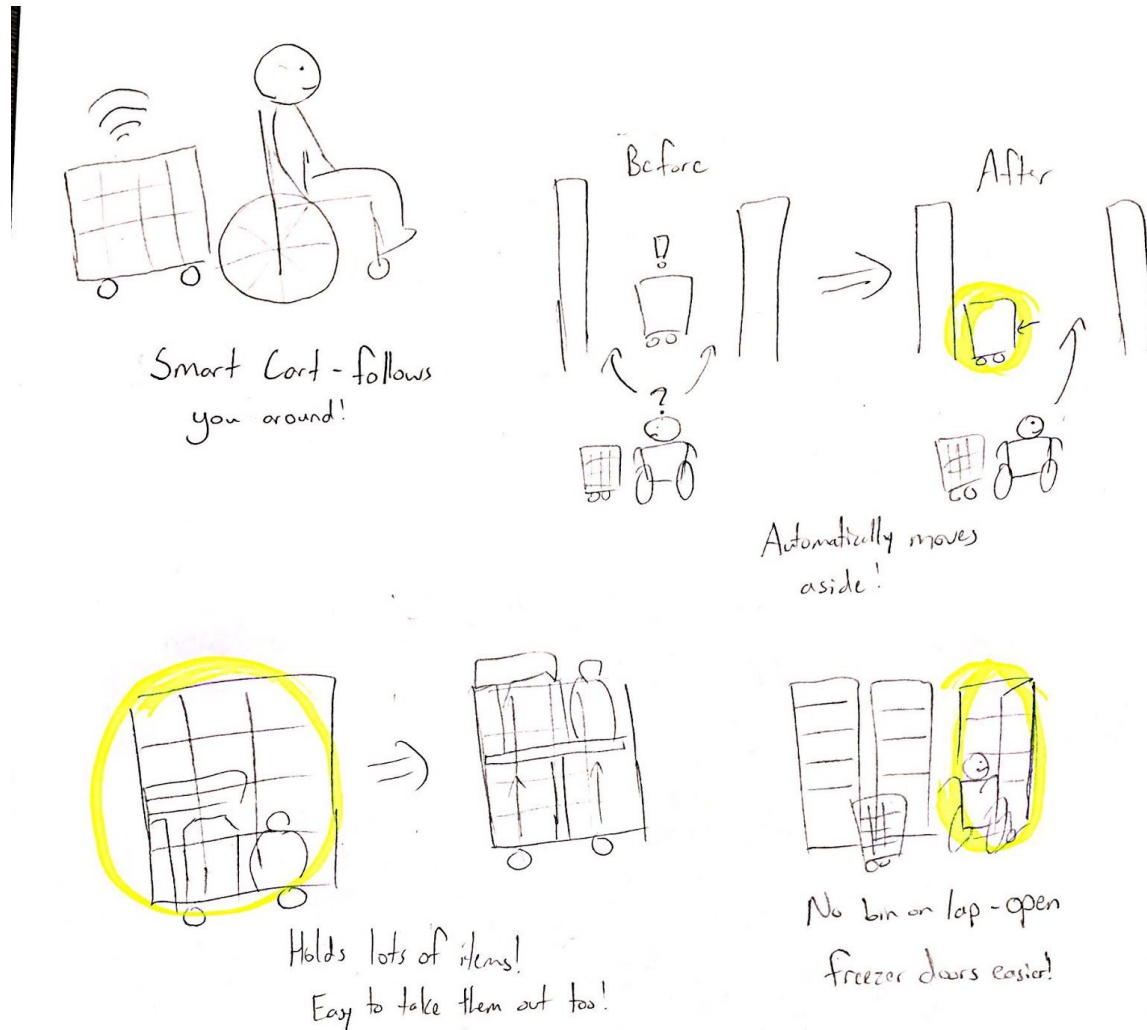


Figure 2: Robotic Carts Sketch

Shopping buddy app

This service would pair up users with other non-wheelchair users in the area who would go shopping with them (Figure 3). They do their shopping together, with the non-wheelchair users helping those in the wheelchair. This way, the wheelchair user would not have as much trouble reaching items or carrying them, since they have someone helping. At the end, the app could offer some small compensation to the shopping buddies willing to help.

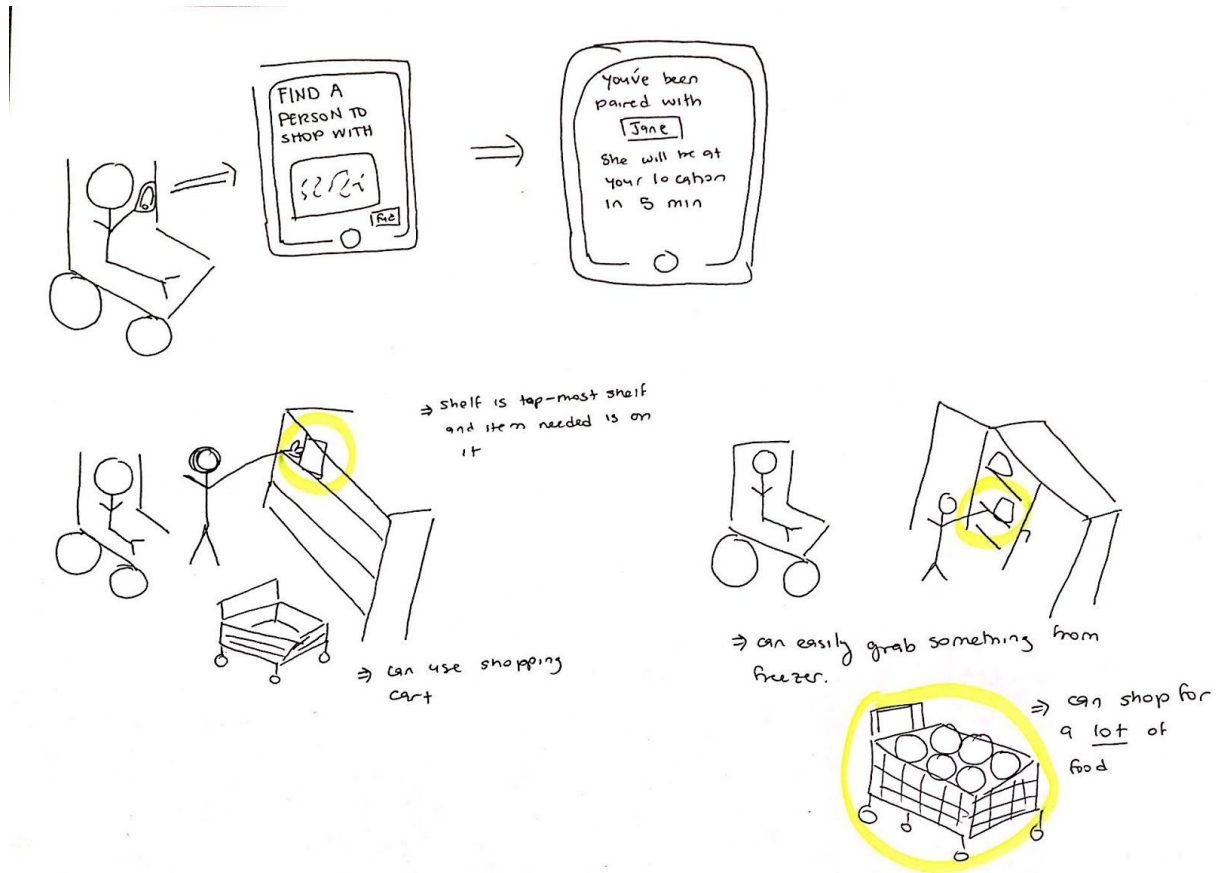


Figure 3: Shopping Buddy Sketch

Design Choice

The design that we chose to advance with is an app that will allow users to keep track of items they want to buy in a virtual shopping cart. They can add items to their cart by scanning or searching the item on the app. The user can then pay and checkout through the app. After checkout, an employee in the store would fetch the items and bag them up. We selected this design because it is the only design out of the others we considered that targeted the difficult tasks that were most commonly seen amongst our participants.

Written Scenarios "1x2" and Storyboard

Scenario 1

In our first scenario (Figure 4), Fred is a wheelchair user at a grocery store. The task we want to complete is adding a starfruit, which is on the top shelf, into his cart. However, Fred has a difficult time doing that since the item is out of reach (Panel 1). With our design, reaching things that are usually difficult to obtain is simple. Using the SnapCart app, Fred can take a picture of the shelf. The app would then identify the purchasable items from that image. Alternatively, Fred can look up the item on the SnapCart app via search. Either way, after Fred finds his desired item, he can add it to his virtual cart (Panel 3) and continue shopping. At the end of his trip, Fred buys all items in his cart. A store employee receives a notification, and Fred's items are delivered to him (Panel 5).

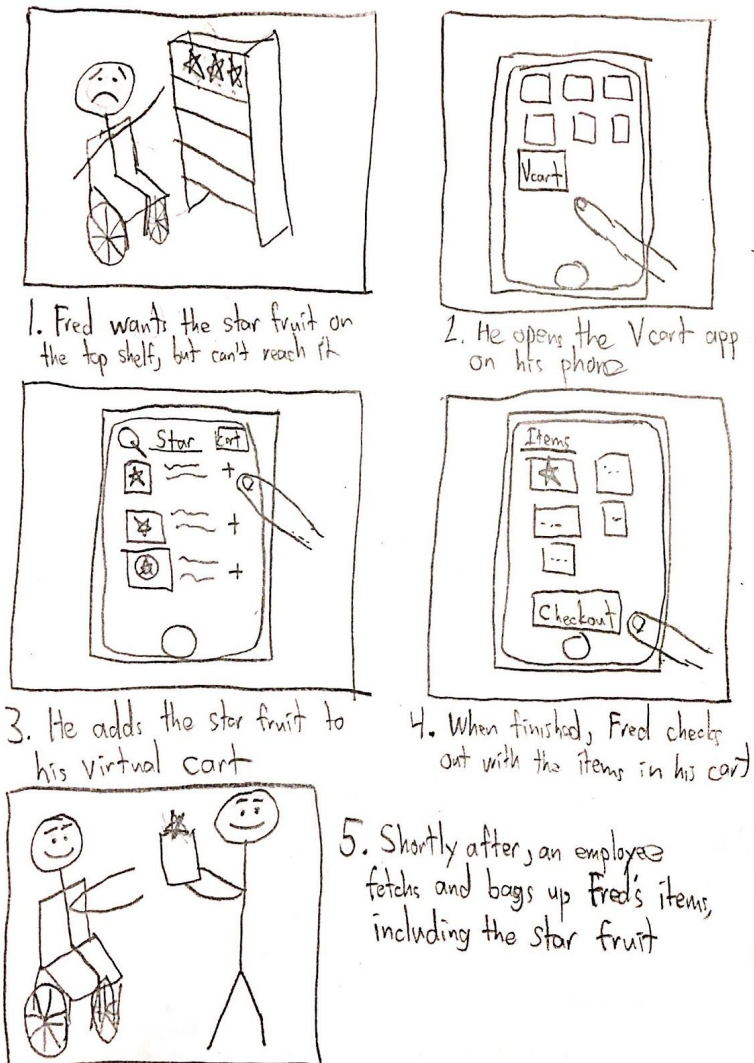


Figure 4: Storyboard Grabbing Item

Scenario 2

In our second scenario (Figure 5), Alex is a wheelchair user that lives with his wife and 2 children. Since his wife is out of town for a week, Alex is face with a task: he must do the shopping for a week in her stead (Panel 1). Preferably, he would want to buy all the food in one trip, but holding that many items in a basket would prove to be difficult due to the limited amount of space on his lap (Panel 3). With the SnapCart app, Alex is able to go around the grocery store and add all the items he wants to add to his cart, without worrying about the physical space it may take up (Panel 4).

Storyboard 2

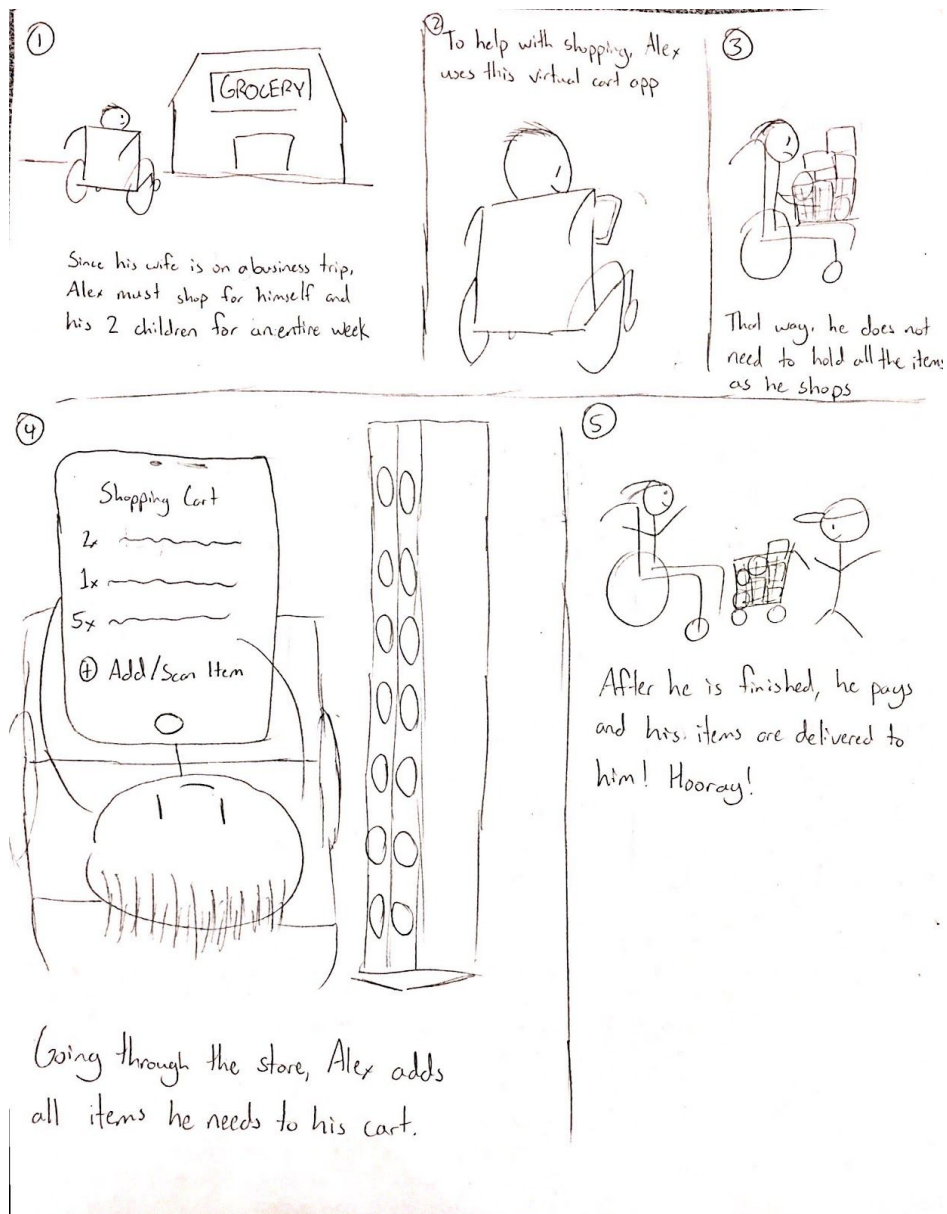


Figure 5: Week's Shopping