

# Process Book

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Bright Futures



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# Introduction

Welcome to my process book. This document will describe the design process our group, Bright Futures, and I went through to complete our real-time, crowd-sourced indoor navigation application. Before hopping into the design of this app, we had some constraints to consider: it must be mobile, provide users with information about where they are in a building, and get information relative to their current location. The overall goal was to create a sort of “digital breadcrumbs” mobile app for users which may or may not have disabilities.

This project primarily consisted of a lot of group work, but each of our individual contributions are truly what made our finished product the best that it could be. Figures [1 and 2] on the left show an example of our progress as a group. Throughout this book I would like to describe our group’s process and approach to each step in the design process, and then reflect on my personal contributions and key take-aways. Finally I will discuss our final working prototype and reflect on the entire design process as a whole.

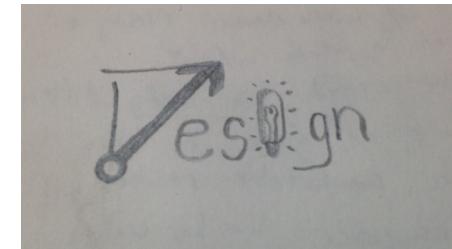
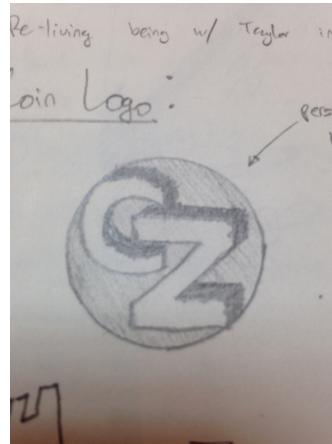


Figure [1] My personal logo followed by our initial group logo



Figure [2] Bright Futures final logo

## Design Approach

Our group's design approach was Ability-Based Design. This approach is centered around the idea that the designer should base their design choices around a user's abilities rather than their disabilities. The seven principles of Ability-Based Design are ability, accountability, adaption, transparency, performance, context, and commodity. Throughout the quarter we attempted to come up with our major design choices with rationales centered around these principles. Our expert user, who I will introduce momentarily, was also a huge proponent of Ability-Based Design and encouraged us every step of the way to abide to these principles. Not only was our expert user an advocate for our design approach, but so was I.

The first two principles, ability and accountability, are required principles that ensure that this design process is abided by, as well as principles which I kept at the front of my mind throughout the project. When possible, I would try to mention the other recommended principles such as adaption and transparency so that our project could better exemplify our design approach. In the end, this was not too difficult to implement because of our group's initial establishment of the fact that we wanted to focus on designing for all of our users, rather than trying to design an app for a very specific, able user group. I think that our design approach was actually the factor that guided the majority of our unique design choices of our app.



## Needs Assessment

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The first part of our needs assessment phase of the project started with the interview of our expert user, George. George is an enthusiastic middle aged man with a passion for helping other people with similar disabilities as himself. Being blind, George always interacts with his iPhone using Voiceover, an accessibility feature which he loves and simply could not stop teaching us about. George was very emphatic that although we should try to design the best app we can, we should not try to compete with already existing apps. He loved our design approach and thought that it perfectly exemplified his mantra of designing an app for everyone, “a universal app,” as he called it. Since George himself is blind, we wanted to appeal to his ability group the most, but it was also very important to us to keep all user groups and different ability spectrums in mind as we moved forward. George’s enthusiasm promoted us to make ability-based design our first priority in this project, and guided a lot of our design choices.



Our first few interviews with George were very successful. We got a lot of insight into his day to day interactions with his mobile device and how best we could uphold those methods of interaction in our design. Our very first interview with George had its faults. We were not sure exactly what kinds of questions we should be asking because we did not know what our goal was going into the interview. This is one of the important concepts of a needs assessment, as I later realized, so after the first interview, we started to come up with goals for specific expert user sessions. Our second interview with George was the most pivotal in this phase of the design process and needs assessment phase of the project. I was generally the leader of these interviews because I felt I was best at communicating our questions and queries with George while still maintaining a polite conversation. My ability to manage the timeliness of the interview helped us receive the data we needed from specific interviews. This data included important preferences to include in our settings such as vibration, tones, shaking of the device and the idea that a user should be able to use our app single-handedly. This was because a lot of blind users navigate with the help of a guide dog who they need to control with a free hand. This data came from our question, “What abilities do you have that you believe your device and applications do not take advantage of?” This question further demonstrates how we kept our design approach very prevalent in our design process.

## Conceptual Model

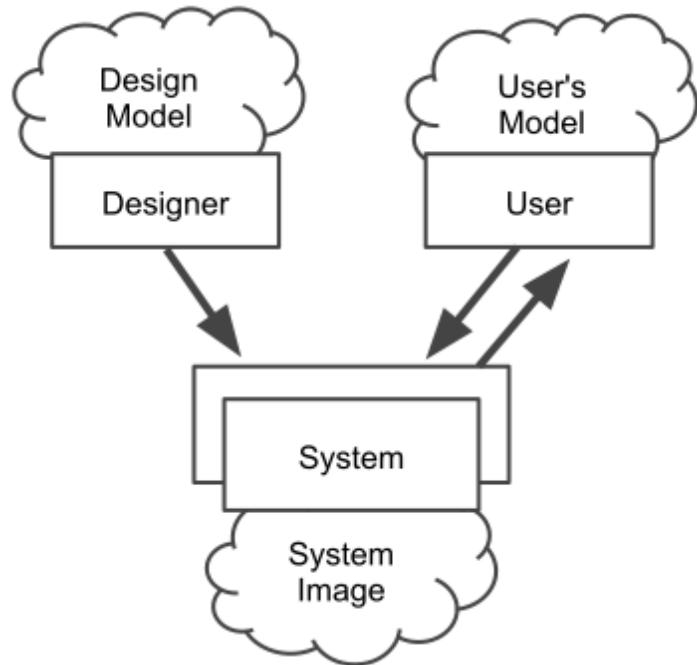


Figure [3] “A Conceptual Model is a highly simplified explanation of how something works” - Don Norman

### Our Model

The main stakeholders of Bright Future’s project are people who struggle when navigating indoors, both those with disabilities and those who are able. Indirect stakeholders include the owners of the buildings, as they may provide information about their building while not actively using or contributing to the app.

While anyone will be able to take advantage of the application, a special design consideration will be placed on understanding the ability of the user. Our ultimate goal is to provide accurate navigation for indoor spaces. Another goal for this project is to provide an adaptive application in order to better address the current disparity in the current application landscape.

As mentioned above, our design approach will place a particular focus on understanding the ability of the user. By designing an adaptive application, our group aims to assist all, regardless of ability, to understand their environment in an unknown building in order to safely and accurately arrive and depart from their desired destination. When the app is used, it first checks for any currently set accessibility mode in order to ensure compatibility with existing technologies a user may already be using. A user will have GPS active in order to accurately locate their positioning within a building. A user will also be able to input information relative to their location to better pinpoint their exact starting position. They will also be able to obtain relevant information regarding the building – this could include building hours, floors, etc.

From there, a user will also be able to input where they want to go within the building; this is to be accomplished by typing or speaking the location. The user is then be able to

receive step-by-step directions to navigate to their location. When receiving directions, the user is also able to manually go to the next step. A user can also go back and look back at previous steps. Users can also receive indicating cues when approaching the next step of navigation, such as visual, audio, or haptic feedback.

When beginning navigation, a user will also be given various choices in routes available. The user will be notified upon their arrival of their destination. Apart from navigation, a user can also be able to contribute information for the crowd-sourced aspect. A user can take a picture and then supply the relevant information in that picture. A user is able to download routes in advance, as well as able to view any previous routes they have taken. A user can also save commonly traveled locations to allow for faster, more accurate way-finding.

As shown in Figure [3] this description is our simplified idea of what our app should be able to do. Our conceptual model is the jumping point into the meat of our design process. After completing this step, we could start to approach specific design problems and considerations within the model. This process was a critical stepping stone in our design, and I think that we did our best to make sure that this conceptual model addressed our user needs accurately.

## Brainstorming and Ideation

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Now began the brainstorming and sketching phase of the design process. Our group had so many great ideas that we wanted to include in our design, so we started by sketching every single one of them. My sketches ranged from tangible ideas that I knew for sure we would include in our final design such as preference settings to alter the method of interaction with our app, to ridiculous ideas that I wasn't sure technology could even account for. Some of these far-fetched ideas included being able to take a picture of a staircase and the device reading how many sets of stairs were in it, as well as being able to take a picture of a map layout of a building and the device interpreting that data to provide a route. This process was a lot of fun, but was also difficult because I had to stretch my thinking outside the box. Without this process however, we would have never exhausted the potential of good ideas our group had from the beginning. This process was the least exemplary of our design approach as well. During this phase it was important to not be restricted or constrained, so we did not let our design approach hinder our ideas. It was not until the compromising phase of sketching that we really used our design approach to narrow our ideas down.

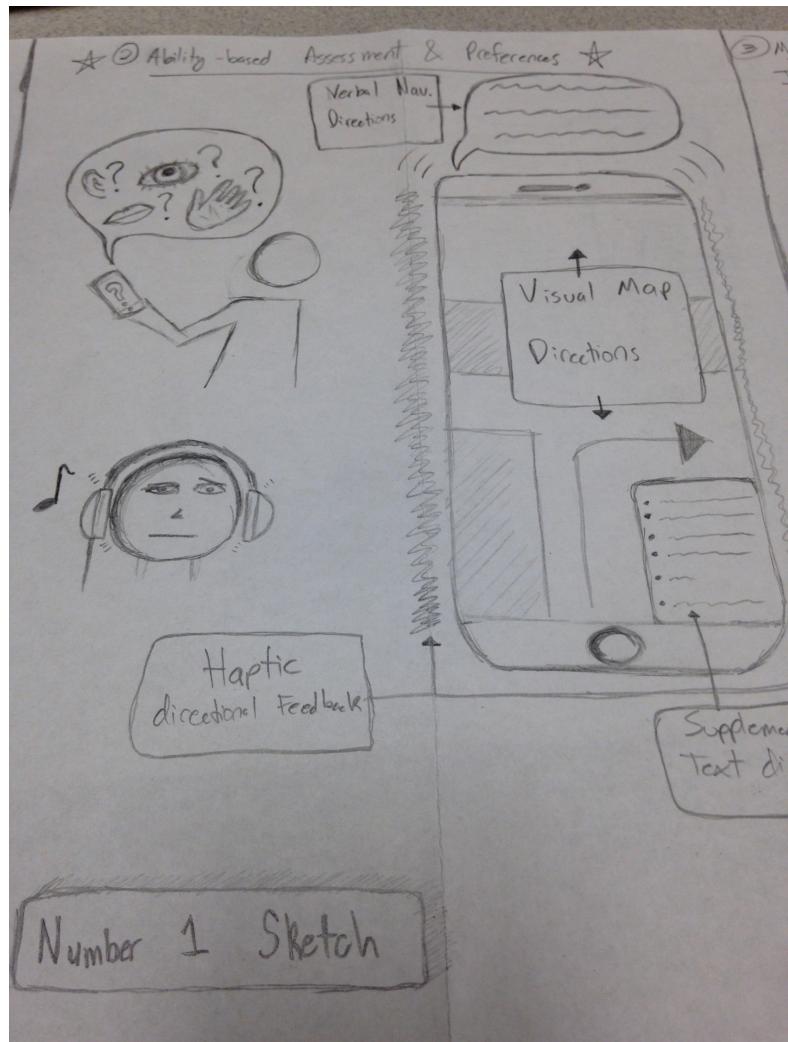


Figure [4] The second of my top 3 sketches, the Ability-Based Assessment and Preferences. This sketch ended up becoming the major unique aspect of app, and also the aspect that best exemplified our design approach.

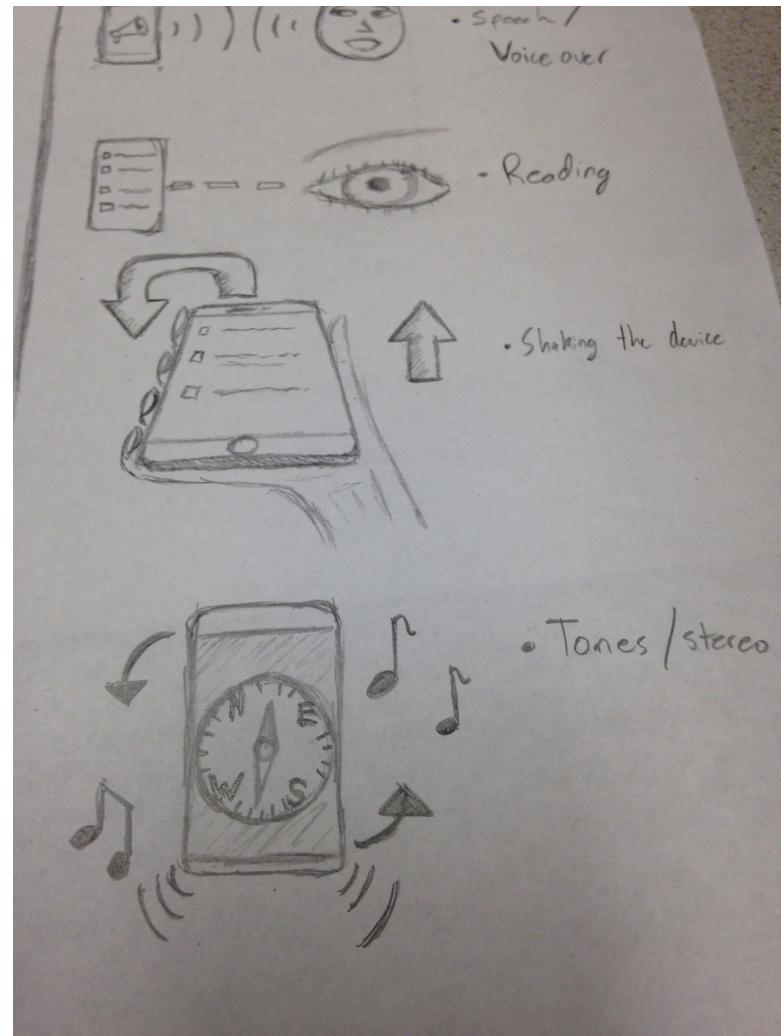


Figure [5] A more in depth sketch of what the Ability-Based Assessment actually consists of. Our initial thoughts were that it would include speech/audio, reading/text, shaking, and tone preferences.

The main focus of our design, the ability-based user assessment and preferences functions similar to a tutorial; at each screen, a user is able to pick the exact settings that they prefer to have on and they are able to leave other settings off. After discussing our sketches for a while we decided that a user should be given the option to customize all of the following settings: audio, visual, vibration, hand motion, text, and directional cues options. This collection of preferences were what we thought would best be able to take advantage of any user's abilities that they find help them interact with their mobile device. This idea is the core of our design, and best epitomizes ability-based design, and also what I am most proud of. Later on, I will discuss the details of our final design choices that supplement the assessment.



## Preliminary User Feedback

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At this point in the design process, we have come up with our critical design choice and are beginning to design the actual layout and interface of our app. We got the chance to meet with a new expert user, Laura, who was also very enthusiastic about our ideas and design. Not only did she support our ability-based assessment, but she gave us some helpful feedback about our design. She gave us the idea to include a pop-up confirmation screen for changes in preferences so as to avoid accidentally editing different settings. This idea stayed with us into our final prototype.

We also got to meet with our primary expert user again to see what he thought of our idea. We went into this interview with more questions and goals so that we could elicit good feedback and be more productive than in our first interview. As I prompted George with questions about the assessment, he was not shy to tell me every suggestion that he had. He suggested that we install "Help Hints" for every preference setting so that a user would be informed of what each setting is actually changing in the app. He also told us that we should add a feature to the 'get current location' aspect which would allow users to input information relative to their location to better help the app pinpoint their position. Both of these pieces of advice stuck with us into our final design because we wanted to ensure that we met our user's needs. This process was critical in narrowing down our ideas, ensuring we were meeting user needs, ensuring we were abiding to our design approach, and completing the overarching goal of the design project.

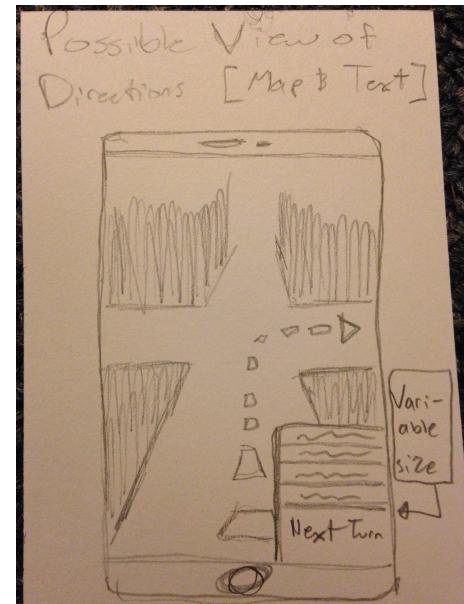
# Iterative Prototyping

Moving forward in the design process, we had ensured that our design ideas met user needs, accomplished our overall goal, and demonstrated our design approach. Now it was time to create the interface and screens of app on a mobile device. We accomplished this by paper prototyping first, followed by our high fidelity prototype. Paper prototyping was a difficult process for me. I didn't like sketching our final ideas, I wanted to just come up with the right idea first. I felt as though we were far enough into the design process that we had to start making decisive decisions about our design choices, and that there was no room for error. Looking back, this was the wrong way of thinking about the paper prototype. The paper prototype, as I now see it, is a way to get all of the prototyping ideas out of your head, and into a safe environment where they can either be edited or accepted. Figure [6] shows an example of a screen I was not very proud at the time, even though it was okay to make mistakes at this point still. Figure [7] on the other hand shows a paper prototype sketch that I wish our app could look like in our finished product. For the group paper prototype, I drew all of the screens personally and was the original sketcher and "idea-guy" for what they should include.



Figure [6] A paper prototype sketch of what the menu screen may look like, with navigation and settings buttons.

Figure [7] A paper prototype of what a navigation screen may look like, with optional text directions supplemented by a 3-D visual map of the building.



# User Testing and Evaluation

After the completion of our paper prototype, we got the chance to test it with another new expert user, Sheri. This is arguably the worst expert user session we had throughout the entire design process. We tried to go into the interview with the goal of discovering the faults in our paper prototype use case and where confusion arose. As we went through the prototype however, Sheri was very compliant and seemed to follow all of our instructions well, if not too well. Either we were being too commanding in how to interact with the paper prototype, or she actually didn't have any confusion going through the process. In either case, these results did not elicit good feedback because we did not accomplish our goal of finding out where the faults were in our design. Nonetheless, she claimed to like our design choices and said that our flow of ideas was understandable and would help her accomplish the overall goal of navigating from point A to point B in an unknown building.

So even though this interview process did not quite go as planned, we still got reassurance from another expert user that our design was satisfactory and on track with our expert user needs. This process was also thought provoking because it forced us to think about the next steps of the design process on our own and without feedback other than George's. George's feedback was not as helpful as we had planned at this stage either, however, our interview with him still gave us some smaller less important ideas to incorporate into our final design. Figure [8] shows us working through the paper prototype of another group so that we could compare our design choices with one another.

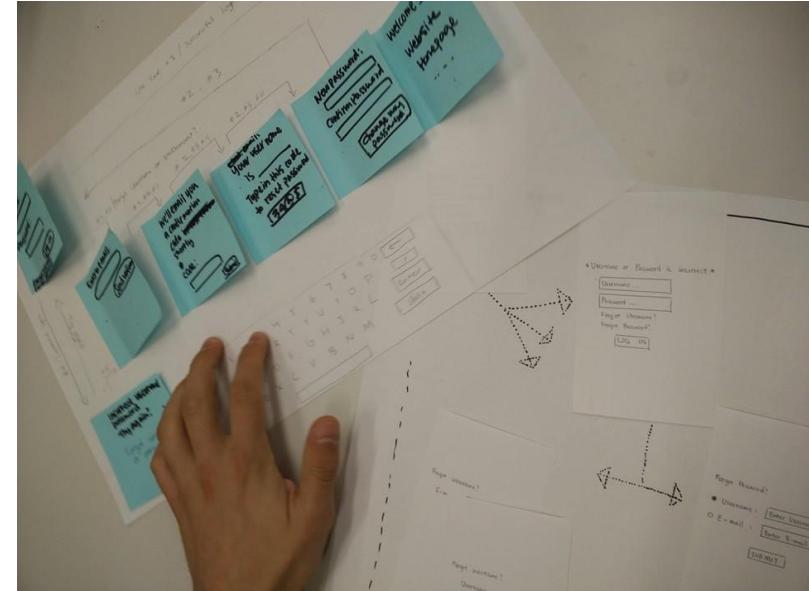


Figure [8] Other groups chose to create their paper prototype with sticky notes on a big sheet of paper, whereas we created multiple screens represented on notecards.



Figure [9] George and I discussing our initial hi-fi prototype. To my left, Vincent took notes on his computer while I was the facilitator; I explained to George what we wanted him to try and accomplish in our prototype.

Figure [9] shows George and I working through the first rendition of our hi-fi prototype. This prototype was by no means finished, but we still had done a lot of work that we could go over with George. George thought that the flow of app made a lot of sense, and that we implemented the ability-based assessment well. He said that this aspect would help him with navigation the most, so we felt accomplished that we had continued to exemplify ability-based design into our prototype. He gave us a couple of pointers about wording and phrasing to change as well as some other ideas which were really neat, but unfortunately we did not have enough time to implement. This was another main difficulty I faced in this process; being able to cut ideas out of the design even though they seem interesting and helpful. One last difficulty we faced at this stage was simulating Voiceover with our app. Since George always uses Voiceover to interact with his device, it was next to impossible for him to interact with our app because Axure (our prototyping tool) does not support Voiceover in the way that George needs it to. Marcus, a group member, functioned as the computer and Voiceover in this situation and did a good job mimicking the type of interaction George might have with the device. This final user feedback session cemented our last touches to make with the prototype and gave us confidence going into the last stages of design.

# High Fidelity Prototype

Creating the high fidelity prototype was the final stage of our design process. We decided to use Axure as our prototyping tool because we could access it for free, a group member had previous experience with it, and it is regarded as the industry standard for prototyping a mobile application. Although difficult to use at first, Axure ended up being perfect for representing our app the way we wanted to; professional, functional, mobile, and aesthetically pleasing. Kevin, a group member, tackled the “programming” aspects of the prototype the most. I helped him through parts of this by writing the proper wording for screens and descriptions, advising him where to place certain information on screens, and draw layouts of navigation panels. Kevin’s contributions to the actual prototype were crucial, however without my help and rationales for each part of the prototype it would not be complete.

As a group, Bright Futures strived to divide work evenly and fairly so that we could all contribute to the design equally. For the high fidelity prototype, this was the hardest to divide work evenly. Axure did not allow us to collaborate like we could on every other project previously. Although we had one person mainly in charge of the prototype, we all did our fair share in other work which supported the prototype and final design choices. The prototype was also the hardest aspect of the design process because it was literally the culmination of all of the work we have done thus far, put into one working design.

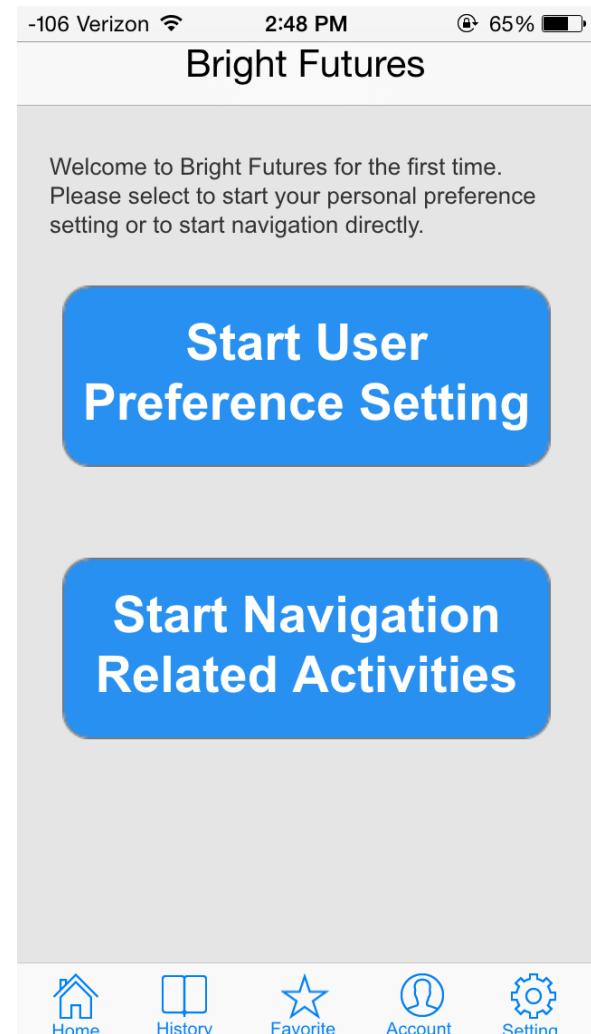


Figure [9] Menu screen of the high fidelity prototype. The first button, ‘Start User Preference Setting’ is used to simulate the first time a user opens the app and begins the assessment.

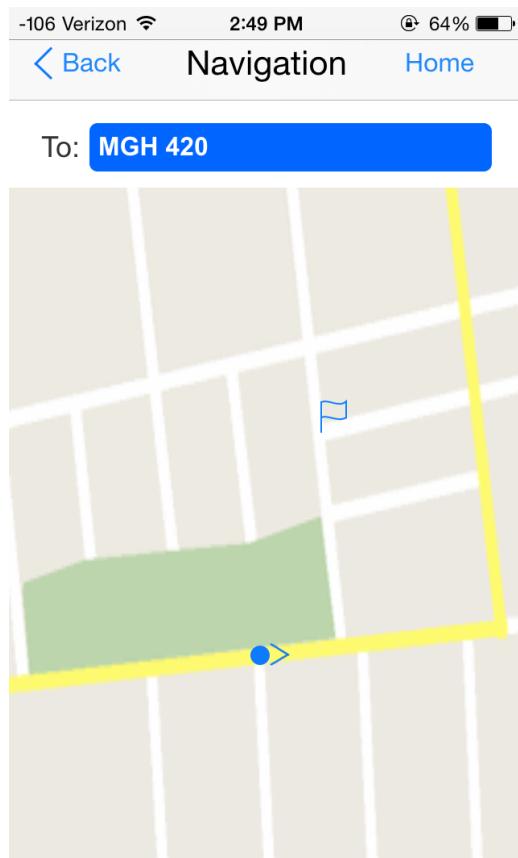


Figure [10] An example of what a panel of navigation could look like. User is presented with their location, destination, option to return to home screen, next step of navigation, and visual map.

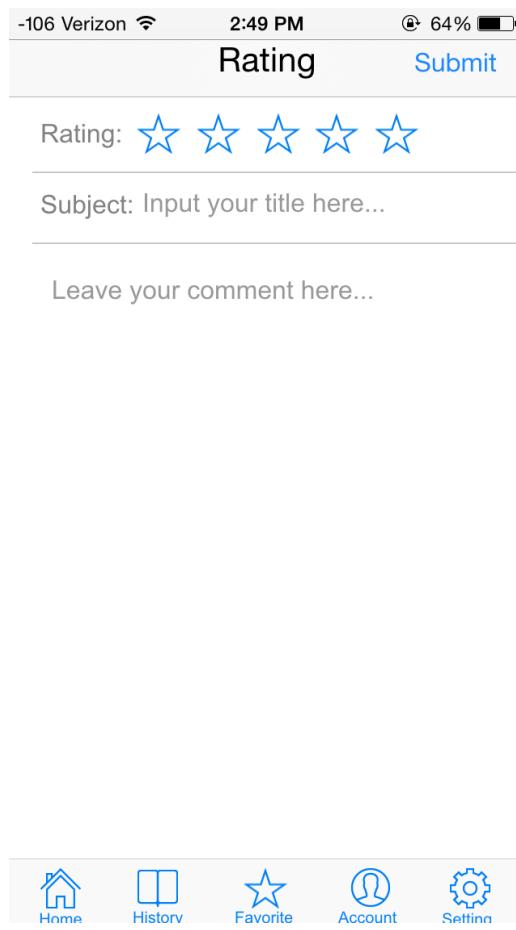
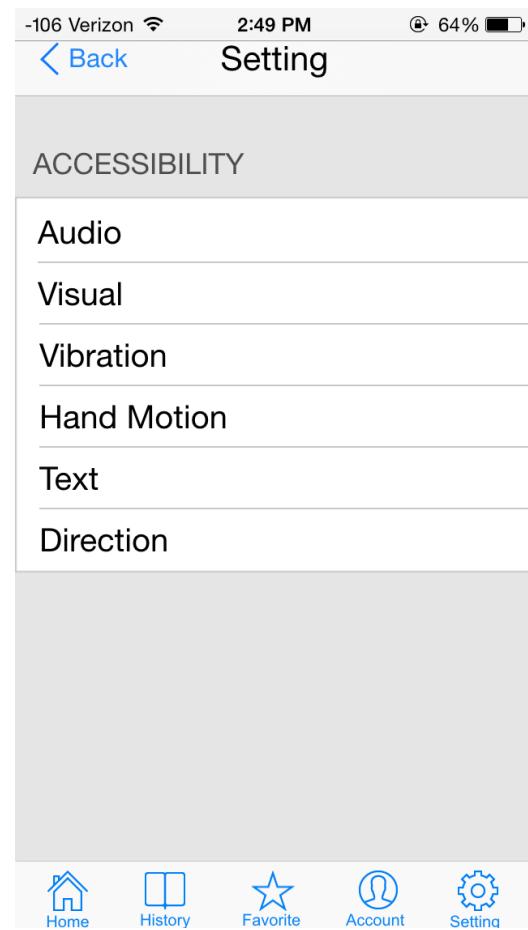


Figure [11] Rating screen where a user can submit feedback about a route and contribute to the crowd-sourced aspect.  
Figure [12] Setting screen with all preferences displayed. Both [9, 11 & 12] feature the NavBar at the bottom of the screen which allows users for easy navigation within the app.



## Conclusion

Looking back on the entire design process, I am very proud of our group's work. We worked very well as a team from the very beginning of the project. We were able to meet every weekend, if not more frequently, and delegate the workload evenly so that we could efficiently get projects done well and on time. We faced our challenges throughout the project, and overcame them in different ways. I would like to consider myself the group leader, in that I prompted and planned our group meetings and times throughout the project. However, everyone contributed their fair share. This is also one of the first times in my academic career I can say the previous statement honestly and without remorse. For that I am proud.

