

HCI Project Milestone 3
Recitation 101

Team ED
Eric Prologo
Daniel Kim

Step 1: Running User Tests

Step 1:

Welcome to our project. For this user test you will be working with our product, an application that has the ability to track and manage inventory for a store by controlling a robot. We created this application with the following goals in mind: to allow employees (the users) to have more time with customers by avoiding tedious tasks pertaining to inventory, to give users efficient and convenient use of our app, to have our app have a quick learning curve for users, and give users complete control over their robot assisting them with inventory management. Overall the purpose of this test is to gather feedback on our application in order to make it more effective and cater the app for our intended users.

During the user test, you will be asked to add and fetch items from the stores inventory, you will be asked to navigate to track modifications made in the past in your inventory, you will be asked to navigate to the robot control screen and properly read the data from this screen, power on/off the robot, read any robot related warnings, and adjust battery percentage to automatically go to charging station from the robot settings, and finally you will be asked to navigate to the settings of the app and enter your employee id, assigned robot id, your desired font size, and your desired background color for the application.

Once you have performed these tasks, we will ask you a series of questions to get a better understanding of how you felt working with our application. These questions include, was it easy to navigate our app? Did our buttons map to their intended outcomes? Were there any points in the application where you felt stuck or confused? Was it easy to fix any incorrect input (if there was any)? Do you feel that you had sufficient feedback on the robot and control of the robot once on the robot screen? Did any tasks in our application feel tedious or feel like there were too many screens/clicks to navigate to the desired outcome? Are there any features you would like to see more of or elements on our app pages you would have liked to have more of? These questions will target specific unknowns we are looking to understand better within our application.

Step 2:

Participant #1:

- Time it took to go through tasks
 - Total time
 - 1 minute 4 seconds
 - Task 1
 - 15 seconds
 - Task 2
 - 3 seconds
 - Task 3
 - 8 seconds
 - Task 4
 - 8 seconds
 - Task 5
 - 20 seconds
 - Task 6
 - 10 seconds
- Notes
 - The user found the labels above some icons to be very helpful when navigating the app
 - The user liked to organization of the prototype and felt it was easy to read the data being displayed
 - User did not have any trouble getting to screens but said that they were a little confused on the “x” button to go back rather than a back arrow
 - The user also would have liked for there to be more options on the add and fetch tasks, such as maybe making one item a priority to fetch if it is high priority.
 - Did not like how the entire app shut down when you wanted to shut off your robot
- High level feedback
 - Add a high priority button to the inventory modification screen
 - When powering off the robot do not also power off the app

Participant #2:

- Time it took to go through three tasks
 - Total time: 2 minutes 16 seconds
 - Task 1
 - 19 seconds
 - Task 2
 - 7 seconds

- Task 3
 - 12 seconds
- Task 4
 - 13 seconds
- Task 5
 - 14 seconds
- Task 6
 - 11 seconds
- Notes
 - The user took their time to read button labels and understand each screen so they took a little longer than expected.
 - Seemed like the user didn't struggle much however
 - The user was able to complete the tasks smoothly so we are on the right track of making the application easy to use, but, we could try to add features that could speed up understanding each screen (maybe make buttons that are used more often bigger so that the user tracks to the quicker).
- High level feedback
 - Main menu looks good and has good labels.
 - Liked that there was a history log of inventory modifications
 - Remove robot off button from main screen so that user does not accidentally shut down their robot
 - The user liked the big icons for tasks that are performed more frequently than others so it was easy to see and navigate

Participant #3:

- Time it took to go through three tasks
 - Total time
 - 1 minute 15 seconds
 - Task 1
 - 12 seconds
 - Task 2
 - 4 seconds
 - Task 3
 - 10 seconds
 - Task 4
 - 11 seconds
 - Task 5
 - 21 seconds
 - Task 6
 - 12 seconds

- Notes
 - The user navigated through the prototype quicker than expected
 - The user seemed to be familiar with interfaces like ours and was able to efficiently perform each task in the prototype
 - The only time the user seemed to slow down was when modifying the settings page and robot settings due to thinking about what they wanted to do on each page (only a slight delay but this is expected from these pages)
- High level feedback
 - Felt that the back button on the final inventory modification page should be located in the same position as the other screens just to help users find it slightly quicker.
 - Make the add and subtract buttons bigger because they are used more often than the other buttons on the home screen
 - Felt like the buttons such as power, settings, and back buttons mapped well to their functions and were appropriately located in the app

Step 3:

Our app for this project is an inventory control app that links to a robot in order to help users manage inventory in store without actually having to perform the managing tasks themselves. Our app has the ability to give users full control over their assigned robot. Users will be able to command this robot to fetch from the inventory and add items to the inventory. Our app also gives users customizability through our settings page as well as real-time information on their robot to ensure that it is functioning properly. The overall purpose of this application is to allow users to have more time to spend interacting with customers and selling products rather than being stuck wasting time with tedious tasks that pertain to organizing and managing inventory.

For our current prototype, we are using Figma to produce an electronic and interactive prototype design. At the moment we have six tasks that can be performed in our prototype. First, users can choose whether to fetch (take out) or add items from REI from or to the store's inventory. Second, users must navigate to our screen that displays the history of adding or fetching items to or from the inventory. Next, we have the task of navigating to the robot management screen and effectively reading the data output on the users assigned robot. On this screen we have the three tasks of, powering on/off the robot, reading any robot related warnings, and adjusting the robot settings. Lastly, we have the task of navigating to the app settings and assigning the user id to the app (for login), assigning the robot id to the app, and then customizing the users preferred background color and font size. Throughout all these tasks the user also has the option to turn off the app and also turn on the app. Our prototype has some connections to the interviews we conducted previously because we were trying to develop a prototype that would meet the needs of our intended users. Some new features we are testing for this assignment include, the readability of the app (adding some text instructions to our prototype), the task of adjusting robot settings, and the task of having users see their inventory

modification history to better understand trends with items (which items are more popular than others/other trends to better meet customer needs).

Design Rationale

Participant Feedback	Influence on Design
Inventory: <ul style="list-style-type: none">• Have to check inventory frequently• Sometimes there is inaccurate inventory count	<ul style="list-style-type: none">• Have the inventory count easily accessible with not many button clicks on our app• Link the inventory count to the robots to avoid human error
Robots: <ul style="list-style-type: none">• Lack of trust with robots• Could need maintenance without people knowing	<ul style="list-style-type: none">• Give the user full control over the robots and their settings• Can turn off the robot at any moment• Have alerts on the app so user knows when robots need maintenance
Software/Inventory Management App: <ul style="list-style-type: none">• App is complex at times• Sometimes the software displays inaccurate inventory• The mapping of the app seems hard to navigate	<ul style="list-style-type: none">• The app has few button clicks so it is easy to navigate different tasks• Again link the inventory counting to the robots to avoid human error (also inventory will update in real-time)• Make sure that our buttons map well to the tasks they perform to help with the learning curve of our app

For our study, we mainly looked for if our current prototype was efficient for users to complete tasks. Since we're doing digital prototype testing, we were able to depict the problems that most people had. We recruited three participants, and they're all from our friends/family group since it was hard to find unplanned/random participants during quarantine. To add on, it was fairly easy to find the participants, since we only needed to send them text/email. Two of the participants were students (one attending college and one attending high school), and the last participant is currently in the workforce at Microsoft and frequently works with technology. We made sure they had to think aloud as they were doing the prototype testing. We believe that the fact that we did high-fidelity digital prototyping, made this experiment unique especially for the participants. They mentioned that they did not expect anything like a digital prototype since they thought they were going to take surveys or written tests.

Overall, the participants were able to complete all six tasks but we noticed a couple of problems as they were doing the tasks. One out of the three participants took longer than expected on the prototype due to reading all of the button labels and trying to understand every page thoroughly. We noticed that they maybe had too much info to take in on some pages which caused them to slow down when using the prototype. To exemplify, the participant had to slow down and read all the information on the robot screen and settings screen which caused them to take longer on these tasks than intended. We also observed that all the participants were struggling to complete the settings tasks because they could not enter text into our prototype (we had to verbally explain that this feature was not implemented when they came across this issue).

From the last version of our test, we received high level feedback from the participants that made us realize we had to get them fixed for our next prototype. We got some criticisms about our main page. They mentioned that we simply need more descriptions in the main page. To exemplify, the main screen is too empty and there were only icons, which made them confused about the actions that each icon did. In order to solve that problem, we made sure that we labeled the icons with descriptions, so that the participants would not get confused (see Appendices 2B). To add on, one of the participants from the last test mentioned that while doing fetch robot inventory tasks, some of the instructions in the application weren't clear especially when it asks "How many you want to add or remove inventory?." One claimed that the question from that section and the task instructions did not match. So, we implemented more clear instructions to match our task such as changing the question to "Enter Value to Add To or Fetch From Inventory" (see Appendices 2B). To further develop our prototype, we implemented the warning section in the robot control so that we would have more tasks for the participants, and gain more trust toward the robot (see Appendices 2B). Lastly, the participants from the previous test implied that the robot control section needs more control actions to fit the page, and it looked off with just 3 actions in a square format. Because of this feedback, we decided to add the robot setting icon to even out the spacing and modified our task which is to configure the battery percentage in the robot setting (see Appendices 2B).

From our current test, we also received some high level feedback that has given us ideas of what to fix in the future. One major piece of feedback we received was that there did not seem to be any distinguishing features between buttons that were more commonly used or performed important tasks compared to others. This was said to make it take a little longer to find buttons when they should be relatively easy to find. In order to fix this issue, in the future we want to highlight important buttons in our prototype or make them bigger so that they stand out to the user. This way the user is drawn towards these buttons/tasks and does not have to read the entire page to understand how to navigate to a specific and important task.

For our next revision design, it is important that we highlight/make bigger the tasks that are more often performed than others so that users do not feel overwhelmed when reading screens to perform tasks/understand our app. We must also add in the initial instructions of our prototype that the user cannot enter in text to our prototype, by doing this we will avoid confusion from the user when they are unable to enter text into mock text boxes for our

prototype. Lastly, we want to make sure that when a user is turning on or off their robot, they do not do this action by accident, and it does not turn off the app but rather gives a notification to the user that the robot is off. This is because there could be circumstances where the user wants the robot off but still wants to use their app. Overall, it is important that we highlight buttons that are more often clicked and tasks that are more often performed than others. By drawing users' attention to these items, we can allow users to more quickly perform important tasks and understand the important features of our prototype.

From our user tests we learned many things. One main takeaway and surprise from these tests was that features and tasks that may seem obvious to see or perform to us, the creators, are not always so easily seen by participants. What we mean by this is that some users have more difficulty than we realized seeing the important buttons on our screens to perform tasks. To fix this, we will need to highlight these buttons better. We also learned how to professionally conduct user tests where we do not walk the user through different tasks but rather let them fail so we can gather meaningful data. Something that we think we could do differently next time is encourage more thinking aloud walkthrough when participants are using our prototype. Even though we told the participants to do this in the beginning they were not always consistent with talking through their thought processes while doing tasks in our prototype.

Step 2: Running Analysis of Our Results

Quantitative Analysis

- Since we implemented more tasks from our last prototype, we used the overlapping tasks from both prototypes to compare our analysis.
- T-test on overlapping tasks in milestone 2 (task 1, 2, 3) and milestone 3 (task 1, 3, 6)

Milestone and Task	Milestone 2 Prototype Average Times	Milestone 3 Prototype Average Times	Significant with T-test?
M2 Task 1 M3 Task 1	62 seconds	15.33 seconds	Not significant
M2 Task 2 M3 Task 3	5 seconds	10 seconds	Not significant
M2 Task 3 M3 Task 6	63.66 seconds	8.25 seconds	Not significant
Total Time	130.66 seconds	91.66 seconds	Not significant

Qualitative Analysis

We believe that the changes from our previous test definitely helped a lot. All of the participants from this prototype seemed to finish the tasks faster than the previous prototype. Our averages from this test were lower than the last test, except for the second overlapping task (M2 Task 2 and M3 Task 3). Since we added more tasks to this prototype, the participants seemed to finish the second overlapping task slower. In addition, since there is more information to take in for this prototype, we believe that this resulted with a slower average for M3 Task 3. Overall, the modification for this prototype made significantly faster for finishing all of the tasks.

Previous Prototype Link

<https://www.figma.com/file/hLgP85UlyUfxbNNnm892xE/HCI-Project>

Current Prototype Link

<https://www.figma.com/file/k08N0roQ8t7eY9Q3s0BaSf/HCI-Updated-Prototype?node-id=0%3A1>

Participation Report

For this group project we both contributed evenly to every milestone and Figma. With working through the prototype, we both were working simultaneously on Discord calls to ensure that we were on the same page and allowing the prototype to mesh together properly while working in Google Docs. We also texted through our phones to set up meetings, and talk about the project. We used a similar work style for our milestones where we would call on Discord and then work through the milestones together to ensure that all of our work was getting done and at a high quality. In terms of working as a group, despite some trouble getting each other's contact information at the very start of this project, we both worked together very well. We communicated well throughout the project and both held up our responsibilities in the project to ensure that all of the work was getting done. Reflecting back on this project, it was a great project that taught many interesting and useful skills, and having a great group to work through this project made it an even better experience.

Presentation Slides Link

<https://docs.google.com/presentation/d/1Z2hzvtxYHBIkgGsnDzYLNAFPHPpTKqVwPKPCylkd10/edit?usp=sharing>

Presentation Video Link

https://drive.google.com/file/d/1Jg034trMTOe89CkOdCNTbgnPIgNqX_d8/view?usp=sharing

Appendices

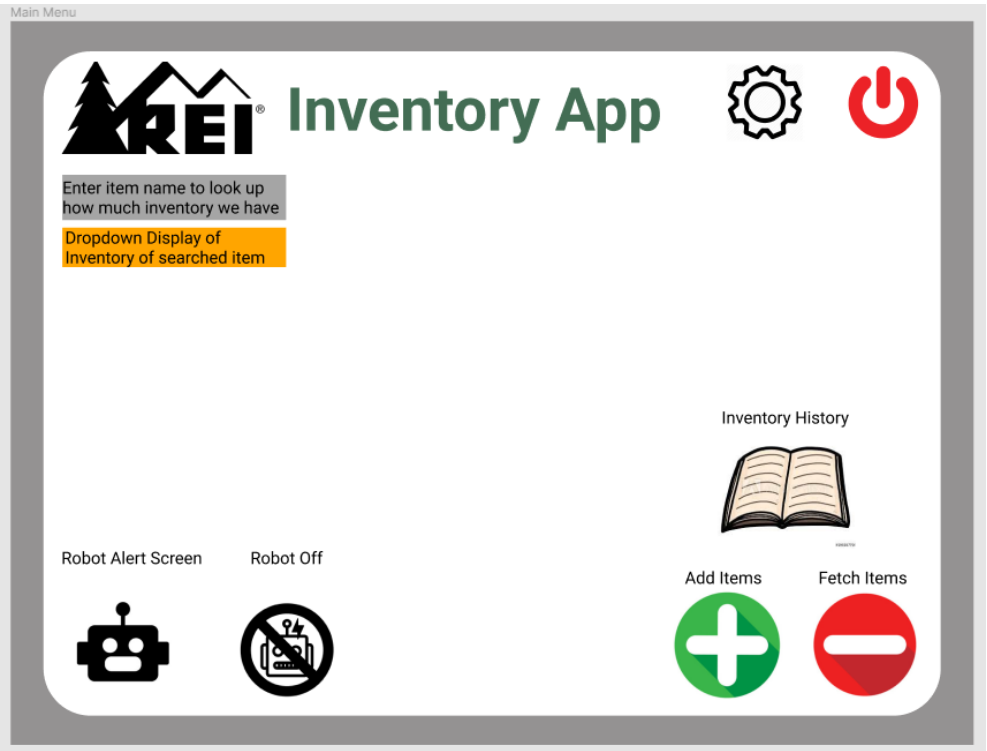
1A. Study Script

Welcome to our project. For this user test you will be working with our product, an application that has the ability to track and manage inventory for a store by controlling a robot. We created this application with the following goals in mind: to allow employees (the users) to have more time with customers by avoiding tedious tasks pertaining to inventory, to give users efficient and convenient use of our app, to have our app have a quick learning curve for users, and give users complete control over their robot assisting them with inventory management. Overall the purpose of this test is to gather feedback on our application in order to make it more effective and cater the app for our intended users.

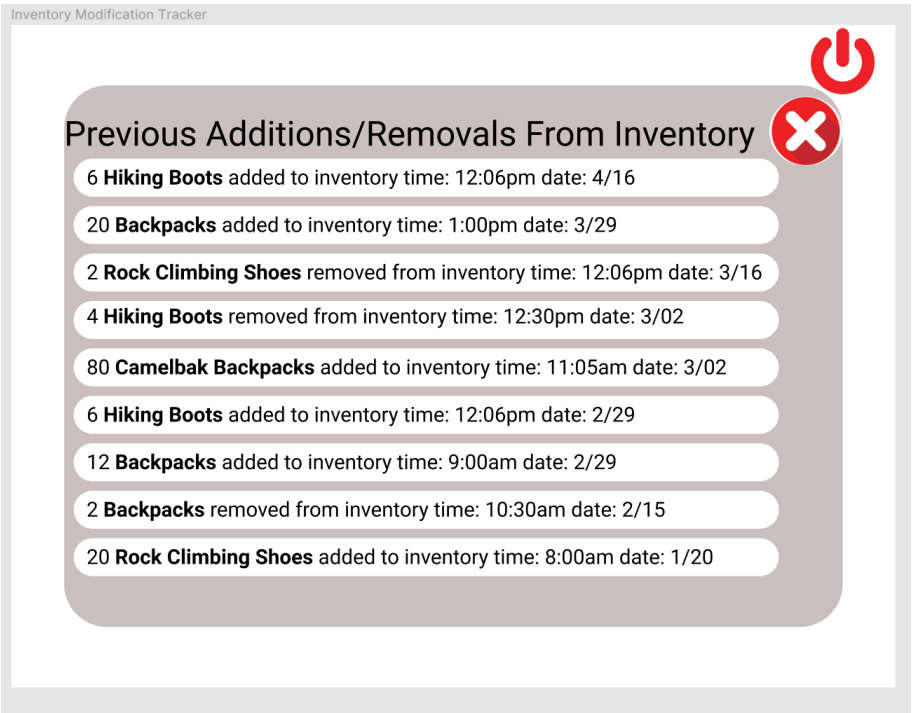
During the user test, you will be asked to add and fetch items from the stores inventory, you will be asked to navigate to track modifications made in the past in your inventory, you will be asked to navigate to the robot control screen and properly read the data from this screen, power on/off the robot, read any robot related warnings, and adjust the robot settings, and finally you will be asked to navigate to the settings of the app and enter your employee id, assigned robot id, your desired font size, and your desired background color for the application.

Once you have performed these tasks, we will ask you a series of questions to get a better understanding of how you felt working with our application. These questions include, was it easy to navigate our app? Did our buttons map to their intended outcomes? Were there any points in the application where you felt stuck or confused? Was it easy to fix any incorrect input (if there was any)? Do you feel that you had sufficient feedback on the robot and control of the robot once on the robot screen? Did any tasks in our application feel tedious or feel like there were too many screens/clicks to navigate to the desired outcome? Are there any features you would like to see more of or elements on our app pages you would have liked to have more of? These questions will target specific unknowns we are looking to understand better within our application.

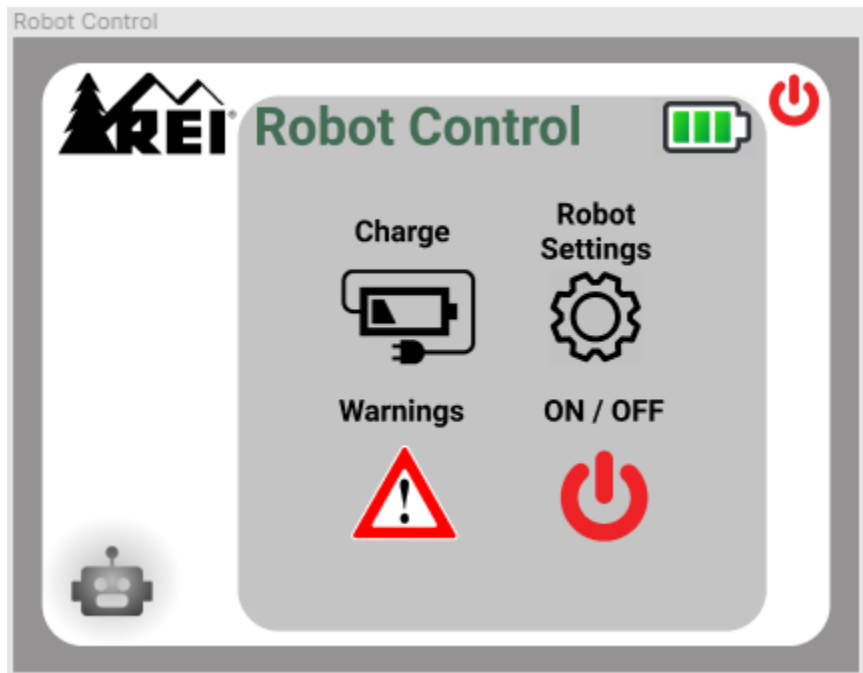
2B. Added Features From Milestone 2:
Main page



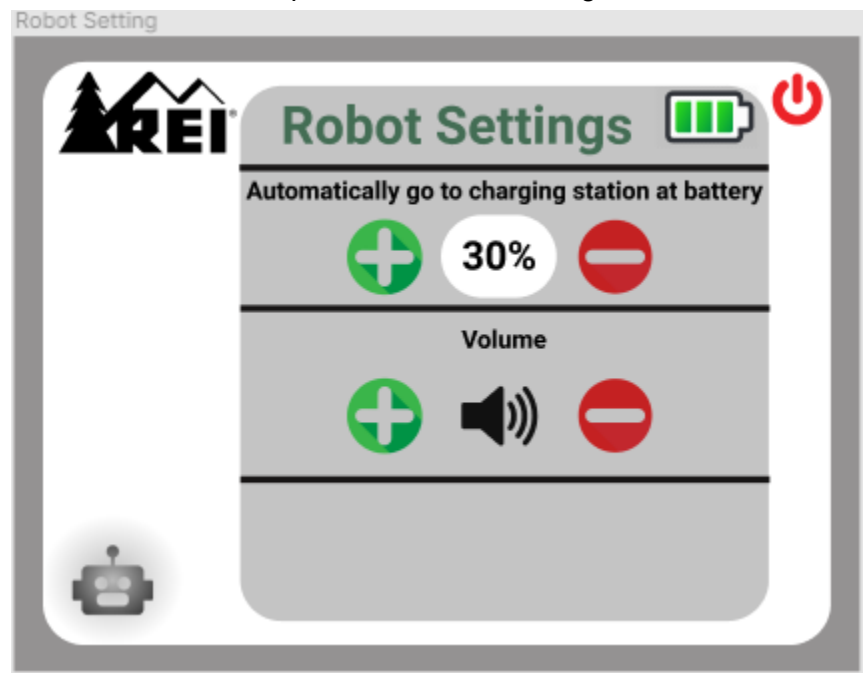
Inventory History Page



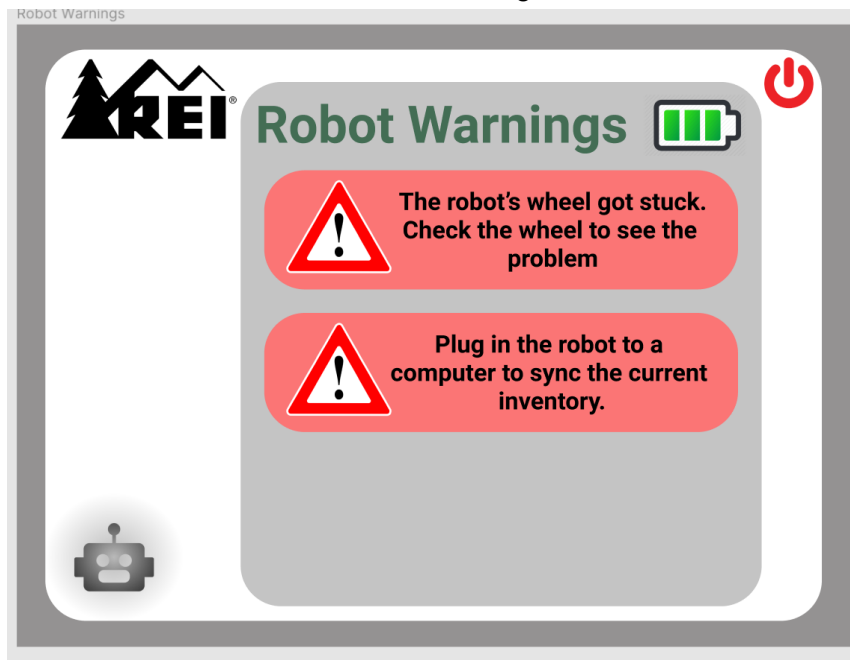
Implemented robot setting



Implemented robot setting 2



Robot Warning



More clear instructions

